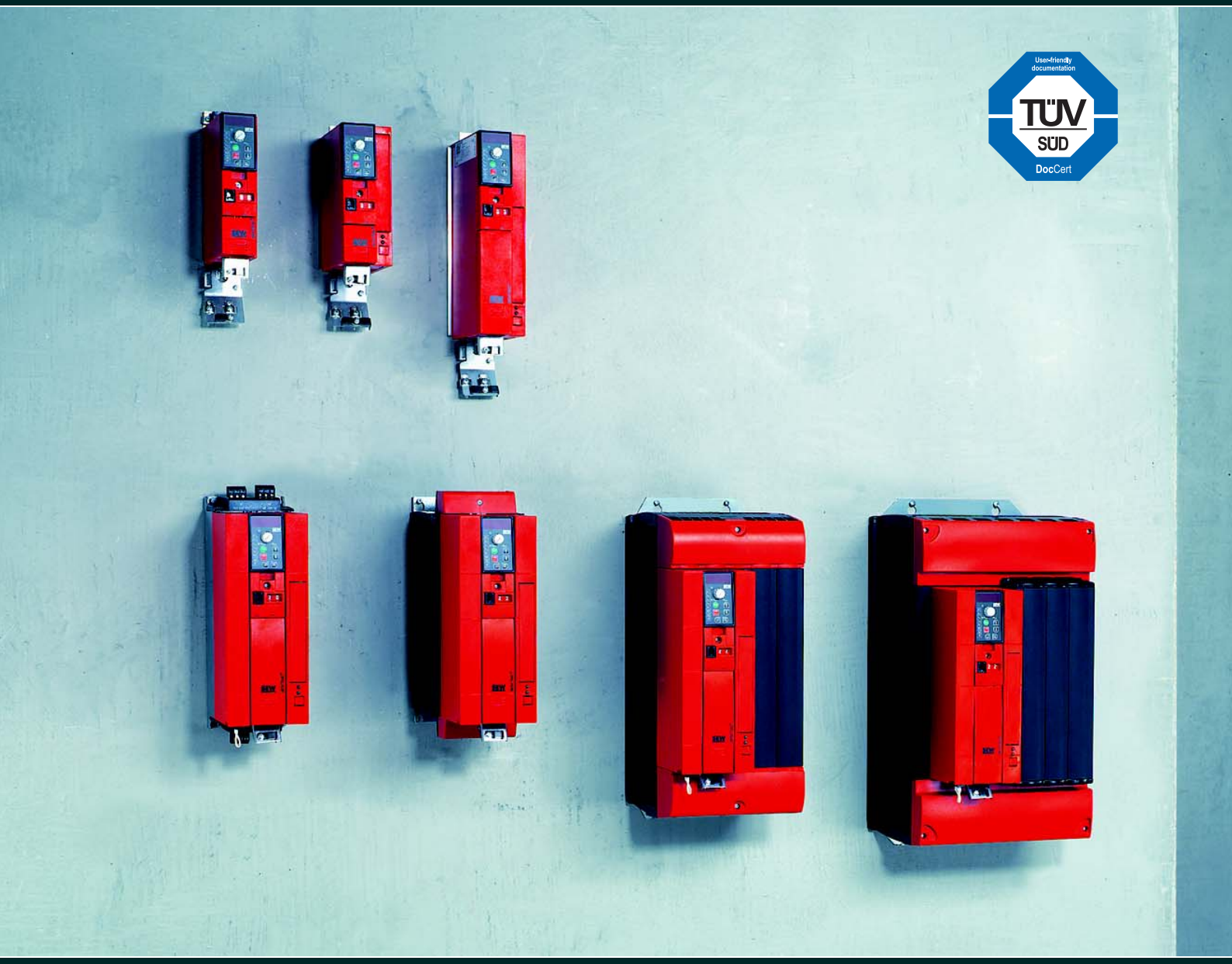
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System Manual



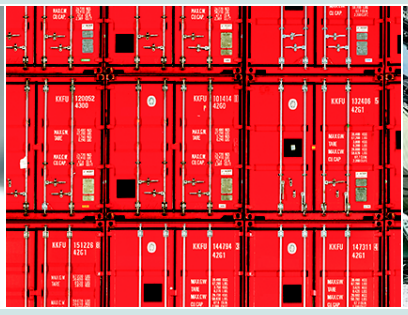
MOVITRAC® B

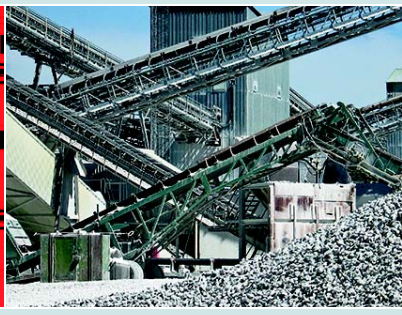
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Contents

1 System description MOVITRAC® B 10
1.1 MOVITRAC® B system overview 10
1.2 The units at a glance 11
1.3 Functions / features 12
1.3.1 Standard functions and device features 12
1.3.2 Optional communication / operation 14
1.3.3 Energy efficiency 15
1.3.4 Functional safety 15
1.3.5 Additional functions, technology version 17
1.3.6 Application modules 17
1.4 MOVITOOLS® MotionStudio engineering software 18
1.4.1 Tasks 18
1.4.2 Establishing communication with the units 18
1.4.3 Executing functions with the units 18
1.4.4 Technical support 19
1.4.5 Online help 19
1.4.6 SCOPE 19
2 Technical data 20
2.1 Technical data of the basic unit 20
2.1.1 CE marking, UL approval and C-Tick 20
2.1.2 General technical data 21
2.1.3 Technical data of MOVITRAC® B, 3 × AC 400 V 23
2.1.4 Technical data of MOVITRAC® B, 3 × AC 230 V 32
2.1.5 Technical data of MOVITRAC® B, 1 × AC 230 V 40
2.1.6 MOVITRAC® B electronics data 44
2.1.7 MOVITRAC® B electronics data for functional safety 45
2.2 Technical data for accessories and options 46
2.2.1 Keypads 46
2.2.2 Interface adapters 52
2.2.3 Front modules 56
2.2.4 Fieldbus connection 64
2.2.5 MOVI-PLC controller® 74
2.2.6 Switched-mode power supply UWU52A 80
2.2.7 Regenerative power supply 81
2.2.8 FHS11B/12B/13B support rail mounting 88
2.2.9 Built-in encoder EI7C connection 90
2.3 Technical data of braking resistors, chokes and filters 91
2.3.1 Braking resistors 91
2.3.2 Line chokes ND 102
2.3.3 NF line filters 105
2.3.4 ULF11A folding ferrites 107
2.3.5 HD output chokes 108
2.3.6 HF... output filters 111
2.3.7 EMC module FKE12B / FKE13B 115

3 Project planning 117
3.1 Schematic sequence 117
3.2 Description of applications 118
3.2.1 Project planning for trolleys 118
3.2.2 Project planning for hoists 118
3.3 Basic recommendations for selecting motors/inverters 119
3.3.1 Speed-torque characteristic curve 119
3.3.2 Motor selection 120
3.3.3 Overload capacity 122
3.3.4 Load capacity of the units at low output frequencies 123
3.4 Selecting the braking resistor 124
3.4.1 Load capacity of PTC braking resistors 125
3.4.2 Load capacity flat design, wire resistors, grid resistors 126
3.5 Electromagnetic compatibility (EMC) 128
3.5.1 Interference immunity 129
3.5.2 Interference emission 129
3.5.3 Connection 129
3.5.4 IT systems 130
3.5.5 Inverter-related earth-leakage currents 130
3.6 Mains and motor connection 131
3.6.1 Permitted voltage supply systems 131
3.6.2 Line contactors and line fuses 131
3.6.3 Connecting AC brakemotors 133
3.6.4 Multi-motor drive / group drive 133
3.6.5 External voltage supply DC 24 V 135
3.6.6 Line protection and core cross section 137
3.6.7 Motor cable length 140
3.6.8 Voltage drop 141
3.7 Priority of the operating states and interrelation between control signals 142
3.7.1 Priority of operating states 142
3.7.2 Interrelation between control signals 142
3.8 Project planning for explosion-proof AC asynchronous motors of category 2 143
3.9 Application examples 144
3.9.1 External setpoint potentiometer 144
3.9.2 Setpoint value processing 144
3.9.3 Speed-controlled agitator 146
3.9.4 Positioning a trolley 147
3.9.5 PI controller 149
3.10 HF output filters 149
3.10.1 Important notes 149
3.10.2 Installation, connection and operation 150
3.10.3 VDC link connection 151



3.11 Electronics cables and signal generation ... 154
3.11.1 Cable type ... 154
3.11.2 0 V cables ... 154
3.11.3 Coupling relays ... 154
3.12 PI controller ... 154
3.12.1 Parameterization ... 156
3.12.2 Setpoint selection ... 156
3.12.3 Actual value detection ... 157
3.12.4 Reference signal ... 158
3.12.5 Inverter control ... 158
3.13 Options for standard applications ... 159

4 Project planning – additional functions ... 160
4.1 Master/slave connection ... 160
4.2 Simple positioning application module ... 160
4.3 Parameter set switchover ... 161
4.4 IPOS® ... 162
4.4.1 Description ... 162
4.4.2 Characteristics ... 162
4.5 Energy efficiency ... 163

5 General information ... 164
5.1 About this documentation ... 164
5.2 Structure of the safety notes ... 164
5.2.1 Meaning of the signal words ... 164
5.2.2 Structure of the section-related safety notes ... 164
5.2.3 Structure of the embedded safety notes ... 164
5.3 Rights to claim under limited warranty ... 165
5.4 Exclusion of liability ... 165
5.5 Copyright ... 165
5.6 Product names and trademarks ... 165

6 Safety Notes ... 166
6.1 Preliminary information ... 166
6.2 General information ... 166
6.3 Target group ... 167
6.4 Designated use ... 167
6.4.1 Safety functions ... 168
6.5 Transport/storage ... 168
6.6 Installation ... 169
6.7 Electrical connection ... 169
6.8 Safe disconnection ... 169
6.9 Operation ... 170
6.10 Unit temperature ... 170

7 Unit structure 171
7.1 Type designation 171
7.2 Nameplate 171
7.3 Scope of delivery 172
7.4 Sizes 0XS / 0S / 0L 173
7.5 Sizes 1 / 2S / 2 174
7.6 Size 3 175
7.7 Sizes 4 / 5 176
8 Installation 177
8.1 Installation notes for basic unit – mechanical aspects 177
8.1.1 Minimum clearance and mounting position 177
8.2 Installation notes for basic unit – electrical aspects 178
8.2.1 Recommended tools 178
8.2.2 UL-compliant installation 178
8.2.3 EMC-compliant installation 180
8.2.4 Shield terminals 180
8.2.5 Wiring diagram 185
8.2.6 Requirements for cold plate installation – size 0 only 185
8.2.7 Deactivating the EMC capacitors – size 0 only 186
8.2.8 Separate cable ducts 187
8.2.9 Operation on IT systems 187
8.2.10 Utilization category of contactors 188
8.2.11 Required cross sections 188
8.2.12 Cable lengths for individual drives 188
8.2.13 Unit output 188
8.2.14 Switched inductances 188
8.2.15 PE supply system connection according to EN 61800-5-1 189
8.2.16 Interference emission 189
8.2.17 Digital outputs 189
8.3 Installing accessories and options – mechanical aspects 190
8.3.1 Attaching the front modules 190
8.3.2 PTC braking resistors BW1 / BW3 with FKB10B 191
8.3.3 Flat-design resistors with FKB11B / FKB12B / FKB13B and FHS11B / FHS12B / FHS13B 192



8.4 Installing accessories and options – electrical aspects 193
8.4.1 Braking resistor connection 193
8.4.2 Connecting braking resistor BW..-P/BW..-T/BW.. to X3/X2 193
8.4.3 Braking resistor installation 194
8.4.4 ND line choke 194
8.4.5 NF line filters 194
8.4.6 ULF11A folding ferrites 195
8.4.7 HF output filters 195
8.4.8 HD output chokes 196
8.4.9 FKE12B / FKE13B EMC-modules 198
8.4.10 Connection of the regenerative power supply unit 199
8.4.11 Connection of RS485 interface 201
8.4.12 System bus connection (SBus 1) 201
8.4.13 Setpoint adjuster connection 208
8.4.14 Connection of the interface adapter option UWS21B 209
8.4.15 Line protection and earth-leakage circuit breaker 210
8.4.16 TF thermistor and TH bimetallic switch 210
8.4.17 Brake rectifier connection 211
8.4.18 Installing FIO11B/21B, FSC11B/12B, FSE24B, DFP21B 212

9 Startup 215

9.1 General startup instructions 215
9.1.1 Requirements 215
9.1.2 Hoist applications 215
9.2 Preliminary work and resources 215
9.2.1 Preliminary work and tools for startup with factory setting 216
9.2.2 Preliminary work and tools for startup with keypad or PC 216
9.3 Keypads 217
9.3.1 FBG11B – Basic keypad 217
9.3.2 DBG60B – Advanced keypad 223
9.4 MOVITOOLS® MotionStudio engineering software 230
9.5 Short description of important startup steps 231
9.5.1 Procedure 231
9.5.2 Notes 231
9.5.3 Restoring the factory settings (P802) 232
9.5.4 Adjusting the PWM frequency (P86x) 232

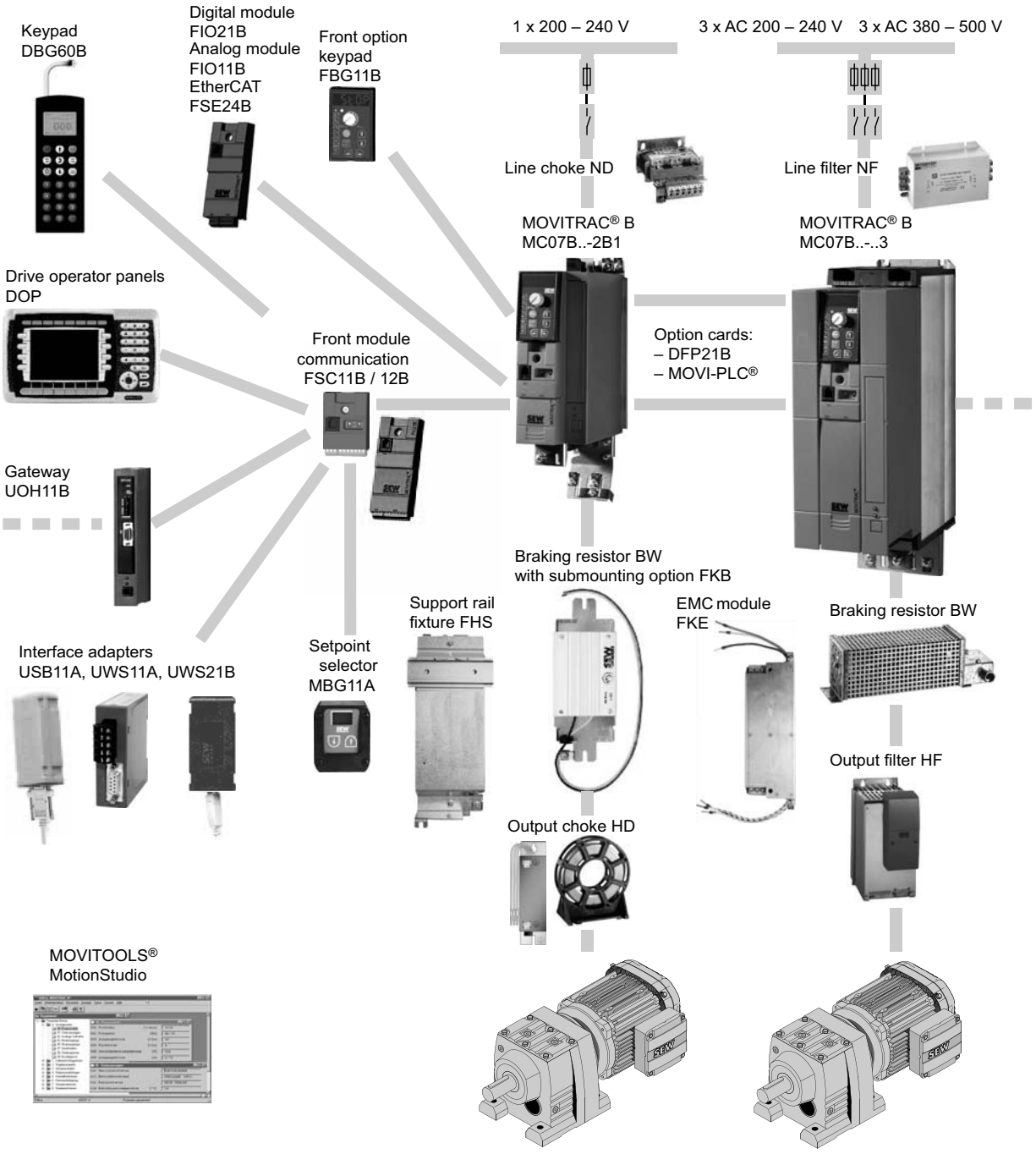
9.5.5 Parameterizing the inverter address (SBus / RS485 / fieldbus) (P81x) ... 232
9.5.6 Setting the control mode (P700) ... 232
9.5.7 Application type specification ... 232
9.5.8 Selection of operating mode (4-quadrant operation P82x) ... 232
9.5.9 Setpoint specification (P10x) ... 233
9.5.10 Protection functions ... 233
9.5.11 Specification of system limits ... 234
9.5.12 Activating the energy-saving function (P770) ... 234
9.5.13 Activating the technology functions ... 234
9.5.14 Settings for low motor speeds (P32x) ... 234
9.5.15 Determining the assignment of digital inputs (P60x) ... 234
9.5.16 Setting the brake function (P73x) ... 234
9.6 Starting the motor in manual mode ... 235
9.6.1 Analog setpoint specification ... 235
9.6.2 Fixed setpoints ... 237
9.7 PI controller (P25x) ... 239
9.8 Master-slave operation (P750) ... 239
9.9 Group drive ... 239
9.10 Startup of explosion-proof AC asynchronous motors category 2 (94/9/EC) ... 239
9.11 Communication and unit profile ... 241
9.11.1 Process data ... 242
9.11.2 Process data configuration ... 244
9.11.3 Process data description ... 245
9.11.4 Sequence control ... 251
9.11.5 Monitoring functions ... 261
9.11.6 Setting the inverter parameters ... 262
9.11.7 Notes on parameterization ... 273
9.12 External setpoint selection ... 274
9.12.1 Setpoint direction ... 274
9.12.2 Setpoint speed ... 274
9.12.3 Enabling the direction of rotation with RS485 or SBus ... 274
9.12.4 Startup for MBG11A setpoint adjuster ... 275



10 Parameters 276
10.1 Overview of parameters 276
10.2 Explanation of the parameters 282
10.2.1 Parameter group 0.. Display value 283
10.2.2 Parameter group 1.. Setpoints/ramp generators 287
10.2.3 Parameter group 2.. Controller parameters 298
10.2.4 Parameter group 3.. Motor parameters 298
10.2.5 Parameter group 4.. Reference signals 303
10.2.6 Parameter group 5.. Monitoring functions 305
10.2.7 Parameter group 6.. Terminal assignment 309
10.2.8 Parameter group 7.. Control functions 316
10.2.9 Parameter group 8.. Device functions 324
10.2.10 Parameter group 9.. IPOS® parameters 333
10.3 Operating modes 334
10.3.1 VFC 1/2 and V/f characteristic curve 334
10.3.2 VFC 1/2 & hoist 335
10.3.3 VFC 1 / 2 & DC BRAKE and V/f DC BRAKING 336
10.3.4 VFC 1 / 2 & Flying start 337
11 Operation 338
11.1 Data backup 338
11.1.1 Data backup using FBG11B 338
11.1.2 Data backup using DBG60B 338
11.1.3 Data backup using UBP11A 339
11.1.4 Data backup using MOVITOOLS® MotionStudio 340
11.2 Status displays 341
11.2.1 Basic unit / FBG11B keypad 341
11.2.2 Status of digital inputs / outputs 342
11.3 Return codes (r19 – r38) 343
11.4 DBG60B keypad 344
11.4.1 Basic displays 344
11.4.2 Information messages 345
11.4.3 Functions of the DBG60B keypad 346
12 Service / list of faults 349
12.1 Device information 349
12.1.1 Fault memory 349
12.1.2 Switch-off responses 349
12.1.3 Reset 350
12.2 List of faults (F00 – F113) 350
12.3 SEW electronics service 355
12.3.1 Hotline 355
12.3.2 Send in for repair 355
12.4 Extended storage 355
12.5 Disposal 356
13 Address list 357
Index 369

1 System description MOVITRAC® B

1.1 MOVITRAC® B system overview



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Supply system 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
- FIO21B digital module or
- FSC11B/FSC12B communication
- EtherCAT FSE24B

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

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

MOVITOOLS® MotionStudio software

1.2 The units at a glance

Supply system connection	Motor power	Nominal output current	MOVITRAC® B type	Part number	Size
230 V 1-phase	0.25 kW / 0.34 HP	AC 1.7 A	MC07B**0003**-2B1-4-00	8284911	0XS
	0.37 kW / 0.50 HP	AC 2.5 A	MC07B**0004**-2B1-4-00	8284938	
	0.55 kW / 0.74 HP	AC 3.3 A	MC07B**0005**-2B1-4-00	8284946	0S
	0.75 kW / 1.0 HP	AC 4.2 A	MC07B**0008**-2B1-4-00	8284954	
	1.1 kW / 1.5 HP	AC 5.7 A	MC07B**0011**-2B1-4-00	8284962	0L
	1.5 kW / 2.0 HP	AC 7.3 A	MC07B**0015**-2B1-4-00	8284970	
	2.2 kW / 3.0 HP	AC 8.6 A	MC07B**0022**-2B1-4-00	8284989	
230 V 3-phase	0.25 kW / 0.34 HP	AC 1.7 A	MC07B**0003**-2A3-4-00	8284997	0XS
	0.37 kW / 0.50 HP	AC 2.5 A	MC07B**0004**-2A3-4-00	8285004	
	0.55 kW / 0.74 HP	AC 3.3 A	MC07B**0005**-2A3-4-00/S0	8285012	0S
	0.75 kW / 1.0 HP	AC 4.2 A	MC07B**0008**-2A3-4-00/S0	8280520	
	1.1 kW / 1.5 HP	AC 5.7 A	MC07B**0011**-2A3-4-00/S0	8285039	0L
	1.5 kW / 2.0 HP	AC 7.3 A	MC07B**0015**-2A3-4-00/S0	8285047	
	2.2 kW / 3.0 HP	AC 8.6 A	MC07B**0022**-2A3-4-00/S0	8285055	
	3.7 kW / 5.0 HP	AC 14.5 A	MC07B**0037**-2A3-4-00	8285063	1
	5.5 kW / 7.4 HP	AC 22 A	MC07B**0055**-2A3-4-00	8285071	2
	7.5 kW / 10 HP	AC 29 A	MC07B**0075**-2A3-4-00	8285098	
	11 kW / 15 HP	AC 42 A	MC07B**0110**-203-4-00	8285101	3
	15 kW / 20 HP	AC 54 A	MC07B**0150**-203-4-00	8285128	
	22 kW / 30 HP	AC 80 A	MC07B**0220**-203-4-00	8285136	4
	30 kW / 40 HP	AC 95 A	MC07B**0300**-203-4-00	8285144	
400 V 3-phase	0.25 kW / 0.34 HP	AC 1.0 A	MC07B**0003**-5A3-4-00	8285152	0XS
	0.37 kW / 0.50 HP	AC 1.6 A	MC07B**0004**-5A3-4-00	8285160	
	0.55 kW / 0.74 HP	AC 2.0 A	MC07B**0005**-5A3-4-00/S0	8285179	0S
	0.75 kW / 1.0 HP	AC 2.4 A	MC07B**0008**-5A3-4-00/S0	8285187	
	1.1 kW / 1.5 HP	AC 3.1 A	MC07B**0011**-5A3-4-00/S0	8285195	
	1.5 kW / 2.0 HP	AC 4.0 A	MC07B**0015**-5A3-4-00/S0	8285209	
	2.2 kW / 3.0 HP	AC 5.5 A	MC07B**0022**-5A3-4-00/S0	8285217	0L
	3.0 kW / 4.0 HP	AC 7.0 A	MC07B**0030**-5A3-4-00/S0	8285225	
	4.0 kW / 5.4 HP	AC 9.5 A	MC07B**0040**-5A3-4-00/S0	8285233	
	5.5 kW / 7.4 HP	AC 12.5 A	MC07B**0055**-5A3-4-00	8285241	2S
	7.5 kW / 10 HP	AC 16 A	MC07B**0075**-5A3-4-00	8285268	
	11 kW / 15 HP	AC 24 A	MC07B**0110**-5A3-4-00	8285276	2
	15 kW / 20 HP	AC 32 A	MC07B**0150**-503-4-00	8285284	3
	22 kW / 30 HP	AC 46 A	MC07B**0220**-503-4-00	8285292	
	30 kW / 40 HP	AC 60 A	MC07B**0300**-503-4-00	8285306	
	37 kW / 50 HP	AC 73 A	MC07B**0370**-503-4-00	8285314	4
	45 kW / 60 HP	AC 89 A	MC07B**0450**-503-4-00	8285322	
	55 kW / 74 HP	AC 105 A	MC07B**0550**-503-4-00	8295271	5
	75 kW / 100 HP	AC 130 A	MC07B**0750**-503-4-00	8295298	

1.3 Functions / features

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

1.3.1 Standard functions and device features

- 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 operation
  - 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
  - Performance Level d 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 digital inputs
  - 3 digital outputs, including 1 relay output
  - Optional: 1 additional analog input / 1 additional analog output
- Voltage supply and evaluation for TF (PTC temperature sensor) integrated for monitoring the motor temperature.
- Integrated evaluation of TH for monitoring the temperature of the motor.

- Braking resistor can be sub-mounted as an option for size 0.
- Separable signal terminals.
- Size 0:
  - Separable power terminals and signal terminals.
  - EMC capacitor can be insulated for reduced leakage currents.
  - Cold plate installation is possible.
  - Long motor cable length.

Control

- 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 through sliding current limitation in the field weakening range.
- 2 complete motor parameter sets.
- Factory setting can be restored.
- Parameter lock for protection against changes to parameters.
- Protective functions for protection against
  - Overcurrent
  - Ground fault
  - Overload
  - Overtemperature of the inverter
  - Overtemperature of the motor (TF/TH)
- Speed monitoring and monitoring of the motor and regenerative limit power.
- 5 fault memories with all relevant operating data at the moment of the fault.
- Standardized operation, parameter setting and identical unit connection technology across all units of the MOVITRAC® B range.
- Parameterizable signal range message (speed).
- Energy-saving function for optimizing the magnetization current automatically.

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

Low emission

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.

1.3.2 Optional communication / operation

- CAN based system bus (SBus) for networking a maximum of 64 MOVITRAC® B units.
- CANopen Protocol DS301 V4.
- RS485 interface.
- Optional keypad for displaying setpoints and for setting parameters
  - 5-digit 7-segment display
  - 9 LEDs for displaying the selected symbols
  - 6 control keys
  - 1 setpoint adjuster for speed specification
  - Data backup parameter set
- Fieldbus interfaces for
  - PROFIBUS
  - DeviceNet
  - CANopen
- Industrial Ethernet:
  - EtherCAT®
  - PROFINET
  - EtherNet/IP
  - Modbus/TCP

1.3.3 Energy efficiency

Several options are available for improving the energy balance:

- Process adaptation
- Energy saving function
- DC link coupling is possible with MOVITRAC® B from size 2S (3 × AC 400 V, 5.5 kW)
- A regenerative power supply unit can be connected to MOVITRAC® B from size 2S (3 × AC 400 V, 5.5 kW)

1.3.4 Functional safety

The following functions are available in the standard version:

- Safe Torque Off (STO) up to performance level (PL) d according to EN ISO 13849-1 for 3 × AC 230 V / 400 V units from 0.55 kW to 75 kW (optionally 230 V to 2.2 kW, and 400 V up to 4 kW).
- Safe Stop (SSI[1)]) up to performance level (PL) d according to EN ISO 13849-1 for 3 × AC 230 V / 400 V units from 0.55 kW to 75 kW (optionally 230 V to 2.2 kW, and 400 V to 4 kW).

The following table lists the availability of safety technology for the individual MOVITRAC® 07B sizes.

MOVITRAC® 07B	Size	Power rating kW	Safety technology		
			Standard	Option	Not available
3 × AC 400 V					
0003-5A3-4-....	0XS	0.25			x
0004-5A3-4-....		0.37			x
0005-5A3-4-....	0S	0.55		x	
0008-5A3-4-....		0.75		x	
0011-5A3-4-....		1.1		x	
0015-5A3-4-....		1.5		x	
0022-5A3-4-....	0L	2.2		x	
0030-5A3-4-....		3		x	
0040-5A3-4-....		4		x	
0055-5A3-4-....	2S	5.5	x		
0075-5A3-4-....		7.5	x		
0110-5A3-4-....	2	11	x		
0150-5A3-4-....	3	15	x		
0220-5A3-4-....		22	x		
0300-5A3-4-....		30	x		
0370-5A3-4-....	4	37	x		
0450-5A3-4-....		45	x		
0550-5A3-4-....	5	55	x		
0750-5A3-4-....		75	x		

1) External connection is required for SSI

MOVITRAC® 07B	Size	Power rating kW	Safety technology		
			Standard	Option	Not available
3 × AC 230 V					
0003-5A3-4-....	0XS	0.25			x
0004-5A3-4-....		0.37			x
0005-5A3-4-....	0S	0.55		x	
0008-5A3-4-....		0.75		x	
0011-5A3-4-....	0L	1.1		x	
0015-5A3-4-....		1.5		x	
0022-5A3-4-....		2.2		x	
0037-5A3-4-....	1	3.7	x		
0055-5A3-4-....	2	5.5	x		
0075-5A3-4-....		7.5	x		
0110-5A3-4-....	3	11	x		
0150-5A3-4-....		15	x		
0220-5A3-4-....	4	22	x		
0300-5A3-4-....		30	x		
1 × AC 230 V Safety technology is not available.					

Sizes 0S and 0L with "STO – Safe Torque Off": 3 × AC 380 – 500 V, 50/60 Hz

Type MC07B... 3 × AC 380 – 500 V	Standard version (...-S0) Part number	Technology version (...-S0/T) Part number	Recommended max. motor power kW / HP	Nominal output current AC A	Size
0005-5A3-4-...[1]	828 995 6	[2]	0.55 / 0.75	2.0	0S
0008-5A3-4-...[1]	828 996 4		0.75 / 1.0	2.4	
0011-5A3-4-...[1]	828 997 2		1.1 / 1.5	3.1	
0015-5A3-4-...[1]	828 998 0		1.5 / 2.0	4.0	
0022-5A3-4-...[1]	828 999 9		2.2 / 3.0	5.5	0L
0030-5A3-4-...[1]	829 000 8		3.0 / 4.0	7.0	
0040-5A3-4-...[1]	829 001 6		4.0 / 5.0	9.5	

1) With integrated line filter, category C2 is maintained on the input end as standard.

2) Without part number. Can only be ordered via the Configurator.

Sizes 0S and 0L with "STO – Safe Torque Off": 3 × AC 230 V, 50/60 Hz

Type MC07B... 3 × AC 230 V	Standard version (...-S0) Part number	Technology version (...-S0/T) Part number	Recommended max. motor power kW / HP	Nominal output current AC A	Size
0005-2A3-4-...[1]	829 987 0	[2]	0.55 / 0.75	3.3	0S
0008-2A3-4-...[1]	829 988 9		0.75 / 1.0	4.2	
0011-2A3-4-...[1]	829 989 7		1.1 / 1.5	5.7	0L
0015-2A3-4-...[1]	829 990 0		1.5 / 2.0	7.3	
0022-2A3-4-...[1]	829 991 9		2.2 / 3.0	8.6	

1) With integrated line filter, category C2 is maintained on the input end as standard.

2) Without part number. Can only be ordered via the Configurator.

1.3.5 Additional functions, technology version

The "simple positioning" application module is currently available as technology function, see also chapter "Application modules".

1.3.6 Application modules

Application modules are part of the MOVITOOLS® MotionStudio and can be used with MOVITRAC® B technology versions (...-0T). The individual application manuals are available for download as PDF from the SEW website.

The "simple positioning" application module is currently the only technology function available.

1.4 MOVITOOLS® MotionStudio engineering software

1.4.1 Tasks

The software package enables you to perform the following tasks:

- Establishing communication with units
- Executing functions with the units

1.4.2 Establishing communication with the units

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

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

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS-485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT®
- Fieldbus (PROFIBUS DP/DP-V1)
- Tool Calling Interface

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

1.4.3 Executing functions with the units

The software package offers uniformity in executing the following functions:

- Parameterization (for example in the parameter tree of the unit)
- Startup
- Visualization and diagnostics
- Programming

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

- MotionStudio
- MOVITOOLS®

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

1.4.4 Technical support

SEW-EURODRIVE offers you a 24-hour service hotline.

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

1.4.5 Online help

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

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

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

  If the help window appears again, activate the "Display" control field in the menu under [Settings] / [Options] / [Help].

- Context-sensitive help is available for the fields that require you to enter values. For example, you can use the <F1> key to display the ranges of values for the unit parameters.

1.4.6 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 four analog and digital measured variables in differently colored curves. You can scale both the x-axis and the y-axis as required.

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

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

- Save
- Meta data
- Print

The online help functions enable you to familiarize yourself quickly with how to use SCOPE.

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

2 Technical data

2.1 Technical data of the basic unit

2.1.1 CE marking, UL approval and C-Tick

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.

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.

2.1.2 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
Duty type	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

Table continued on next page.

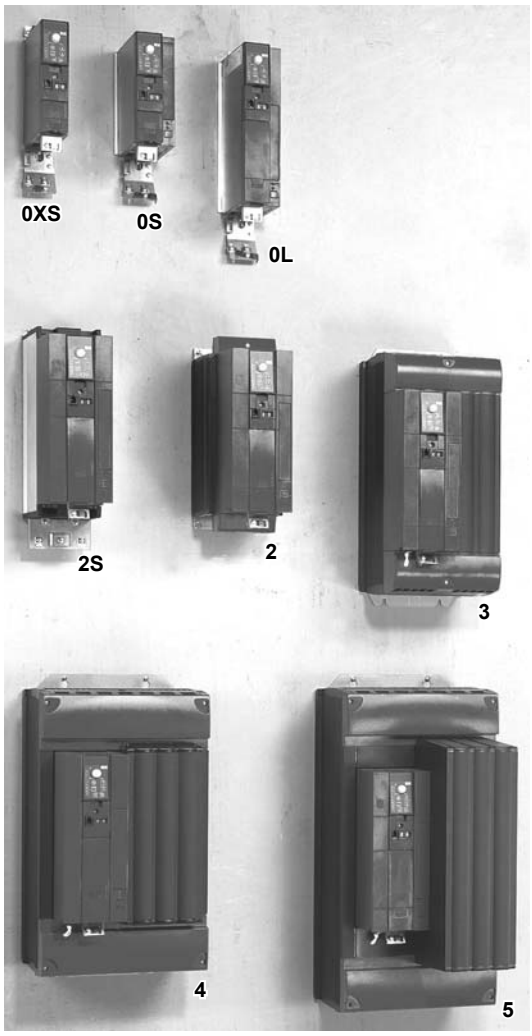
MOVITRAC® B	All sizes
Installation altitude	Up to h ≤ 1000 m (3281 ft) without restrictions. At h ≥ 1000 m (3281 ft), the following restrictions apply: • From 1000 m (3281 ft) to max. 4000 m (13 120 ft): – I_N reduction by 1% per 100 m (328 ft) • From 2000 m (6600 ft) to max. 4000 m (13 200 ft): – The safe disconnection of power and electronics connections can no longer be assured above 2000 m. This requires external measures (IEC 60664-1 /EN 61800-5-1). – You have to connect an overvoltage protection device in order to reduce the overvoltages from category III to category II.
Dimensioning	According to DIN ISO 276-v
Size 0: Restrictions for continuous operation with 125% I_N	• Maximum ambient temperature ϑ_A: 40 °C • No DIN rail mounting / submounting resistor • With 1 × 230 V: Install 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.

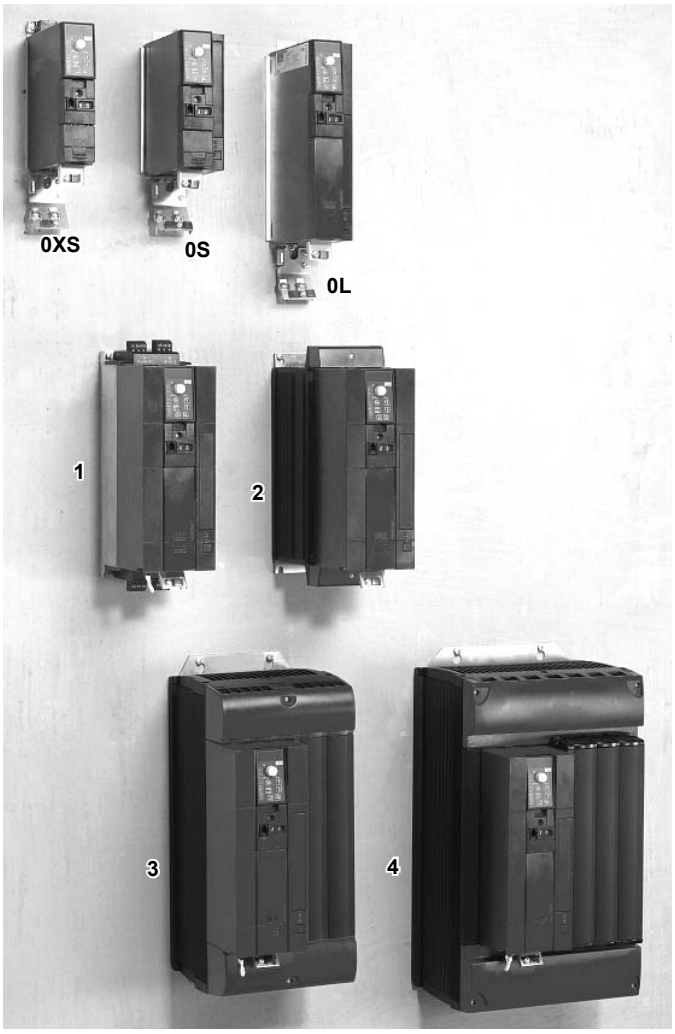
2.1.3 Technical data of MOVITRAC® B, 3 × AC 400 V

Overview of MOVITRAC® B

400 / 500 V



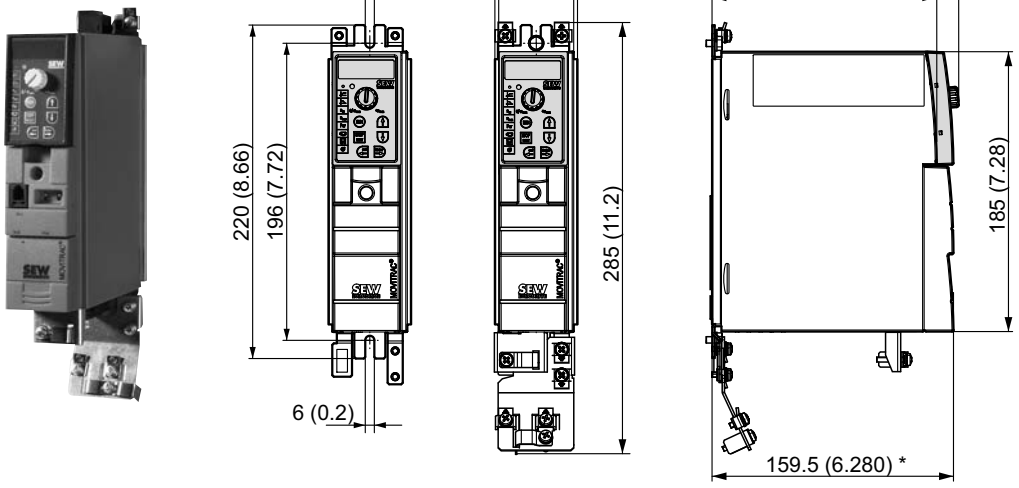
230 V



Supply system 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

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).



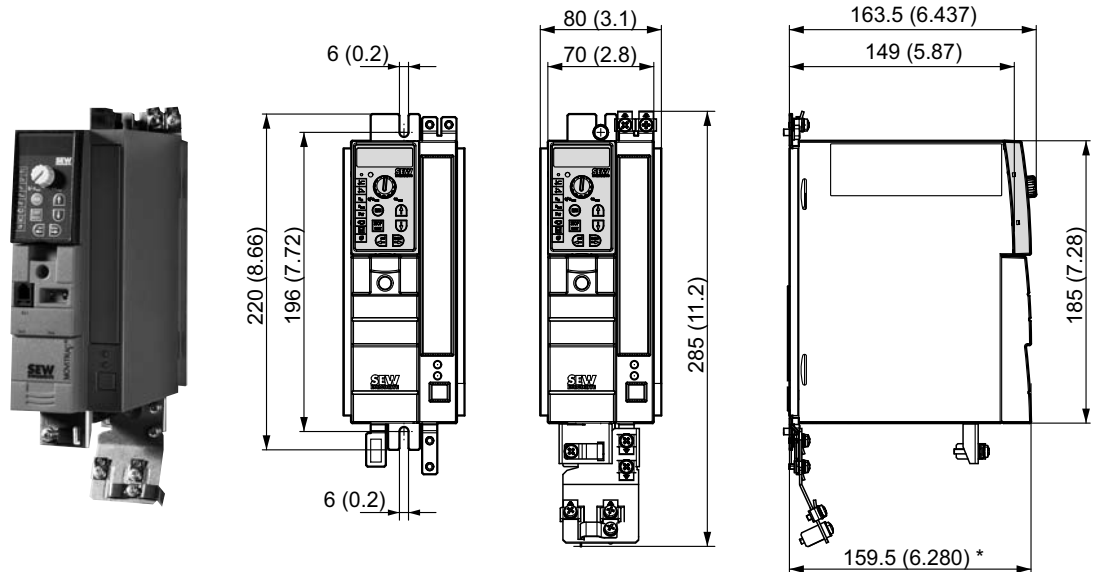
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system) **Part number (without "safe stop")**		**0003-5A3-4-00** **828 515 2**	**0004-5A3-4-00** **828 516 0**
INPUT[1]			
Nominal 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_{line}	
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 1.0 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-quadrant operation)	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	
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / AWG12 / 0.6 Nm / 5 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 line and output currents must be reduced by 20% from the nominal values for V_{line} = 3 × AC 500 V.

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)

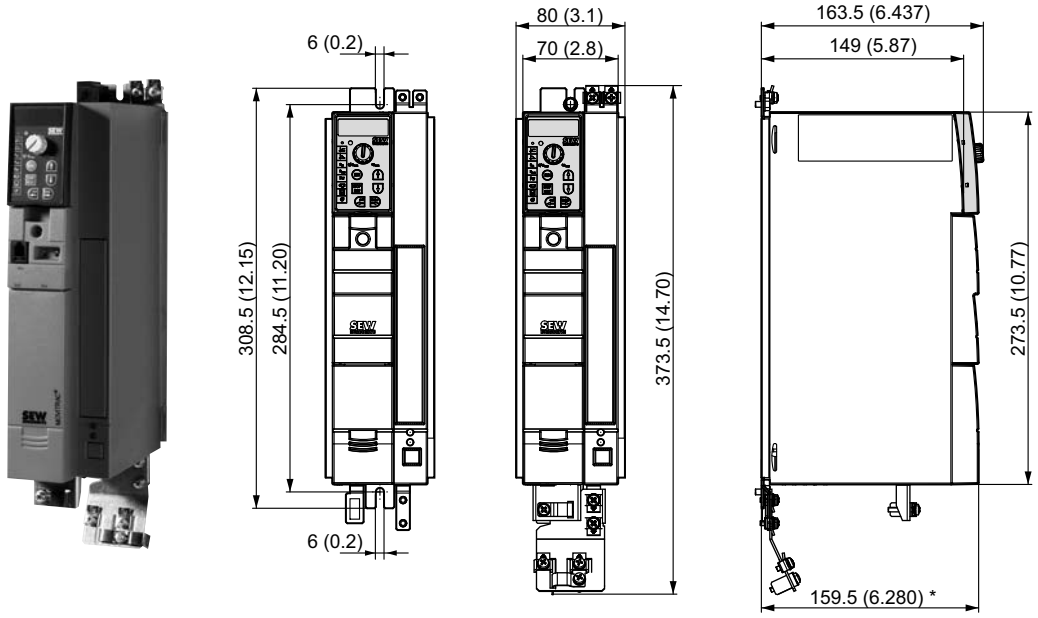
MOVITRAC® MC07B (3-phase supply system)		**0005-5A3-4-x0**	**0008-5A3-4-x0**	**0011-5A3-4-x0**	**0015-5A3-4-x0**
Part number, standard unit (-00)		**828 517 9**	**828 518 7**	**828 519 5**	**828 520 9**
Part number "Safe stop" (-S0[1])		**828 995 6**	**828 996 4**	**828 997 2**	**828 998 0**
INPUT[2]					
Nominal 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_{line}			
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	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
Minimum permitted braking resistance value (4-quadrant operation)	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 cooling / 12 m^3/h
Current limitation		150% I_N for at least 60 seconds			
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / AWG12 / 0.6 Nm / 5 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 line and output currents must be reduced by 20% from the nominal values for V_{line} = 3 × AC 500 V.

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).



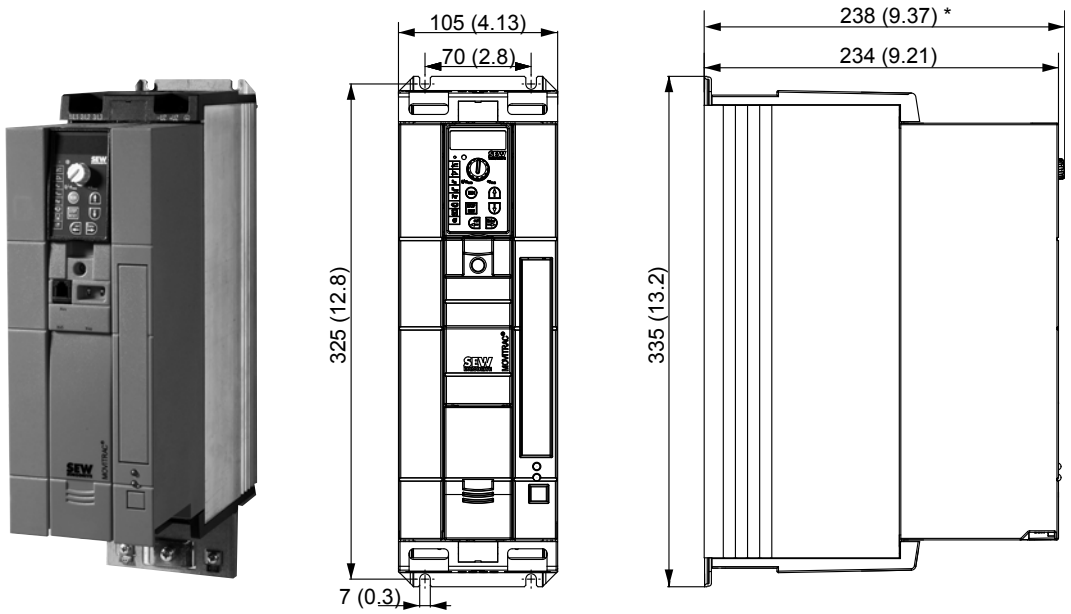
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system)		**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]				
Nominal line voltage	V_{line}	3 × AC 380 – 500 V		
Nominal line frequency	f_{line}	50/60 Hz ±5%		
Nominal line current (with 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_{line}		
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-quadrant operation)	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 cooling / 18 m^3/h
Current limitation		150% I_N for at least 60 seconds		
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / AWG12 / 0.6 Nm / 5 lb in		
Dimensions	W × H × D	80 mm × 273.5 mm × 163.5 mm (3.1 in × 10.77 in × 6,437 in)		
Weight	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 line and output currents must be reduced by 20% from the nominal values for V_{line} = 3 × AC 500 V.

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

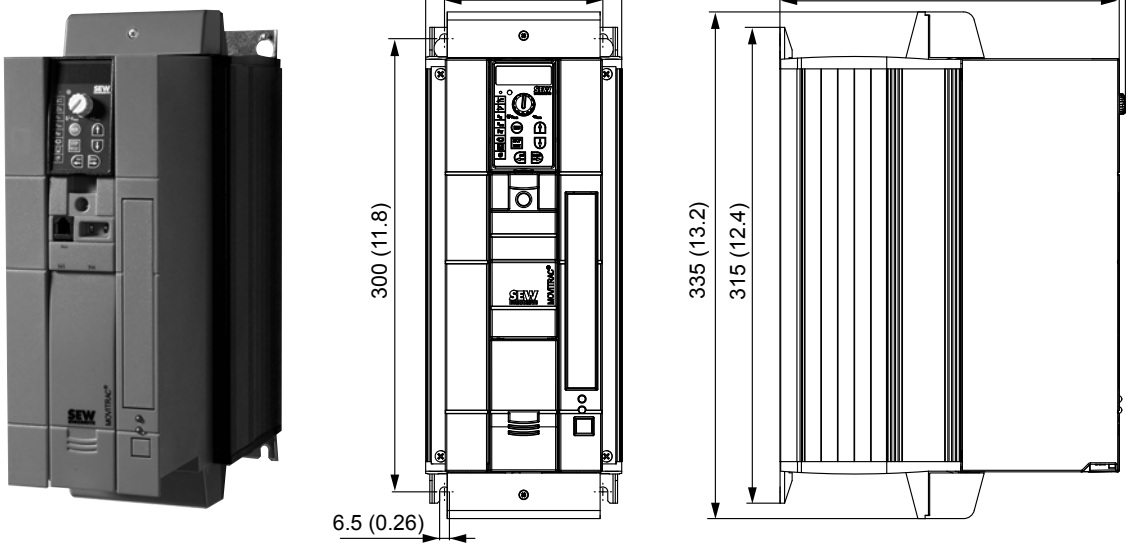


* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0055-5A3-4-00** **828 524 1**	**0075-5A3-4-00** **828 526 8**
INPUT[1]			
Nominal 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_{line}	
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-quadrant operation)	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 cooling / 80 m^3/h	
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / 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 line and output currents must be reduced by 20% from the nominal values for V_{line} = 3 × AC 500 V.

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

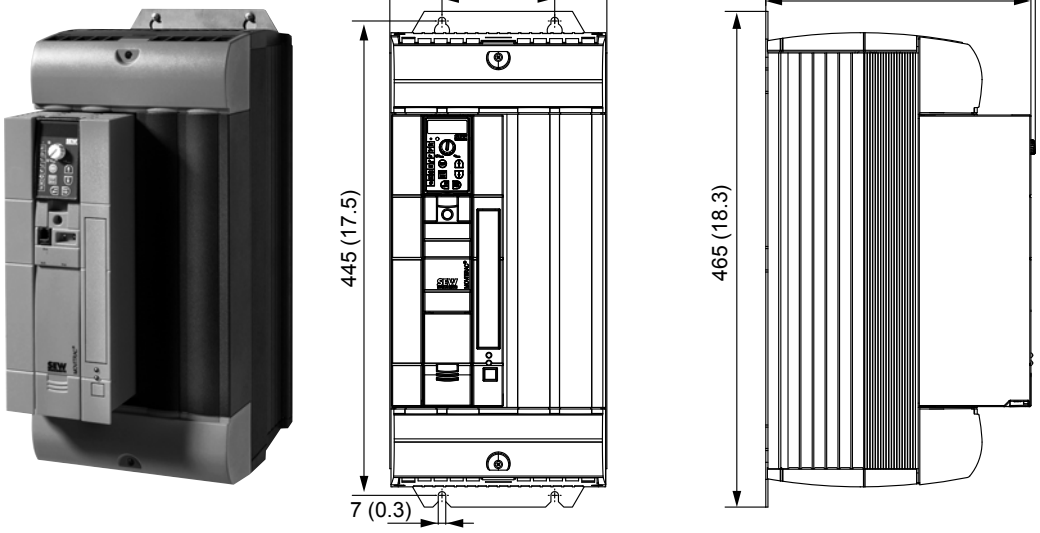


* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0110-5A3-4-00** **828 527 6**
INPUT[1]		
Nominal 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_{line}
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-quadrant operation)	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 cooling / 80 m^3/h
Current limitation		150% I_N for at least 60 seconds
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / AWG12 / 0.6 Nm / 5 lb in 6 mm^2 / AWG10 / 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 line and output currents must be reduced by 20% from the nominal values for V_{line} = 3 × AC 500 V.

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



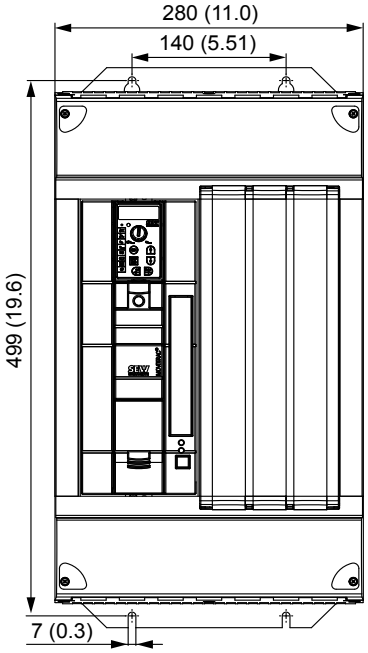
* With front module FSE24B +4 mm (0.16 in)

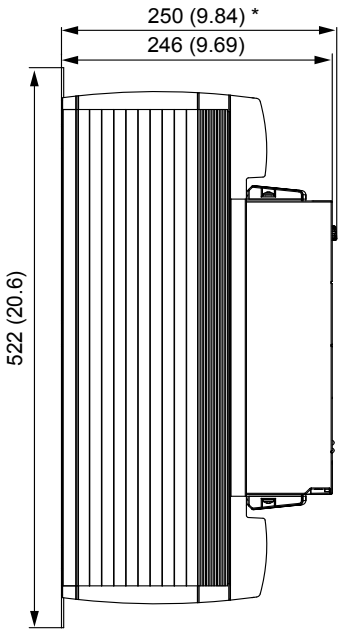
MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0150-503-4-00** **828 528 4**	**0220-503-4-00** **828 529 2**	**0300-503-4-00** **828 530 6**
INPUT[1]				
Nominal line voltage	V_{line}	3 × AC 380 – 500 V		
Nominal line frequency	f_{line}	50/60 Hz ±5%		
Nominal line 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_{line}		
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-quadrant operation)	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 cooling / 180 m^3/h		
Current limitation		150% I_N for at least 60 seconds		
Unit terminal cross section / tightening torque	Terminals	25 mm^2 / AWG4	25 mm^2 / AWG4	25 mm^2 / AWG4
		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 line and output currents must be reduced by 20% from the nominal values for V_{line} = 3 × AC 500 V.

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







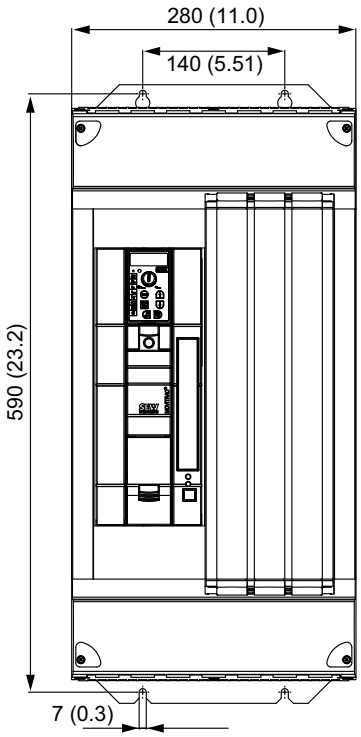
* With front module FSE24B +4 mm (0.16 in)

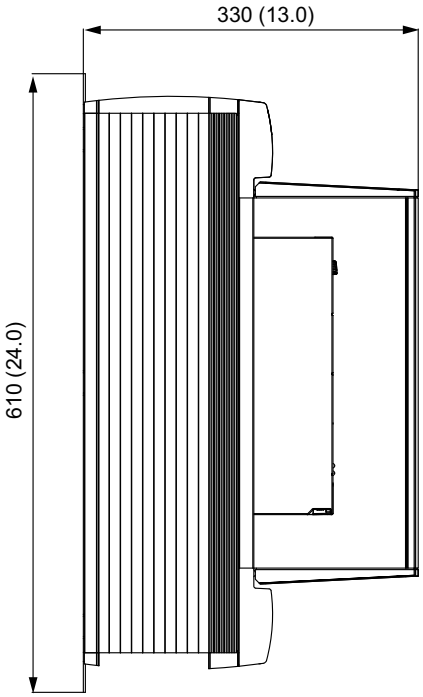
MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0370-503-4-00** **828 531 4**	**0450-503-4-00** **828 532 2**
INPUT[1]			
Nominal line voltage	V_{line}	3 × AC 380 – 500 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (at V_{line} = 3 × AC 400 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_{line}	
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-quadrant operation)	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 cooling / 180 m^3/h	
Current limitation		150% I_N for at least 60 seconds	
Unit terminal cross section / tightening torque	Terminals	70 mm^2 / AWG00	
		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 line and output currents must be reduced by 20% from the nominal values for V_{line} = 3 × AC 500 V.

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







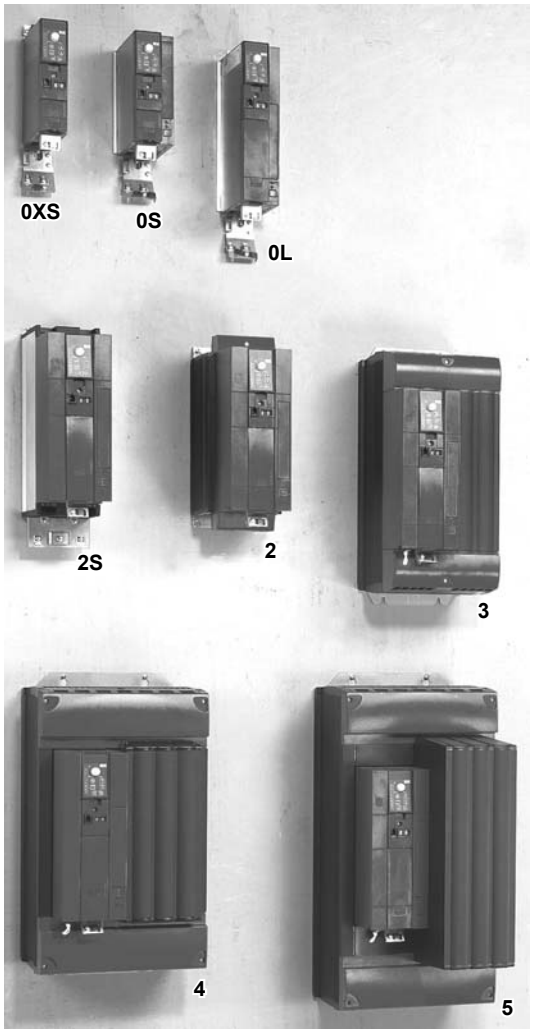
MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0550-503-4-00** **829 527 1**	**0750-503-4-00** **829 529 8**
INPUT[1]			
Nominal line voltage	V_{line}	3 × AC 380 – 500 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line} $I_{line\ 125}$	AC 94.5 A AC 118.1 A	AC 117 A AC 146.3 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{line}	
Recommended motor power 100% operation Recommended motor power 125% operation	P_{Mot} $P_{Mot\ 125}$	55 kW / 74 HP 75 kW / 100 HP	75 kW / 100 HP 90 kW / 120 HP
Nominal output current 100% operation Nominal output current 125% operation	I_N $I_{N\ 125}$	AC 105 A AC 131 A	AC 130 A AC 162 A
Apparent output power 100% operation Apparent output power 125% operation	S_N $S_{N\ 125}$	73.5 kVA 90.8 kVA	91.0 kVA 112.2 kVA
Min. perm. braking resistance (4-quadrant operation)	R_{BW_min}	6 Ω	4 Ω
GENERAL INFORMATION			
Power loss 100% operation Power loss 125% operation	P_V $P_{V\ 125}$	1700 W 2020 W	2000 W 2300 W
Type of cooling / cooling air consumption		Forced cooling / 360 m^3/h	
Current limitation		150% I_N for at least 60 seconds	
Unit terminal cross section / tightening torque	Terminals	70 mm^2 / AWG00	
		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 line and output currents must be reduced by 20% from the nominal values for V_{line} = 3 × AC 500 V.

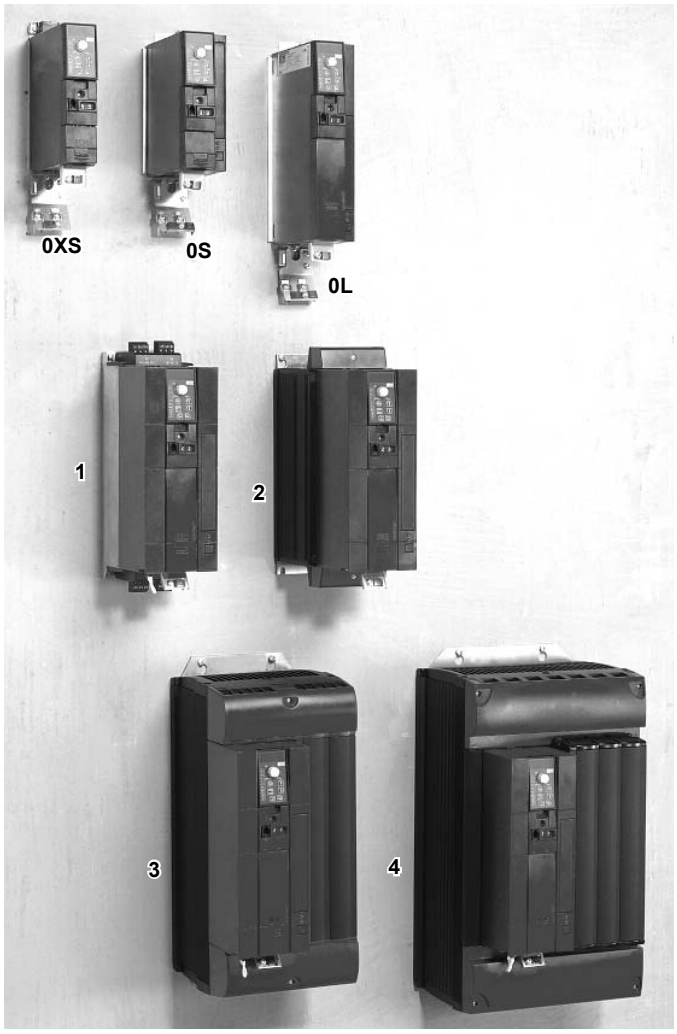
2.1.4 Technical data of MOVITRAC® B, 3 × AC 230 V

Overview of MOVITRAC® B

400 / 500 V

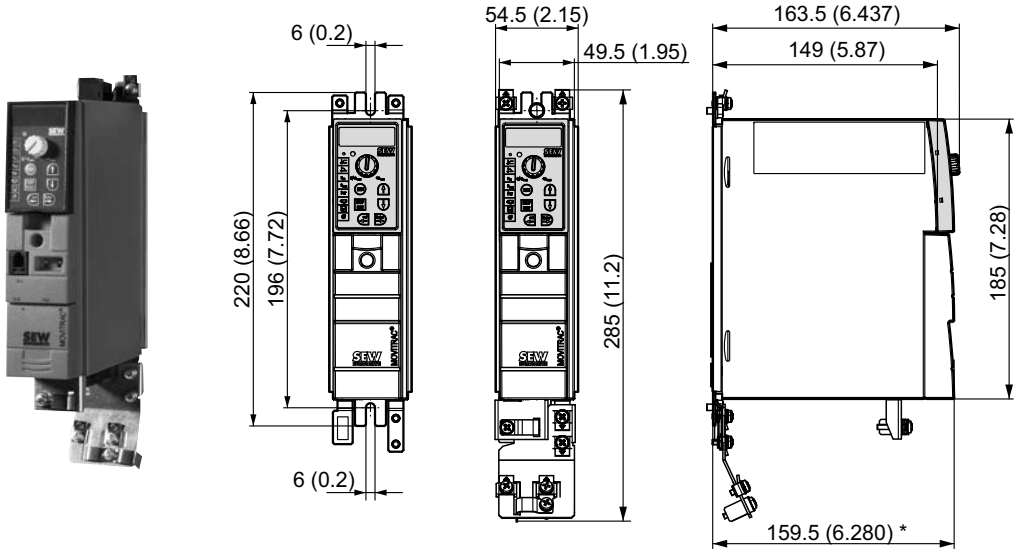


230 V



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

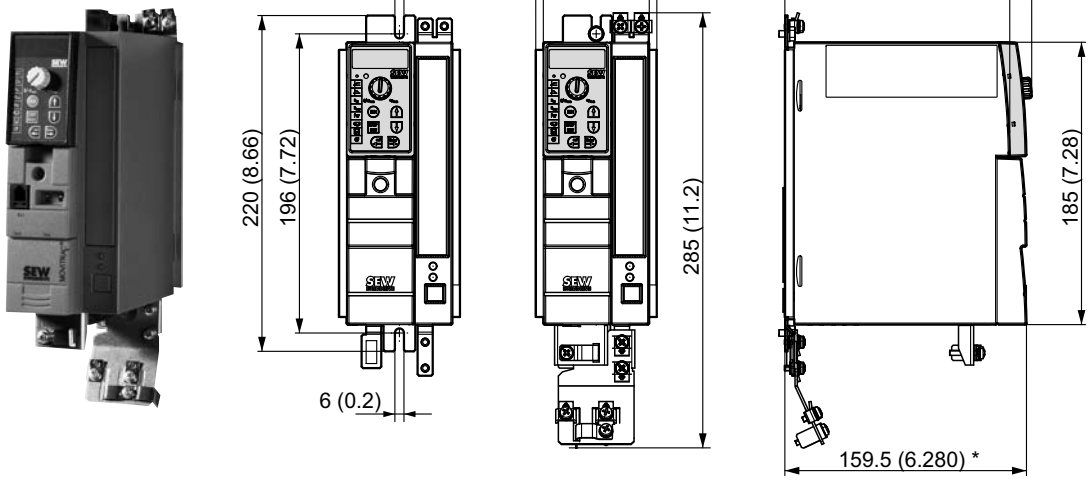
AC 230 V / 3-phase / size 0XS / 0.25 / 0.37 kW / 0.34 / 0.50 HP



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

MOVITRAC® MC07B (3-phase supply system) **Part number (without "safe stop")**		**0003-2A3-4-00** **828 499 7**	**0004-2A3-4-00** **828 500 4**
INPUT			
Nominal line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (with 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_{line}	
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-quadrant operation)	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	
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / AWG12 / 0.6 Nm / 5 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	

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

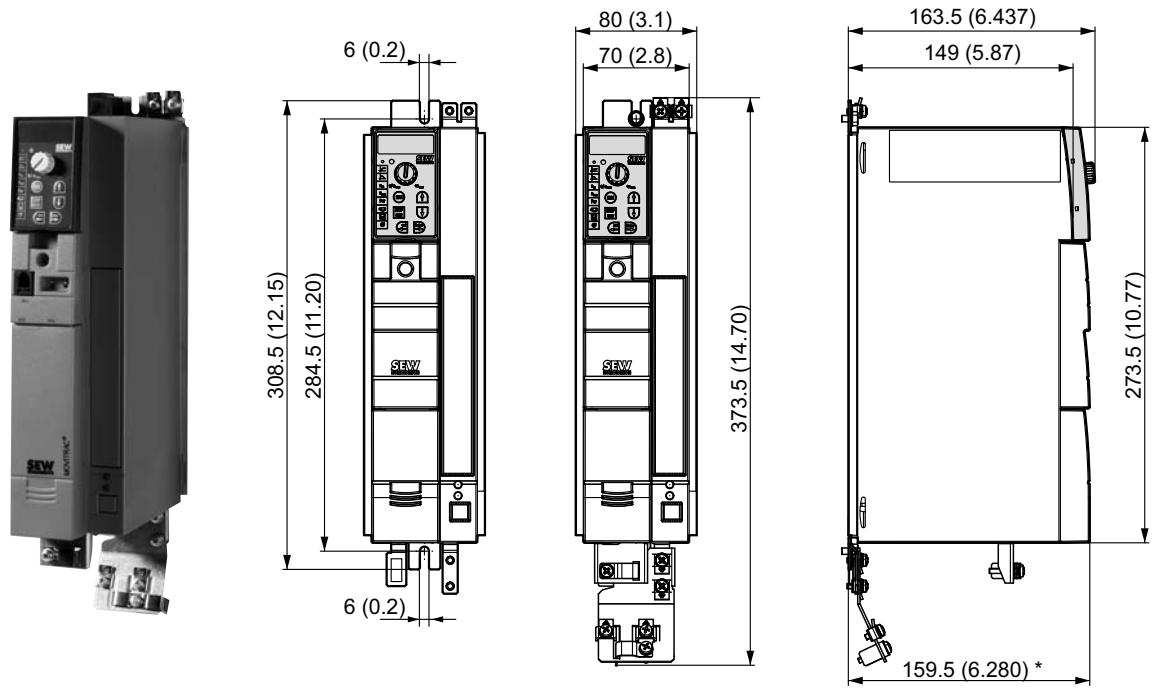


* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system) **Part number, standard unit (-00)** **Part number "Safe stop" (-S0[1])**		**0005-2A3-4-x0** **828 501 2** **829 987 0**	**0008-2A3-4-x0** **828 502 0** **829 988 9**
INPUT			
Nominal line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (with V_{line} = 1 × AC 230 V)	I_{line} $I_{line\ 125}$	AC 2.8 A AC 3.4 A	AC 3.3 A AC 4.1 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{line}	
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-quadrant operation)	R_{BW_min}	27 Ω	
GENERAL INFORMATION			
Power loss 100% operation Power loss 125% operation	P_V $P_{V\ 125}$	50 W 60 W	60 W 75 W
Type of cooling / cooling air consumption		Natural convection / –	
Current limitation		150% I_N for at least 60 seconds	
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / AWG12 / 0.6 Nm / 5 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.

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

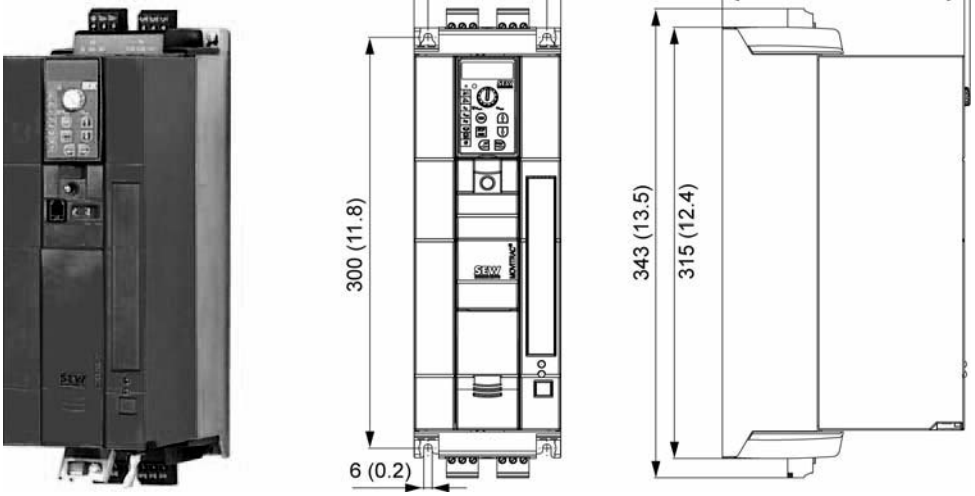


* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system)		**0011-2A3-4-00**	**0015-2A3-4-00**	**0022-2A3-4-00**
Part number standard design (-00) **Part number "Safe technology" (-S0[1])**		**828 503 9** **829 989 7**	**828 504 7** **829 990 0**	**828 505 5** **829 991 9**
INPUT				
Nominal line voltage	V_{line}	3 × AC 200 – 240 V		
Nominal line frequency	f_{line}	50/60 Hz ±5%		
Nominal line current (with 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_{line}		
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-quadrant operation)	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 cooling / 18 m^3/h
Current limitation		150% I_N for at least 60 seconds		
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / AWG12 / 0.6 Nm / 5 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.

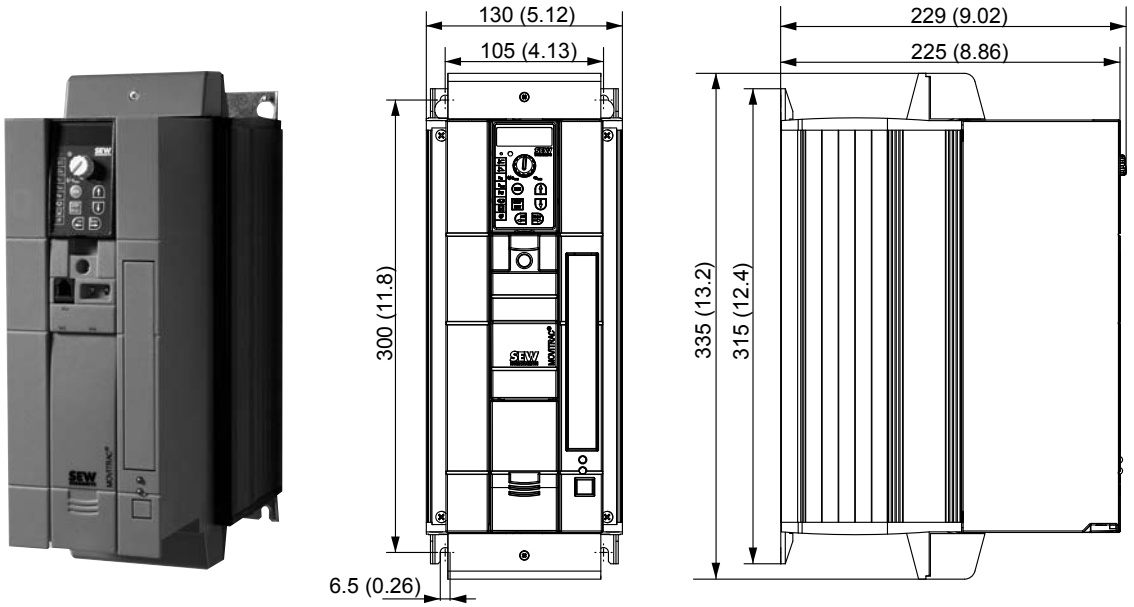
AC 230 V / 3-phase / size 1 / 3.7 kW / 5.0 HP



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

MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0037-2A3-4-00** **828 506 3**
INPUT		
Nominal 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_{line}
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-quadrant operation)	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 cooling / 40 m^3/h
Current limitation		150% I_N for at least 60 seconds
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / 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

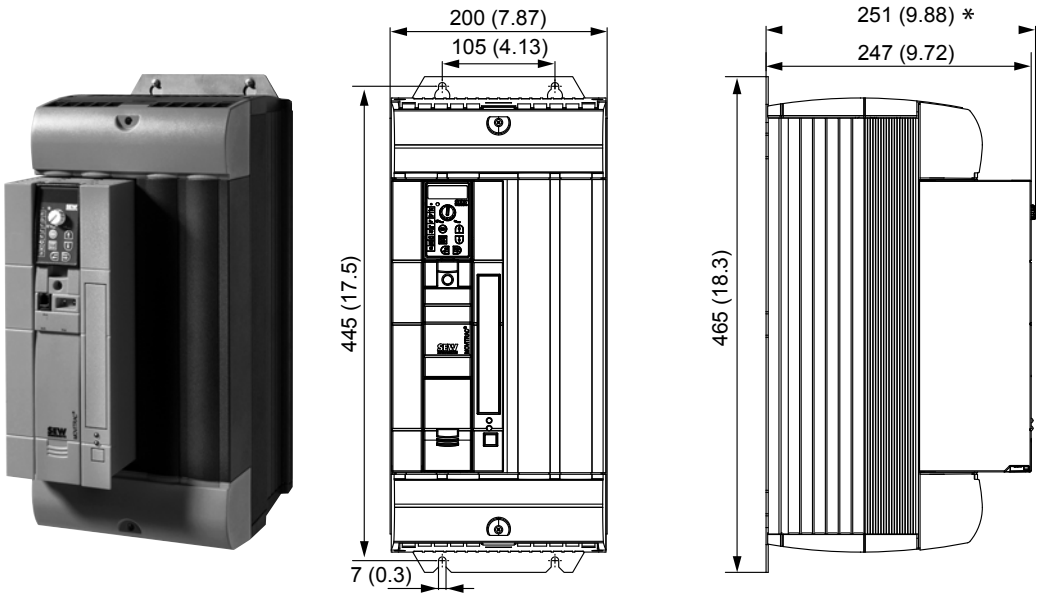
AC 230 V / 3-phase / size 2 / 5.5 / 7.5 kW / 7.4 / 10 HP



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

MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0055-2A3-4-00** **828 507 1**	**0075-2A3-4-00** **828 509 8**
INPUT			
Nominal line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (with V_{line} = 3 × AC 230 V)	I_{line} $I_{line\ 125}$	AC 19.5 A AC 24.4 A	AC 27.4 A AC 34.3 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{line}	
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 22 A AC 27.5 A	AC 29 A AC 36.3 A
Apparent output power 100% operation Apparent output power 125% operation	S_N $S_{N\ 125}$	8.8 kVA 11.0 kVA	11.6 kVA 14.5 kVA
Min. perm. braking resistance (4-quadrant operation)	R_{BW_min}	12 Ω	
GENERAL INFORMATION			
Power loss 100% operation Power loss 125% operation	P_V $P_{V\ 125}$	300 W 375 W	380 W 475 W
Type of cooling / cooling air consumption		Forced cooling / 80 m^3/h	
Current limitation		150% I_N for at least 60 seconds	
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / AWG12 / 0.6 Nm / 5 lb in 6 mm^2 / AWG10 / 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	

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

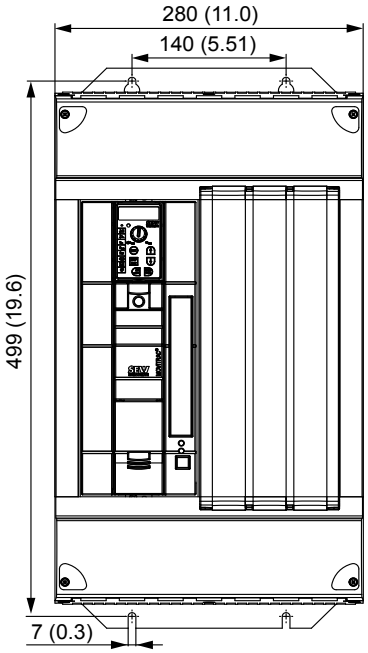


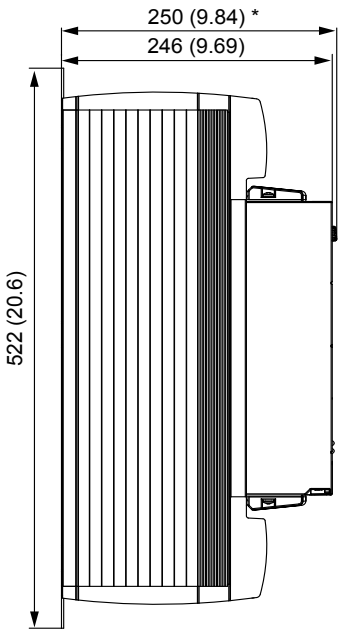
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0110-203-4-00** **828 510 1**	**0150-203-4-00** **828 512 8**
INPUT			
Nominal line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (with 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_{line}	
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-quadrant operation)	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 cooling / 180 m^3/h	
Current limitation		150% I_N for at least 60 seconds	
Unit terminal cross section / tightening torque	Terminals	25 mm^2 / AWG4	
		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	

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







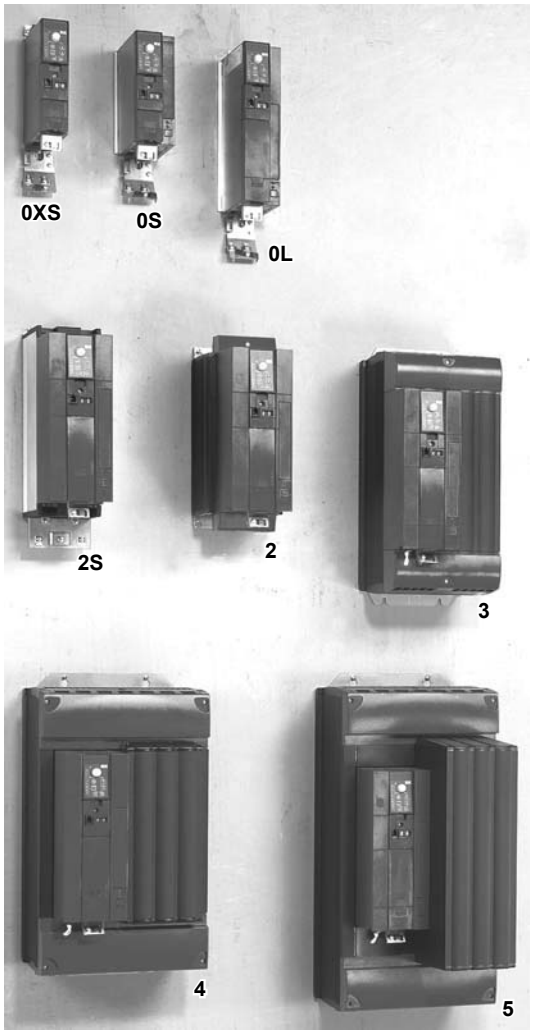
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0220-203-4-00** **828 513 6**	**0300-203-4-00** **828 514 4**
INPUT			
Nominal line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (with 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_{line}	
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-quadrant operation)	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 cooling / 180 m^3/h	
Current limitation		150% I_N for at least 60 seconds	
Unit terminal cross section / tightening torque	Terminals	70 mm^2 / AWG00	
		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	

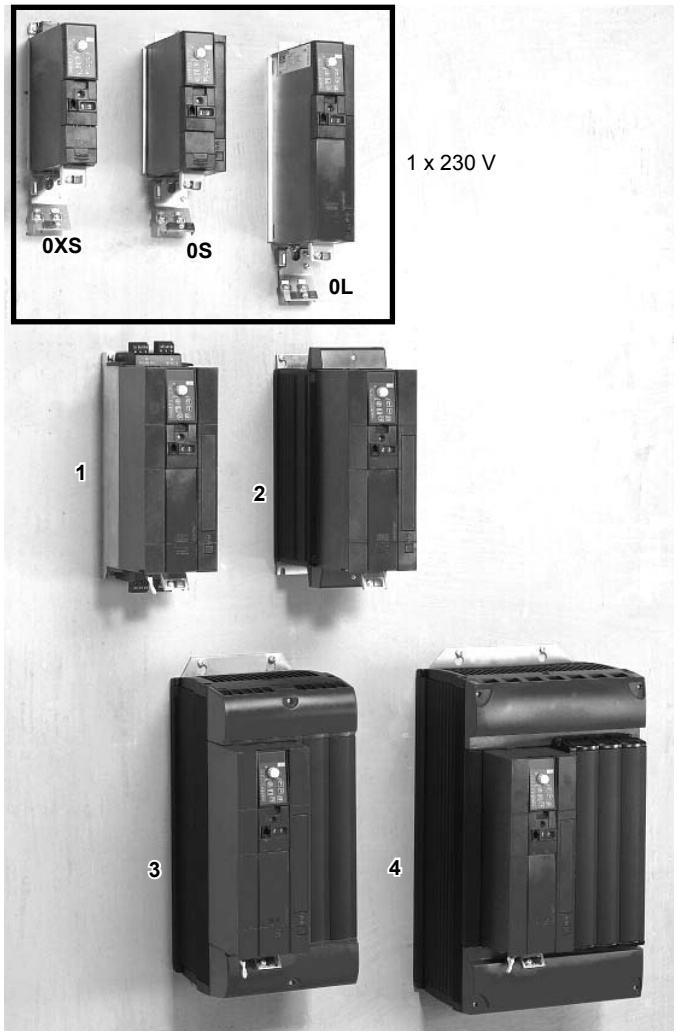
2.1.5 Technical data of MOVITRAC® B, 1 × AC 230 V

Overview of MOVITRAC® B

400 / 500 V

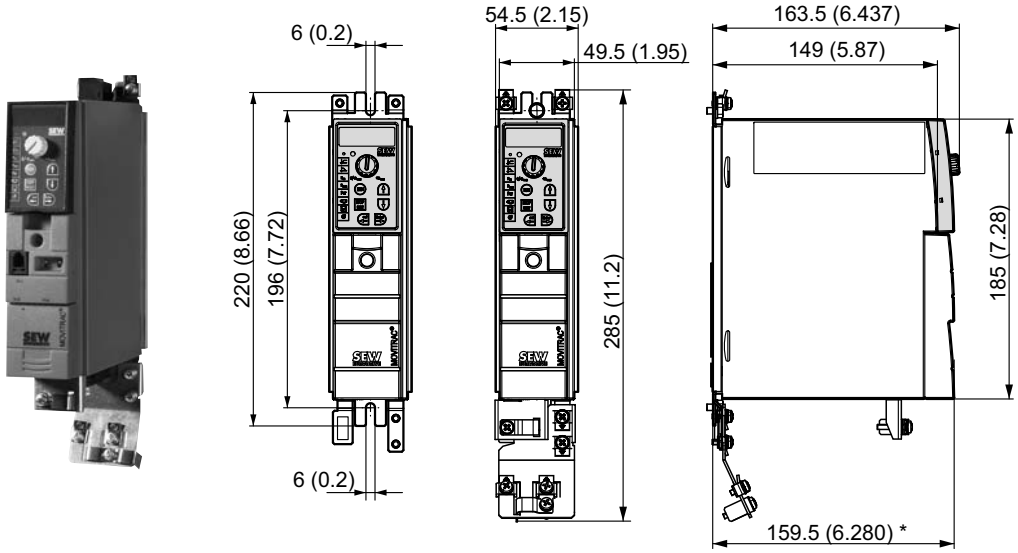


230 V



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

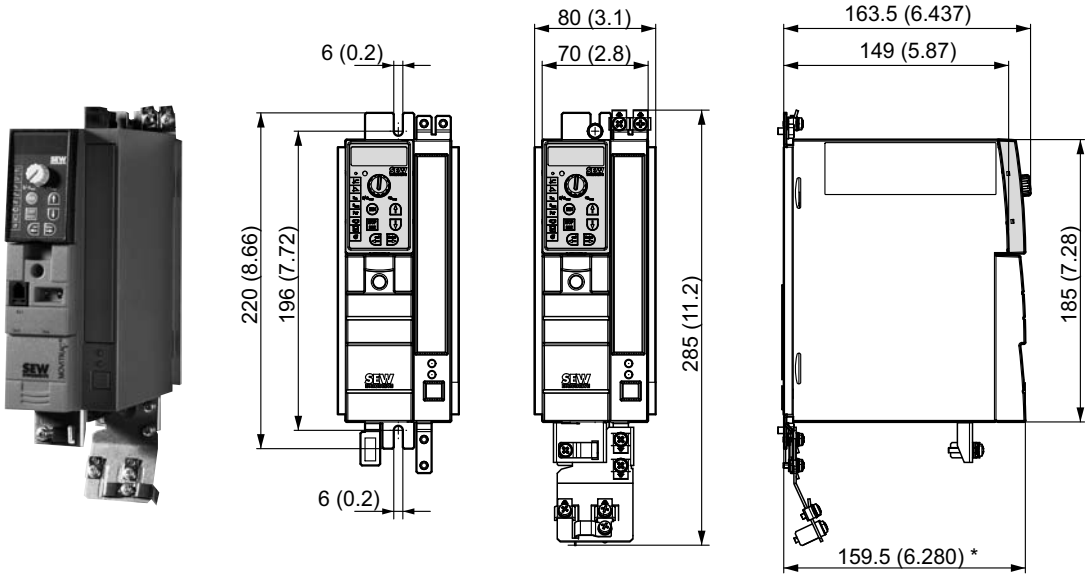
AC 230 V / 1-phase / size 0XS / 0.25 / 0.37 kW / 0.34 / 0.50 HP



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

MOVITRAC® MC07B (1-phase supply system) **Part number (without "safe stop")**		**0003-2B1-4-00** **828 491 1**	**0004-2B1-4-00** **828 493 8**
INPUT			
Nominal line voltage	V_{line}	1 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (with 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_{line}	
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-quadrant operation)	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	
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / 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	

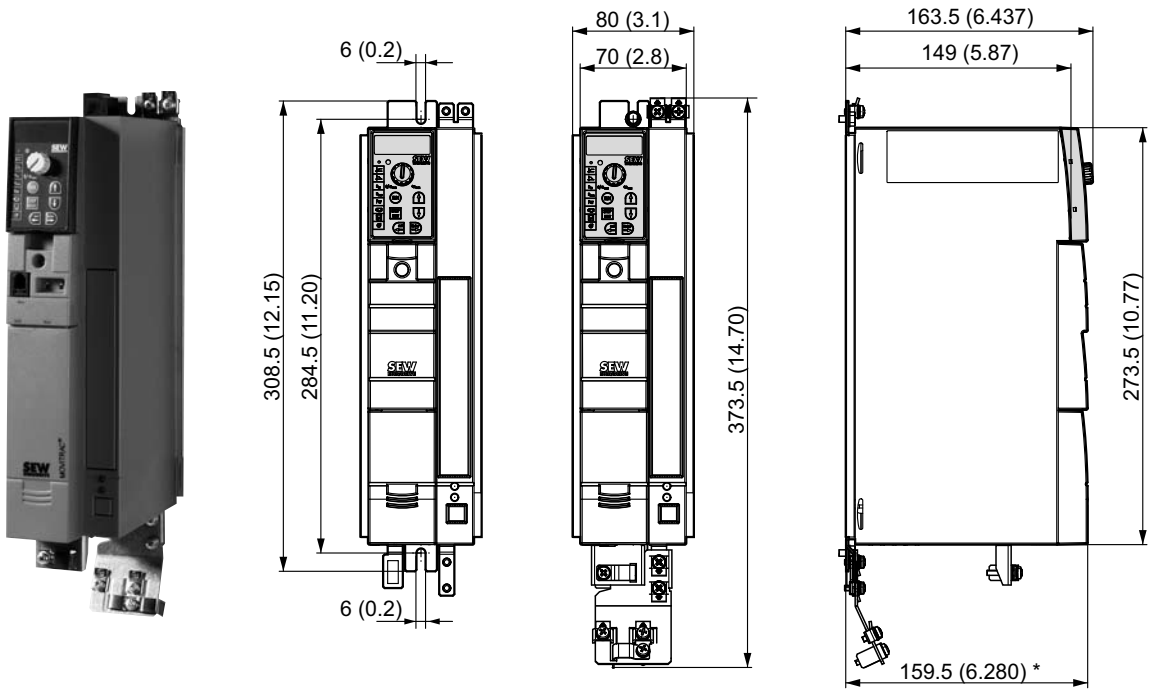
AC 230 V / 1-phase / size 0S / 0.55 / 0.75 kW / 0.74 / 1.0 HP



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

MOVITRAC® MC07B (1-phase supply system) **Part number (without "safe stop")**		**0005-2B1-4-00** **828 494 6**	**0008-2B1-4-00** **828 495 4**
INPUT			
Nominal line voltage	V_{line}	1 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (with 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_{line}	
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-quadrant operation)	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	
Unit 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	

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



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

MOVITRAC® MC07B (1-phase supply system) Part number (without "safe stop")		0011-2B1-4-00 828 496 2	0015-2B1-4-00 828 497 0	0022-2B1-4-00 828 498 9
INPUT				
Nominal line voltage	V_{line}	1 × AC 200 – 240 V		
Nominal line frequency	f_{line}	50/60 Hz ±5%		
Nominal line current (with 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_{line}		
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-quadrant operation)	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 m^3/h
Current limitation		150% I_N for at least 60 seconds		
Unit terminal cross section / tightening torque	Terminals	4 mm^2 / 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		

2.1.6 MOVITRAC® B electronics data

Function	Terminal	Designation	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
Digital inputs	X12:1 X12:2[1)] X12:3 X12:4 X12:5 X12.6	DI00 DI01 DI02 DI03 DI04 DI05TF	Fault 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 / trip value 3 kΩ
Auxiliary voltage output /external voltage supply[2)]	X12:8	24VIO		Auxiliary supply output: V = DC 24 V, current carrying capacity I_{max} = 50 mA External voltage supply: V = DC 24 V –15% / +20% according to EN 61131-2 See chapter "Project planning / External DC 24 V voltage supply".
Reference terminal	X12:9	GND		Reference potential for binary and analog signals, PE potential
Digital 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 45).			
Terminal response times	Digital input and output terminals are updated every 5 ms			
Max. cable cross-section	1.5 mm^2 (AWG15) without conductor end sleeves 1.0 mm^2 (AWG17) with conductor end sleeves			
Cable stripping length	X10 / X12 / X13: 5 mm FSC11B/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) X12:2 / DI01 with fixed assignment CW/stop

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

DC 24 V power demand for 24 V backup mode

Size	Power demand of basic unit[1)]	DBG60B	FIO11B	Fieldbus option[2)3)]	DHP11B[3)]	DHE21B/41B[3)]	FSE24B
0 MC07B..-00	5 W	1 W	2 W	3.4 W	4.5 W	8.5 W	1.2 W
0 MC07B..-S0	12 W						
1, 2S, 2	17 W						
3	23 W						
4, 5	25 W						

1) Including FIO21B, FBG11B, FSC11B/12B (UWS11A / USB11A). Take account of the additional load of the digital inputs with 2.4 W per 100 mA.

2) Fieldbus options are: DFP21B, DFD11B, DFE32B, ...

3) These options must ALWAYS be supplied externally.

2.1.7 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; **must not 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) 2 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-related 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-related 24 V supply at MOVITRAC® B until the disconnection of the pulse pattern at output stage $t_{switch\text{-}off}$	0	–	–	–	20 ms
	1 – 5	–	–	–	100 ms
Time for restart	200 ms				

2.2 Technical data for accessories and options

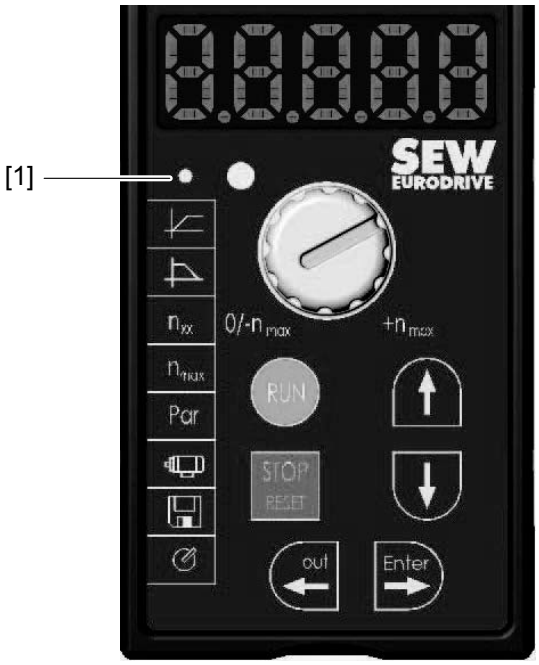
2.2.1 Keypads

Basic keypad FBG11B

Part number: 1820 635 2

Description

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



9007199279701003

[1] LED display

Functions

- Display process values and status
- Fault memory queries and fault reset
- Displaying and setting parameters
- Data backup and transfer of parameter sets
- Easy-to-use startup menu for SEW motors and non-SEW motors
- Manual control of MOVITRAC® B

Features

- 5-digit 7-segment display / 6 buttons / 8 icons / setpoint adjuster
- Selection of short or long menu
- Can be plugged onto the inverter (during operation)
- Degree of protection IP20 (EN 60529)
- LED display when IPOS® program is started

Advanced keypad DBG60B

Description

The basic version of MOVITRAC® does not have a DBG60B keypad and can be upgraded to include the keypad as an option. Controlling MOVITRAC® 07B using the DBG60B advanced operator terminal is only possible with firmware 13 and higher.

Operator terminal		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 digital inputs/outputs
- Fault memory queries and fault 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

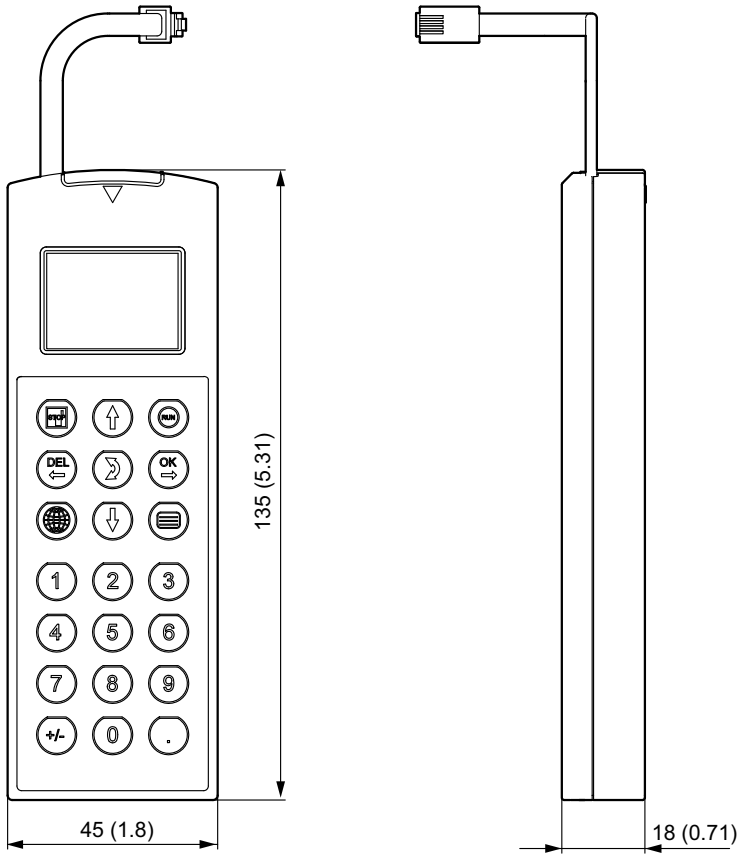
- Illuminated plain text display, choice of 7 languages
- Keypad with 21 keys
- Can be connected via extension cable DKG60B (5 m (20 ft))
- Degree of protection IP40 (EN 60529)

INFORMATION

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

Dimension drawing of DBG60B

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



All dimensions in mm (in)

DBM60B/DKG60B built-in housing for DBG60B

Description

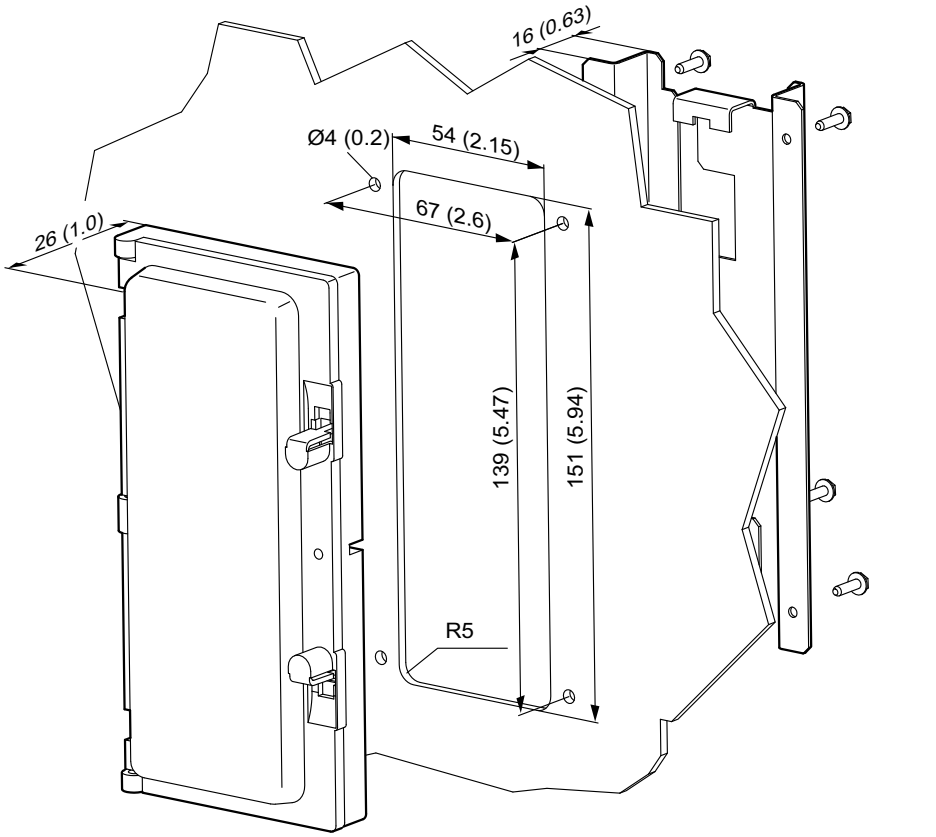
The DBM60B option can be used to mount the keypad close to the inverter (e.g. in the control cabinet door). The DBM60B option consists of a housing in degree of protection IP65 and a 5 m (20 ft) long DKG60B extension cable.

Part numbers

- DBM60B 08248532
- DKG60B 08175837

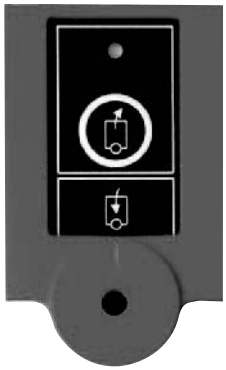
Dimension drawing DBM60B/DKG60B

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



All dimensions in mm (in)

UBP11A parameter module



18028939

Part number 823 933 9

Description

- For saving data from the inverter to the parameter module
- For 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
  - 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, do not additionally connect the MOVITRAC® B RS485.

MBG11A setpoint adjuster

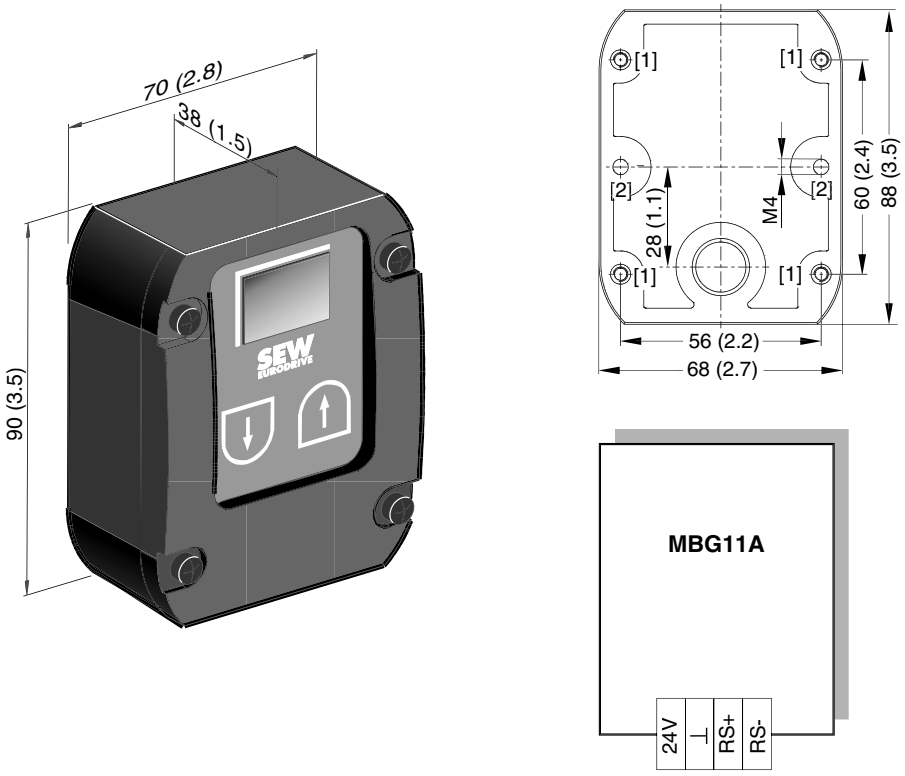
Part number 822 547 8

Description

- The MBG11A setpoint adjuster has 2 keys and a display. It allows for remote speed control in the range of –100% to +100% f_{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.

Dimensions and connection assignment

All dimensions are specified in mm (in).



186412427

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

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 Bd)
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

2.2.2 Interface adapters

UWS11A interface adapter

INFORMATION

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

Part number

822 689 X

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 MOVITRAC®.

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

RS232 interface

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

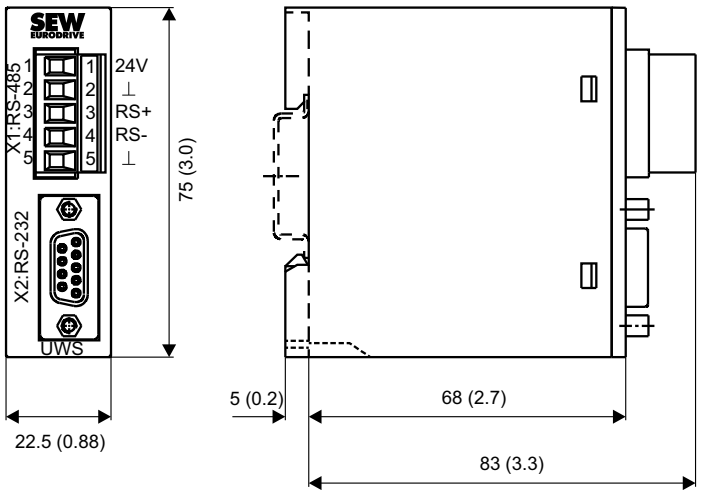
RS485 interface

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)

Dimension drawing 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.

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)

UWS21B interface adapter

INFORMATION

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

Part number 1820 456 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.

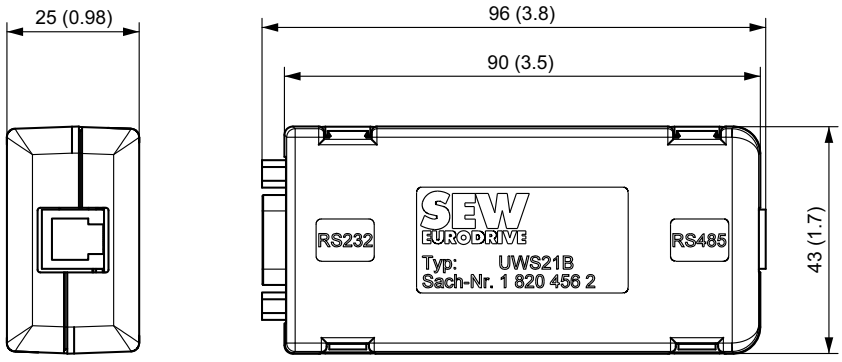
RS232 interface The connection of UWS21B with PC is made using a standard serial interface cable (shielded).

RS485 interface UWS21B and MOVITRAC® B are connected using a serial interface cable with RJ10 connectors.

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

Dimension drawing UWS21B



1454854283

All dimensions in mm (in)

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)

USB11A interface adapter

INFORMATION

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

Part number 824 831 1

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.

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

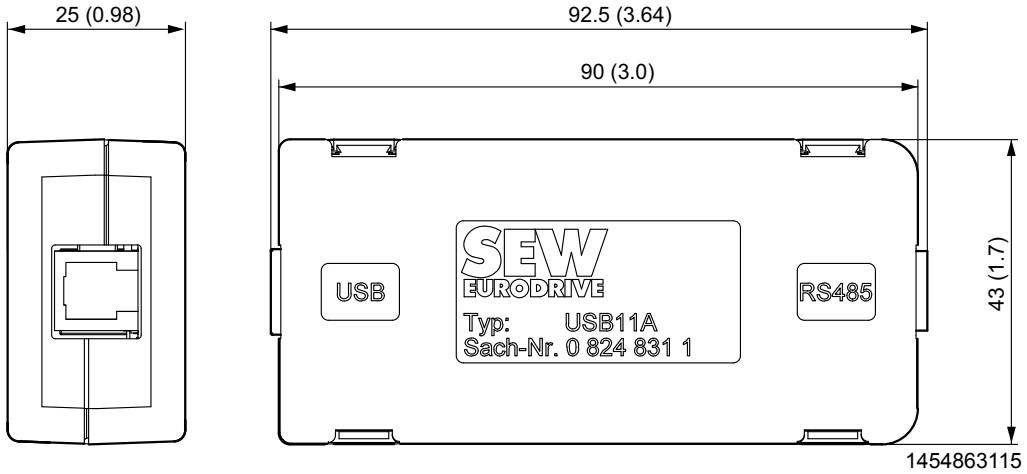
RS485 interface USB11B and MOVITRAC® B are connected using a serial interface cable with RJ10 connectors.

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

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

Dimension drawing All dimensions in mm (in)



All dimensions in mm (in)

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)

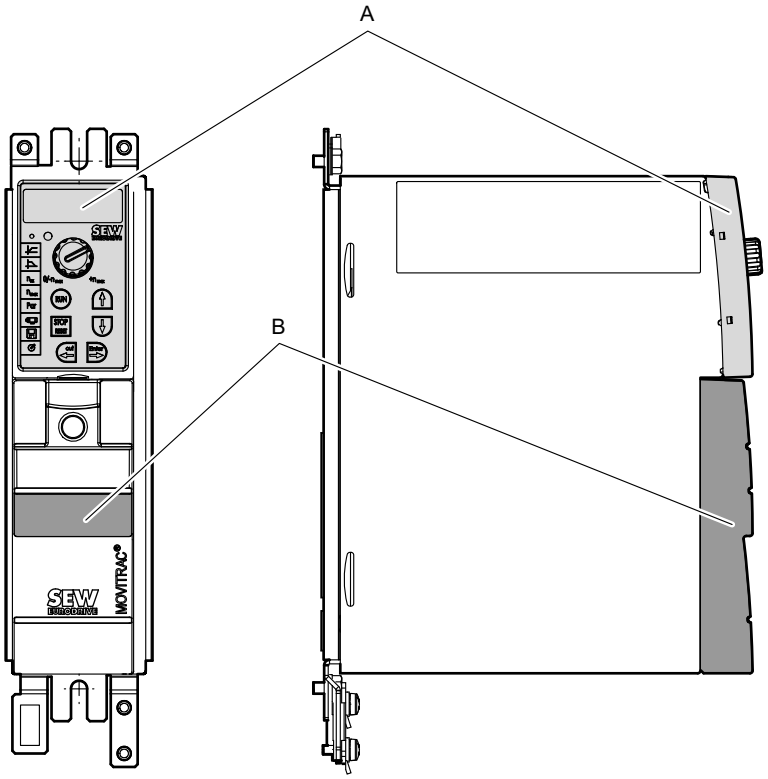
2.2.3 Front modules

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

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 therefore not be used simultaneously).



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Slot A is reserved for FBG11B.

Slot B is intended for one of the following modules:

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

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





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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
Service interface	X44 RJ10	Service interface	EIA standard, 9.6 kBd Connection: Only for service purposes, solely for point-to-point connection Maximum cable length 3 m (10 ft)
RS485 interface	X45:H X45:L X45:⊥ X44 RJ10	ST11: RS485+ ST12: RS485– GND: Reference potential Service interface	EIA standard, 9.6 kBd, 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

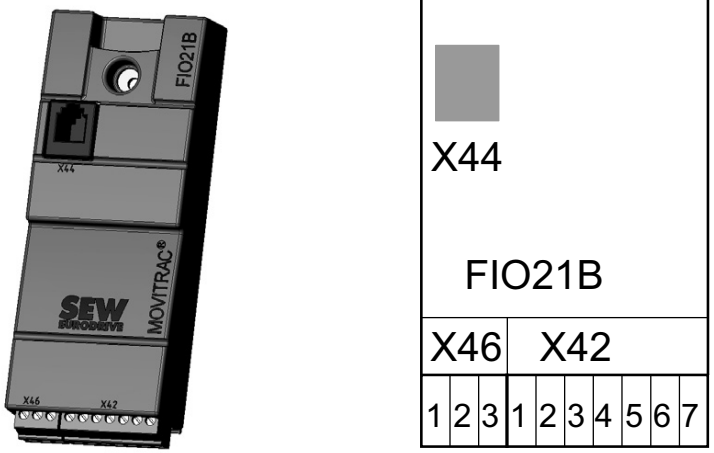
FIO21B digital module

Part number 1822 541 1

Description

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

- 7 additional digital 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
Digital 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 kBd 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 in accordance with CAN specification 2.0, parts A and B Transmission technology according to ISO 11898, max. 64 stations Bus termination possible between SC11 and SC12 with enclosed 120 Ω resistor.

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

FSC11B communication module

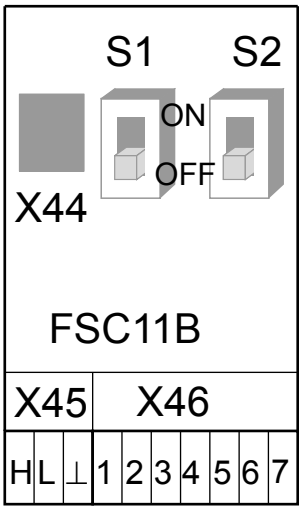
Part number: 1820 716 2

Description

The FSC11B communication module 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)





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Electronics data for FSC11B communication module

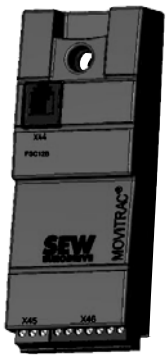
Function	Terminal	Designation	Data
System bus (SBus)	X46:1 X46:2 X46:3 X46:4 X46:5 X46:6 X46:7	SC11: SBus high SC12: SBus low GND: Reference potential SC21: SBus high SC22: SBus low GND: Reference potential 24VIO: Auxiliary voltage / External voltage supply	CAN bus according to CAN specification 2.0, parts A and B, transmission technology according to ISO 11898, max. 64 stations, terminating resistor (120 Ω) can be activated using DIP switch **S1**.
Service interface	X44 RJ10	Service interface	EIA standard, 9.6 kBd Connection: Only for service purposes, solely for point-to-point connection Maximum cable length 3 m (10 ft)
RS485 interface	X45:H X45:L X45:⊥	ST11: RS485+ ST12: RS485– GND: Reference potential	EIA standard, 9.6 kBd, max. 32 stations Maximum cable length 200 m (656 ft) Dynamic terminating resistor with fixed installation

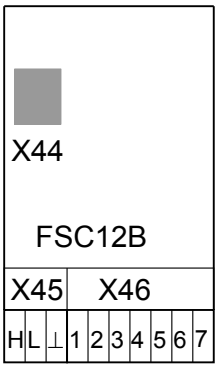
The terminal cross-section for all terminals of the FSC11B is:

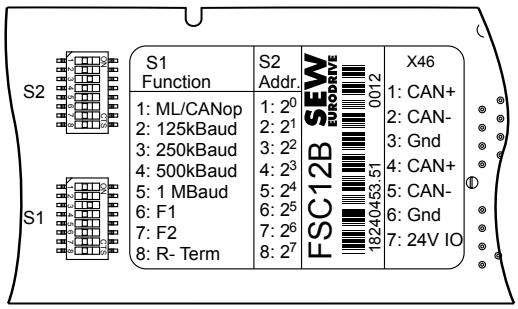
- 1.5 mm^2 (AWG15) without conductor end sleeves
- 1.0 mm^2 (AWG17) with conductor end sleeves

FSC12B communication module

Part number: 1824 045 3







3833587211

Description

The FSC12B communication module 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

In contrast to the FSC11B communication module, the CAN address can be set permanently with FSC12B. Setting it in the software is not necessary. The address can be kept even in case of a unit replacement.

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).
Service interface	X44 RJ10	Service interface	EIA standard, 9.6 kBd Connection: Only for service purposes, solely for point-to-point connection Maximum cable length 3 m (10 ft)
RS485 interface	X45:H X45:L X45:⊥	ST11: RS485+ ST12: RS485– GND: Reference potential	EIA standard, 9.6 kBd, max. 32 stations Maximum cable length 200 m (656 ft) Dynamic terminating resistor with fixed installation
DIP switches	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 kBd S1:3 250 kBd S1:4 500 kBd S1:5 1 MBd 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 a 120 Ω bus termination between CAN high and CAN low

Terminal cross-section for all terminals of the FSC12B:

- 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. This means the values set in 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.

Examples of invalid addresses:

- 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 version 5.80 or later.

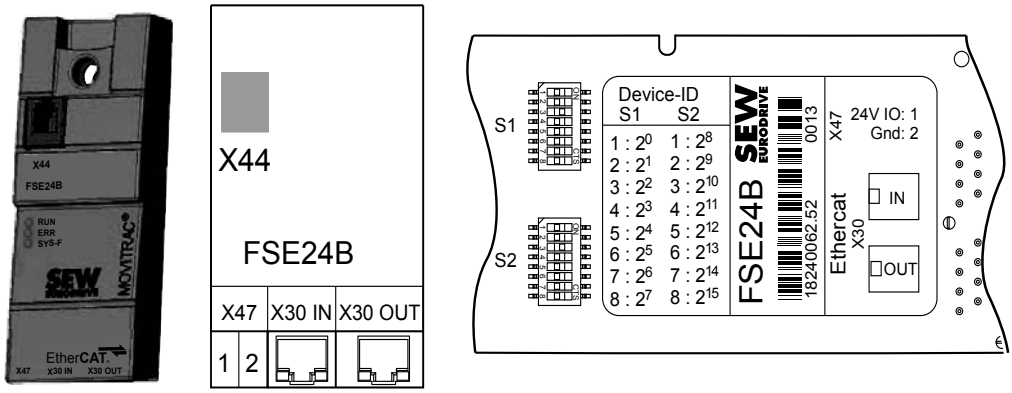
EtherCAT® module FSE24B

Part number: 1824 006 2

Description

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

- EtherCAT®
- RS485 service interface



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The communication module is also available as gateway variant DFE24B.

Electronics data EtherCAT® FSE24B

Function	Terminal	Designation	Data
EtherCAT®	X30 IN X30 OUT (2 × RJ45)	Incoming and outgoing EtherCAT® connection	• Fast Ethernet (100 MBd, full duplex) • Auto-crossing • IEC 61158, IEC 61784-2
Service interface	X44 RJ10	Service interface	EIA standard, 9.6 kBd Connection: Only for service purposes, solely for point-to-point connection Maximum cable length 3 m (10 ft)
External voltage supply	X47:1 X47:2	24 V IO GND	• U = DC 24 V (–15%, +20%) • The FSE24B and MOVITRAC® B are supplied with 24 V via X47 • Alternatively, the FSE24B can be supplied via the MOVITRAC® B only

You can use DIP switches S1 and S2 to set a binary-coded device 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.

2.2.4 Fieldbus connection

DFP21B fieldbus interface for PROFIBUS

Part number: 1820 962 9

1823 840 8 as a kit with suitable screws.

Description

With the powerful, universal fieldbus interface option DFP21B, the MOVITRAC® B frequency inverter can be connected to higher-level automation systems via PROFIBUS DP and DP-V1.

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 variants	PROFIBUS DP and DP-V1 according to IEC 61158
	Automatic baud rate detection	9.6 kBd – 12 MBd
	Connection technology	• Via 9-pin D-sub connector • Pin assignment according 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 switches
	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

DFS11B fieldbus interface for PROFIBUS / PROFIsafe®

Part number: 1821 183 6

1823 863 7 as a kit with suitable screws.

Description

With the powerful, universal fieldbus interface option DFS11B, the MOVITRAC® B frequency inverter can be connected to higher-level automation systems via PROFIBUS and PROFIsafe.

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 variants	PROFIBUS DP and DP-V1 according to IEC 61158
	Automatic baud rate detection	9.6 kBd – 12 MBd
	Connection technology	• Via 9-pin D-sub connector • Pin assignment according 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 switches
	F address	1 – 1022, can be set via DIP switches
	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

- **⚠ CAUTION**

  Safety-related applications are implemented using PROFIsafe interfaces.

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

DFD11B fieldbus interface for DeviceNet

Description

With the powerful, universal fieldbus interface option DFD11B, the MOVITRAC® B frequency inverter can be connected to higher-level automation systems via the open and standardized fieldbus system DeviceNet.

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 kBd, can be set via DIP switches
	Bus cable length	For thick cable according to DeviceNet specification 2.0 appendix B: • 500 m (1640 ft) at 125 kBd • 250 m (820 ft) at 250 kBd • 100 m (656 ft) at 500 kBd
	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 switches • 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

DFE24B fieldbus interface for EtherCAT®

Description

With the powerful, universal fieldbus interface option DFE24B, the MOVITRAC® B frequency inverter can be connected to higher-level automation systems via EtherCAT.®

Refer to the publication "DFE24B EtherCAT® fieldbus interface" for installation.

Instead of the DFE24B, you may also use the FSE24B front module (page 63). 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 MBd full duplex
	Connection technology	2 × RJ45 (8 × 8 modular jack)
	Bus termination	Not integrated because bus termination is activated automatically.
	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®)

DFE32B fieldbus interface for PROFINET IO RT

Description

With the powerful, universal fieldbus interface option DFE32B, the MOVITRAC® B frequency inverter can be connected to higher-level automation systems via PROFINET IO RT.

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 $_{hex}$) to control and set parameters for the frequency inverter. • **HTTP** (Hypertext Transfer Protocol) for diagnostics using a Web browser. • **SMLP** (Simple MOVILINK Protocol), protocol used by MOVITOOLS® MotionStudio.
	Port numbers used	• 300 (SMLP) • 80 (HTTP)
	Ethernet services	• ARP • ICMP (ping)
	OSI layer 1/2	Ethernet II
	Baud rate	100 Mbd in full duplex mode
	Connection technology	2 × 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

DFS21B fieldbus interface for PROFINET / PROFIsafe®

Description

With the powerful, universal fieldbus interface option DFS21B, the MOVITRAC® B frequency inverter can be connected to higher-level automation systems via PROFINET IO RT with PROFIsafe.

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 $_{hex}$) to control and set parameters for the frequency inverter. • **HTTP** (Hypertext Transfer Protocol) for diagnostics using a Web browser. • **SMLP** (Simple MOVILINK Protocol), protocol used by MOVITOOLS® MotionStudio.
	Port numbers used	• 300 (SMLP) • 80 (HTTP)
	Ethernet services	• ARP • ICMP (ping)
	OSI layer 1/2	Ethernet II
	Baud rate	100 Mbd in full duplex mode
	Connection technology	2 × 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 switches
	Manufacturer ID (vendor ID)	$010A_{hex}$
	GSD file name	GSML-V2.1-SEW-DFE-DFS-2Ports-YYYYMMTT.xml

- **⚠ NOTICE**

  Safety-related applications are implemented using PROFIsafe interfaces.

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

DFE33B fieldbus interface for EtherNet/IP and Modbus/TCP

Description

With the powerful, universal fieldbus interface option EtherNet/IP DFE33B, the MOVITRAC® B frequency inverter can be connected to higher-level automation systems via EtherNet/IP.

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

Electronics data

DFE33B option		
	**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 MBd
	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

Fieldbus gateways

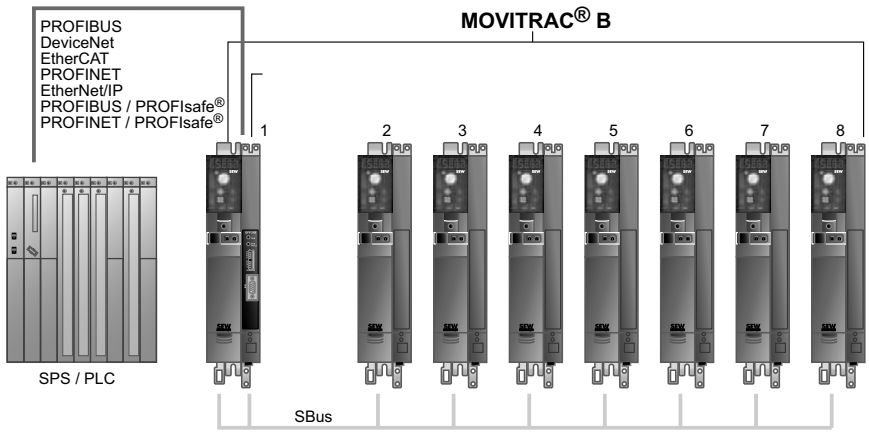
Fieldbus gateways convert standard fieldbuses into the SEW SBus. This means that up to 8 inverters can be triggered using one gateway.

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® frequency inverters) with the fieldbus via SBus.

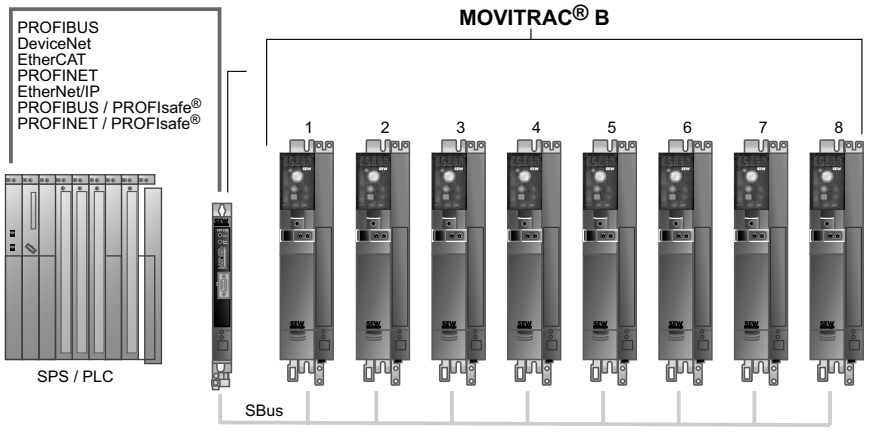
There are two different versions of gateway functionality:

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



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- In separate housing: The DF..B fieldbus interface is mounted in an UOH11B housing.



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INFORMATION

If a fieldbus interface is factory-installed in MOVITRAC® B, then the 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 connection to the following fieldbus systems:

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

1) Integration in inverter not with size 0XS.

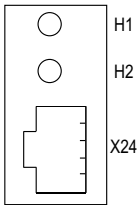
2) As an alternative, you can connect each MOVITRAC® B unit to an EtherCAT® network via FSE24B front module.

MOVITRAC® B with installed option card comes equipped 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 voltage to the gateway.

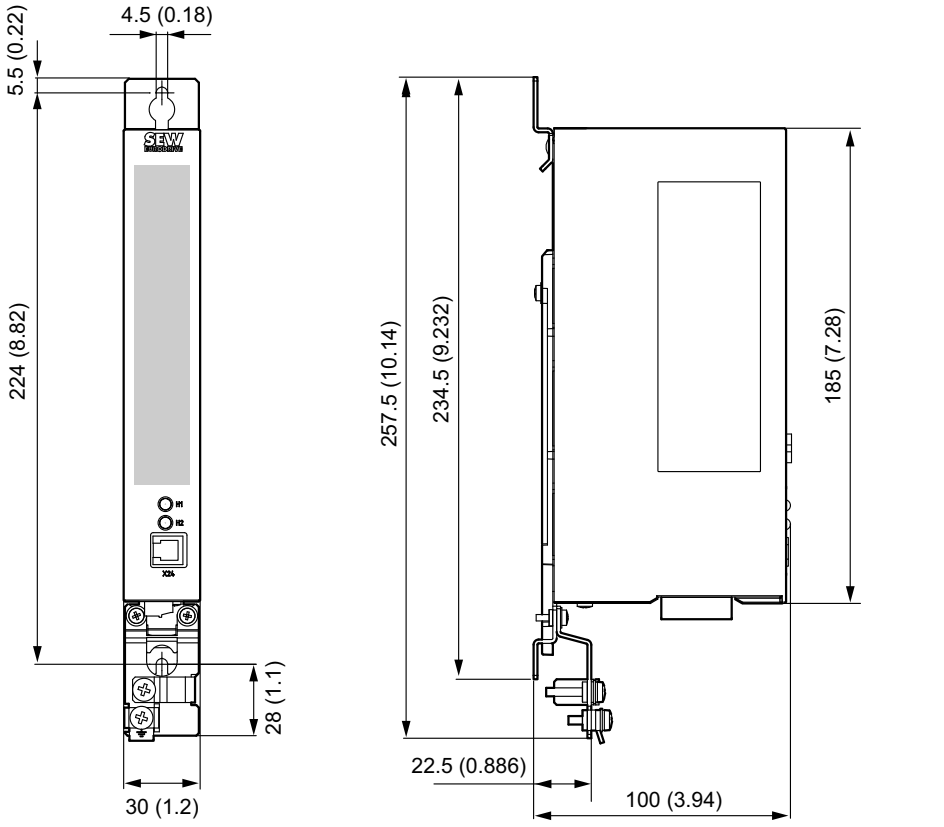
Functional principle

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
	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 drawing UOH

All dimensions are specified in mm (in).



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2.2.5 MOVI-PLC controller®

Unit variants

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 variant		Description
MOVI-PLC® basic	DHP11B-T0	MOVI-PLC® basic controller
	DHP11B-T1[1),2)]	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, in addition enormous power reserves and high-speed interfaces.

1) Versions T1 and T2 are only partly useful together with MOVITRAC® B

2) Please consult SEW-EURODRIVE.

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 is 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®).

MOVI-PLC® basic DHP11B

Electronics data of MOVI-PLC® basic DHP11B:



Status displays	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 kBd to 12 MBd • 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
Connection technology	• PROFIBUS: 9-pin D-sub connector according to IEC 61158 • System buses and I/Os: Plug-in terminals • RS485: RJ10
Digital inputs/ outputs	8 I/Os according to IEC 61131-2; can be configured as inputs or outputs, 5 of which are interrupt-capable.
Memory	• Program: 512 KB • Data: 128 KB • Retain: 24 KB
Tools for startup	• Programming languages – IL – ST – LD – FBD – SFC • Libraries for optimized inverter control

MOVI-PLC® basic DHE21B/41B

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

DHE21B/41B option		
 1455764363	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: Digital 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 digital inputs and outputs • Potential system bus CAN 2
	Memory	• Retain data: 32 kB • System variables (retain): 8 kB Program memory: • DHE21B: 2 MB (for application program, incl. IEC libraries) • DHE41B: 6 MB (for application 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 • Min. 128 MB memory • Versions, part numbers and functions: – OMH41B-T0: 1821 204 2 Functions: Management of speed control functions, positioning, e.g. with the MPLCMotion_MDX library – OMH41B-T1: 1821 205 0 Additional functions: e.g. electronic cam, electronic gear unit, cam controller – OMH41B-T2: 1821 206 9 Additional functions: e.g. handling
	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

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.

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® version thanks to the 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.

Configurable application controller (CCU)

The controller can be used as configurable application controller (CCU) by using SD cards of the type OMC41B. You can then only execute standardized application modules created by SEW-EURODRIVE. 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.

Performance class CCU Standard

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

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.

Documentation for MOVI-PLC®

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

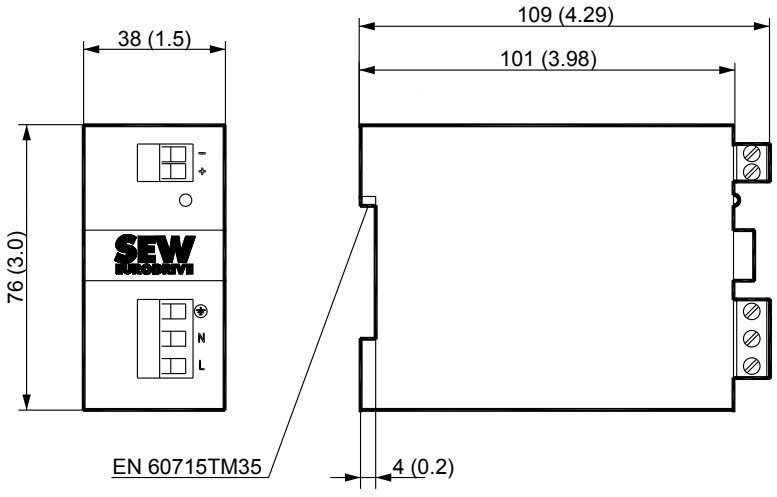
- "Controller DHE21B / DHF21B / DHR21B (standard), DHE41B / DHF41B / DHR41B (advanced)" manual
- "MOVI-PLC® basic DHP11B Controller" manual

2.2.6 Switched-mode power supply UWU52A

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 at 40 °C at 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

Dimension drawing All dimensions are specified in mm (in).



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2.2.7 Regenerative power supply

For MOVITRAC® B inverters from size 2 operating in regenerative mode and 4Q operation, you can use the MOVIDRIVE® MDR60A regenerative power supply unit as an alternative to braking resistors. The prerequisite is a powerful supply system. For more detailed information, refer to the "MOVIDRIVE® MDR60A Regenerative Power Supply Unit" system manual. This manual can be ordered from SEW-EURODRIVE.

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

UL approval

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

Protection and monitoring functions

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



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Characteristics of the regenerative power supply unit compared to an inverter with braking resistors

- Energy balance: Regenerative power is fed back into the supply system instead of being converted into waste heat.
- Less installation work with several inverters (network and braking resistor connections). However, a braking resistor is required to bring the drive to a controlled stop in case there is a disruption in the supply system.
- Reduction in use of control cabinet capacity and ventilator power if the braking resistor used to have to be installed in the control cabinet.

General technical data

MOVIDRIVE® MDR60A regenerative power supply unit

MOVIDRIVE® MDR60A	**0150-503-00 (size 2)** **0370-503-00 (size 3)** **0750-503-00 (size 4)**
Interference immunity	Meets EN 61800-3
Interference emission with EMC-compliant installation	Meets EN 61800-3: • with NF035-503 line filter (MDR60A0150-503-00) • with NF048-503 line filter (MDR60A0150-503-00) • with NF085-503 line filter (MDR60A0370-503-00) • with NF150-503 line filter (MDR60A0750-503-00)
Ambient temperature ϑ_{amb} **Derating ambient temperature**	0 °C to +40 °C I_N reduction: 3% I_N per K to max. 60 °C
Climate class	EN 60721-3-3, class 3K3
Storage temperature[1] ϑ_S	–25 °C to +70 °C (EN 60721-3-3, class 3K3)
Cooling type (DIN 51751)	Forced cooling (temperature-controlled fan, response threshold 50 °C)
Degree of protection **size 2** **EN 60529** **size 3** **(NEMA1)** **size 4**	IP20 IP20 IP00 (power connections) IP10 (power connections) • With fitted plexiglass cover supplied as standard • With fitted shrink tubing (not included in scope of delivery) IP20 • with mounted DLB11B touch guard
Duty type	Continuous duty (EN 60149-1-1 and 1-3)
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Installation altitude	There are no restrictions for heights < 1000 m. The following restrictions apply to heights ≥ 1000 m: • From 1000 m to max. 4000 m: – I_N reduction by 1% per 100 m • 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 60664-1/EN 61800-5-1). – You have to connect an overvoltage protection device in order to reduce the overvoltages from category III to category II.

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

Technical data for MOVIDRIVE® MDR60A

MOVIDRIVE® MDR60A0150/0370 size 2 and size 3

MOVIDRIVE® MDR60A Standard variant Variant with coated printed circuit boards		Size 2 0150-503-00 0150-503-00/L	Size 3 0370-503-00 0370-503-00/L
Part number		1 825 271 0 1 825 272 9	826 658 1 829 672 3
INPUT			
Nominal line voltage (according to EN 50160)	V_{line}	3 × AC 380 V - 500 V	
Line frequency	f_{line}	50 Hz - 60 Hz ±5%	
Nominal connected load	P_N	15 kW	37 kW
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line}	AC 29 A	AC 66 A
ELECTRONICS TERMINALS			
Digital inputs **Internal resistance**		PLC compatible (EN 61131), sampling time 1 ms R_i = 3.0 kΩ, I_E ≈ 10 mA	
Signal level		+13 V – +30 V = "1" = contact closed -3 V – +5 V = "0" = contact open	
Digital outputs		PLC compatible (EN 61131-2), response time 1 ms, short-circuit proof, I_{max} = 50 mA	
Signal level		"0"=0 V, "1"=+24 V, **Important: Do not apply external voltage!**	
DC LINK			
Apparent output power (at V_{line} = 3 × AC 380 – 500 V)	S_A	25 kVA	50 kVA
DC link voltage (at nominal supply current I_{line})	$V_{DC\ link}$	DC 560 V - 780 V	
Nominal DC link current (at nominal supply current I_{line})	$I_{DC\ link}$	DC 35 A	DC 70 A
Max. DC link current	$I_{DC\ link_max}$	DC 53 A	DC 105 A
GENERAL INFORMATION			
Power loss at P_N	P_{Vmax}	120 W	950 W
Cooling air consumption		100 m^3/h	180 m^3/h
Connection for power terminals **Permitted tightening torque** **Permitted cable cross section**	**X1, X2**	Separable terminal strip DIN 46228 conductor end sleeve 1.8 Nm (16 in-lb) 6 mm^2 (AWG9) PE: M4 with 1.5 Nm (13 n-lb)	M6 screw and washer assembly 3.5 Nm (31 in-lb) 25 mm^2 (AWG4)
Connection for electronics terminals	**X3**	Permitted cable cross-section: • One core per terminal: 0.20 – 2.5 mm^2 (AWG 24 – 13) • Two cores per terminal: 0.25 – 1 mm^2 (AWG 23 – 17)	
Mass		4 kg (8.8 lb)	16 kg (35 lb)
Dimensions	**W×H×D**	118 mm × 320 mm × 127 mm (4.65 in × 12.6 in × 5.0 in)	200 mm × 465 mm × 221 mm (7.87 in × 18.3 in × 8.7 in)
Line choke (always required)		ND045-013, L_N = 0.1 mH Part number 826 013 3	ND085-013 L_N = 0.1 mH Part number 826 014 1
Line filter (optional)		NF035-503 up to 15 kW Part number 827 128 3 NF048-503 up to 22 kW (15 kW × 125%) Part number 827 117 8	NF085-503, Part number 827 415 0
For MOVIDRIVE® MDX60B/61B...-5_3		0005 – 0150	0005 – 0370
Recommended line fuse		63 A	100 A

MOVIDRIVE® MDR60A0750/1320 size 4

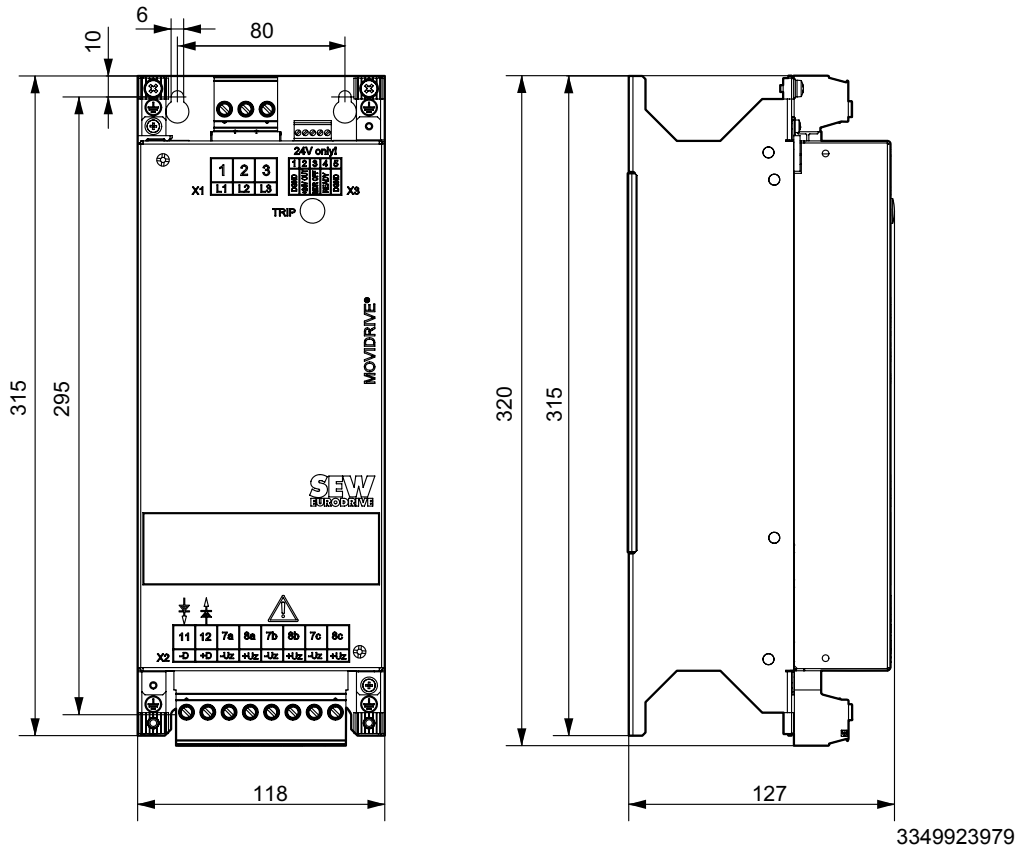
MOVIDRIVE® MDR60A **Standard variant** **Variant with coated printed circuit boards**		**Size 4** **0750-503-00** **0750-503-00/L**
Part number		826 556 9 829 673 1
INPUT		
Nominal line voltage **(according to EN 50160)**	V_{line}	3 × AC 380 V - 500 V
Line frequency	f_{line}	50 Hz - 60 Hz ±5%
Nominal connected load	P_N	75 kW
Nominal line current **(at V_{line} = 3 × AC 400 V)**	I_{line}	AC 117 A
ELECTRONICS TERMINALS		
Digital inputs **Internal resistance**		Isolated (optocoupler), PLC compatible (EN 61131), sampling interval 1 ms R_i = 3.0 kΩ, I_E ≈ 10 mA
Signal level		+13 V – +30 V = "1" = Contact closed -3 V – +5 V = "0" = Contact open
Digital outputs		PLC compatible (EN 61131-2), response time 1 ms, short-circuit proof, I_{max} = 50 mA
Signal level		"0"=0 V, "1"=+24 V, **Important: Do not apply external voltage.**
DC LINK		
Apparent output power **(at V_{line} = 3 × AC 380 – 500 V)**	S_A	90 kVA
DC link voltage	$V_{DC\ link}$	DC 560 V - 780 V
Nominal DC link current **(at nominal supply current I_{line})**	$I_{DC\ link}$	DC 141 A
Max. DC link current **(at nominal supply current I_{line})**	$I_{DC\ link_max}$	DC 212 A
GENERAL INFORMATION		
Power loss at P_N	P_{Vmax}	1700 W
Cooling air consumption		360 m^3/h
Connection for power terminals **(L1, L2, L3 for size 6)** **Permitted tightening torque** **Permitted cable cross section**	X1, X2	M10 terminal studs 14 Nm (120 in-lb) 70 mm^2 (AWG2/0)
Connection of power terminals SKS 1 – 3		–
Connection for electronics terminals **(X2 for size 6)**	X3	Permitted cable cross-section: • One core per terminal: 0.20 – 2.5 mm^2 (AWG 24 – 13) • Two cores per terminal: 0.25 – 1 mm^2 (AWG 23 – 17)
Mass		24 kg (53 lb)
Dimensions	W×H×D	280 mm × 522 mm × 205 mm (11 in × 20.6 in × 8.07 in)
Line choke (always required)		ND200-0033 L_N = 0.03 mH Part number 826 579 8
Line filter (optional)		NF150-503, Part number 827 417 7
For MOVIDRIVE® MDX60B/61B...-5_3		0005 – 0750
Recommended line fuse		175 A

Dimension drawings

MOVIDRIVE® MDR60A0150 size 2

Observe the following minimum clearance for control cabinet installation:

- Above and below 100 mm each (3.9 in)
- No clearance required on the side

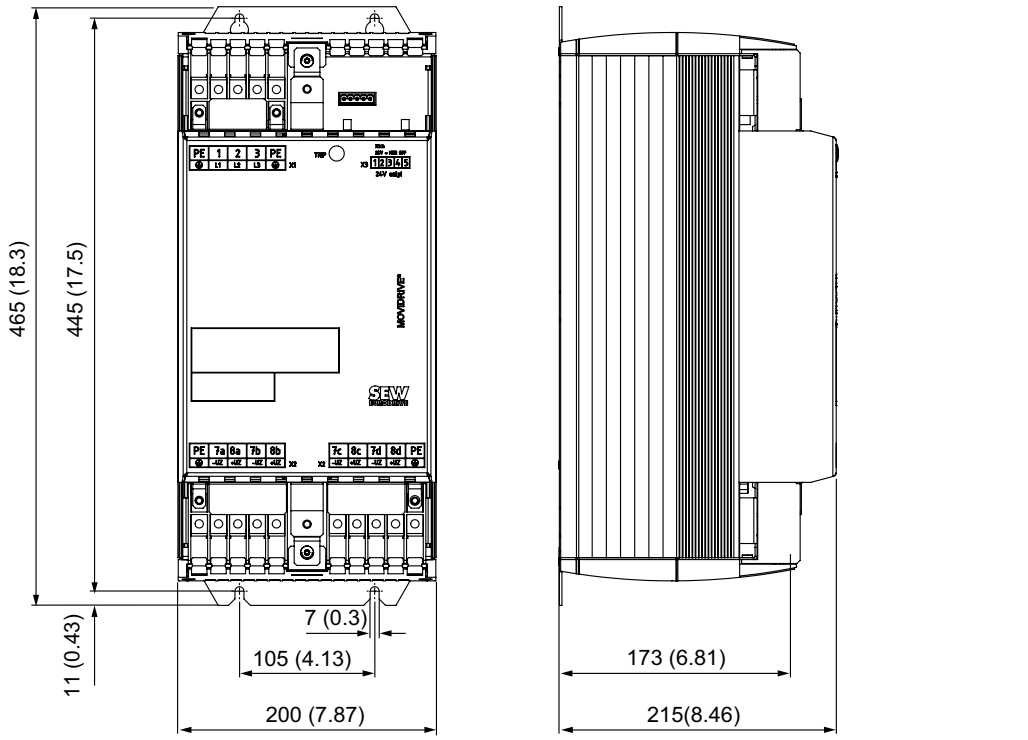


All dimensions in mm (in)

MOVIDRIVE® MDR60A0370 size 3

Observe the following minimum clearance for control cabinet installation:

- Above and below 100 mm each (3.9 in)
- No clearance required on the side

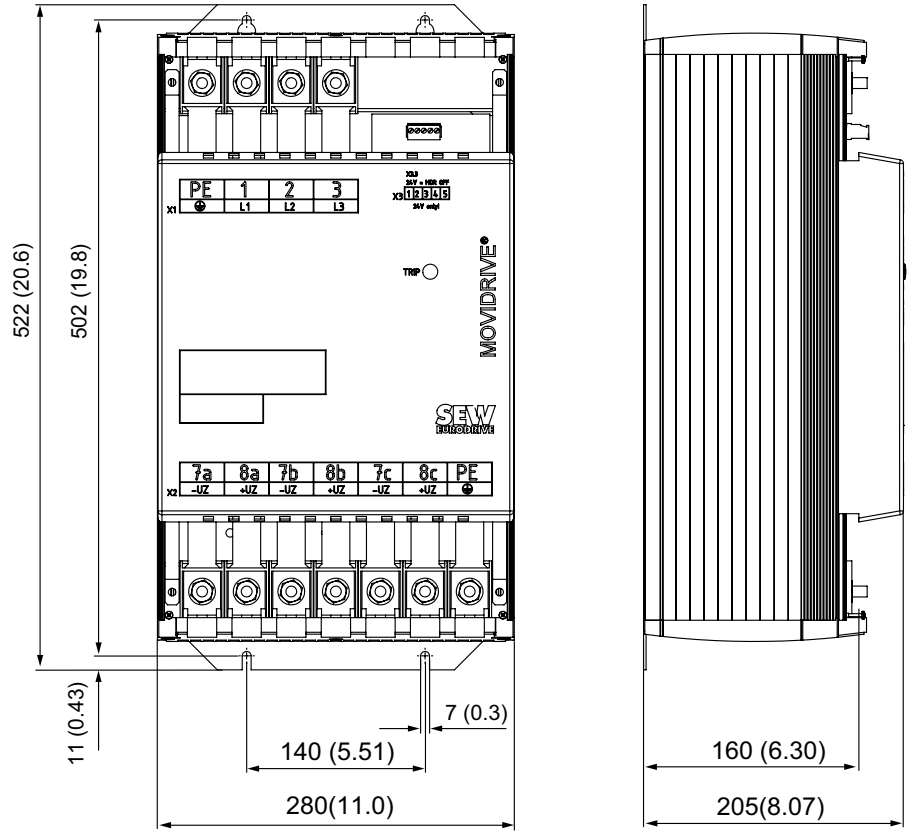


All dimensions in mm (in)

MOVIDRIVE®
MDR60A0750
size 4

Observe the following minimum clearance for control cabinet installation:

- Above and below 100 mm each (3.9 in)
- The minimum distance above the inverter for installing temperature-sensitive components, such as contactors or fuses, is 300 mm (11.8 in).
- No clearance required on the side



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All dimensions in mm (in)

DC link connection

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

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

Cable set type	DCP12A	DCP13A	DCP15A
Part number	814 567 9	814 250 5	814 251 3
For connecting MOVITRAC®	0055 ... 0110	0150 ... 0300	0400 ... 0750



INFORMATION

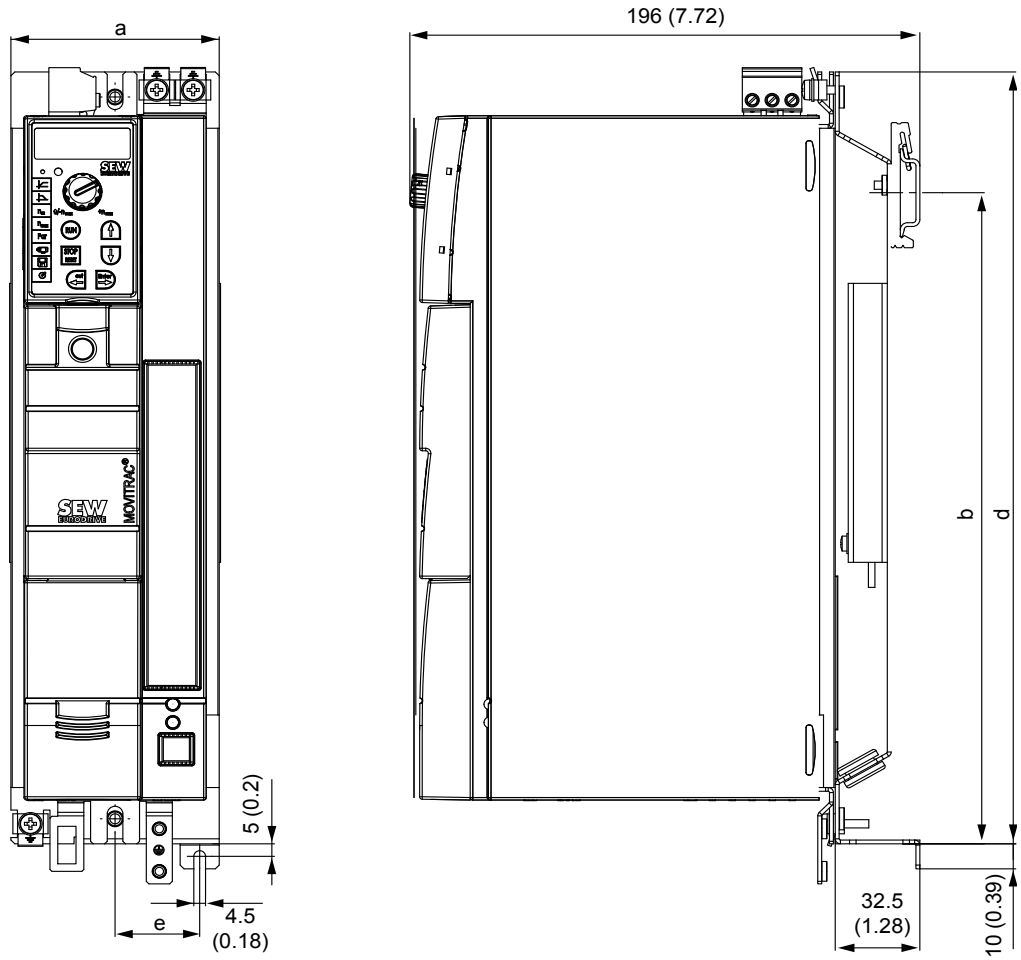
Refer to the "MOVIDRIVE® MDR60A Regenerative Power Supply Unit" system manual for information on the DC link connection. This system manual can be ordered from SEW-EURODRIVE.

2.2.8 FHS11B/12B/13B support rail mounting

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		

Dimension drawing All dimensions are specified in mm (in).

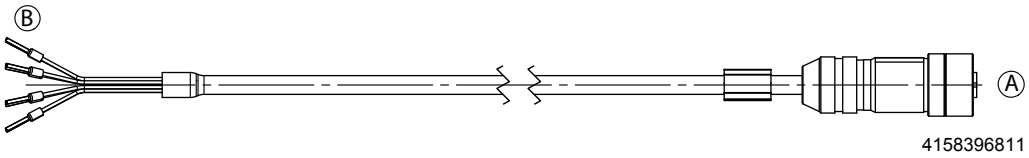


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MOVITRAC® B size	All dimensions in mm (in)			
	a	b	d	e
0XS	55 (2.2)	171.5 (6,752)	220 (8.66)	7.5 (0.30)
0S	80 (3.1)	171.5 (6,752)	220 (8.66)	32.5 (1.28)
0L	80 (3.1)	260.3 (10.25)	308.5 (12.15)	32.5 (1.28)

2.2.9 Built-in encoder EI7C connection

Encoder cable with one M12



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Inverter connection			Motor connection side
Contact	Signal	Cable core color	Contact
X12.4 (DI03)	A	Brown (BN)	3
	$\overline{A}$	White (WH)	4
X12.5 (DI04)	B	Yellow (YE)	5
	$\overline{B}$	Green (GN)	6
	nc	Red (RD)	7
	nc	Blue (BU)	8
X12.8 (24VIO)	UB	Gray (GY)	1
X12.9 (GND)	GND	Pink (PK)	2

The encoder requires a current up to 40 mA. External 24 V supply might be required if digital inputs are also supplied.

Part number:

Cable type	M12, conductor end sleeves
Fixed installation	1362 3273
Cable carrier installation	1362 3281

You find more information in chapter "Simple positioning application module" (page 160).

2.3 Technical data of braking resistors, chokes and filters

2.3.1 Braking resistors

BW braking resistors

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 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

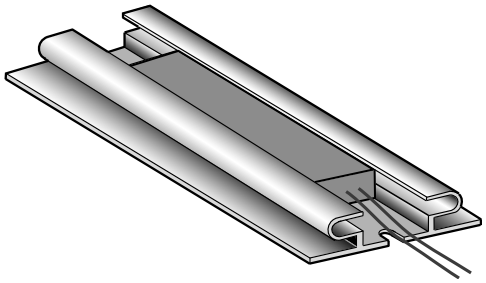
Type BW.. braking resistors are UL and cUL approved in conjunction with MOVITRAC® B frequency inverters. SEW-EURODRIVE will provide certification on request. The BW..-T and BW..-P braking resistors have cRUus approval independent of the MOVITRAC® B inverter.

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" fault (fault *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)	

Flat design

Flat-design resistors have IP54 enclosure 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 BW027-003 and BW072-003 braking resistors.
- Attach to a mounting rail using a BS touch guard.

230 V

Braking resistor type	**BW027-003**	**BW027-005**
Part number	826 949 1	826 950 5
100% cdf 50% cdf 25% cdf 12% cdf 6% cdf	230 W 310 W 410 W 550 W 980 W	450 W 610 W 840 W 1200 W 2360 W
Resistance value R_{BW}	27 Ω ±10%	27 Ω ±10%
Trip current of external bimetal relay	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 50% cdf 25% cdf 12% cdf 6% cdf	230 W 310 W 420 W 580 W 1000 W	450 W 600 W 830 W 1110 W 2000 W
Resistance value R_{BW}	72 Ω ±10%	72 Ω ±10%
Trip current of external bimetal relay	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

Wire resistors and grid resistors

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

SEW-EURODRIVE recommends implementing protection against overload for the wire and grid resistors by using a bimetallic relay with trip characteristics of trip class 10 or 10 A (in accordance with EN 60947-4-1). Set the 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 braking resistors of the BW..-T / BW..-P series, you can connect the integrated temperature sensor or the overcurrent 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 surfaces of the resistors get very hot if loaded with P_N. Make sure that you select an installation site that will accommodate these high temperatures. Braking resistors are therefore usually 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.

Assignment to AC 230 V units

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 138 5	1820 139 3	–	1820 140 7	1820 141 5
Type BW..-P part number	–	–	1820 416 3	–	–	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	2.2 kW	2.7 kW	5.9 kW	12.7 kW	4.2 kW	8.5 kW	17 kW
25 cdf	1.9 kW	3.8 kW	4.5 kW	10.5 kW	13.0 kW[1)]	7.5 kW	15.0 kW	19.6 kW[1)]
12% cdf	3.6 kW	7.2 kW	6.7 kW	13.0 kW[1)]	13.0 kW[1)]	11.2 kW	19.6 kW[1)]	19.6 kW[1)]
6% cdf	5.7 kW	8.7 kW[1)].	13.0 kW[1)]	13.0 kW[1)]	13.0 kW[1)]	19.0 kW	19.6 kW[1)]	19.6 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		Grid resistor					
For MOVITRAC® B	0015 – 0037		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	15.6 kW	13.5 kW	18 kW
50% cdf	0.5 kW	1.1 kW	2.2 kW	4.6 kW	15.6 kW	23 kW	30.6 kW
25% cdf	1.0 kW	1.9 kW	3.8 kW	6.0 kW[1)]	15.6 kW[1)]	39.2 kW[1)]	39.2 kW[1)]
12% cdf	1.8 kW	3.5 kW	6.0 kW[1)].	6.0 kW[1)]	15.6 kW[1)]	39.2 kW[1)]	39.2 kW[1)]
6% cdf	2.9 kW	5.7 kW	6.0 kW[1)]	6.0 kW[1)]	15.6 kW[1)]	39.2 kW[1)]	39.2 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				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

BW...-T / BW...-P	
Connection cross section for signal contact/tightening torque	1 x 2.5 mm²/ 1 Nm
Switching capability of the thermostat's signal contact	• DC 2 A / DC 24 V (DC11) • AC 2 A / AC 230V (AC11)
Switch contact (NC)	According to EN 61800-5-1

Assignment to AC 400 V units

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 50% cdf 25% cdf 12% cdf 6% cdf	0.6 kW 1.1 kW 1.9 kW 3.6 kW 5.7 kW	0.8 kW 1.4 kW 2.6 kW 4.8 kW 7.6 kW	1.2 kW 2.2 kW 3.8 kW 7.2 kW 11.4 kW[1].	1.2 kW 2.2 kW 3.8 kW 7.2 kW 11.4 kW	2.0 kW 3.8 kW 6.4 kW 12 kW 19 kW	4.0 kW 7.2 kW 12.8 kW 20 kW[1] 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 5 % cdf 25% cdf 12% cdf 6% cdf	1.2 kW 2.1 kW 3.8 kW 7.0 kW 11.4 kW	2.6 kW 4.7 kW 8.3 kW 15.6 kW 24.1 kW[1]	5.0 kW 8.5 kW 15.0 kW 22.5 kW[1] 24.1 kW[1]	1.5 kW 2.5 kW 4.5 kW 6.7 kW 11.4 kW	3.5 kW 5.9 kW 10.5 kW 15.7 kW 26.6 kW	7.5 kW 12.8 kW 22.5 kW 33.8 kW 52.3 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		Grid resistor			
For MOVITRAC® B	0110		0110	0150 / 0220		

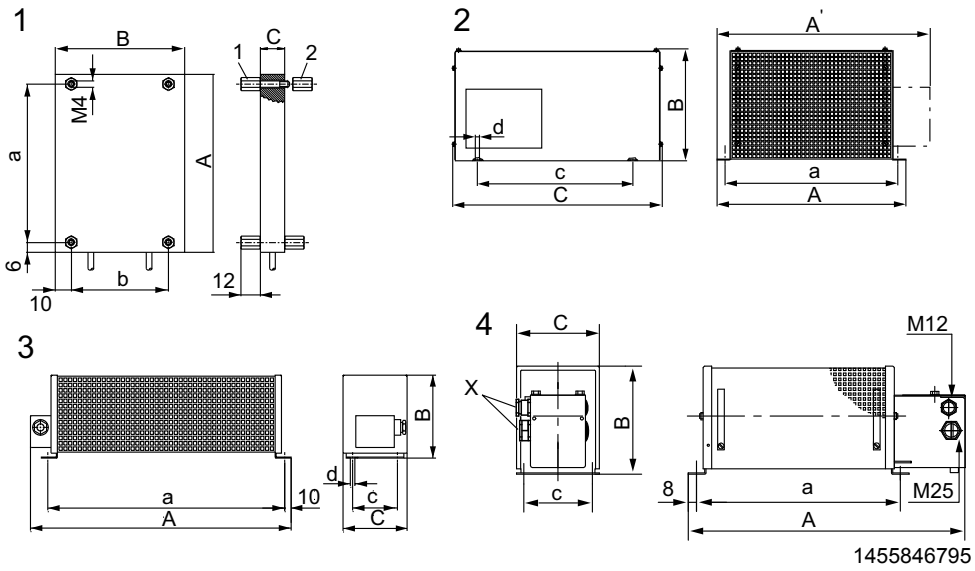
1) Physical power limit due to DC link voltage and resistance value

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 50% cdf 25% cdf 12% cdf 6% cdf	16.0 kW 27.2 kW 48.0 kW[1]. 62.7 kW[1] 62.7 kW[1]	2.5 kW 4.2 kW 7.5 kW 11.2 kW 19.0 kW	5.0 kW 8.5 kW 15.0 kW 22.5 kW 38.0 kW	10 kW 17 kW 30 kW 45 kW 76.0 kW[1]	13.5 kW 23 kW 40 kW 61 kW 102 kW	18 kW 30.6 kW 54 kW 81 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	Grid resistor					
For MOVITRAC® B	0220	0300			0370 – 0750	

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

Dimension drawing of BW... / BW...-T / BW...-P

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



BW... :

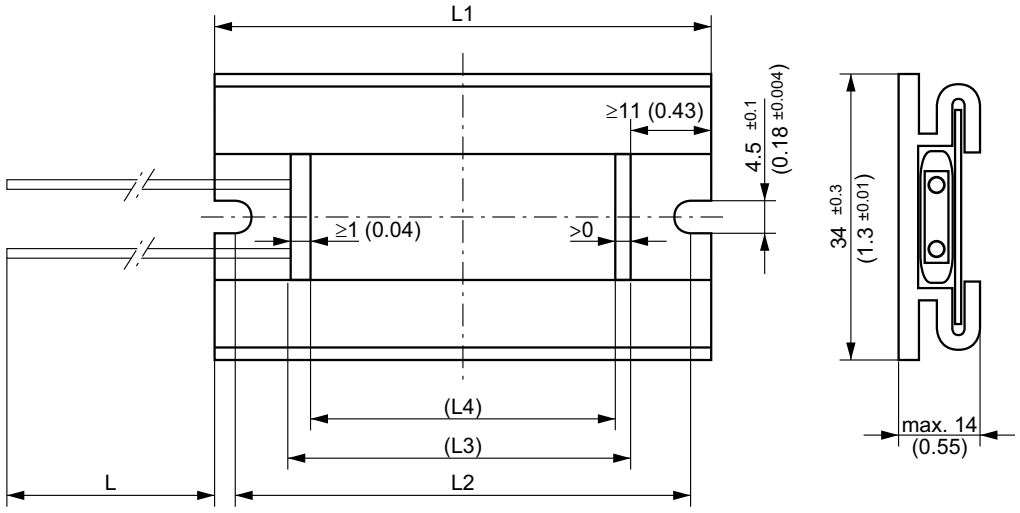
- 1 = Flat design
  The connecting lead is 500 mm (19.7 in) long. The scope of delivery includes four M4 stud bolts each of type 1 and 2.
- 2 = Grid resistor
- 3 = Wire resistor
- 4 = Wire resistor with temperature switch (-T/-P)
  Cable entry (X) is possible from both sides.

BW... type BW..-T/ BW...-P	Mounting position	Main dimensions mm (in) A/A'	 B	 C	Fastening parts mm (in) a	 b/c	 d	Cable gland	Weight kg (lb)
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)

Table continued on next page.

BW... type	Mounting position	Main dimensions mm (in)			Fastening parts mm (in)			Cable gland	Weight kg (lb)
BW..-T/ BW...-P		A/A'	B	C	a	b/c	d		
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)
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)

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)

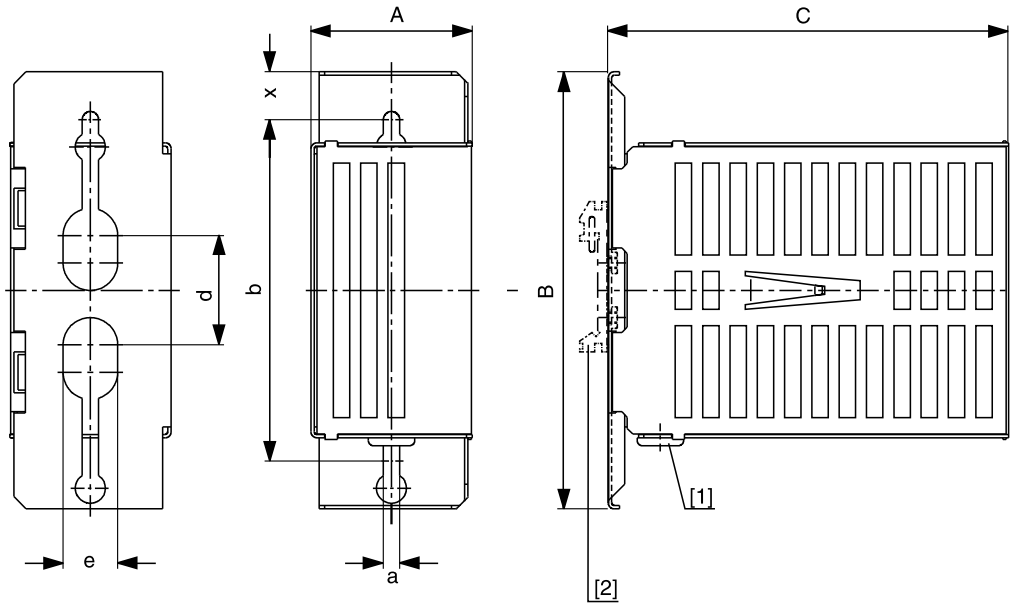
BS... touch guard

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

Dimension drawing BS...



[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)

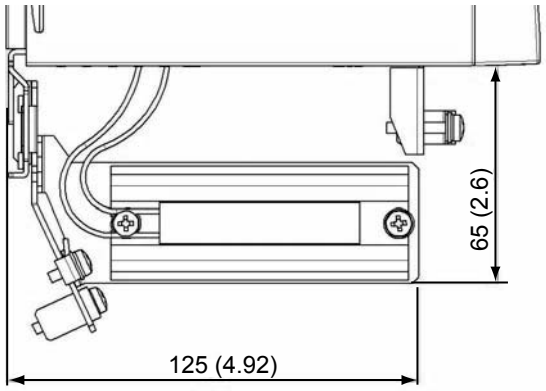
Mounting rail installation

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

Mounting braking resistors FKB10B

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

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



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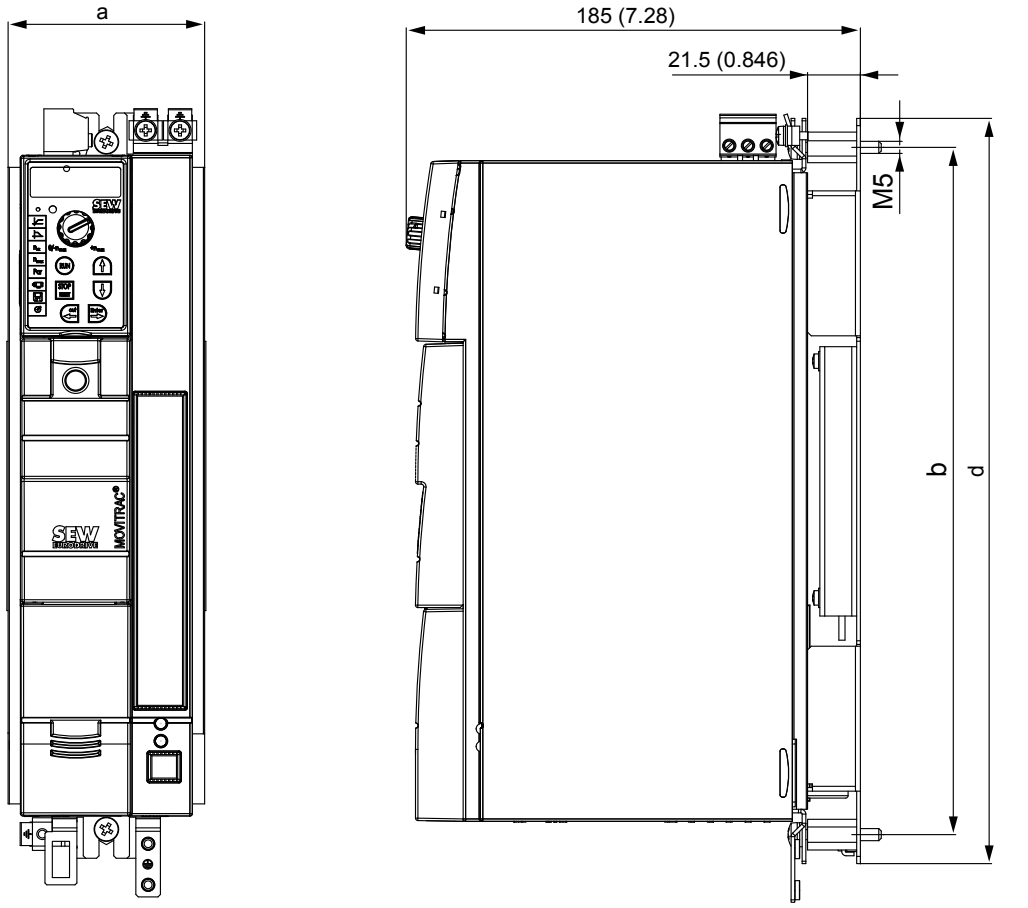
FKB11/12/13B for submounting braking resistors

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.

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)

2.3.2 Line chokes ND

ND.. line chokes have cRUs approval independent of 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)	M10/PE stud: M8
Tightening torque		0.6 – 0.8 Nm / 5 – 7 lb in	2.5 Nm / 22 lb in	3.2 – 3.7 Nm / 28 – 33 lb in	M10 stud: 10 Nm / 89 lb in PE: 6 Nm / 50 lb in
Suitable for MOVITRAC® B					
3-phase 400/500 V	100% I_N	0003 – 0075	0110 – 0220	0300 – 0450	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

1-phase inverter

Use is required under the following circumstances:

- Unit load I_N > 100%
- Supply system inductances < 100 µH per phase
- Operation of several units that are switched 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 a three-phase line choke

You can connect several single-phase inverters to a three-phase line choke if the following requirements are met:

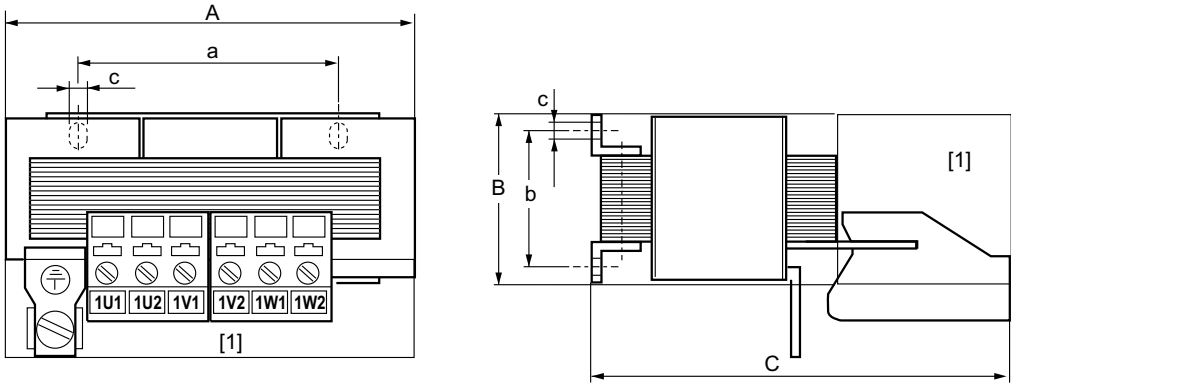
- The line contactor is designed for the total current
- The pre-fuse corresponds to the nominal current of the line choke
- MOVITRAC® B is connected symmetrically to the line choke

3-phase inverters

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.

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



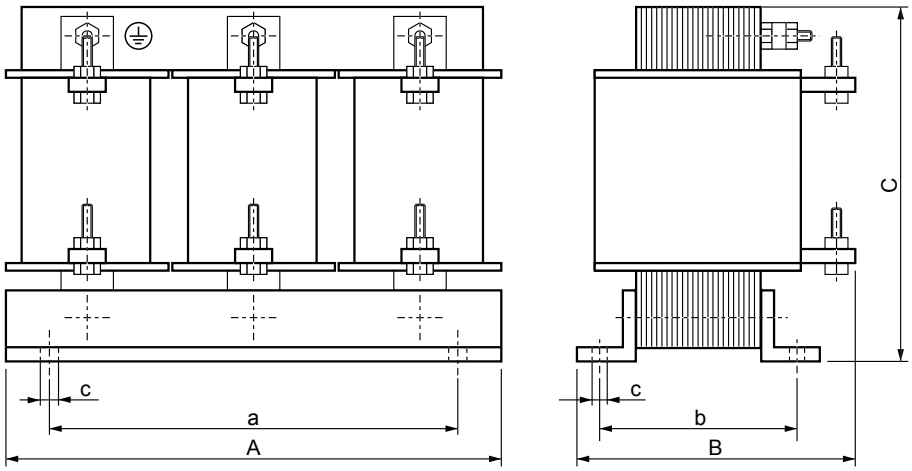
1455926923

[1] Space for installation terminals
Any mounting position

Input: 1U1, 1V1, 1W1
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)

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)

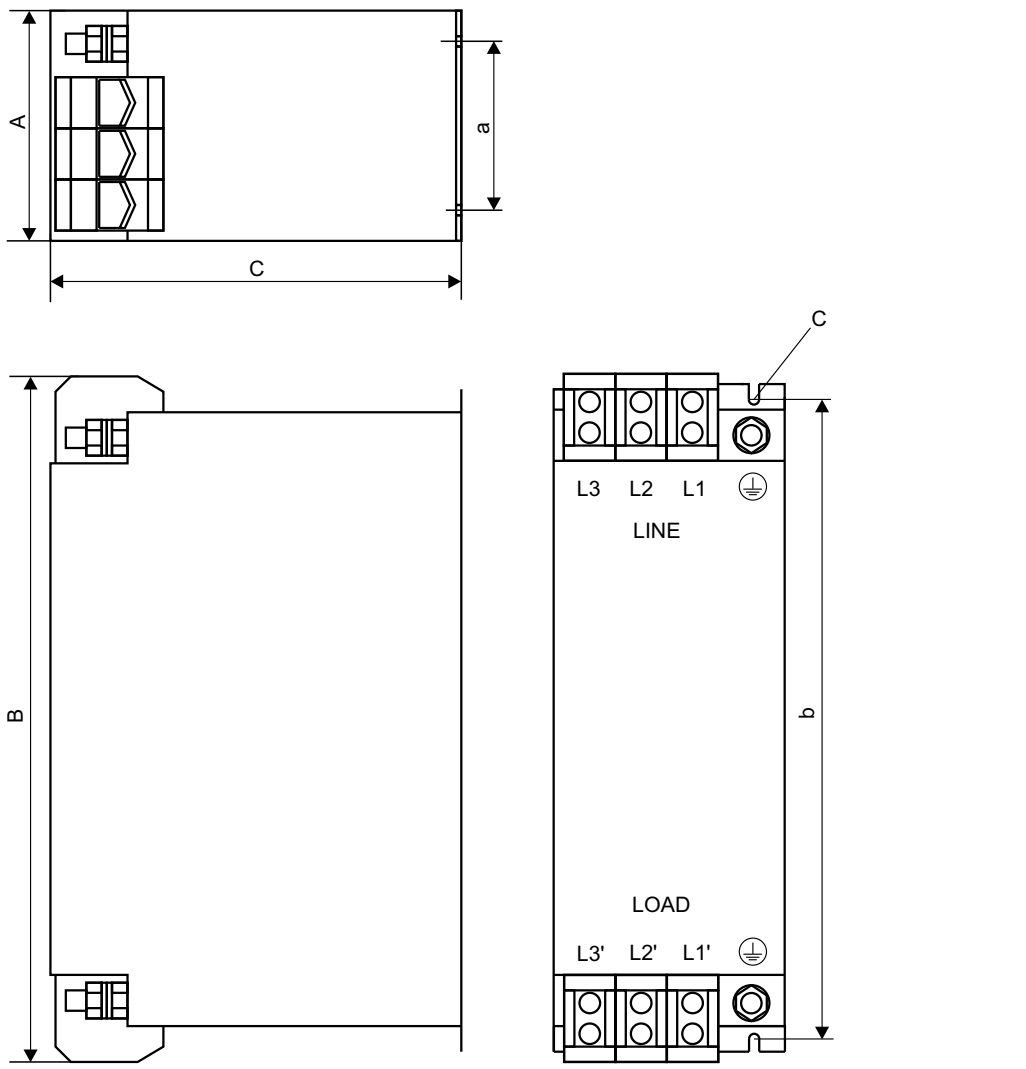
2.3.3 NF line filters

- 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	–

Dimension drawing of 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 connection	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		225 (8.86)			210 (8.27)			0.9 (2)
NF018-503	50 (1.97)	255 (10)			240 (9.45)			1.1 (2.4)
NF035-503	60 (2.36)	275 (10.8)	100 (3.94)	30 (1.18)	255 (10)			1.7 (3.7)
NF048-503		315 (12.4)			295 (11.6)		M6	2.1 (4.6)
NF063-503	90 (3.54)	260 (10.2)		60 (2.36)	235 (9.25)	6.5 (0.26)		2.4 (5.3)
NF085-503		320 (12.6)	140 (5.51)		255 (10)		M8	3.5 (7.7)
NF115-503	100 (3.94)	330 (13)	155 (6.1)	65 (2.56)			M10	4.8 (11)
NF150-503								5.6 (12.3)

2.3.4 ULF11A folding ferrites

Part number: 1821 213 1 (3 pcs)

Description

Folding ferrites are used to reduce interference emitted from the supply system cable. Use only folding ferrites with single-phase units.

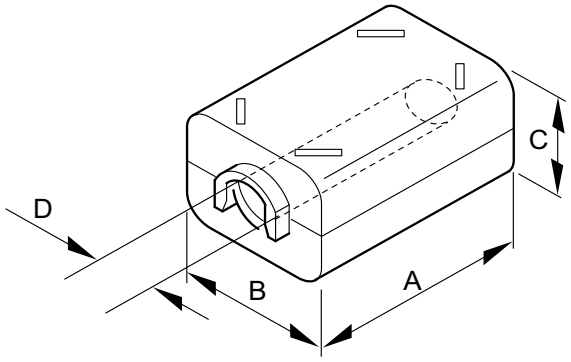
The delivery scope contains 3 folding ferrites. Install them according to the installation instructions.

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

Dimension drawing

All 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)

2.3.5 HD output chokes

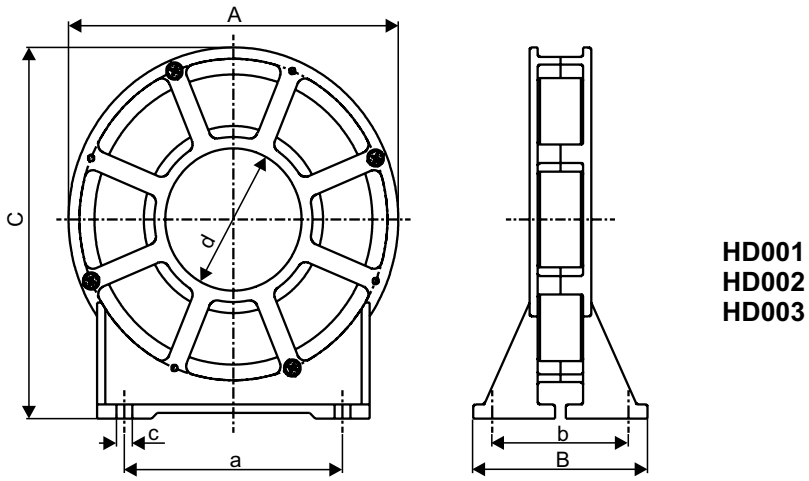
You can reduce the radiated interference of the unshielded motor cable by using an output choke.

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 mm² AWG16 – 6	≤ 1.5 mm² ≤ AWG16	≥ 16 mm² ≥ 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 mm² ≤ AWG12	Screw terminals 4 mm² (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

Dimension drawing HD001 – HD003

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



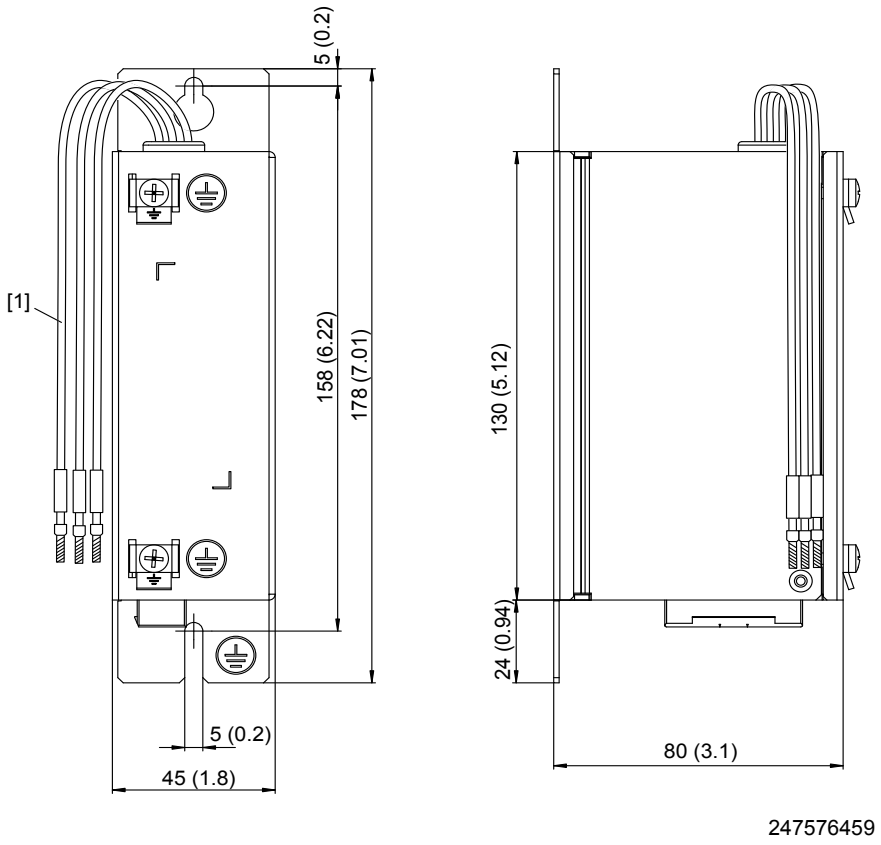
HD001
HD002
HD003

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)

Dimension drawing HD012

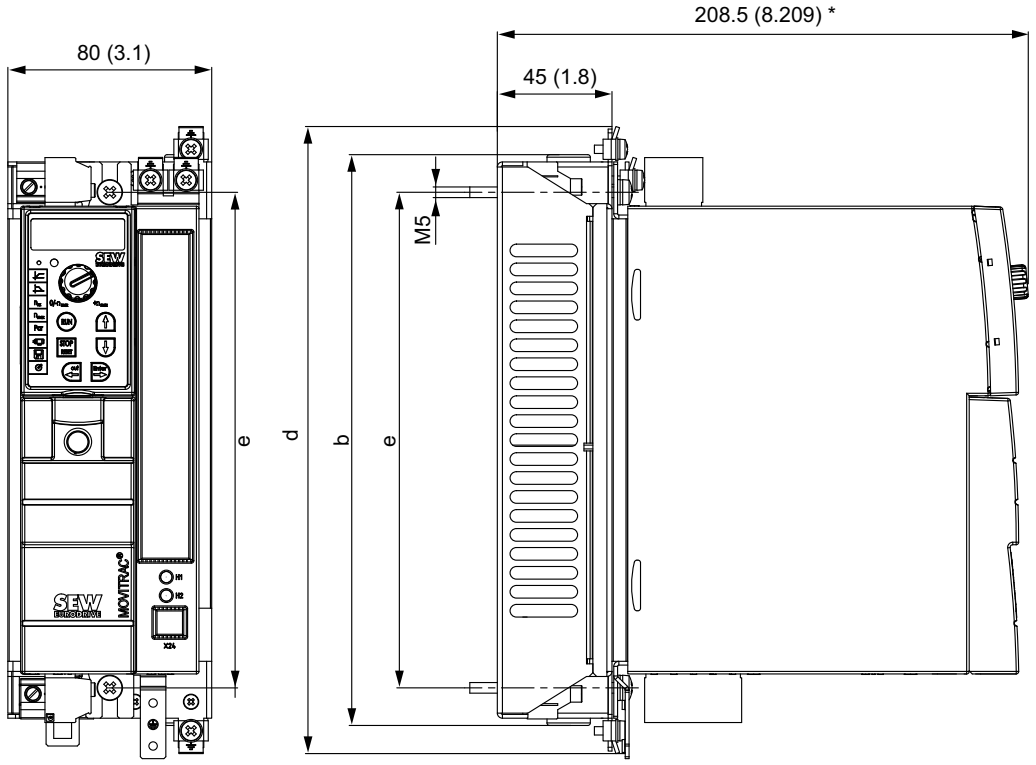
The following figure shows the mechanical dimensions in mm (in):



[1] Length = 100 mm (3.94 in)

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)

2.3.6 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 to 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:

NOTES

- Output filters must only be operated in V/f and VFC operating modes.
- Do not use output filters in hoist applications.
- During project planning of the drive, take the voltage drop in the output filter into account and the reduced motor torque that results. This applies particularly to AC 230 V 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 / Tightening torque	M4 terminal stud 1.6 Nm ±20%					
Weight	3.1 kg (6.8 lb)	4.4 kg (9.7 lb)			10.8 kg (23.8 lb)	
Assignment of 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 at 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 conjunction with MOVITRAC® frequency inverters. SEW-EURODRIVE provides proof of approval 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]					
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
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 stud 1.6 Nm ± 20%	35 mm² (AWG 2) 3.2 Nm				M10 terminal studs / 70 mm² (AWG 3/0) 30 Nm (270 lb in)
Weight	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 of 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 at 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[4]	0220	0370/0450/0550[4]/0750	0550/0750
Increased power (125%) [3]	0055	0075	0110/0220[4]	0150	0300/0370/0450[4] /0550/0750[4]	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[4]	0220	0300	-
Increased power (125%) [3]	0055	0075	0110/0220[4]	0150	0220/0300	-

1) Approved to UL/cUL in conjunction with MOVITRAC® frequency inverters. SEW-EURODRIVE provides proof of approval 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.

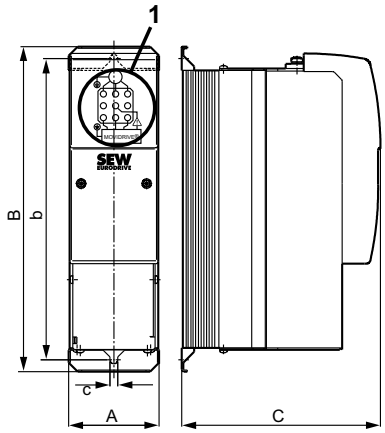
3) Observe the chapter on EMC-compliant installation according to EN 61800-3 in the SEW documentation

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

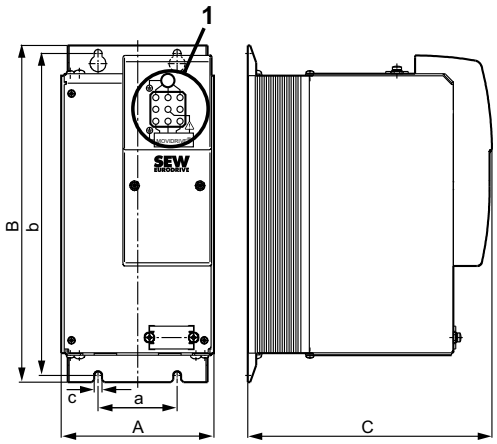
Dimension drawings of HF...-503 output filters

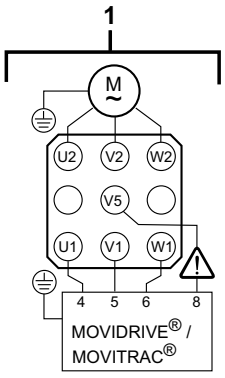
The following figures show the mechanical dimensions in mm (in):

HF008 / 015 / 022 / 030-503



HF040/055/075-503





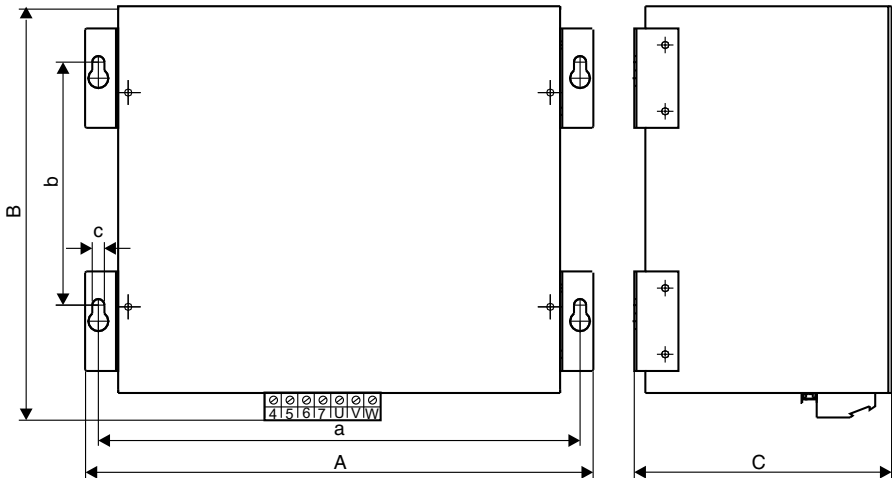
1472824587

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[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



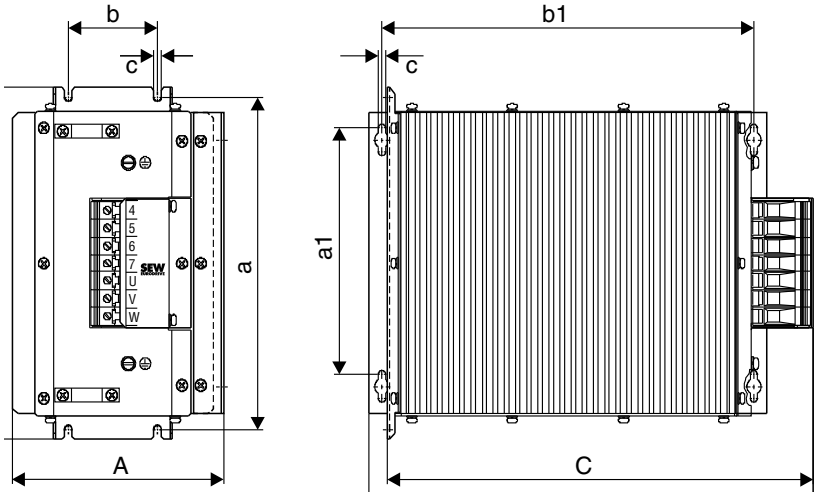
1472827659

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

Output filter type	Main dimensions mm (in)			Mounting dimensions mm (in)		Hole dimension 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)

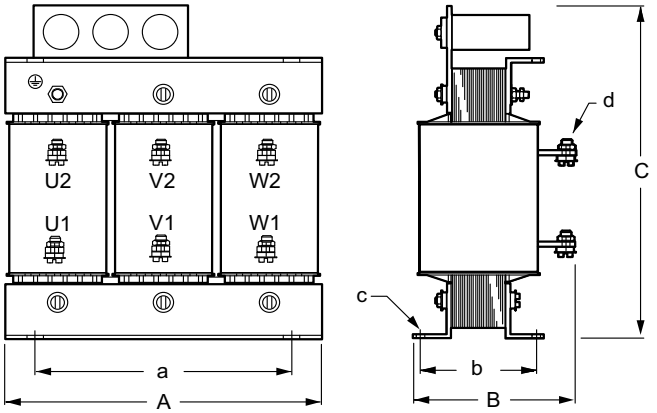
Dimension drawings of HF...-403 output filters

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



1472830731

Type	Main dimensions mm (in)			Mounting dimensions mm (in)				Hole dimension mm (in)	Ventilation clearances mm (in)		
				Standard installation		Horizontal mounting position					
	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)

2.3.7 EMC module FKE12B / FKE13B

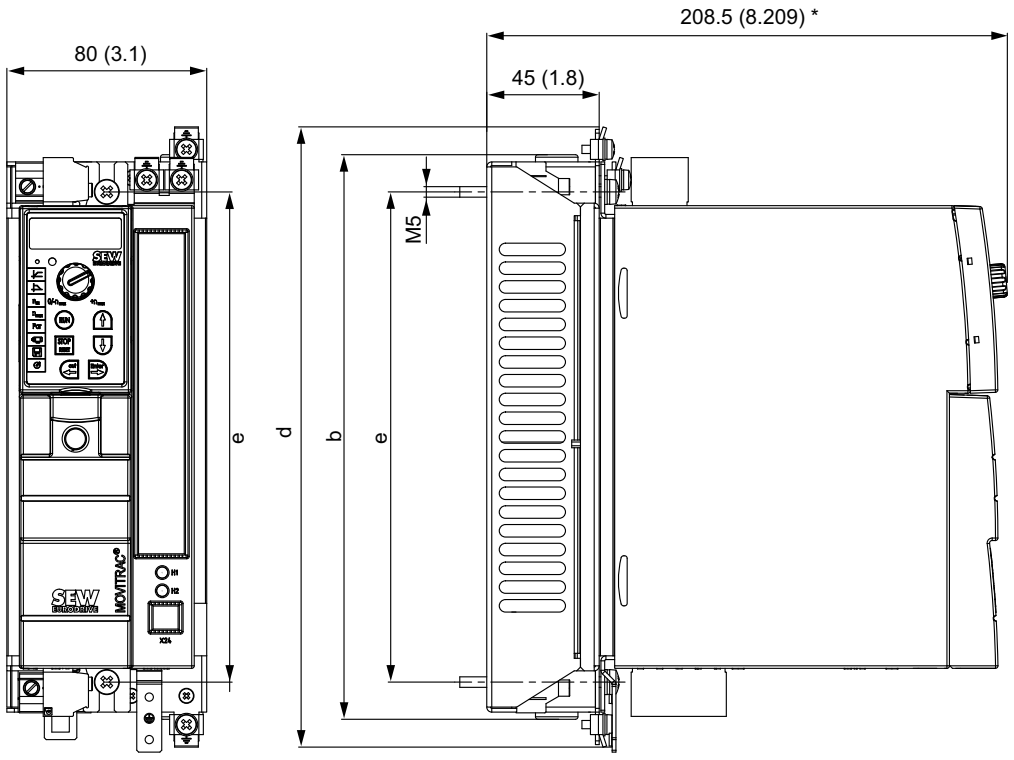
Using the EMC module, you can reach limit class C1 (B). The EMC module is designed for 100% and 125% operation.

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 nominal current)	< 1%	
Nominal current	AC 12 A	
Power loss (at nominal 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

Dimension drawing of EMC modules FKE12B / FKE13B

All dimensions are specified in mm (in).



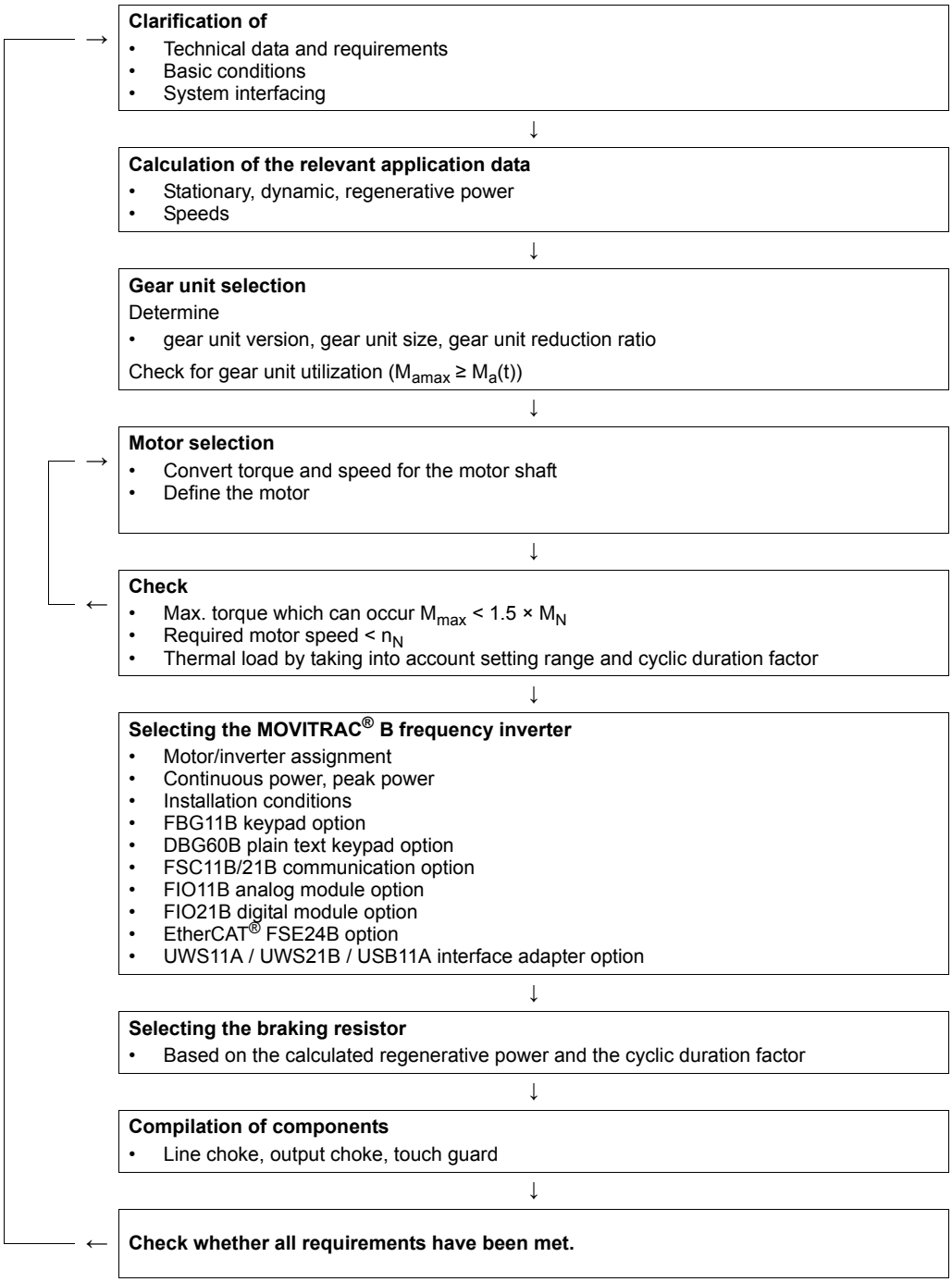
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* With front module FSE24B + 4 mm (0.16 in)

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)

3 Project Planning

3.1 Schematic sequence



3.2 Description of applications

3.2.1 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.

3.2.2 Project planning for hoists

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

NOTICE:

Speed monitoring is set by changing parameters *P500* / *P502* and *P501* / *P503*. The sagging of hoists cannot be avoided safely if the delay time is set to an excessively high value.

Thermal considerations

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

Starting torque

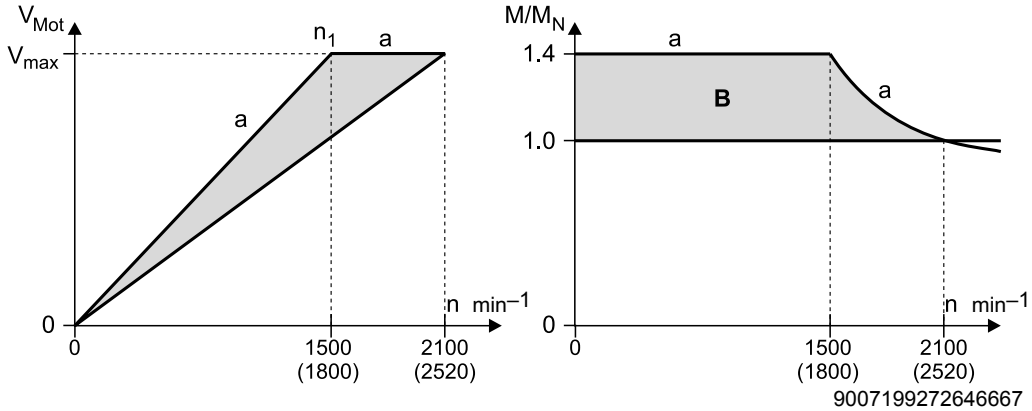
The highest operating torque is required for acceleration with maximum load in **upwards** hoisting direction.

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 is more powerful.

Hoist voltage/speed characteristic curve



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

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

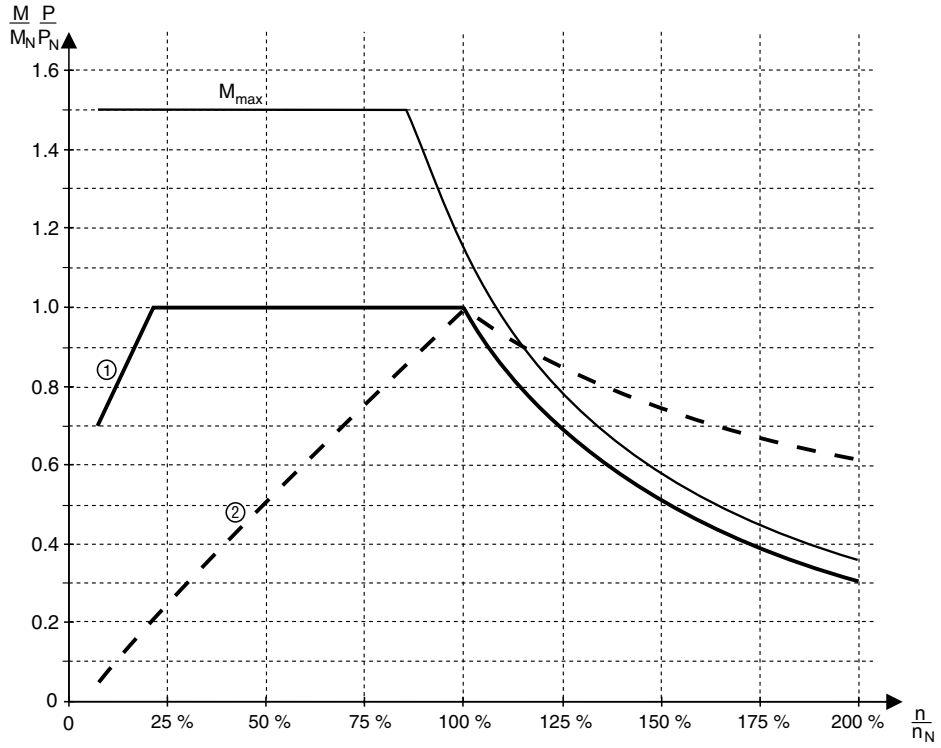
- S1 (100% cdf): Select the motor power of the next higher motor type than the selected inverter power, e.g. for lengthy upwards travel or continuous elevators.
- S3 (40% cdf): Select the motor power according to the selected inverter power.

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

3.3 Basic recommendations for selecting motors/inverters

3.3.1 Speed-torque characteristic curve

The speed-torque characteristic curve looks as follows:



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[1] M in S1 100% cdf
[2] P in S1 100% cdf

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.

3.3.2 Motor selection

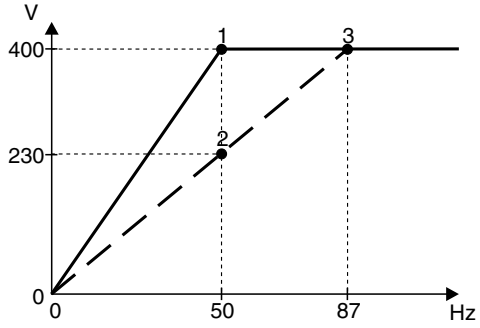
Basic recommendations

- 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.

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 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.



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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.

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.

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)

3.3.3 Overload capacity

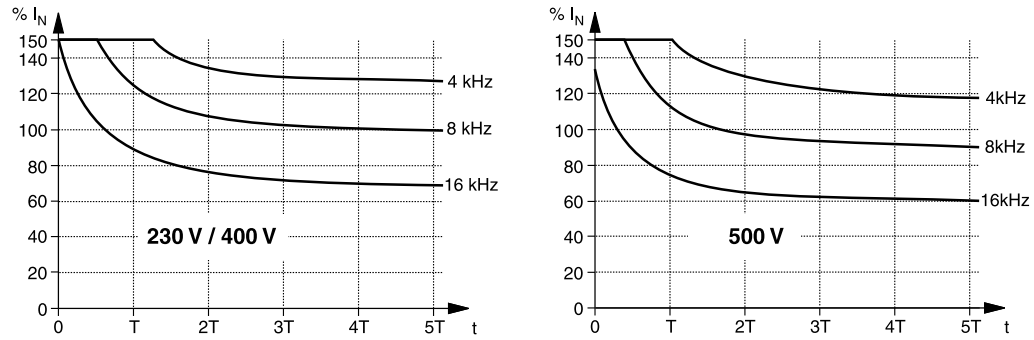
MOVITRAC® B frequency inverters permanently calculate the load on the inverter output stage (unit utilization). They can output the maximum possible power in every operating state.

The permitted continuous output current depends on:

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

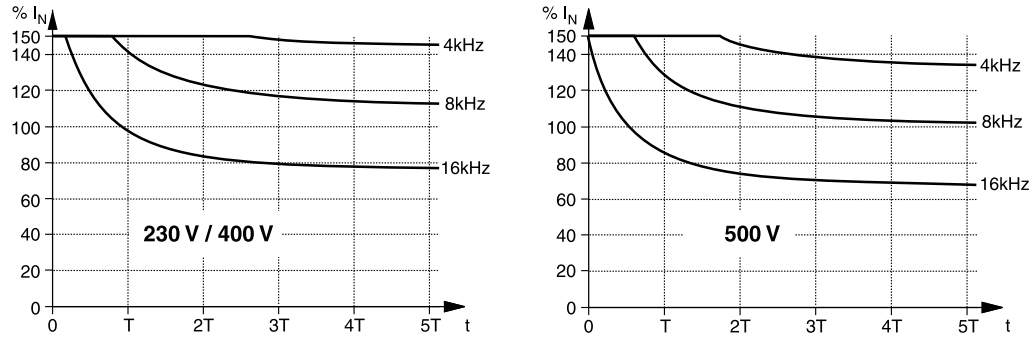
If a PWM frequency > 4 kHz is set and *P862/P863 PWM fix 1/2* is set to "Off", the inverter automatically reduces the PWM frequency in the event of a unit overload. If the inverter is subjected to a higher than permitted load, it issues the fault message *F44 Unit utilization* and switches off immediately.

Overload capacity at 40 °C



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Overload capacity at 25 °C



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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

3.3.4 Load capacity of the units at low output frequencies

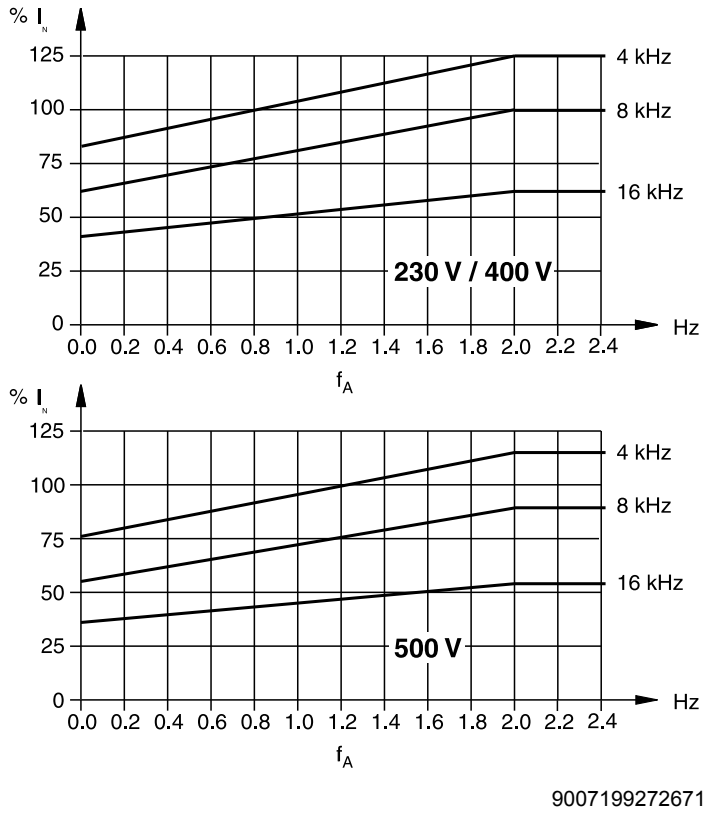
The thermal model of MOVITRAC® B implements dynamic limiting of the maximum output current. Consequently, the thermal model only permits less than 100% nominal current at output frequencies less than 2 Hz if the capacity utilization is high.

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 comprises the rotational frequency (= speed) and the slip frequency.

Guaranteed continuous currents depending on the output frequency:



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3.4 Selecting the braking resistor



⚠ DANGER

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

Severe or fatal injuries from electric shock.

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



⚠ WARNING

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

Risk of burns and fire.

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



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 (176 °F).
- The overload factor of the BW..-T and BW..-P braking resistors is limited by using an integrated temperature relay:
  - BW..-T up to overload factor 12
  - BW..-P up to overload factor 40
- The **maximum permitted line length** between **MOVITRAC®** 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 provided in the table.

- **Peak braking power**

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

  $P_{max} = V^2_{DC}/R$

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

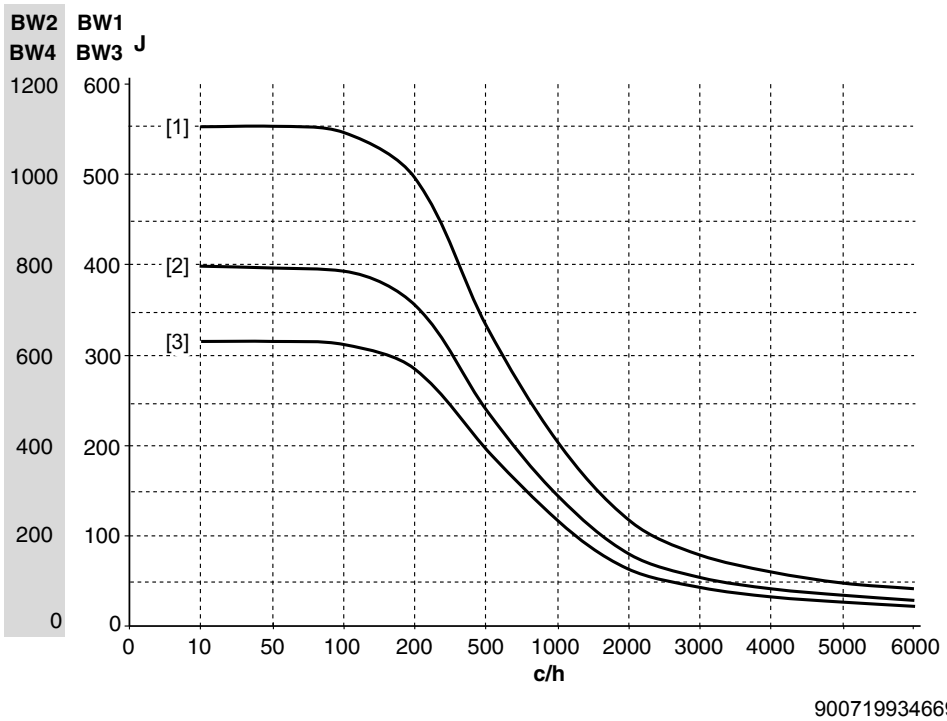
  - With 400/500 V units, its value is: DC 970 V
  - With 230 V units: DC 485 V

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

3.4.1 Load capacity of PTC braking resistors

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



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[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.

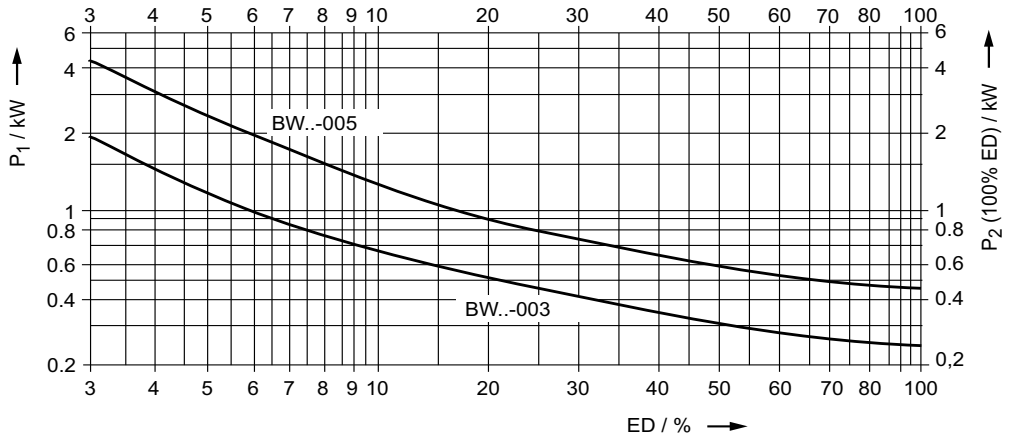
The diagram allows a power of 580 J with a 0.2 s brake ramp at 200 cycles per hour. In this case, the required 500 J can be dissipated with BW2/BW4.

3.4.2 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:

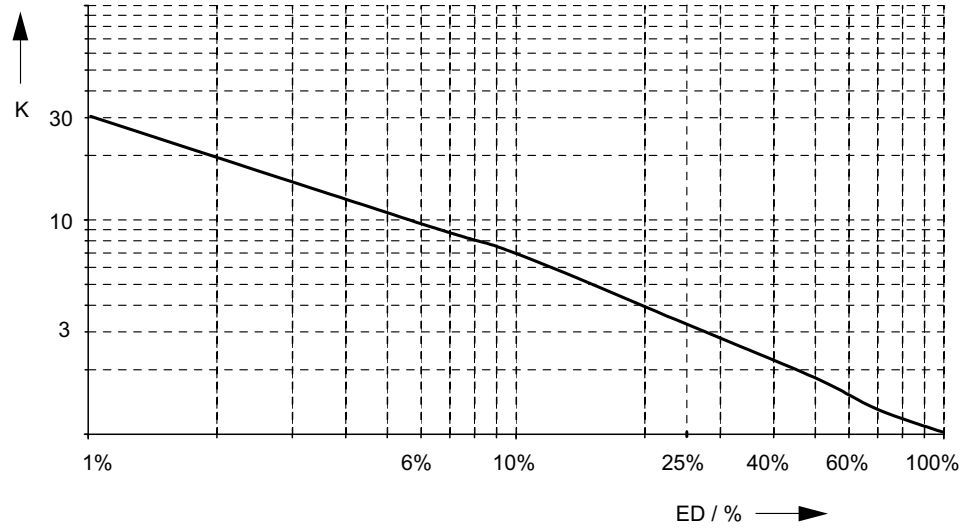


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P_1 = Short-term power
P_2 = Continuous power
cdf = cyclic duration factor of the braking resistor

Overload factor for wire resistors

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

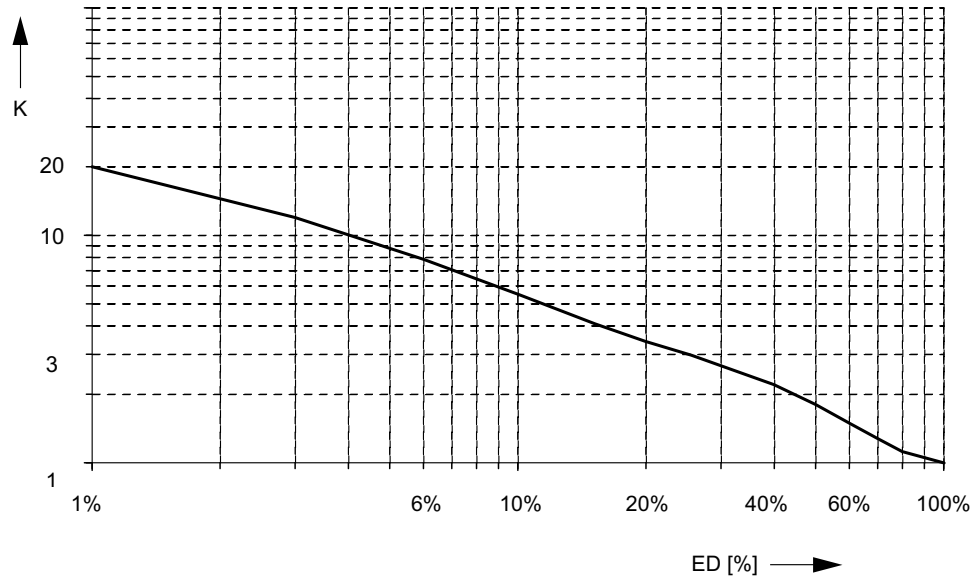


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Cyclic duration factor cdf	1%	3%	6%	15%	25%	40%	60%	80%	100%
Overload factor K	30	15	9.5	5	3.2	2.2	1.5	1.12	1

Overload factor for grid resistors

Overload factor depending on cycle duration factor for grid resistors:



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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

3.5 Electromagnetic compatibility (EMC)

MOVITRAC® B frequency inverters are components of machines and systems. They comply with the EMC product standard EN 61800-3 **Variable-speed electrical drives**. If you want to equip the machine/system with frequency inverters compliant with 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

3.5.1 Interference immunity

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

3.5.2 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

3.5.3 Connection

For EMC-compliant connection, refer to chapter "Installation" (page 177).

3.5.4 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.

3.5.5 Inverter-related earth-leakage currents

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

Earth leakage currents are mainly determined 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 / operation on IT systems" (page 187)) 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.).

3.6 Mains and motor connection

3.6.1 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 operation on voltage supply systems with non-grounded star point (IT system), SEW-EURODRIVE recommends using an insulation monitoring device that can drive capacitive loads. Using such devices prevents the earth-leakage monitor from mis-tripping due to the ground capacitance of the inverter.
  - **Supply systems grounded via an outer conductor**

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

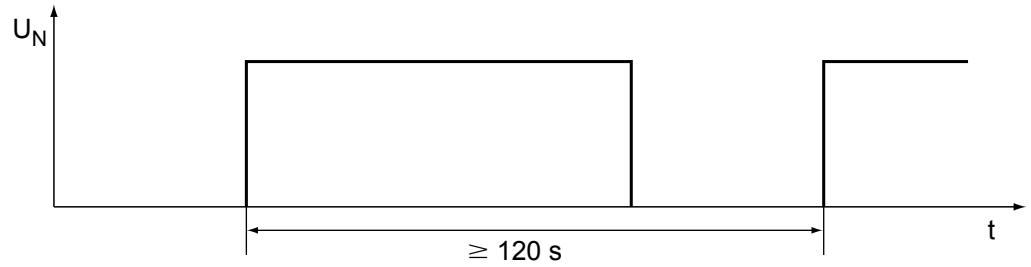
3.6.2 Line contactors and line fuses

Line contactor

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

Mains activations

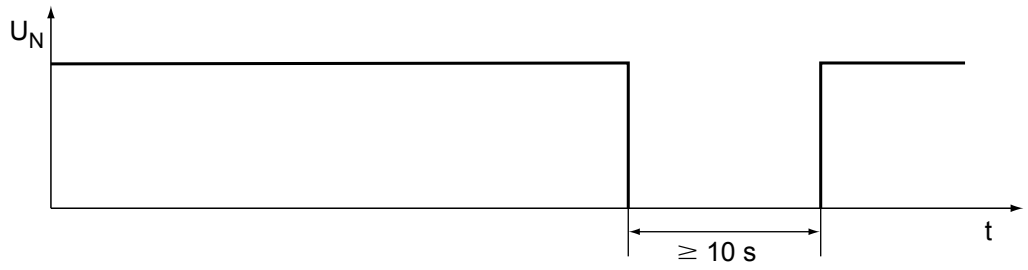
- Ensure a minimum time of 120 s between two mains activations for AC 230 V / 1-phase units.



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- 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.



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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 10 % 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.

3.6.3 Connecting AC brakemotors

For detailed information about the SEW brake system, refer to the "AC Motors" 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.

INFORMATION

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

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

Activating the brake

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

The digital output DOØ2 "/Brake" is configured as an output for operating a relay with free-wheeling diode and a control voltage of DC 24 V / max. 150 mA / 3.6 W. A power contactor can be controlled directly with a DC 24 V coil voltage or the BMK brake rectifier. This power contactor is used 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 when using non-SEW motors.

Brake parameters

INFORMATION

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

3.6.4 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 fault *F01 overcurrent*.

- Switch the frequency inverter output only when the output stage is inhibited.

Motor currents

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

Motor cable

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

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

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

I_{max} = Recommended maximum motor cable length for individual drives (page 140)

n = Number of motors connected in parallel

No additional fusing is required if the cross section of the motor cable corresponds to that of the supply system lead. If the cross section of the motor cable is smaller than the cross section of the power supply cable, you must secure the motor cable against short circuit for the corresponding cross section. Motor protection switches are suitable for this purpose.

Motor size

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

Output filters

For groups of more than 3 or 4 motors, SEW-EURODRIVE recommends using an HF output filter. An HF output filter is required when the maximum motor cable length (I_{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 (I_{total}). 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.

3.6.5 External voltage supply DC 24 V

The internal voltage supply is sufficient for the basic unit and digital outputs 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 also operate the digital outputs. 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 line contactor and after switching off the line contactor.

The DC 24V voltage output can be switched off with *P808*. External voltage supply continues to be possible.

INFORMATION

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

DC 24 V power demand of MOVITRAC® B:

Power demand per input terminal: 0.2 W.

Size	Power demand of basic unit[1)]	DBG60B	FIO11B / FIO21B	Fieldbus option[2)3)]	DHP11B[3)]	DHE21B / DHE41B	FSE24B
Size 0 MC07B..-00	3.8 W	1 W	2 W	3.4 W	4.5 W	8.5 W	1.2 W
Size 0 MC07B..-S0[4)]	10.8 W[5)]						
1, 2S, 2	15.8 W [6)]						
3	21.8 W [6)]						
4, 5	23.8 W [6)]						

1) Including FBG11B, FSC11B / 12B (UWS11A / USB11A). Take account of the additional load of the digital inputs with 2.4 W per 100 mA.

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

3) These options must always be supplied externally.

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

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

6) Including current consumption for safe stop (X17)

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.

Example

MC07B0015-5A3-4-00/DFP21B with options FSC11B & FBG11B. MOVTRAC® B supplies the digital 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): 3.8 W
- Power demand of the DFP21B fieldbus option: 3 W
- Power demand of the brake coil: 2.4 W
- Power demand of the fault signal contact: 24 V x 0.05 A = 1.2 W
- Power demand of the input terminals: 0.4 W

The total power demand is 10.8 W and must be provided by an external DC 24 V supply.

3.6.6 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 wire bending space (EN 61800-5-1)

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

Cable cross section in mm²	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 proposes the following cable cross-sections and fuses for an ambient temperature of 25 °C and nominal power supply 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		
	Line cable	1.5 mm²				4 mm²		
	PE conductor	2 × 1.5 mm²				2 × 4 mm²		
Motor cable		1.5 mm²				1.5 mm²		
Unit terminal cross section of the power section		Separable terminal block 4 mm² conductor end sleeve 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	
	Line cable	1.5 mm²				1.5 mm²		
	PE conductor	2 × 1.5 mm²				2 × 1.5 mm² / 1 × 10 mm²		
Motor cable		1.5 mm²				1.5 mm²		
Unit terminal cross section of the power section		Separable terminal block 4 mm² conductor end sleeve 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 Crimp 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
	Line cable	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		Separable terminal block 4 mm² conductor end sleeve DIN 46228									M4 screw and 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
	Line cable	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 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		

MOVITRAC® B 400/500 V		0370	0450	0550	0750
3-phase	Line protection	80 A	100 A	100 A	125 A
	Line cable	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		
	Line cable	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	
	Line cable	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. AWG4 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			

3.6.7 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		Permitted maximum motor cable length in m (ft)			
Size		**0XS / 0S / 0L**		**2S 0055**	**2S 0075 / 2 / 3 / 4 / 5**
Voltage V_{mains}		**3 × AC 400 V 3 × AC 230 V 1 × AC 230 V**	**3 × AC 500 V 3 × AC 400 V (125 % I_N)**	**3 × AC 230 V 3 × AC 400/500 V**	
Shielded cable	4 kHz[1)]	100 (328)	50 (160)	300 (984)	400 (1310)
	8 kHz	70 (230)	35 (110)	250 (820)	300 (984)
	12 kHz	50 (160)	25 (82)	200 (656)	250 (820)
	16 kHz	40 (130)	25 (82)	150 (492)	200 (656)
Unshielded cable	4 kHz[1)]	200 (656)	100 (328)	900 (2950)	1200 (3937)
	8 kHz	140 (459)	70 (230)	750 (2460)	900 (2950)
	12 kHz	100 (328)	50 (160)	600 (1970)	750 (2460)
	16 kHz	80 (2640	50 (160)	450 (1480)	600 (1970)

1) Standard setting



INFORMATION

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

3.6.8 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)
10 mm²						3.2	4.0	5.0	6.0	8.2	10.2	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.

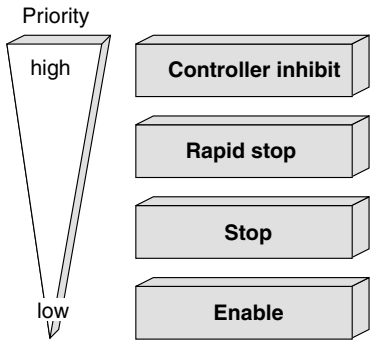
Cable cross section	Load with I / A =															
	4	6	8	10	13	16	20	25	30	40	50	63	80	100	125	150
Copper	Voltage drop Δ V / V with length = 100 m (328 ft) and ϑ = 70 °C															
AWG16	7.0	10.5	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG14	4.2	6.3	8.4	10.5	13.6	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	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.

3.7 Priority of the operating states and interrelation between control signals

3.7.1 Priority of operating states

The following figure shows the priority of operating states:



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3.7.2 Interrelation between control signals

The control signals have the following significance:

- Controller inhibit
- Rapid stop
- Stop

They are activated via:

- Digital inputs
- Control word processing bus, if *P101 control source* is set to RS485 or SBus.
- IPOS$^{plus®}$ control word H484

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

Controller inhibit	Digital input is programmed to			Inverter status
	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 if the digital input is set to controller inhibit and "/Controller inhibit" = "0"

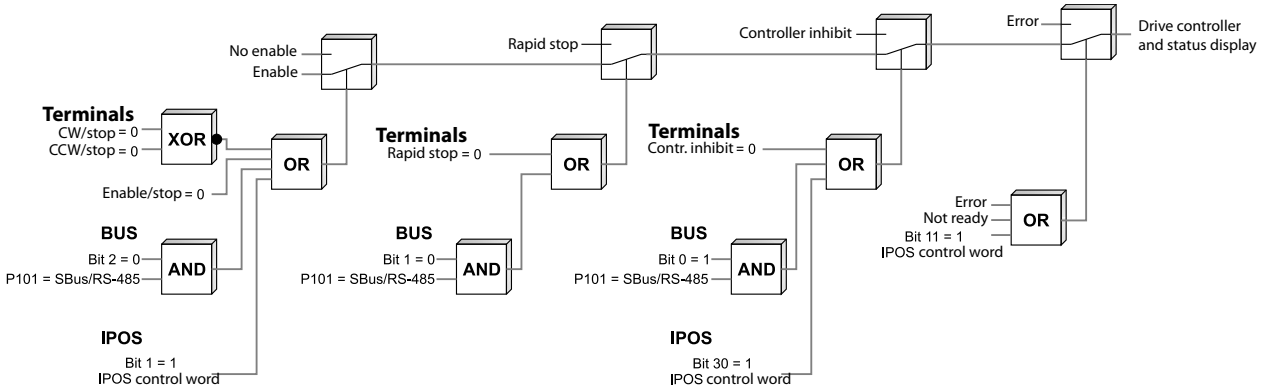
2) Not relevant if "Enable/rapid stop" = "0"

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 digital 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 frequency inverter must be enabled 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 the 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



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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.

3.8 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.

3.9 Application examples

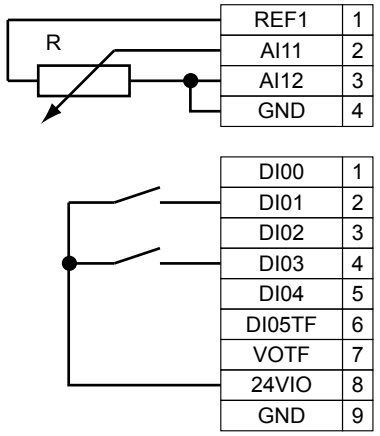
All application examples presented here assume that the unit has been started up correctly in accordance with the "Startup" section.

3.9.1 External setpoint potentiometer

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

Connect an external setpoint potentiometer as follows:

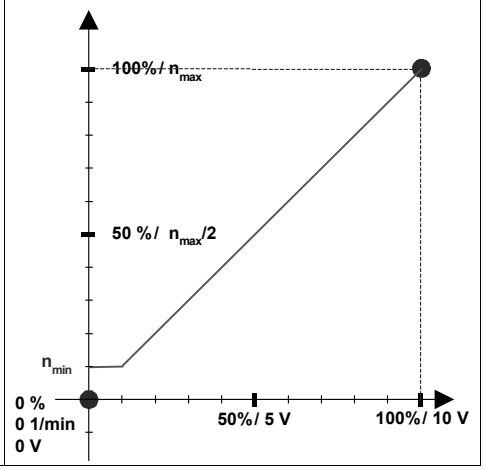
The resistance value of the external setpoint potentiometer R must be ≥ 3 kΩ.

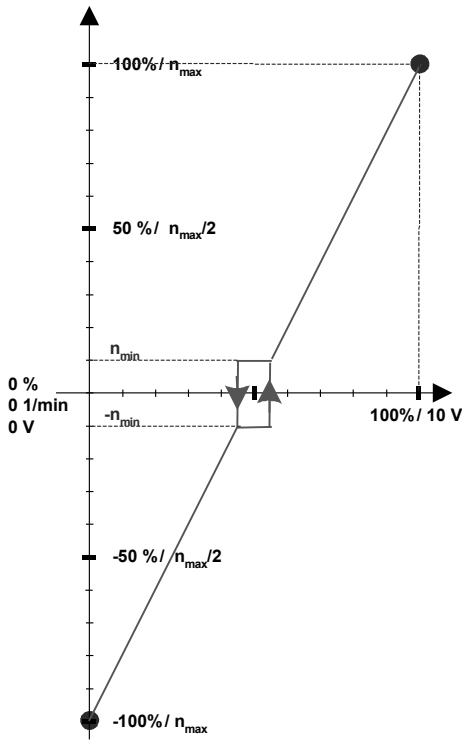
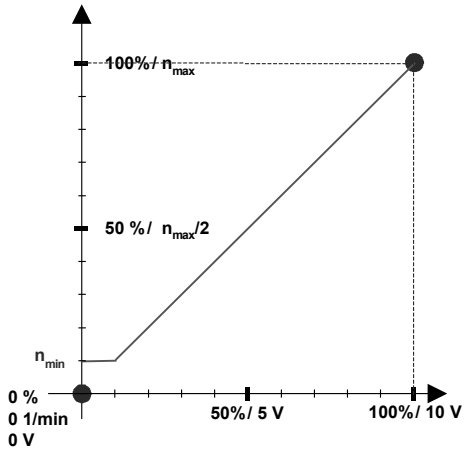
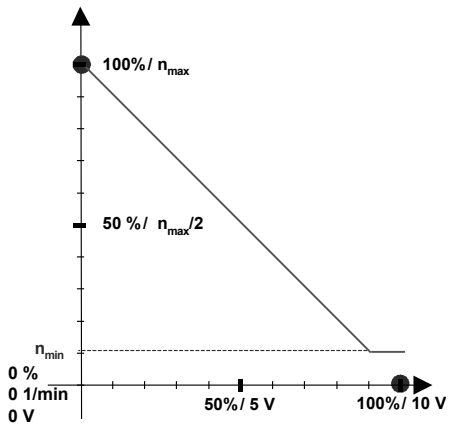


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3.9.2 Setpoint value processing

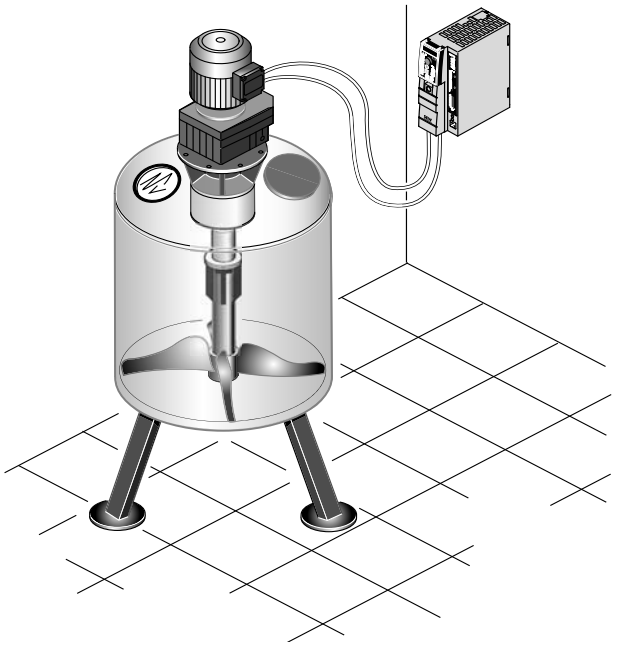
Using AI1 as 0 – 10 V voltage input, no fixed setpoint selected, frequency inverter enabled.

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}	

3.9.3 Speed-controlled agitator

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



18108811

The keypad is used to control:

- Reset
- Start
- Stop
- Speed control.

Select the "FGB setpoint adjuster" icon to operate the agitator.

Parameters

Adapt the following parameters for the agitator:

- *P122 Direction of rotation FBG manual operation*
- Ramp t11 up (adjust via 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*

3.9.4 Positioning a trolley

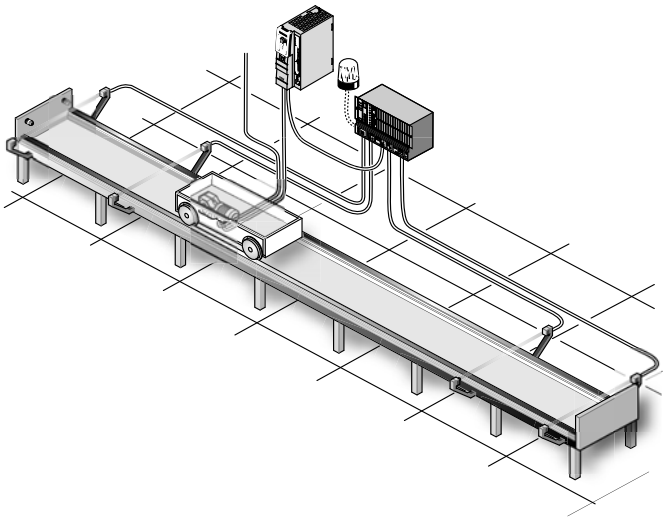
Principle

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.



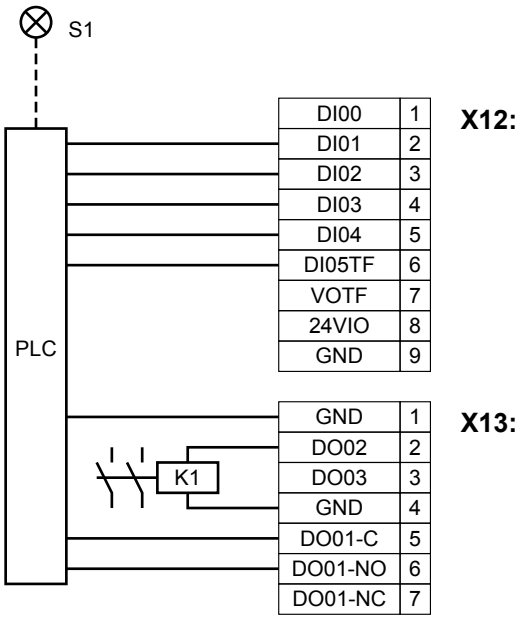
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Terminals

- 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

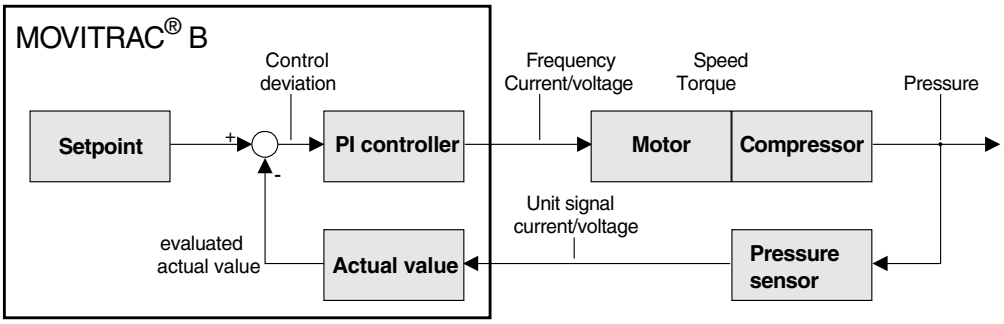
Parameters

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

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

3.9.5 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.



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3.10 HF output filters

3.10.1 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.
- The flying start function is not possible with HF output filter.

3.10.2 Installation, connection and operation

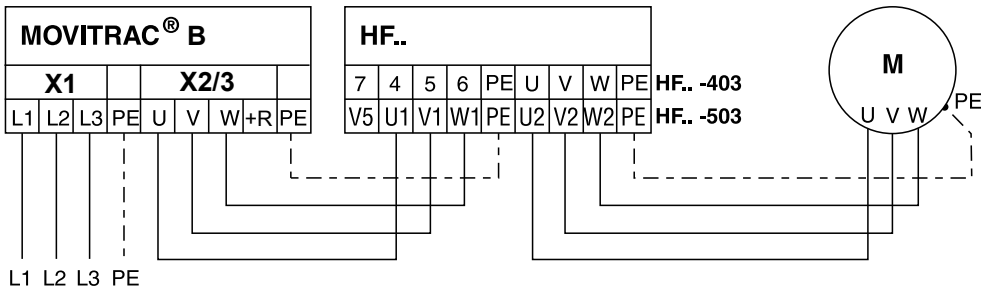
INFORMATION

- 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.

3.10.3 $V_{DC\ link}$ 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

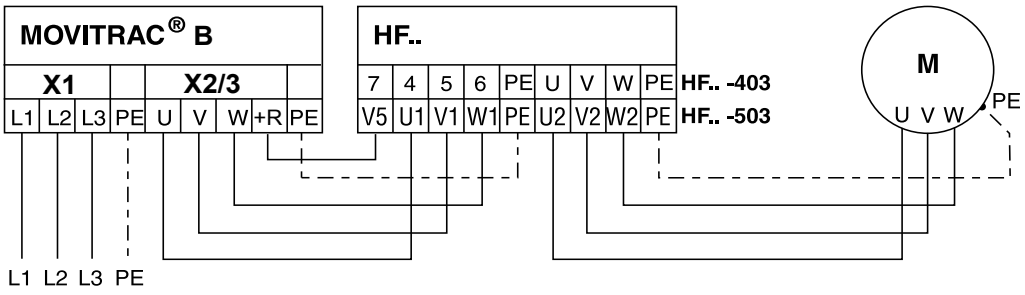
Connection of inverter terminal +R with HF..-503 Kl. V5 or HF..-403 Kl. 7

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} ≤ 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.

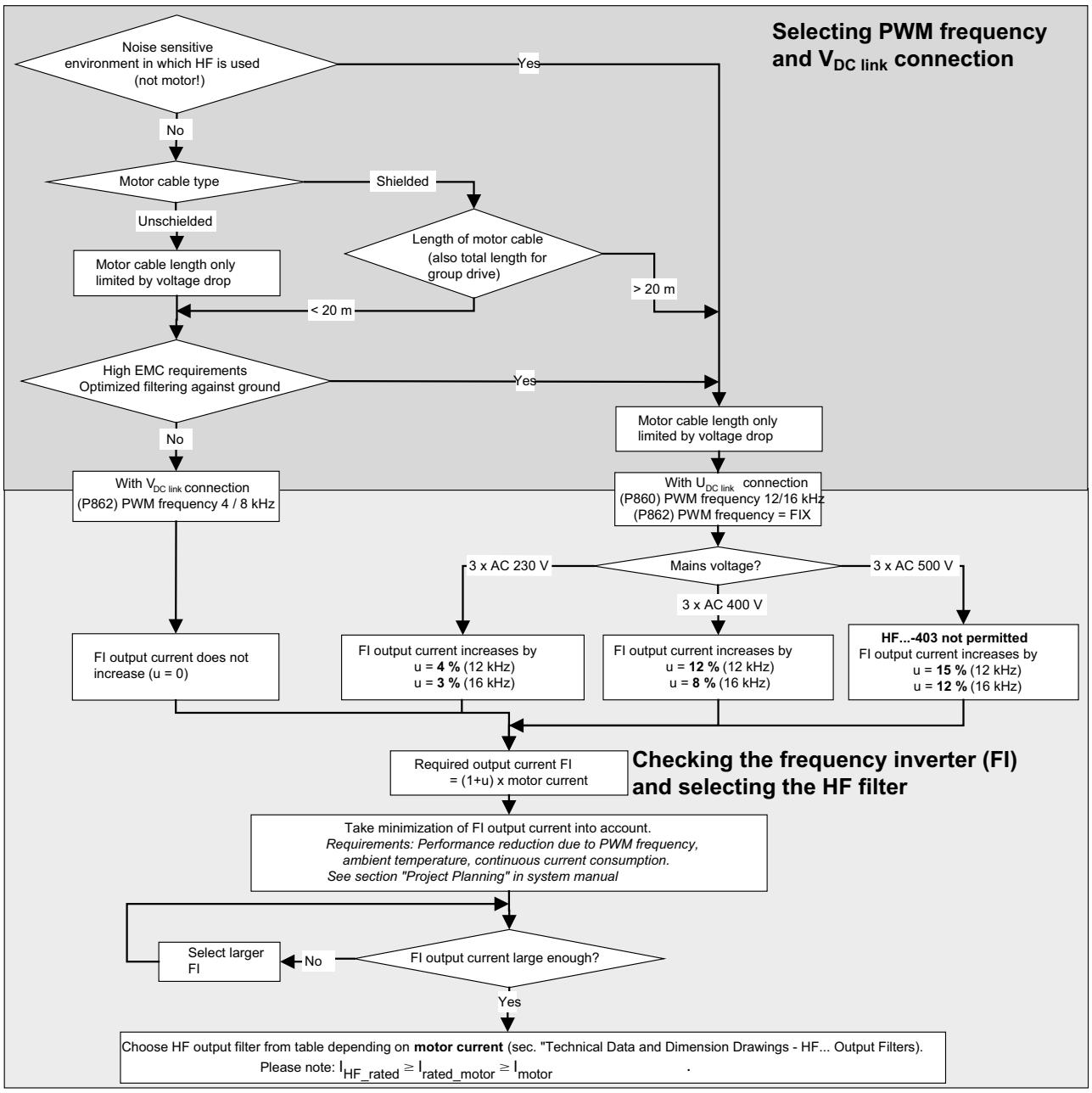


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INFORMATION

- No $V_{DC\ link}$ connection is permitted for size 0XS units.
- No $V_{DC\ link}$ connection is possible with HF180-403.

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!)
Yes
No
Motor cable type
Shielded
Unschielded
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
Yes
No
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
Select larger FI
No
FI output current large enough?
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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3.11 Electronics cables and signal generation

3.11.1 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.

3.11.2 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:

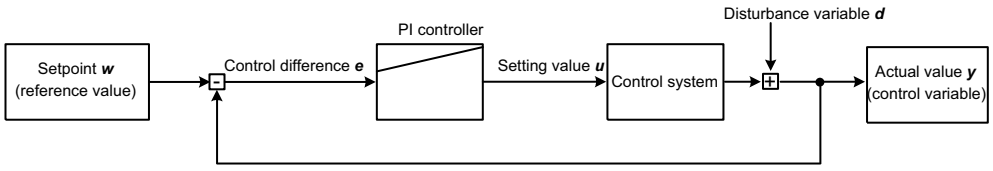
- Install the units in adjacent control cabinet compartments rather than distributing them widely.
- Lay the 0 V cables with at least 1 mm^2 (AWG17) cross section from a central point to each individual unit by the shortest possible route.

3.11.3 Coupling relays

You can use coupling relays for electrical isolation of the digital inputs and digital 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).

3.12 PI controller

The illustration below shows the basic structure of PI controller.

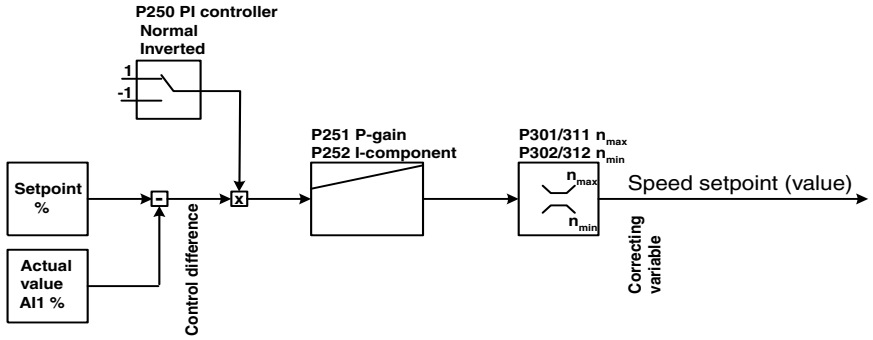


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Setpoint *w* (reference value):	Parameter *P100 setpoint source*. See chapter "setpoint selection" (page 156).
Correcting variable *u*	Speed
Actual value *y* (control variable)	Feedback via analog input AI1. See chapter "Actual value measuring" (page 157).

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



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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.

3.12.1 Parameterization

The default settings for the parameters are underlined.

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

3.12.2 Setpoint selection

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

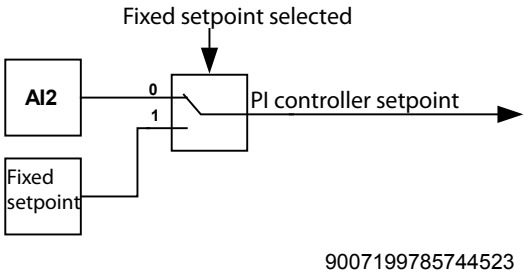
- **Unipolar / Fixed setpoint**: The setpoint "0" applies as long as no setpoint is selected. The FBG setpoint adjuster can be added to the setpoint "0" or a fixed setpoint using *P121*.

  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 setpoint adjuster can be added to AI1 or a fixed setpoint using *P121*.



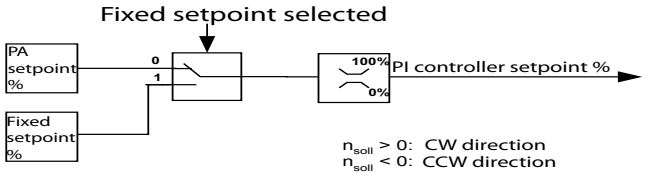
- **RS485/fixed setpoint**

- **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 %]

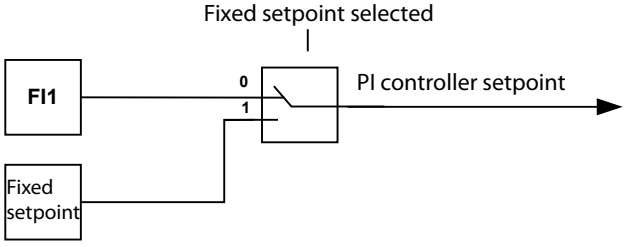
  PO1/PO2/PO3 = 0 – 2^{14} = 0 – 100% PI controller setpoint

  Setpoint selection is **always unipolar**. The inverter restricts negative setpoints (e.g. via RS-485 or SBus) to "0".



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- **For all setpoint sources:** The FBG setpoint adjuster 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**



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3.12.3 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 – 10% 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

3.12.4 Reference signal

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

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

You have to program a digital 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 digital output DO01 *P620*, DO02 *P621* or DO03 *P622* to PI controller actual value reference.

3.12.5 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.

3.13 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 Project planning – additional functions

4.1 Master/slave connection

The master-slave function allows for implementing automatic functions such as speed synchronization, shared load and torque control (slave). The RS485 interface (ST11 / ST12) or the system bus interface (SC11 / SC12) can be used as the communication link.

See also chapter "RS485 interface connection" (page 201) and chapter "System bus (SBus 1) connection" (page 201).

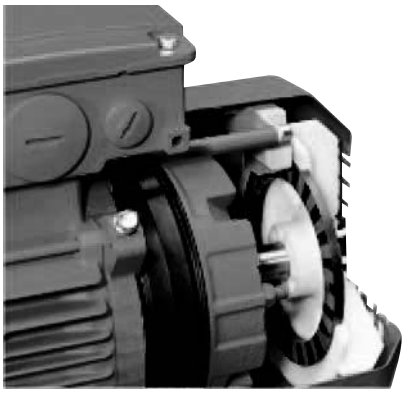
4.2 Simple positioning application module

The simple positioning application module is suited for many applications that have so far been implemented by switching between rapid and creep speed.

Compared to conventional encoders, a cost-effective EI7C built-in encoder with up to 24 pulses per motor revolution is used, see the following figure. An encoder card is no longer necessary because the simple encoder can be directly connected to the MOVITRAC® B inverter. Another advantage is the compact design that makes it possible to integrate the encoder into the motor without adding extra length.

The parameters are set with the IPOS® positioning control by means of the MOVITOOLS® MotionStudio engineering software.

Built-in encoder EI7C



For detailed information, see chapter “Built-in encoder connection” (page 90).

4.3 Parameter set switchover

This function lets you operate two motors on one inverter using two different parameter sets.

The parameter set is switched over using a digital input or fieldbus. A digital input must be programmed to the "Parameter set switchover" function (→ *P60./P61.*) for this purpose. You can then change from parameter set 1 to 2 and vice versa in INHIBITED inverter status.

Function	Effect in case of	
	"0" signal	"1" signal
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.

4.4 IPOS®

4.4.1 Description

Die IPOS$^{plus®}$ positioning and sequence control system is integrated as standard in every MOVITRAC® inverter and is activated using parameter P809. IPOS$^{plus®}$ can be used to execute control functions either simultaneously or independently of one another.

The IPOS$^{plus®}$ program is written using the MOVITOOLS® MotionStudio engineering software. Starting up the inverter, accessing parameters, and editing variables are all possible either with the software or the DBG60B keypad (startup in VFC mode only).

4.4.2 Characteristics

- Program execution is independent of the operating mode
- The user program is continued even if a unit malfunction occurs (troubleshooting is possible in the user program)
- Two user programs can be run in parallel and independently of one another (tasks 1 and 2, each interrupt-capable).
- The user programs programmed in assembler can contain up to 3200 program lines
- User-friendly and comprehensive control options for the inverter
- Access to all available options
- Extensive options for communication via system bus (SBus), RS485, RS232 and fieldbus (direct communication with MOVIMOT® is possible)
- Processing of digital and analog input/output signals

Max. program length of task 1, task 2 and task 3	**Total of ca. 3200 program lines**
Command processing time per program line	Task 1: 1 ... 10 commands/ms can be configured Task 2: 2 ... 11 commands/ms can be configured
Variables	1024, of which 128 (0...127) can be stored to non-volatile memory; range of values: -2^{31} to $+(2^{31}-1)$
Sampling cycle of digital and analog inputs	5 ms
Digital inputs/outputs	6 inputs/3 outputs
Analog inputs/outputs	1 input (DC 0 – 10 V, DC 0...20 mA, DC 4...20 mA) 1 input (DC 0 – 10 V, DC +-10 V) -> only with FIO11B 1 output (DC 0 – 20 mA, DC 4...20 mA, DC 0 – 10 V) -> only with FIO11B Seven more digital inputs are available with FIO21B.

4.5 Energy efficiency

Sizes 2S and higher allow for using regenerative power supply and DC link coupling to significantly increase the energy efficiency. The MDR60A.. regenerative power supply unit has the following features:

- Braking energy is fed back into the power supply system
- The axes may only be connected to the power supply with energy recovery unit size 2
- Coupling of several axes to one energy recovery unit
- Exchange of energy among several axes

The inverter is selected based on the motor load

Regenerative power supply offers the following advantages:

- Reduced overall energy consumption
- Reduced CO_2 emissions
- Installation cost savings
- No investment in braking resistors
- No emission of braking resistor thermal energy
- No need for ventilation

5 General information

5.1 About 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-related 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-related 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.

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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-EURODRIVE.

6.1 Preliminary information

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

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.

- All work related to transportation, storage, installation, assembly, connection, startup, maintenance and repair may only be carried out by qualified specialists, in strict observance of:
  - The pertinent detailed operating instructions
  - The warning and safety signs on the motor or gearmotor
  - All other project planning documents, operating instructions and wiring diagrams related to the drive
  - System-specific regulations and requirements
  - The national/regional regulations governing safety and accident prevention
- 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 machinery.

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, troubleshooting 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, troubleshooting 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 overvoltages 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 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-EURODRIVE website**.

6.5 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 about any damage. It may be necessary to preclude startup. Observe the climate conditions according to chapter "General technical data (page 21)".

6.6 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 explicitly permitted:

- 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 that are subject to mechanical vibration and shock loads in excess of the requirements in EN 61800-5-1.

6.7 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.

6.8 Safe disconnection

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

6.9 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 internal safety functions of the unit can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive restarting automatically. If this is not permitted for the driven machine for safety reasons, disconnect the unit from the supply system before correcting the fault.

6.10 Unit temperature

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

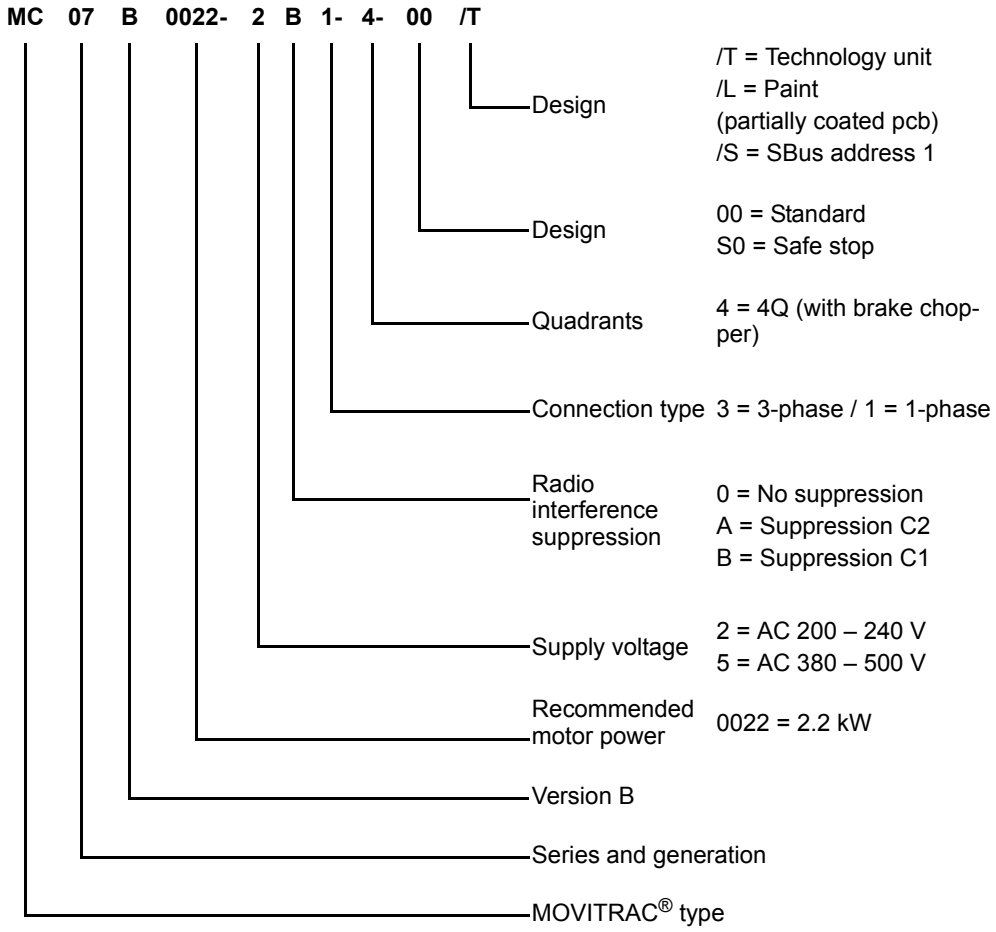
The braking resistors can reach a surface temperature of significantly more than 70 °C.

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

7 Unit structure

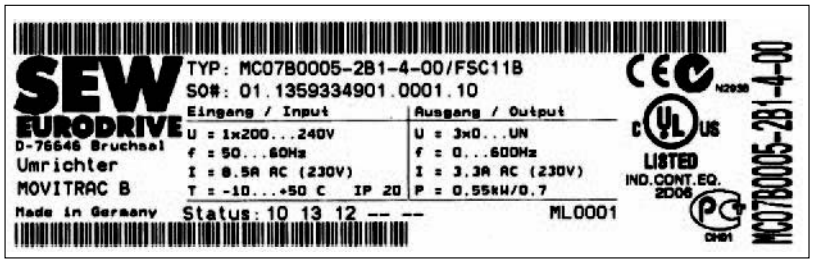
7.1 Type designation

The following diagram shows a type designation:



7.2 Nameplate

The following figure shows a nameplate:



3185547659

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

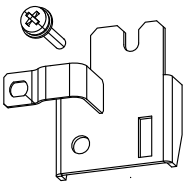
The unit status is indicated above the lower barcode. It documents the unit's hardware and software states.

7.3 Scope of delivery

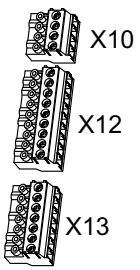
The parts listed below are delivered in an accessory bag for each unit size.

Illustration no.	Size					
	0XS, 0S, 0L	1	2S	2	3	4, 5
Shield plate for control electronics with clamps and screws						
[1]	1x	1x	1x	1x	1x	1x
[3]	1x					
Shield plate for the power section without screws						
		1x				
Shield plate for the power section with screws						
			1x	1x		
Connector for electronics terminals						
[2]	3x	3x	3x	3x	3x	3x
Grounding terminals with screws						
[4]	1x	1x	1x	1x		
Connector for supply system (2 or 3-pole) and motor						
[5]	1x					
Plastic insulation with sticker						
[6]	1x					
Touch guard						
						1x
Fixing straps						
		1x	1x			

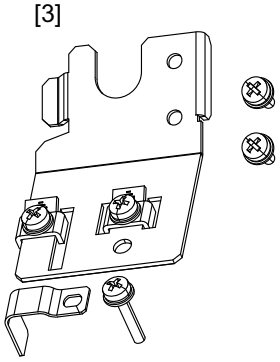
[1]



[2]



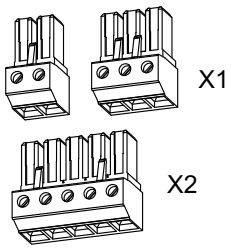
[3]



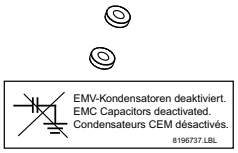
[4]



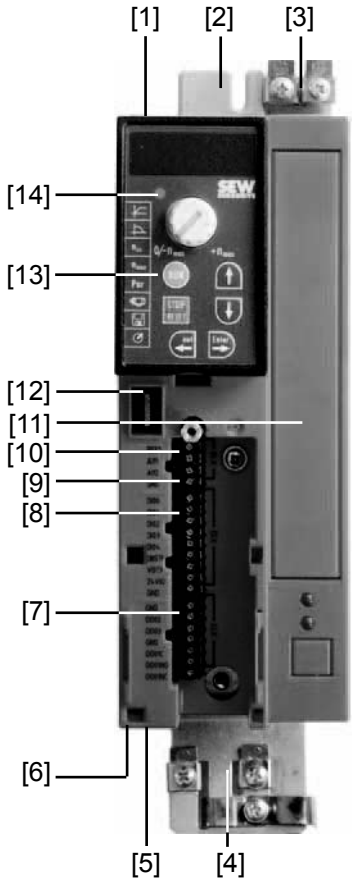
[5]



[6]



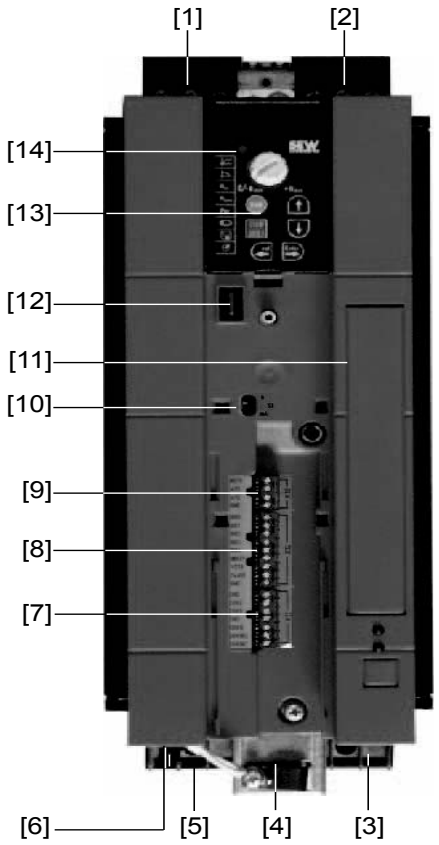
7.4 Sizes 0XS / 0S / 0L



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[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: Digital outputs
[8] X12: Digital 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)

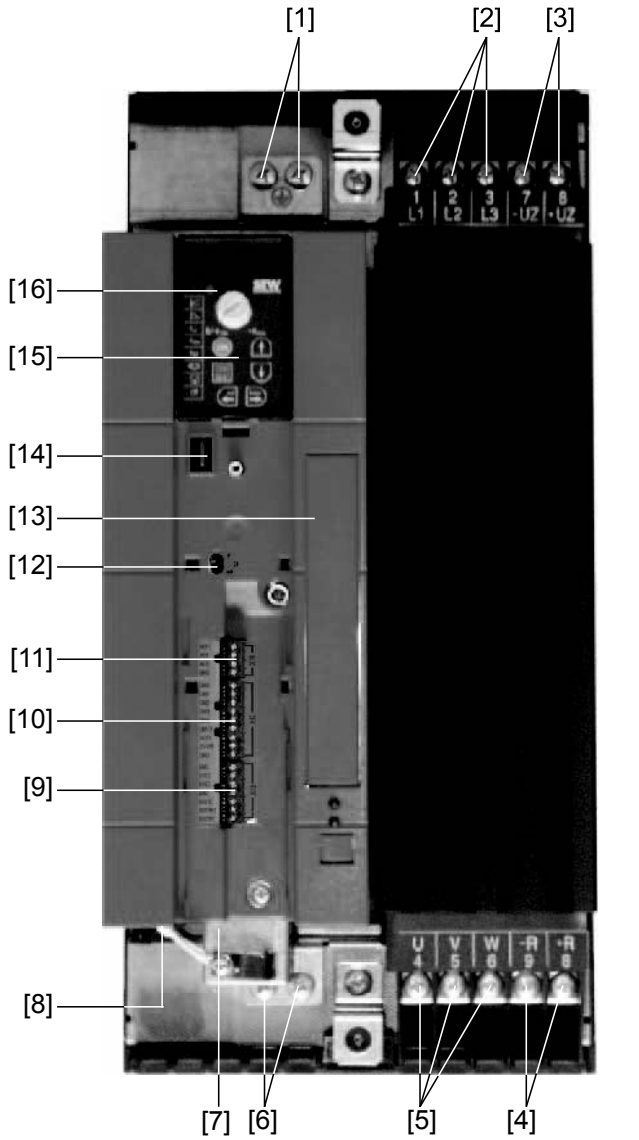
7.5 Sizes 1 / 2S / 2



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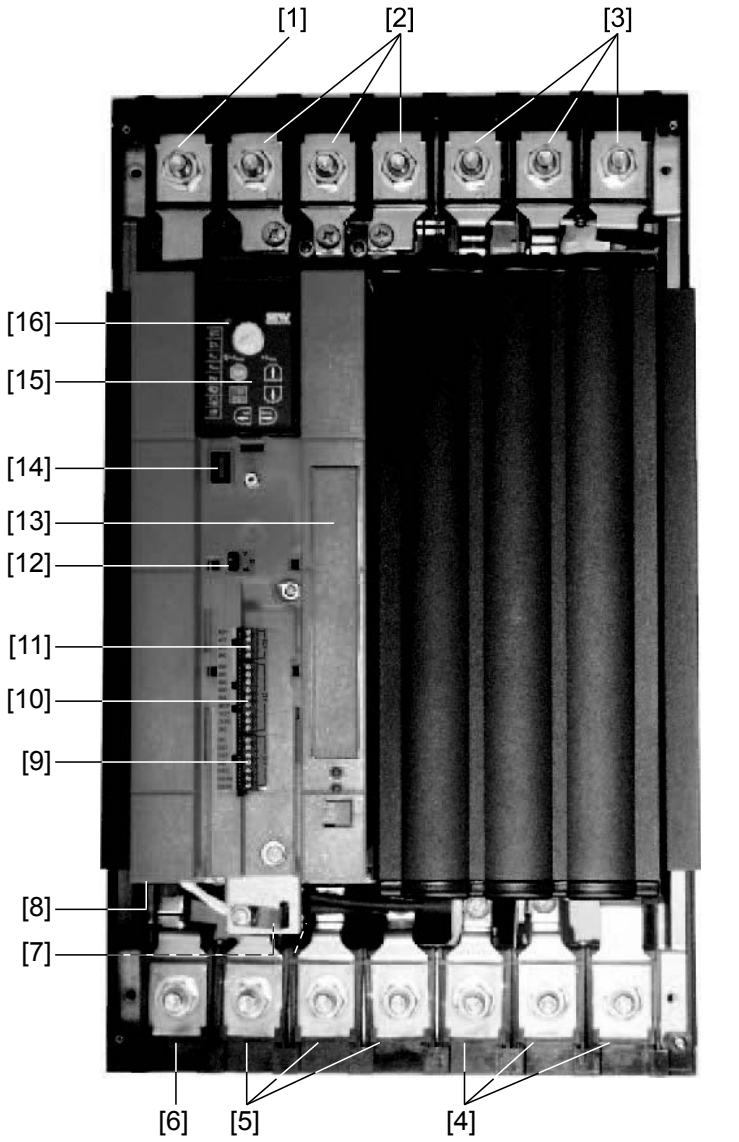
[1] X1: Power supply connection 3-phase: L1 / L2 / L3 / PE screw
[2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$
[3] X3: Braking resistor connection R+ / R– / PE
[4] Electronics shield clamp
[5] X2: Motor connection U / V / W / PE screw
[6] X17: Safety contact for safe stop (only 400 / 500 V)
[7] X13: Digital outputs
[8] X12: Digital 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)

7.6 Size 3



[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: Digital outputs
[10] X12: Digital 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)

7.7 Sizes 4 / 5



[1] X2: PE connection
[2] X1: Power supply connection 3-phase: 1/L1 / 2/L2 / 3/L3
[3] X4: DC link connection $-U_Z$ / $+U_Z$ and PE connection
[4] X3: Braking resistor connection R+ (8) / R– (9) and PE connection
[5] X2: Motor connection U (4) / V (5) / W (6)
[6] X2: PE connection
[7] Electronics shield clamp
[8] X17: Safety contact for safe stop (only 400 / 500 V)
[9] X13: Digital outputs
[10] X12: Digital 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)

8 Installation



⚠ DANGER

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

Danger of burns.

- Do not touch the heat sink.



⚠ DANGER

Dangerous voltages present at cables and terminals.

Severe or fatal injuries from electric shock.

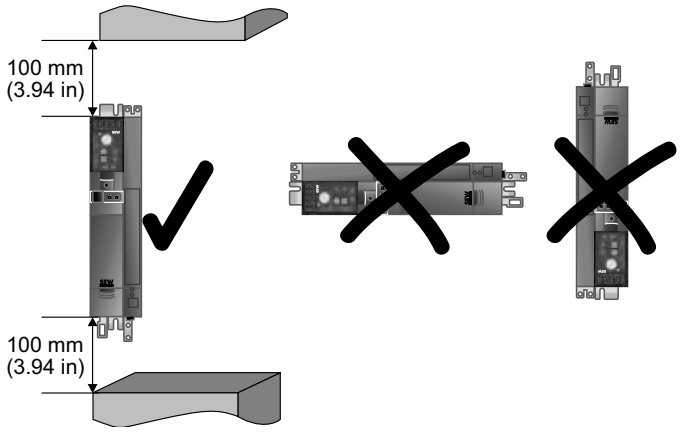
To prevent electric shocks due to stored charges:

- Disconnect the inverter from the supply system and wait 10 minutes before starting to work on it.
- Use suitable measuring instruments to make sure that no voltage is present at cables and terminals.

8.1 Installation notes for basic unit – mechanical aspects

8.1.1 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.



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8.2 Installation notes for basic unit – electrical aspects

8.2.1 Recommended tools

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

8.2.2 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 und 0750: Temperature range 75 °C (167 °F)
- Necessary tightening torques of MOVITRAC® B power terminals: See chapter "Technical Data" (page 23).
- 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 a fault.
- 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.

Maximum values/fuses

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

230 V units / 1-phase	Max. line current	Max. line 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. line current	Max. line 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. line current	Max. line 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

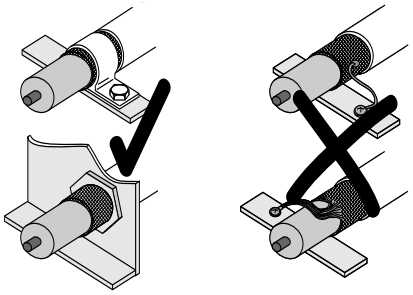
INFORMATION

Use only tested units with a limited output voltage (V_{max} = DC 30 V) and limited output current (I ≤ 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).

8.2.3 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.



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- You can also use grounded 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 that can cause electromagnetic interference according to EN 61800-3. In this case, it is recommended for the operator to take suitable measures.
- For detailed information on EMC-compliant installation, refer to the publication "Drive Engineering – Practical Implementation: EMC in Drive Engineering" from SEW-EURODRIVE.

8.2.4 Shield terminals

Installation of 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.



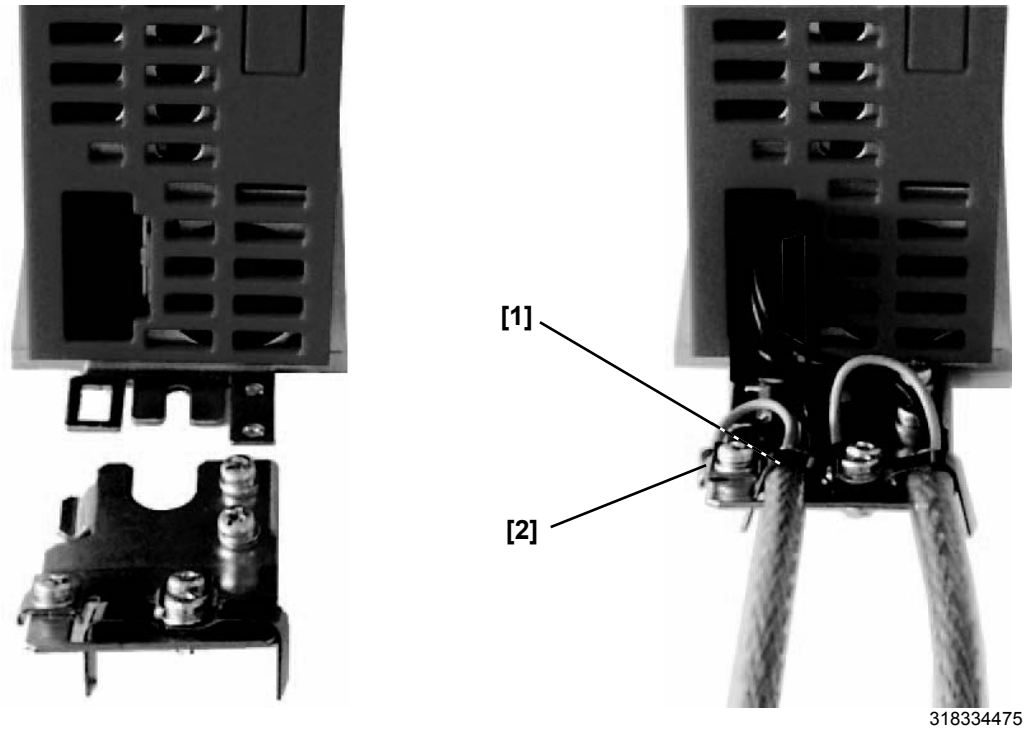
Installation of shield plate for the power section

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.

Size 0

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

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

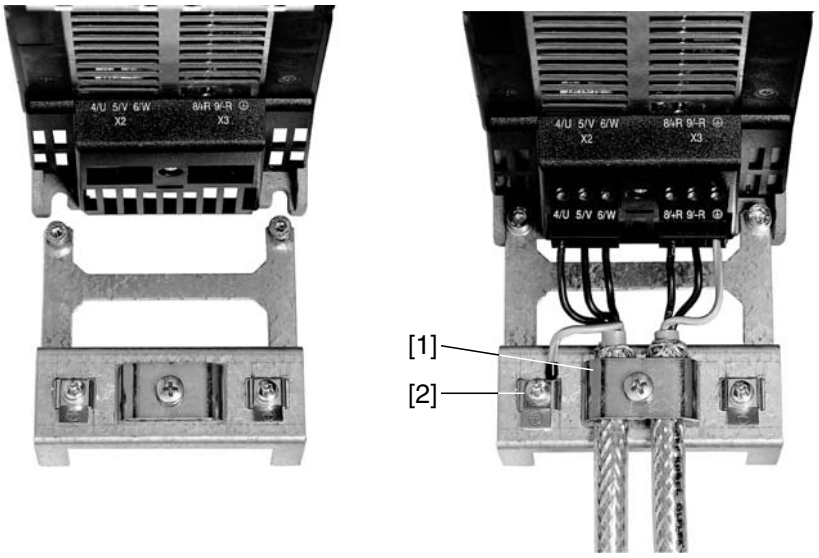


[1] Shield plate
[2] PE connection

Size 1

A shield plate for the power section with 2 retaining screws is supplied as standard with MOVITRAC® B size 1.

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



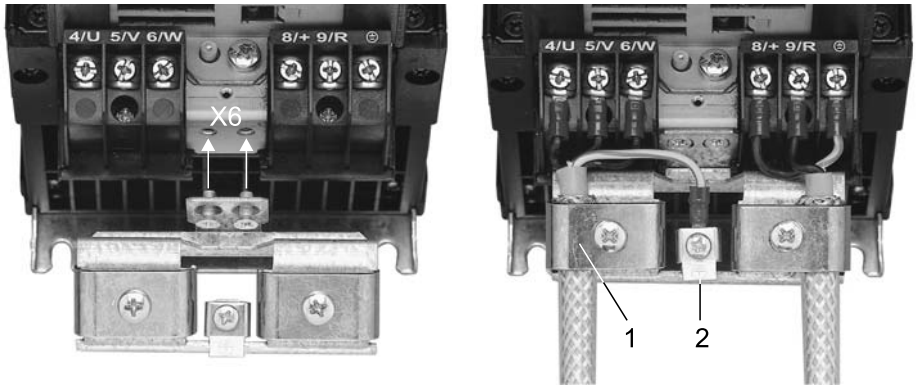
244986123

[1] Shield plate
[2] PE connection

Size 2S/2

A 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 below shows size 2.



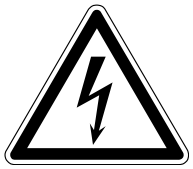
111752587

[1] Shield plate
[2] PE connection

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 resistor cables. Apply the shield as closely as possible to the inverter.

Touch guard installation



⚠ 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.

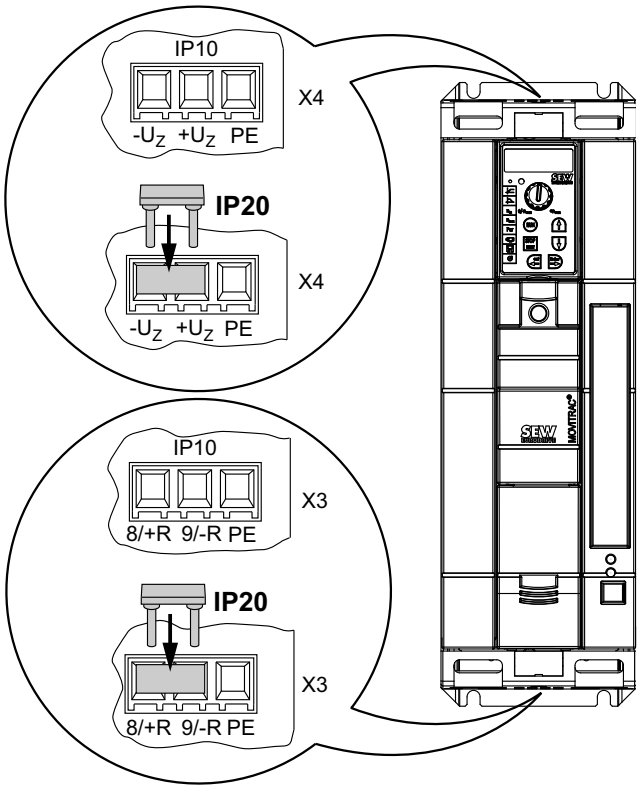
Size 2S

SEW-EURODRIVE supplies 2 touch guards for the DC link and braking resistor terminals as standard with MOVITRAC® B size 2S. When the touch guard is installed, MOVITRAC® B size 2S has degree of protection IP20.

INFORMATION

When the touch guard is not installed, MOVITRAC® B size 2S has degree of protection IP10.

Install the touch guard as shown in the illustration below.

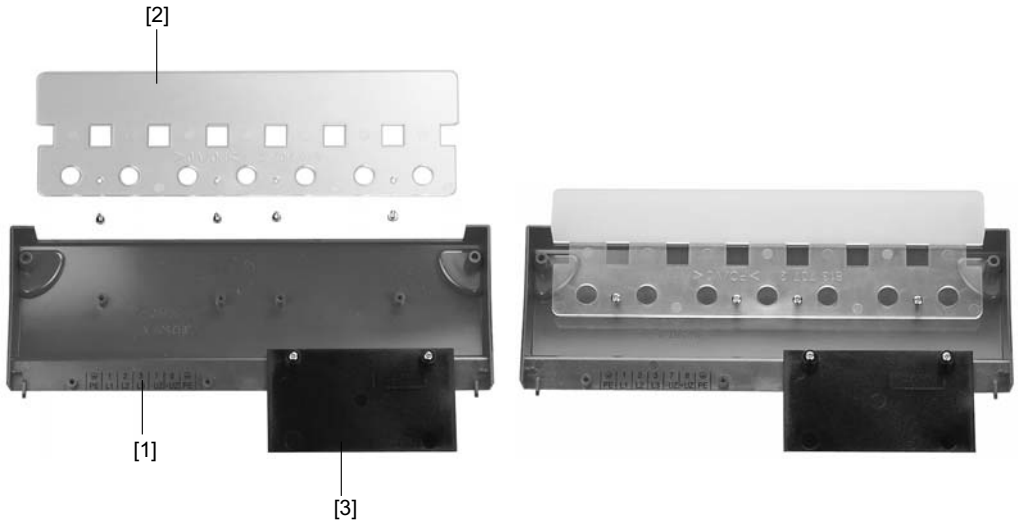


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Sizes 4 / 5

Two touch guards with 8 retaining screws are supplied as standard with MOVITRAC® B sizes 4 and 5.

Install the touch guard on both covers of the power section terminals.



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

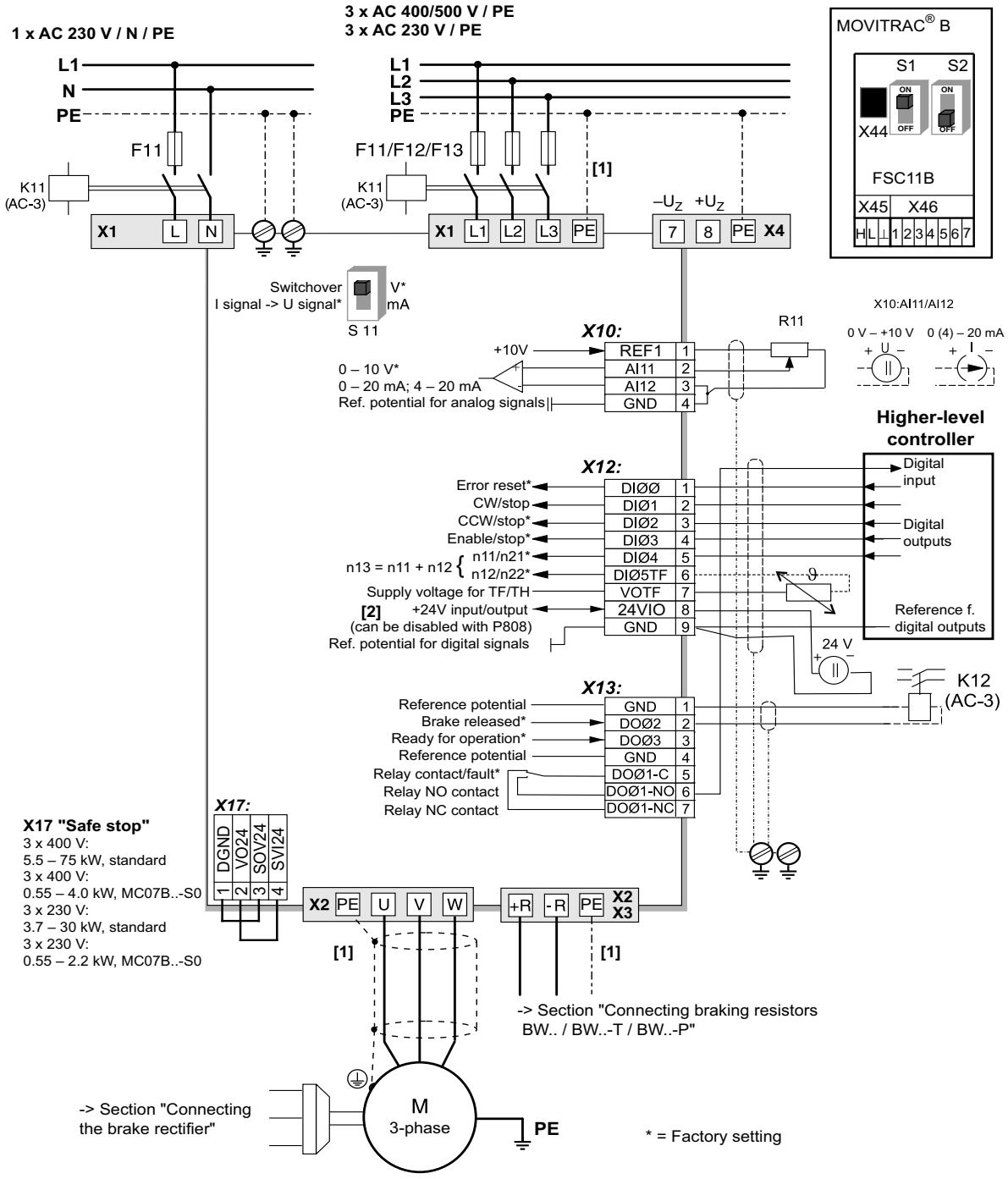
MOVITRAC® B units of size 4 and 5 can only achieve degree of protection IP10 when the following conditions are met:

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

INFORMATION

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

8.2.5 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.

8.2.6 Requirements for cold plate installation – 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 instal-

lation 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 surfaces are required, maximum deviation 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.

8.2.7 Deactivating the EMC capacitors – size 0 only



⚠ DANGER

Severe or fatal injuries from electric shock.

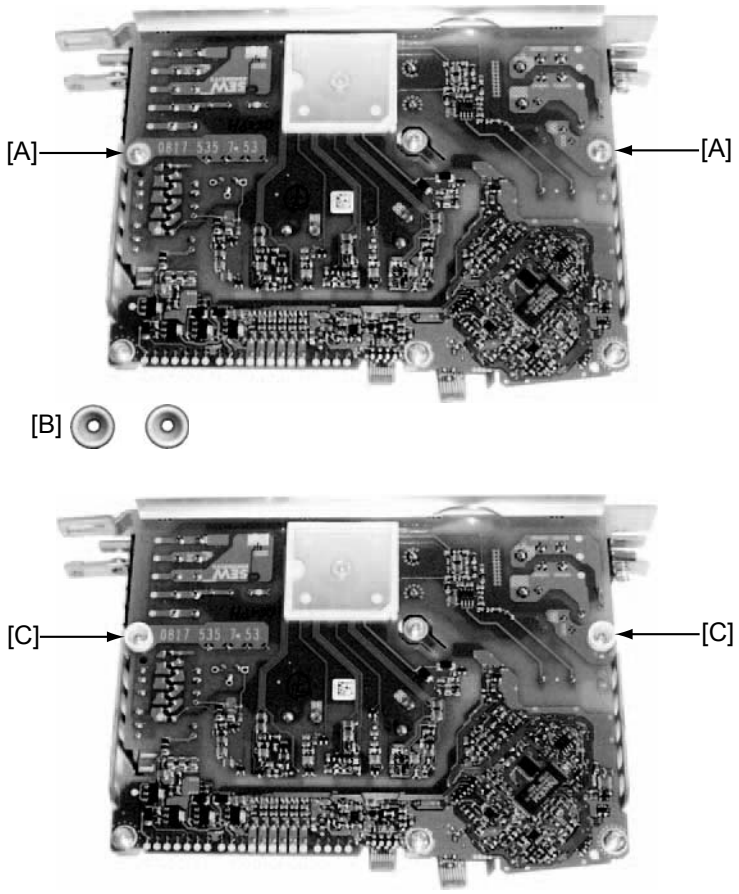
- Disconnect the inverter from the power. Disconnect the DC 24 V supply and the line voltage.
- Wait 10 seconds.
- Ensure that the unit is de-energized.
- Take appropriate measures to avoid electrostatic charges (use discharge strap, conductive shoes, etc.) before removing the cover.
- Touch only the unit frame and the 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 in the MOVITRAC® B frequency inverter:

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 for this purpose [B].
4. Fasten screws to the unit [C].
5. Close the unit.
6. Attach the sticker provided to the unit.



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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 motor cable used, its length and the motor in use.

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

8.2.8 Separate cable ducts

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

8.2.9 Operation on IT systems

- SEW recommends using insulation monitoring devices with pulse code measuring in network systems with a non-grounded star point (IT systems). Use of such devices prevents the earth-leakage monitor mis-tripping due to the earth capacitance of the inverter.

8.2.10 Utilization category of contactors

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

8.2.11 Required cross sections

- Supply system lead: Cross section according to rated input current I_{line} 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)]

  Max. 1.0 mm^2 (AWG17) with conductor end sleeves

8.2.12 Cable lengths for individual drives

- The cable lengths depend on the PWM frequency. The permitted motor cable lengths are listed in chapter "Project planning" (page 140).

8.2.13 Unit output

- Only connect ohmic/inductive load (motor).

8.2.14 Switched inductances



⚠ CAUTION

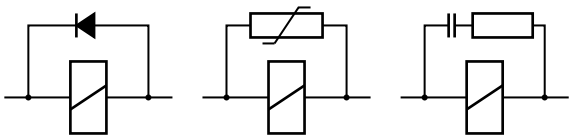
Switched inductances

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:



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

1) Never mount finely stranded cables without conductor end sleeves.

8.2.15 PE supply system connection according to EN 61800-5-1

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:
  - Use a 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:
  - Use a copper protective earth conductor with half the cross section of the supply system cable.

8.2.16 Interference emission

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

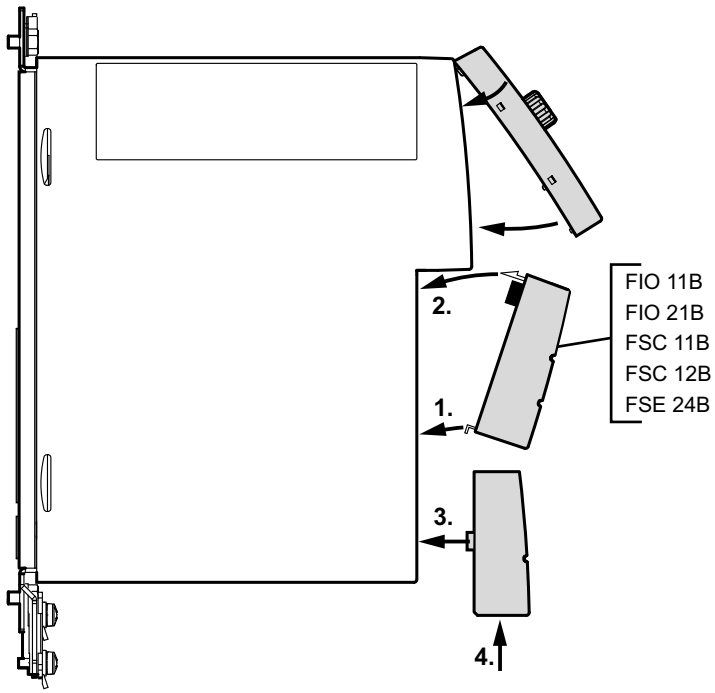
8.2.17 Digital outputs

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

8.3 Installing accessories and options – mechanical aspects

8.3.1 Attaching the front modules

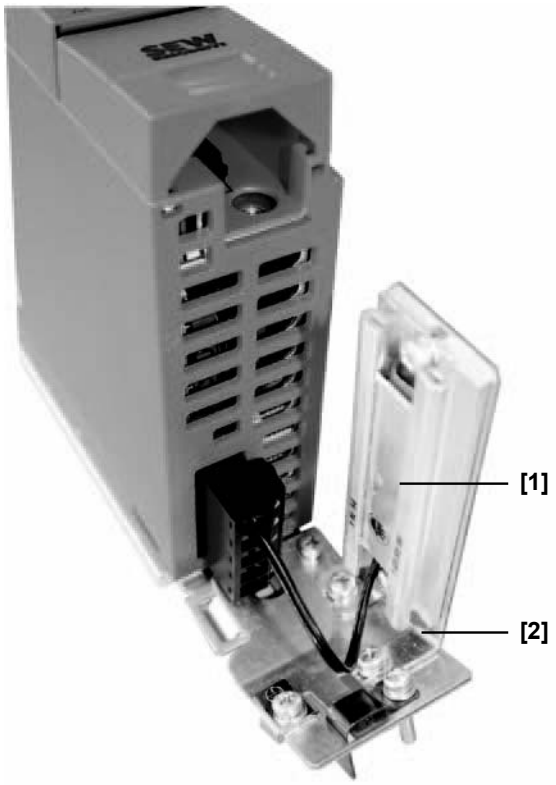
Attach the front modules as follows:



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8.3.2 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.

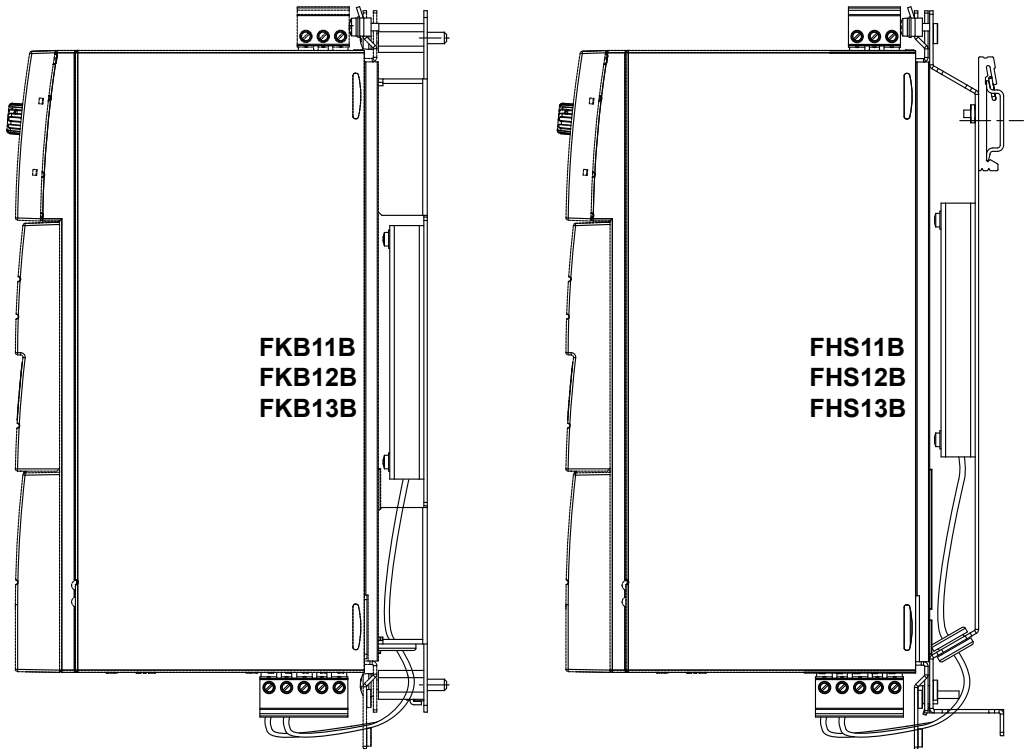


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8.3.3 Flat-design resistors with FKB11B / FKB12B / FKB13B and FHS11B / FHS12B / FHS13B

Proceed as follows to install flat-type braking resistors:

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



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8.4 Installing accessories and options – electrical aspects

8.4.1 Braking resistor connection

- Shorten the cables to the required length.
- Use 2 tightly twisted leads or a 2-core shielded power cable. Cable cross section according to trip current I_F of F16.
- Protect the braking resistor with a bimetallic relay (F16, see wiring diagram) with trip class 10 or 10A. 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-type braking resistors together with the appropriate touch guard.

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

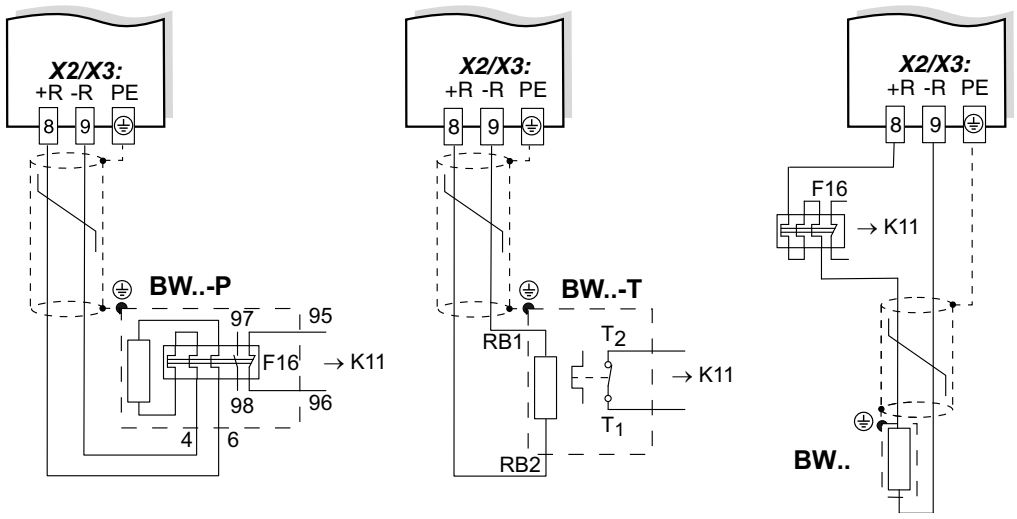


⚠ WARNING

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	–	–

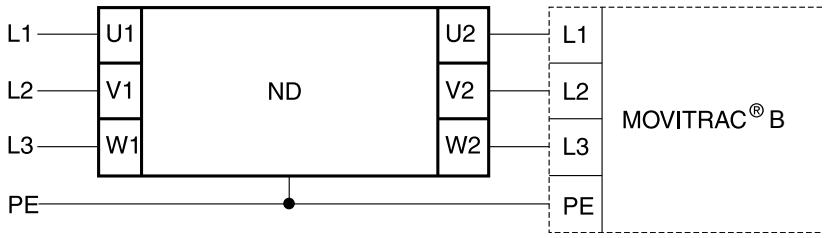
1) Permitted installation: On horizontal or vertical surfaces with brackets at the bottom and perforated sheets at top and bottom. **Improper installation:** On vertical surfaces with brackets at the top, right or left.

8.4.3 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.

8.4.4 ND line choke

Connecting ND series line choke



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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

8.4.5 NF line filters

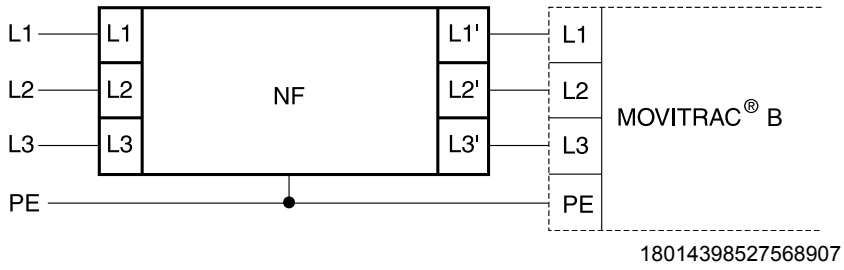
- Using the NF line filter, you can maintain limit value class C1/B with MOVITRAC® B sizes 0 to 5.
- ⚠ **NOTICE** Possible damage to property

  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



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.

8.4.6 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.

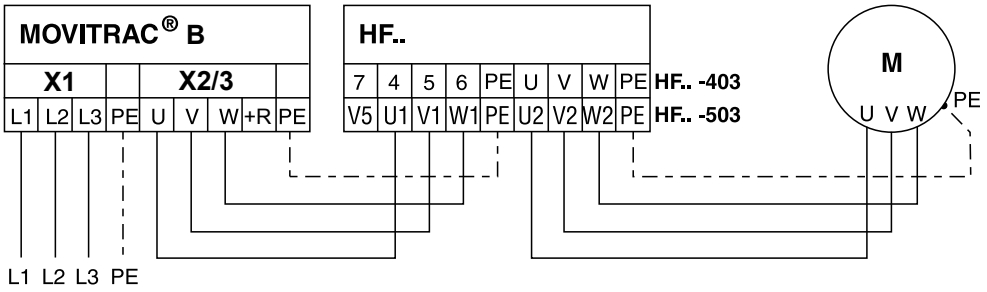
8.4.7 HF output filters

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.

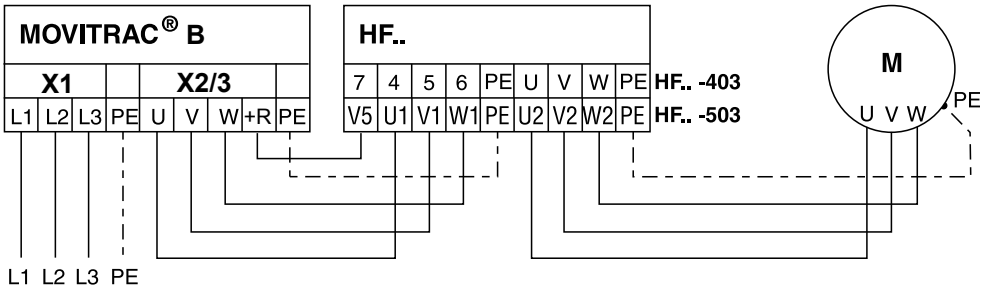
- Limit the length of the cable between inverter and output filter to the absolute minimum needed. Maximum 1 m / 3 ft with unshielded cable, 10 m / 33 ft with shielded cable.
- Several motors can be connected to one output filter when operating a motor group from one inverter. The total value of the rated motor currents must not exceed the nominal throughput current of the output filter.
- Two identical output filters can be connected in parallel to one inverter output to double the nominal 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)



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

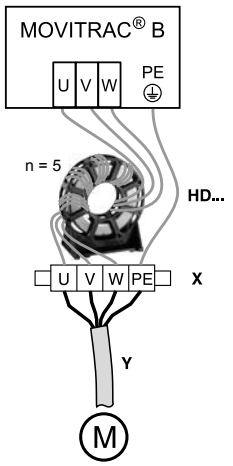


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8.4.8 HD output chokes

- 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.



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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 chokes:

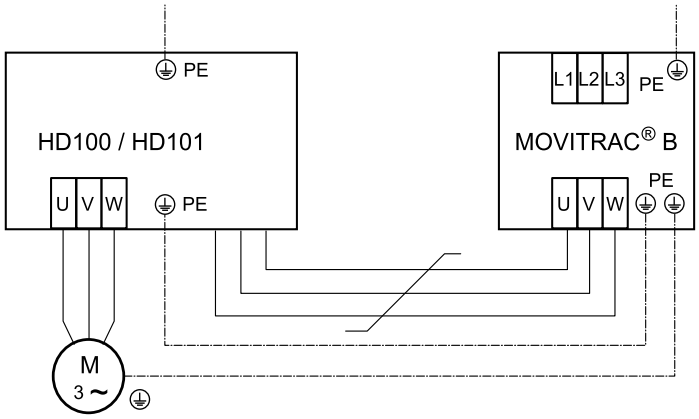
  Install the output choke under the respective inverter. Leave a ventilation space of at least 100 mm (3.94 in) below and above the output choke. Provide a clearance of 10 mm (0.39 in) on each side.

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

Installation of output choke HD100 / HD101

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

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



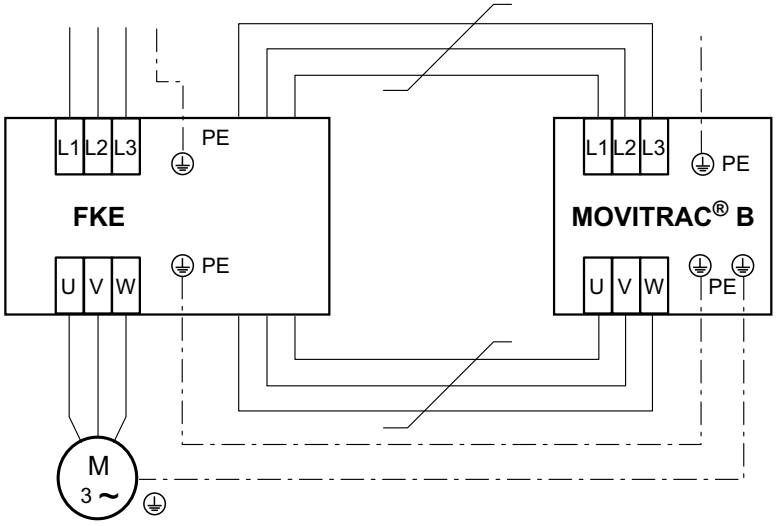
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8.4.9 FKE12B / FKE13B EMC-modules

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.

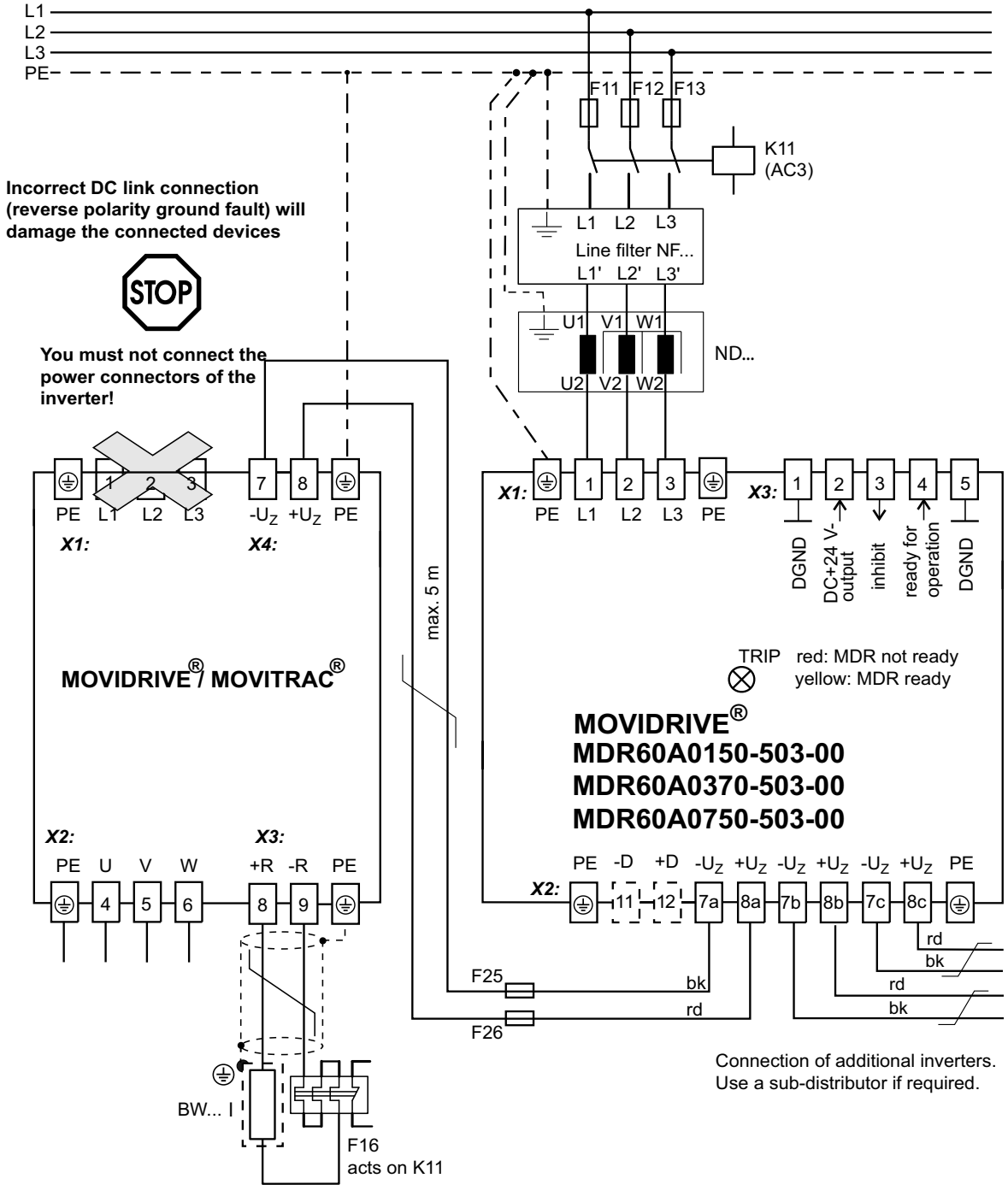
The connections L1 / L2 / L3 (brown / orange / white) can be connected in any order.



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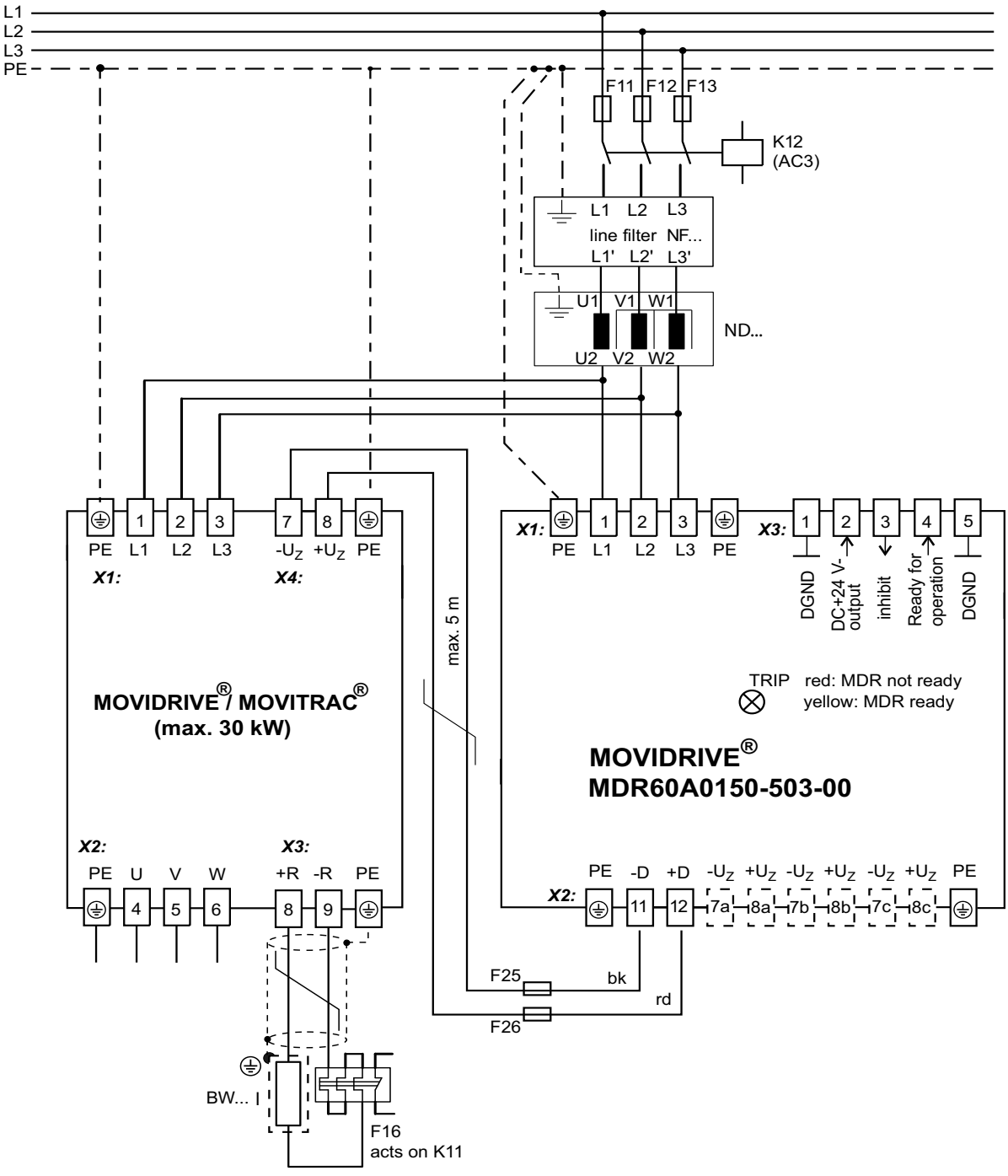
8.4.10 Connection of the regenerative power supply unit

DC link connection with MDR60A0150/0370/0750 regenerative power supply unit



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DC link connection with MDR60A0150 regenerative power supply unit as brake module



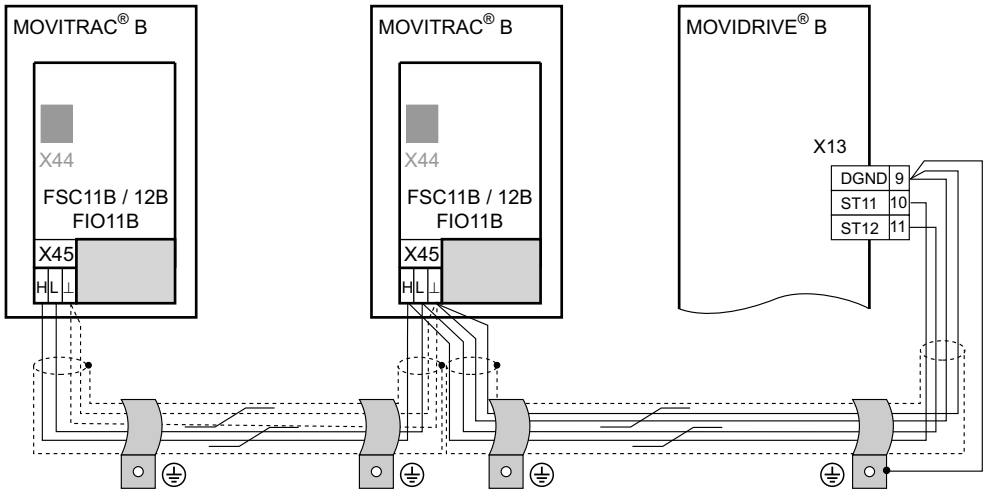
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8.4.11 Connection of RS485 interface

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.

8.4.12 System bus connection (SBus 1)

Installing system bus (SBus) to FSC11B/12B/FIO21B

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

DIP switch S1 or S1:8 lets you add a terminating resistor of 120 ohms (bus termination).

With FSC11B, also the continuing CAN is disconnected via X46:4;:5.

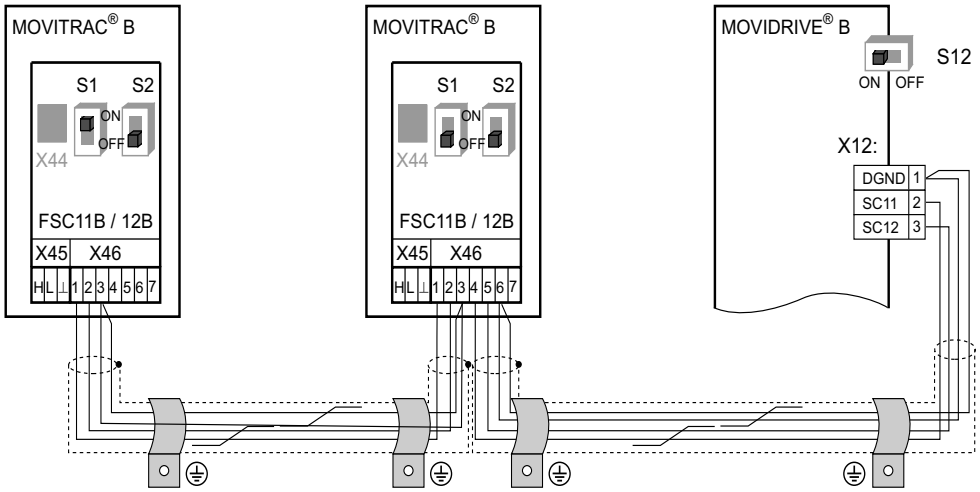
FIO21 does not have a switchable terminating resistor of 120 ohms integrated. The enclosed resistor must be connected for bus termination between X46:4 and X46:5.

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".

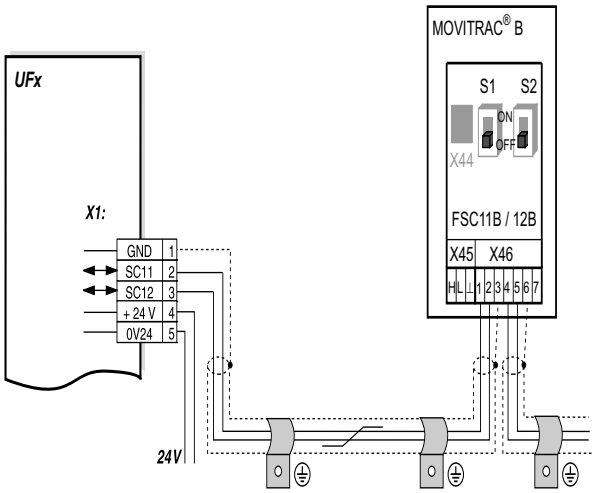
MOVITRAC® B with installed option card comes equipped with a connection cable for SBus connection.

MOVITRAC® B system bus connection



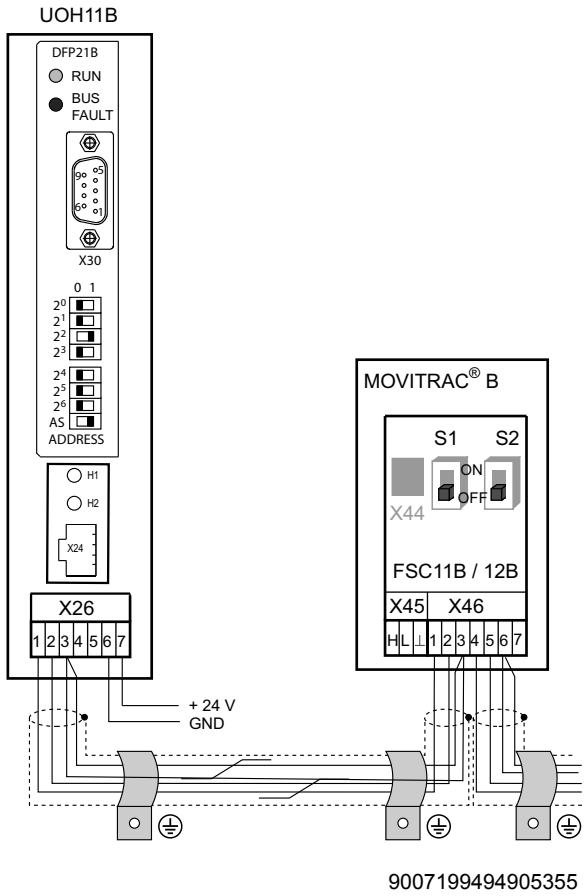
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MOVITRAC® B system bus connection with UFx



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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 kBd: 500 m (1640 ft)
  - 250 kBd: 250 m (820 ft)
  - 500 kBd: 100 m (328 ft)
  - 1000 kBd: 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.

Applying 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.
- 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.

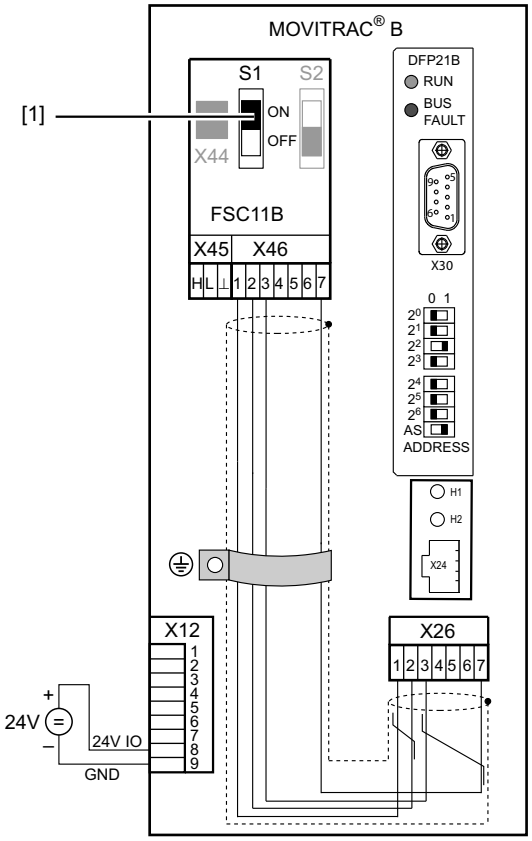
Connecting the system bus (SBus) to DFP21B

Installing the DFP21B option card in MOVITRAC® B

INFORMATION

- MOVITRAC® B does not require a special firmware status.
- Only SEW-EURODRIVE may install or remove option cards for MOVITRAC® B.

SBus connection



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[1] Terminating resistor activated, S1 = ON

INFORMATION

The DFP21B features an integrated SBus terminating resistor and must therefore always be installed at the beginning of the SBus connection.

The address of the DFP21B is always 0.

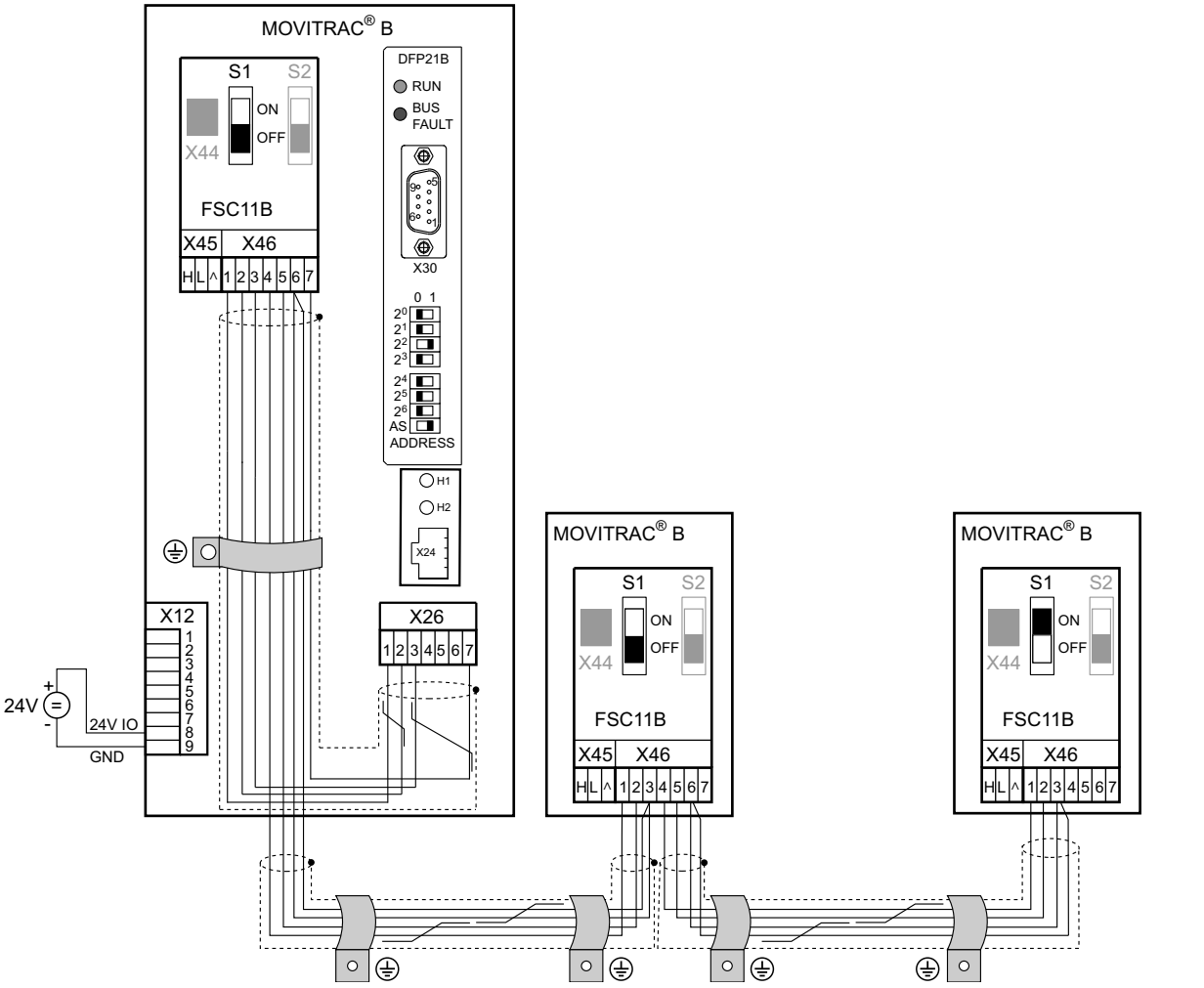
X46	X26	
X46:1	X26:1	SC11 SBus +, CAN high
X46:2	X26:2	SC12 SBus –, CAN low
X46:3	X26:3	GND, CAN GND
X46:7	X26:7	DC 24 V

X12	
X12:8	+24 V input
X12:9	GND reference potential for digital inputs

To simplify cabling, the DFP21B can be supplied with DC 24 V from X46.7 of the MOVITRAC® to X26.7.

MOVITRAC® B must be supplied with DC 24 V at terminals X12.8 and X12.9 when it supplies voltage to the DFP21B option.

System bus connection



DFP
GND = System bus reference
SC11 = System bus high
SC12 = System bus low

MOVITRAC® B
GND = System bus reference
SC22 = System bus outgoing low
SC21 = System bus outgoing high
SC12 = System bus incoming low
SC11 = System bus incoming high
S12 = System bus terminating resistor

Please note:

- Use a 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). Connect the shield flatly on both sides of the electronics shield clamp of MOVITRAC®. Also connect the ends of the shield to GND. The cable must meet the following specifications:
  - Core cross section 0.75 mm^2 (AWG18)
  - Cable resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m (12 pF/ft) at 1 kHz
- The permitted total cable length depends on the baud rate setting of the SBus:
  - 250 kBd: 160 m (528 ft)
  - 500 kBd: 80 m (264 ft)
  - 1000 kBd: 40 m (132 ft)
- Connect the system bus terminating resistor (S1 = ON) at the end of the system bus connection. Switch off the terminating resistor on the other units (S1 = OFF). The DFP21B gateway must always be connected either at the beginning or the end of the system bus connection and features a permanently installed terminating resistor.

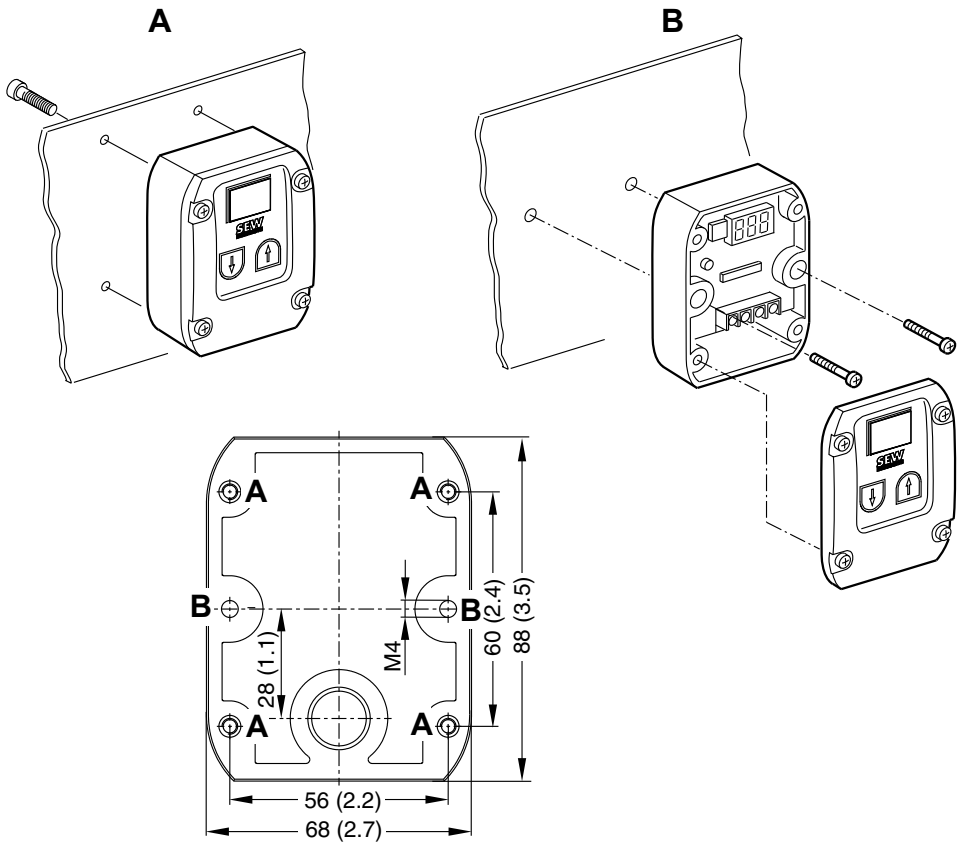
INFORMATION

- There must not be any potential displacement between the units connected with the SBus. Take suitable measures to avoid potential displacement, e.g. by connecting the unit ground connectors using a separate lead.
- Point-to-point wiring is not permitted.

8.4.13 Setpoint adjuster connection

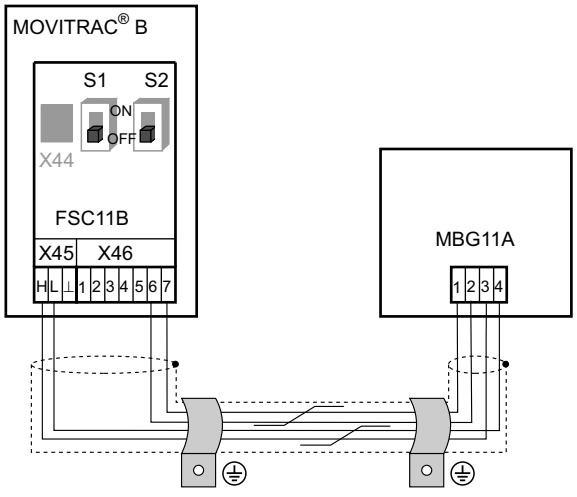
Installing the MBG11A setpoint adjuster

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



188175883

Connection



188285707

8.4.14 Connection of the interface adapter option UWS21B

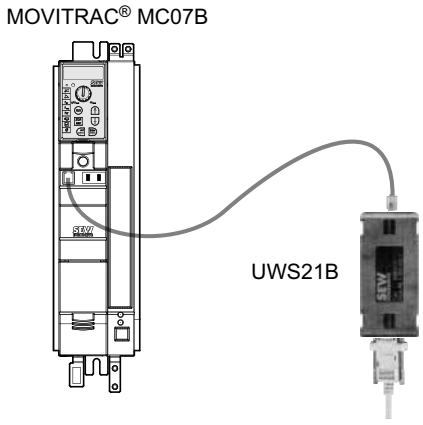
Part number Interface adapter UWS21B: 1 820 456 2

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

- UWS21B
- CD-ROM with MOVITOOLS® MotionStudio
- Serial interface cable with 9-pin sub D socket and 9-pin D-sub connector to connect the UWS21B option to the PC.
- Serial interface cable with two RJ10 connectors to connect UWS21B to MOVIDRIVE®.

Connecting inverter and UWS21B

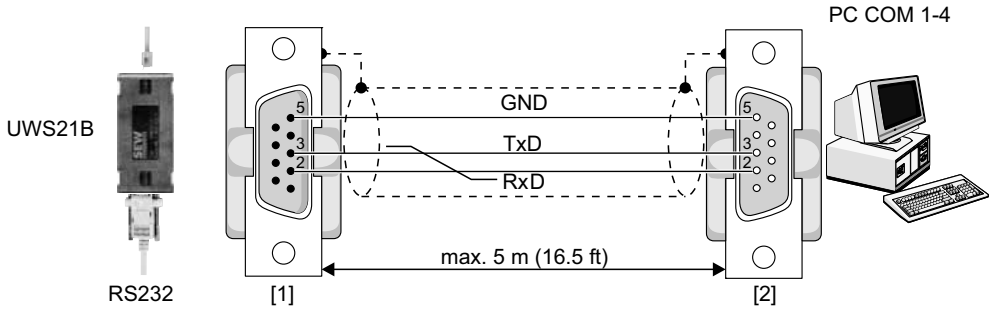
- Use the supplied connection cable to connect the UWS21B option to the MOVITRAC® unit.
- Plug the connection cable into the XT terminal socket of the MOVITRAC® unit.
- Note that the DBG60B keypad and the UWS21B serial interface cannot be connected to MOVIDRIVE® at the same time.
- The following figure shows the connection cable between MOVITRAC® and UWS21B.



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Connecting inverter and PC

- Use the connection cable supplied (shielded RS232 standard interface cable) to connect the UWS21B option to the PC.
- The following figure shows the connection cable between UWS21B and PC (1:1 connection).



1805918987

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

8.4.15 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®.

8.4.16 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 digital 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 24 V IO and a digital input. Set the digital input to "/External fault".

8.4.17 Brake rectifier connection

INFORMATION

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

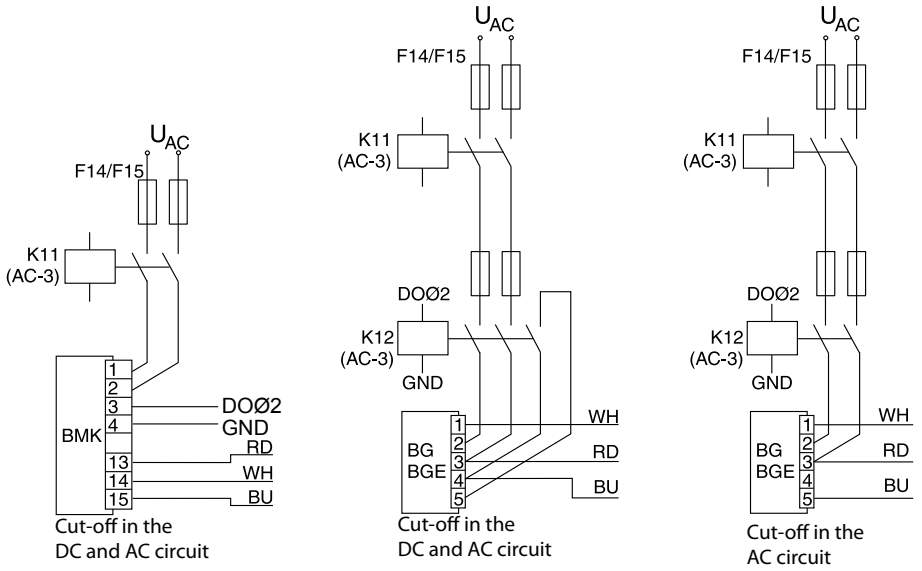
Use only contactors of utilization category AC-3 for K11 and K12.

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.

Wiring diagrams

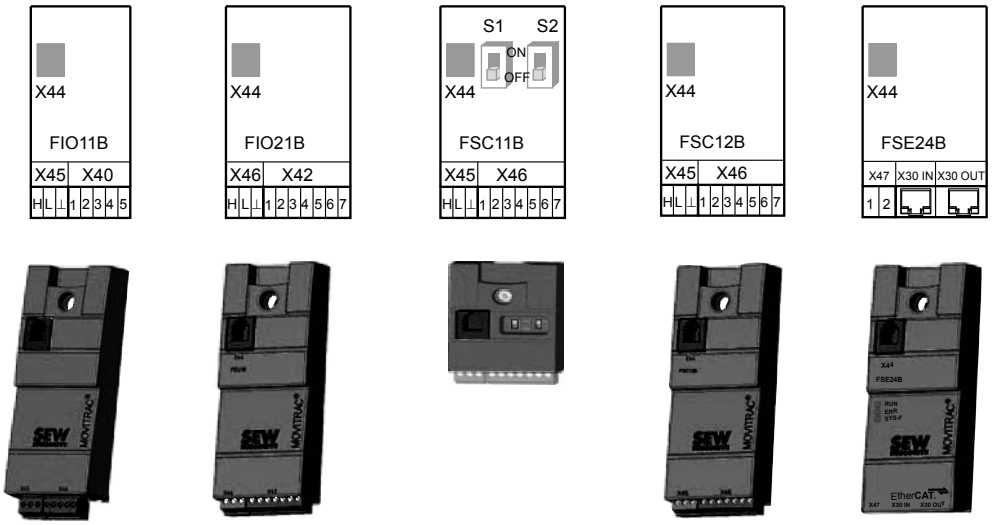


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Note the corresponding connection regulations for brakes without BG/BGE or BME. Refer to the SEW publication "Drive Engineering - Practical Implementation: SEW Disk Brakes".

8.4.18 Installation of FIO11B/21B, FSC11B/12B, FSE24B, DFP21B

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



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Connection/module type	FIO11B Analog module	FIO21B Digital module	FSC11B/12B Communication	FSE24B Communication
Analog input/output X40	Yes	No	No	No
Digital 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

Connection and installation of 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. The screw connection ensures a 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	For service purposes only 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					
Digital 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 deactivated.

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 are CAN bus cables 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 shift

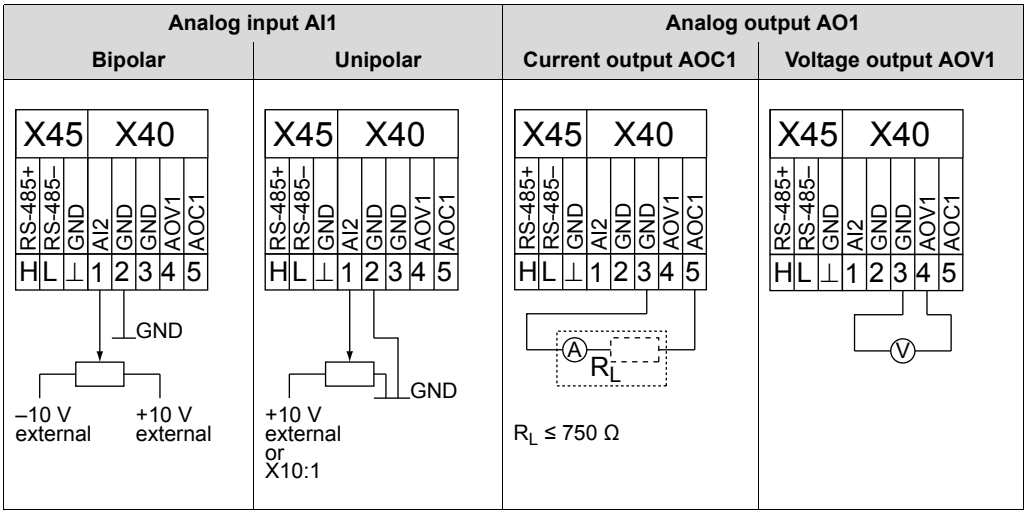
  Possible consequences include malfunctions that could lead to irreparable damage to the unit.

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

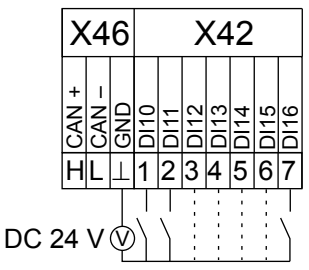
INFORMATION

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*.

Wiring the FIO11B analog module



FIO21B digital module wiring



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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. This means you can start up 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 signal!**
- 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.

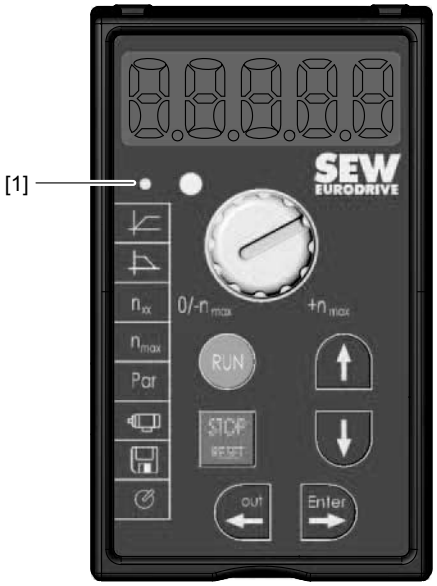
INFORMATION

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

9.3 Keypads

9.3.1 FBG11B – Basic keypad

Key arrangement and symbols on the keypad:

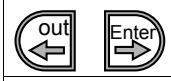


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[1] LED display when IPOS® program is started

Keypad functions

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

	Use UP/DOWN to select symbols and change values.
	Use out/Enter to activate and deactivate symbols or parameter menus
	Use RUN to start the drive.
	Use STOP/RESET to reset faults and stop the drive.



The STOP/RESET key 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.

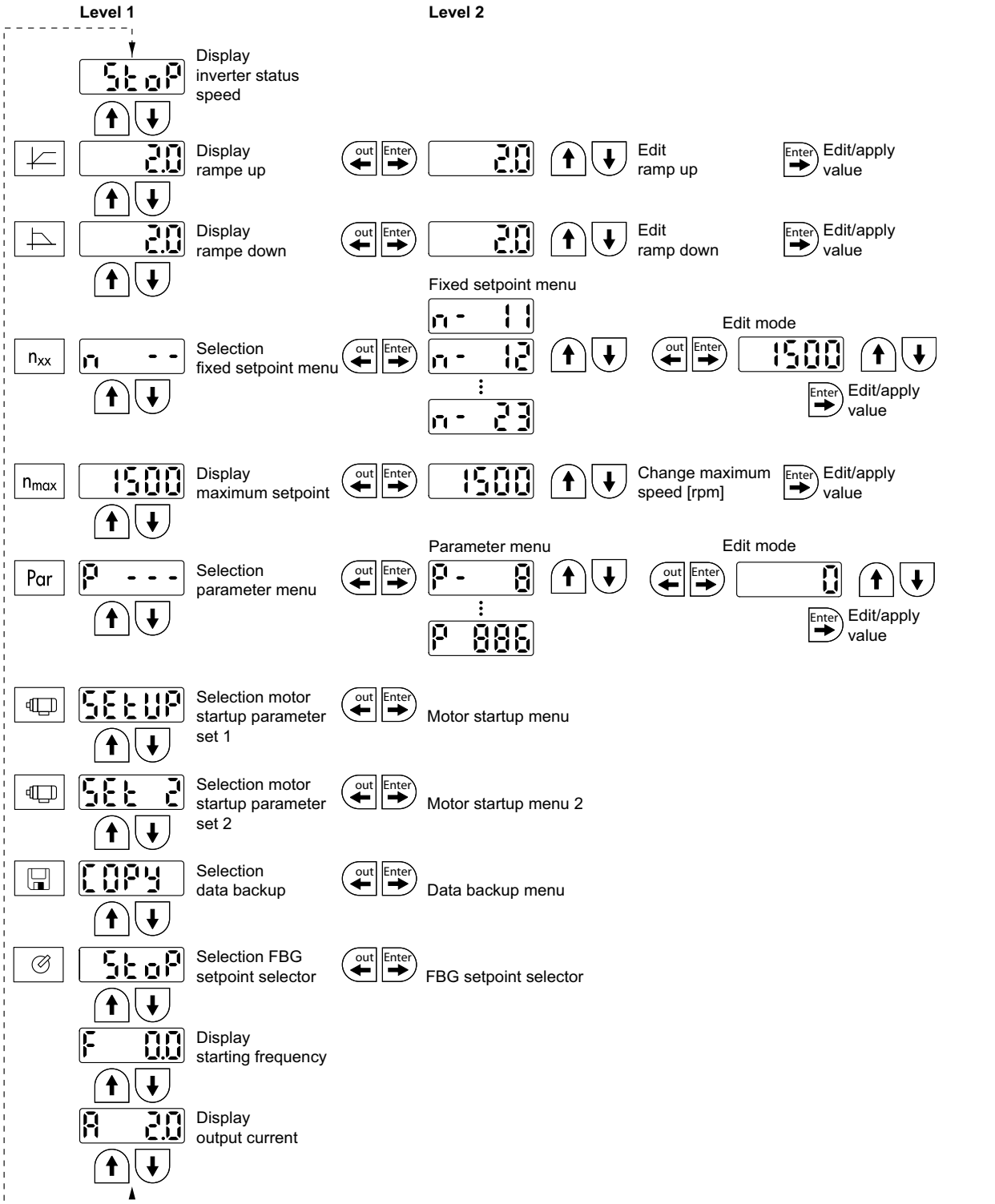
The STOP/RESET key can be used for performing a reset after a fault has occurred with a programmed fault response. The drive is then inhibited and must be enabled by pressing the RUN key. You can deactivate the STOP function with parameter *P760* using FBG11B.



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 to the inverter, the unit is also stopped.

Basic operation of the FBG11B keypad



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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" chapter). This situation will not occur during active startup.

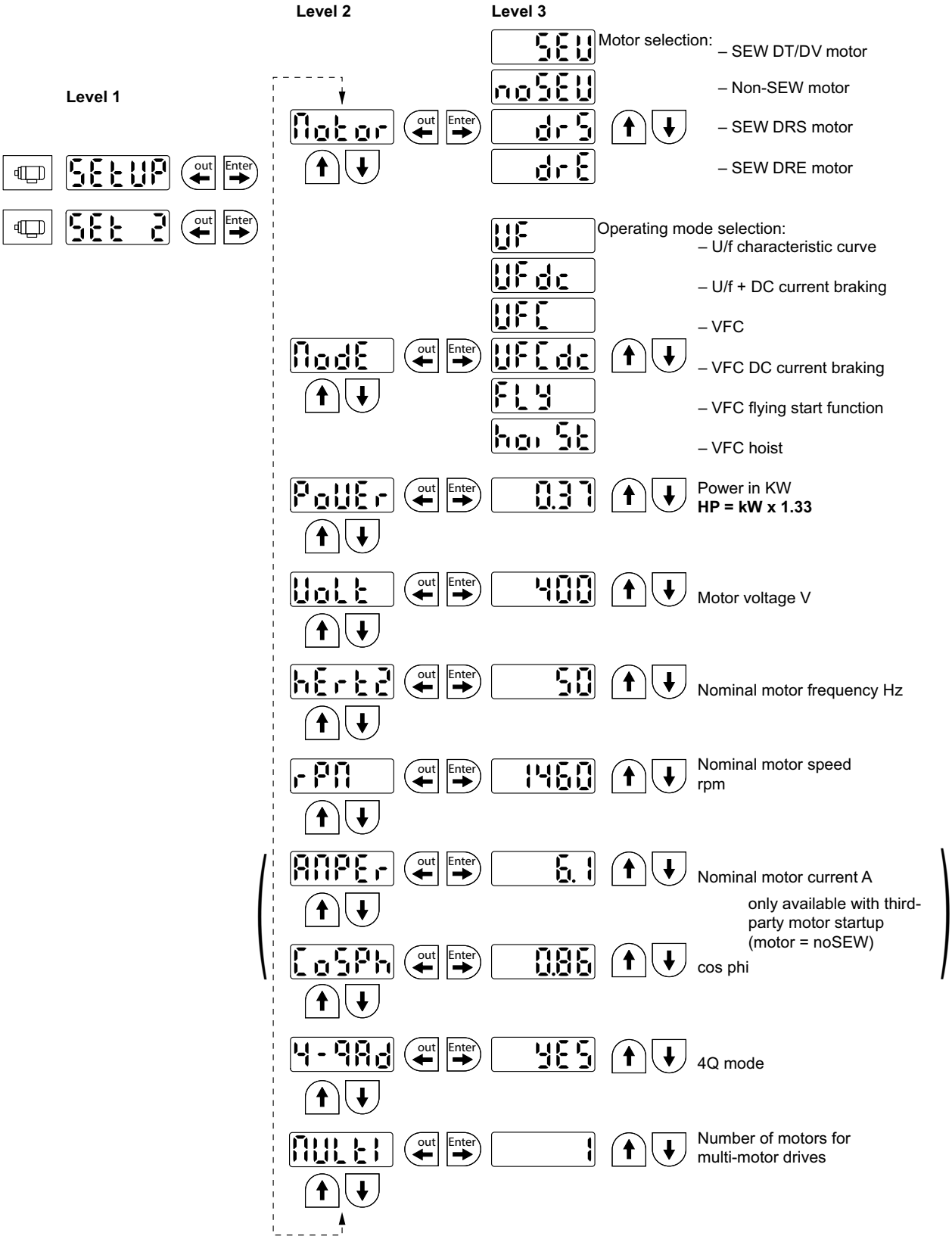
Warnings

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" (page 338) chapter.

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.

Startup using the FBG11B keypad



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Required data

The following data is required to ensure startup is successful:

- Motor type (SEW or non-SEW motor)
- Motor data
  - Nominal voltage and nominal frequency
  - Additionally for non-SEW motors: Nominal current, nominal power, power factor cosφ, and nominal speed.
- Nominal line voltage

Activating startup

Prerequisites:

- 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 key.

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.

Multi-motor drive startup

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.

Group drive startup

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.

Manual operation with FBG11B setpoint adjuster

FBG11B setpoint adjuster of the keypad (local manual mode): LED flashes.

The only relevant parameters in "FBG setpoint adjuster" operating mode are:

- *P122 Direction of rotation FBG manual operation*
- RUN key and STOP/RESET key
- Setpoint adjuster (potentiometer)

When the FBG setpoint adjuster 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 adjuster" 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 key.

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

Removing the FBG11B keypad will trigger a stop response.

9.3.2 DBG60B – Advanced keypad

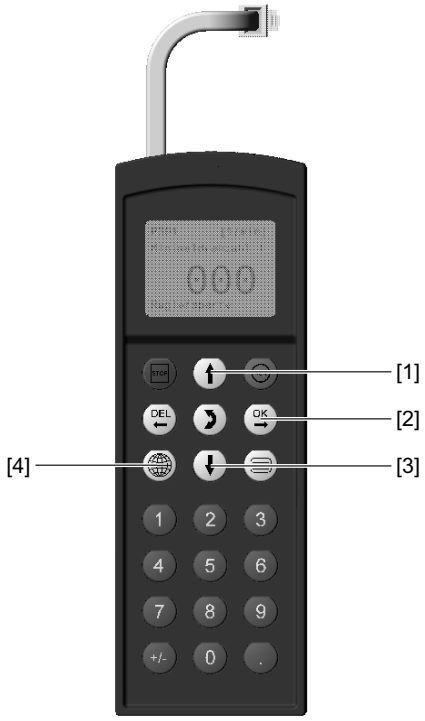
Required data

The following data is required to ensure startup is successful:

- Motor type (SEW or non-SEW motor)
- Motor data
  - Nominal voltage and nominal frequency
  - Additionally for non-SEW motors: Nominal current, nominal power, power factor cosφ, and nominal speed.
- Nominal line voltage

Selecting a language

The figure below shows the keys for selecting the language.



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[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.

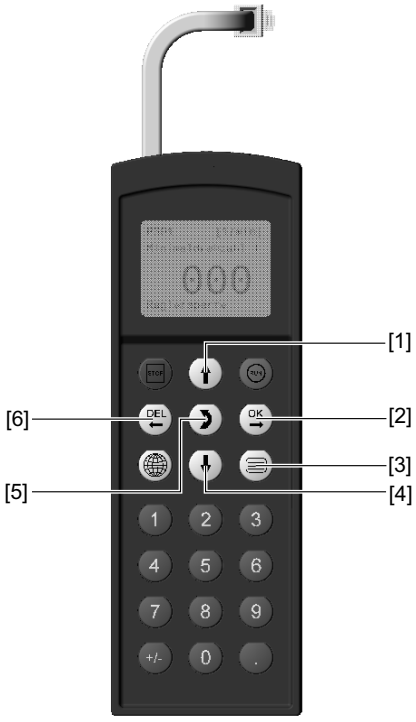


Proceed as follows to select the language:

- Press the language key. 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.

Startup

The figure below shows the keys required for startup.

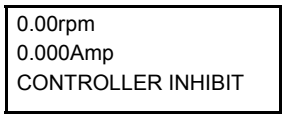


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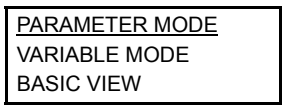
[1]	↑ key	Move up to the next menu item
[2]	OK key	Confirm entry
[3]	Context key	Activate the context menu
[4]	↓ key	Move down to the next menu item
[5]	↔ key	Change the menu, display mode ↔ edit mode
[6]	DEL key	Cancel or abort startup

Startup procedure

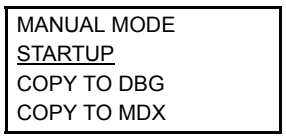
1. Enter "0" signal at terminal X12:2 (DIØ1 "/CW/STOP), e.g. by disconnecting X12 the electronics terminal block.



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

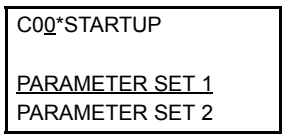


3. Scroll down with the ↓ key until you have selected the menu option "STARTUP".

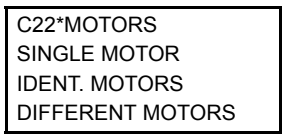


4. To start up, press the OK key. The first parameter appears. The flashing cursor under the parameter number indicates that the keypad is in display mode.
   - Use the ↔ key to switch to edit mode. The flashing cursor disappears.
   - Use the ↑ or ↓ key to select "PARAMETER SET 1" or "PARAMETER SET 2".
   - Press OK to confirm your selection.
   - Use the ↔ key to switch back to display mode. The flashing cursor appears again.
   - Use the ↑ key to choose the next parameter.



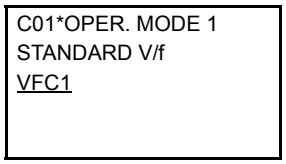


5. Set the motor type.

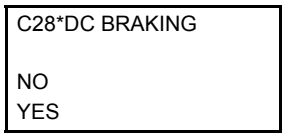


6. Select the operating mode you require. Use the ↑ key to choose the next parameter.

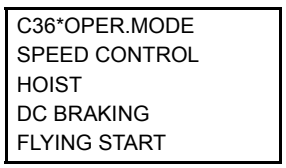
   VFC operating mode is required for activating the flying start or hoist function.



a. When selecting STANDARD V/f operating mode:



b. When selecting VFC operating mode:



7. Select the motor type. If a 2 or 4-pole SEW-EURODRIVE motor is connected, select the correct motor from the list.

   If a non-SEW motor or an SEW motor with more than four poles is connected, select "NON-SEW MOTOR" from the list.

   Use the ↑ key to 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.

   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.

   Use the ↑ key to choose the next parameter.

```
C03*     V
NOM. MOT. VOLT 1
  +400,000
```

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

   Example: 230△/400⅄50 Hz

   Enter "50 Hz" for ⅄ and △ connection.

   Use the ↑ key to choose the next parameter.

```
C04*     Hz
NOM. MOT. FREQ. 1
  +50,000
```

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 cosφ
    - C13* rated motor speed

```
C47*4-Q OPERATION
NO
YES
```

11. Enter the nominal voltage of the supply system (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. Use 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.

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:

Nominal motor voltage	230 V
Nominal motor frequency	50 Hz
Maximum speed (transition speed)	2470 rpm

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.

Manual mode

The inverter can be controlled using the DBG60B keypad in manual mode (context menu → manual mode).

The digital inputs will be without any functions for the duration of manual operation, with the exception of a "/Controller inhibit". A digital 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" digital 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 manual mode, the signals at the digital inputs are active immediately. A digital input / controller inhibit does not have to be wired "1"-"0"-"1". The drive can start according to the signals at the digital 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.

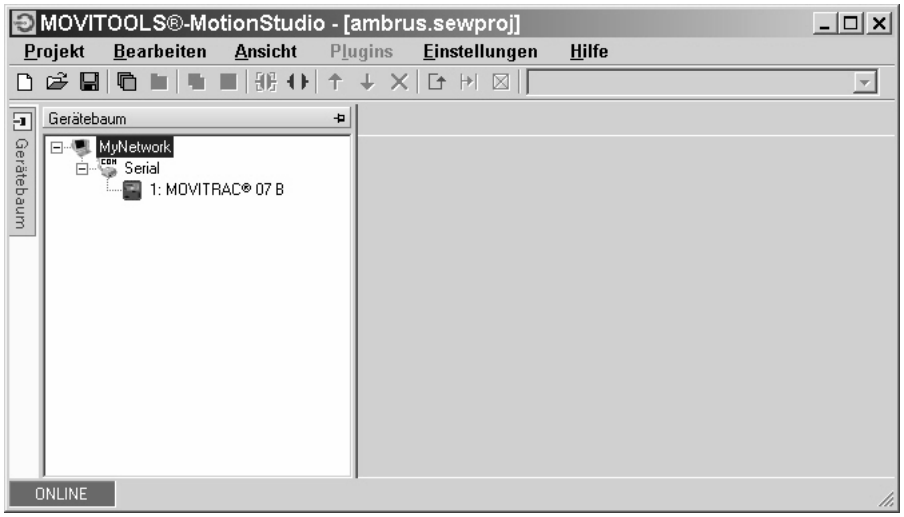
  – Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.

9.4 MOVITOOLS® MotionStudio engineering software

Start MOVITOOLS® MotionStudio in the Windows start menu:

`Programs / SEW / MOVITOOLS MotionStudio / MotionStudio`

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



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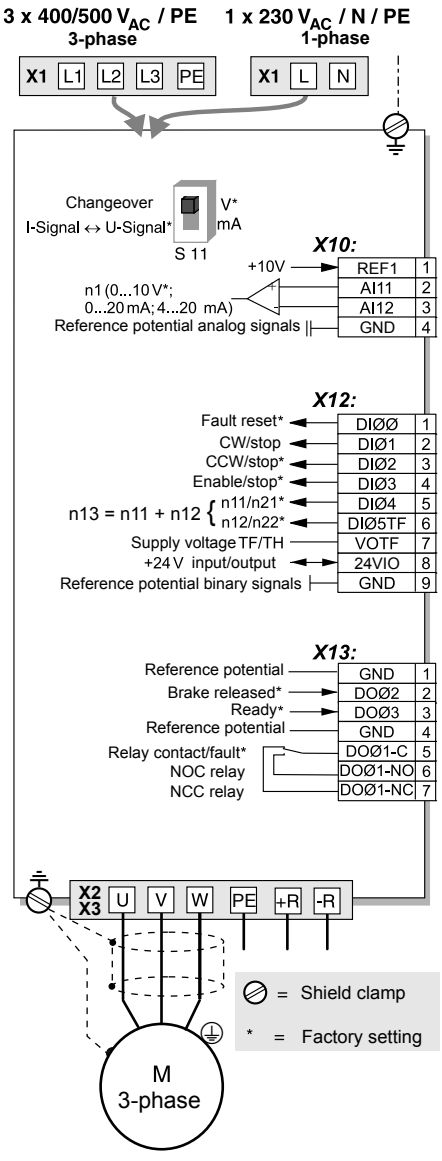
You can perform a startup by right-clicking on one of the units. Refer to the online help for more information.

9.5 Short description of important startup steps

You can directly connect the MOVITRAC® B frequency inverter 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 or / and
     - DIØ5 = n12 = 750 rpm or / and
     - 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 = fault 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.

9.5.3 Restoring the factory settings (P802)

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

9.5.4 Adjusting the PWM frequency (P86x)

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.

9.5.5 Parameterizing the inverter address (SBus / RS485 / fieldbus) (P81x)

P810 sets the address of MOVITRAC® B for communication via serial interface.

9.5.6 Setting the control mode (P700)

This parameter is used to set the basic operating mode of the inverter. Setting on the operator terminal.

V/f characteristic curve (standard)

The default operating mode setting is V/f. Use this operating mode if you have no particular requirements on the speed quality and when a maximum output speed of 150 Hz is required.

VFC characteristic curve (vector control)

Start up the inverter in operating mode VFC or VFC & DC braking 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.

9.5.7 Application type specification

Speed control

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.

DC braking

DC braking means the asynchronous motor brakes by using current injection. The motor brakes without a braking resistor on the inverter.

Flying start function

The flying start function lets you synchronize the inverter to a motor that is already in operation. This function is used in particular with drives that are not braked actively, run on for a long time or are turned by a flowing medium, e.g. pumps and fans. The maximum flying start time is approx. 200 ms.

9.5.8 Selection of operating mode (4-quadrant operation P82x)

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.

9.5.9 Setpoint specification (P10x)

P100 "Setpoint source" and P101 "Control source" can also be used for selecting a communication interface as the setpoint or control signal source. However, the interfaces are not automatically disabled with these parameters because the frequency inverter must remain ready to receive data via all interfaces at any time.

Fixed setpoints always have priority over other setpoints. A complete list of selection options is included in the description of parameter P100.

Specification via fieldbus/SBus

Select the value "SBus1 / fixed setpoint" for P100 to specify the setpoint via fieldbus or SBus. The sign of the setpoint determines the direction of rotation.

Specification via analog values

To specify the setpoint via analog values, you can select the following for P100:

- Bipolar (processing of signed value of analog input 1 or fixed setpoint)
- Unipolar (processing of absolute value of analog input 1 or fixed setpoint)
- Motor potentiometer (virtual potentiometer)
- Fixed setpoint + AI1 (sum of selected fixed setpoint and value of analog input AI1 → P112 AI1 operating mode also applies)
- Fixed setpoint × AI1 (evaluation factor for analog input AI1→ 0 - 10 V = 0 - 100%)
- Bipolar AI2 (analog input 2 or fixed setpoint)

Specification via fixed setpoint (digital control)

To select the digital inputs as setpoint source, set P100 to the value "frequency setpoint input / fixed setpoint" (frequency at digital input DI04 specifies the setpoint). Use P102 "Frequency scaling" to determine at which input frequency the system setpoint 100 % is reached.

9.5.10 Protection functions

Parameterization of current limit (P303)

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.

Parameterization of speed monitoring (P50x)

The drive reaches the speed specified by the setpoint only with adequate torque. When the inverter reaches *P303 Current limit* it assumes that it will not reach the required speed. Speed monitoring is triggered if the inverter exceeds the current limit for longer than set in *P501 deceleration time*.

Parameterization of fault responses (P83x)

The fault "EXT. FAULT" triggers only in "ENABLED" inverter status. *P830* lets you set the fault response that is triggered by an input terminal set to "/EXT. FAULT".

Parameterization of motor protection (P340)

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.

9.5.11 Specification of system limits

Minimum speed (P301)

This speed is the lower limit that may not be exceeded even when zero is selected as the setpoint. The minimum speed also applies when $n_{min} < n_{start/stop}$ was set.

Maximum speed (P302)

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.

Speed ramps (P13x)

The ramp times refer to a setpoint step change of Δn = 3000 rpm. Ramps t11/t21 up and t11/t21 down are effective when the setpoint is changed. The stop ramp t13/t23 is in effect when the enable is withdrawn by pressing the STOP/RESET key or via the terminals.

9.5.12 Activating the energy-saving function (P770)

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%.

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.

9.5.13 Activating the technology functions

In addition to the standard features, you can use the MOVITOOLS® MotionStudio application module with the technology variant. The technology function is indicated by "0T" at the end of the type designation or by "Unit variant: Technology" in the "Unit data" in MOVITOOLS® MotionStudio.

The "Simple positioning" application module in combination with SEW built-in encoders is currently used as a substitute for rapid/creep speed switchover via initiators.

Activation is also possible subsequently. In this case, the correct TAN must be entered in MOVITOOLS® MotionStudio via the menus "Working with the unit" / "Technology activation".

9.5.14 Settings for low motor speeds (P32x)

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 parameter *P322/P332 IxR adjustment*. The values are saved in volatile memory.

9.5.15 Determining the assignment of digital inputs (P60x)

For detailed information, refer to section "Parameter group 6.. Terminal assignment" (page 309).

9.5.16 Setting the brake function (P73x)

MOVITRAC® B inverters are capable of controlling a brake installed on the motor. The brake function acts on the digital output which has the assignment of the "/BRAKE" function (24 V = brake released). Use DO02 for the brake control system.

9.6 Starting the motor in manual mode

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

9.6.1 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. This terminal assignment is an example. It can be changed via parameters *P601 – 608*. CW/stop DIO1 is permanently assigned.

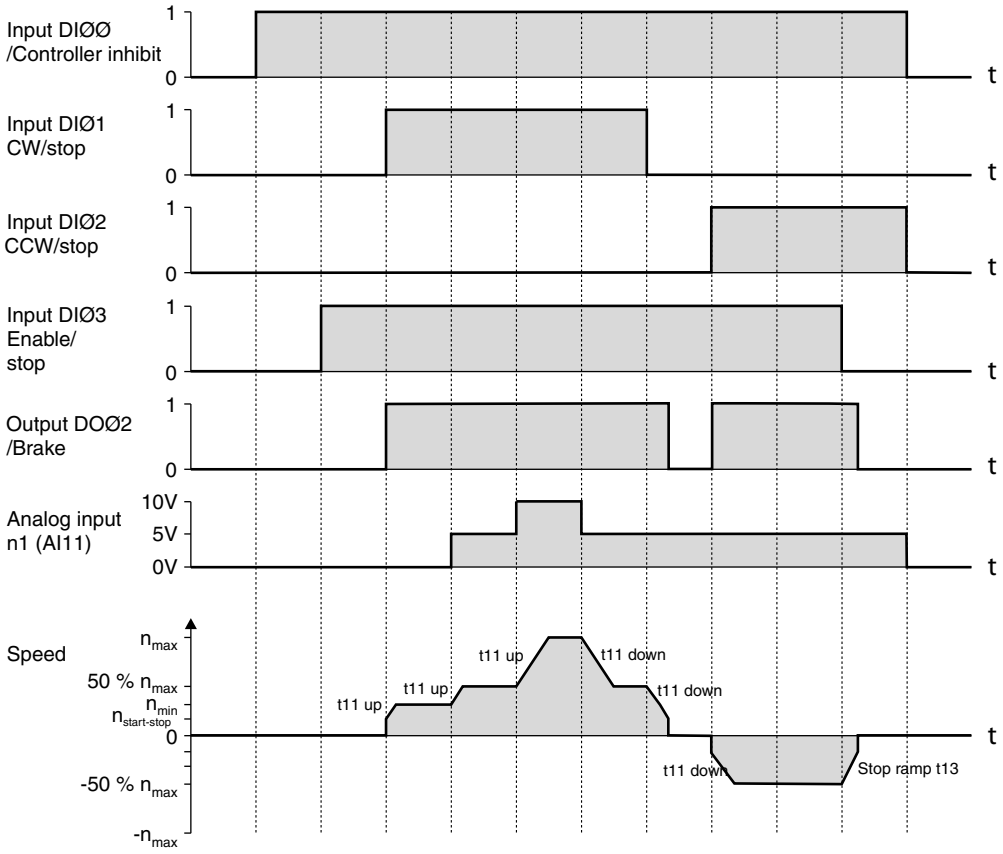
Function	X11:2 (AI11) Analog input n1	X12:1 (DIØØ) /Controller inhibit[1)]	X12:2 (DIØ1) CW/stop[2)]	X12:3 (DIØ2) CCW/stop	X12:4 (DIØ3) Enable/stop	X12:5 (DIØ4) n11/n21	X12:6 (DIØ5) n12/n22
Controller inhibit	X	0	X	X	X	0	0
Stop	X	1	X	X	0	0	0
Enable and stop	X	1	0	0	1	0	0
Clockwise at 50% n_{max}	5 V	1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

1) No default setting

2) Fixed assignment

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. Digital output X10:2 (DOØ2 "/Brake") is used for switching brake contactor K12.



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INFORMATION

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

9.6.2 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. This terminal assignment is an example. It can be changed via parameters *P601 – 608*. CW/stop DIO1 is permanently assigned.

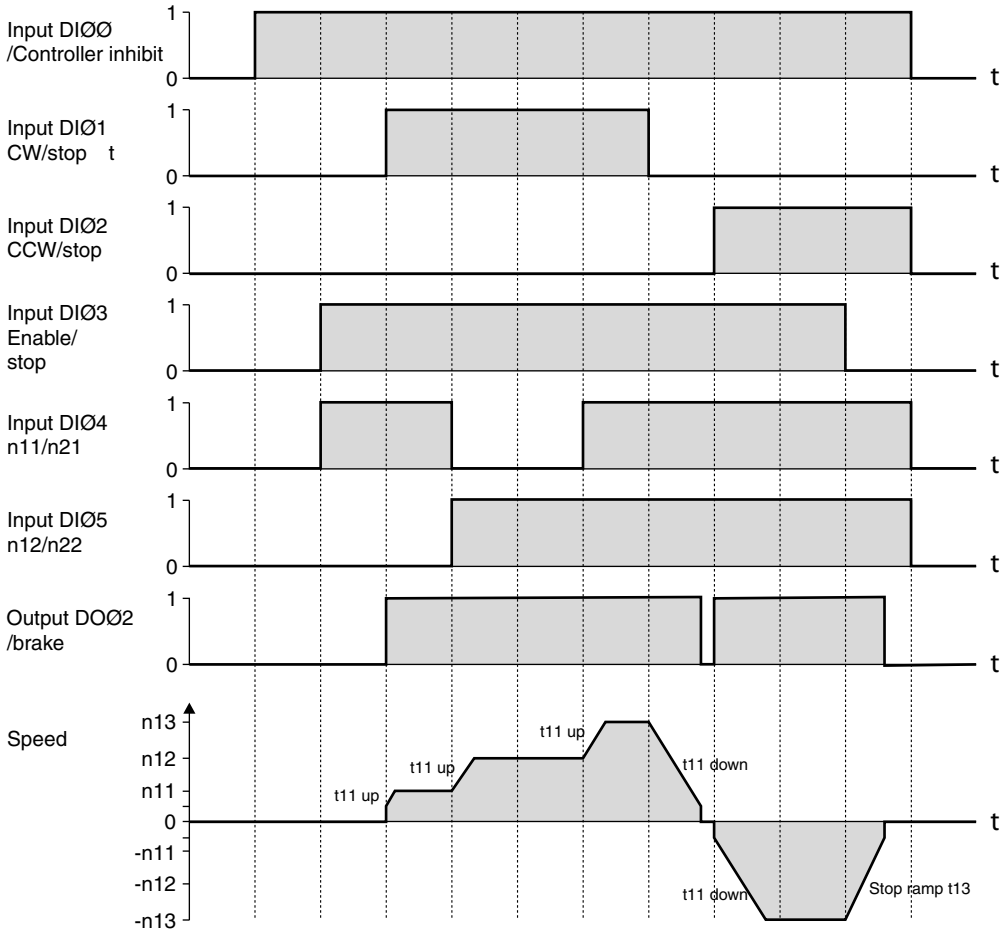
Function	X12:1 (DIØØ) /Controller inhibit[1)]	X12:2 (DIØ1) CW/stop[2)]	X12:3 (DIØ2) CCW/stop	X12:4 (DIØ3) Enable/Stop	X12:5 (DIØ4) n11/n21	X12:6 (DIØ5) n12/n22
Controller inhibit	0	X	X	X	X	X
Stop	1	X	X	0	X	X
Enable and stop	1	0	0	1	X	X
Clockwise at n11	1	1	0	1	1	0
Clockwise at n12	1	1	0	1	0	1
Clockwise at n13	1	1	0	1	1	1
Counterclockwise at n11	1	0	1	1	1	0

1) No default setting

2) Fixed assignment

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. Digital output X10:2 (DOØ2 "/Brake") is used for switching brake contactor K12.



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INFORMATION

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

9.7 PI controller (P25x)

For information regarding the PI controller, refer to chapter "Project Planning / PI controller" (page 154).

9.8 Master-slave operation (P750)

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 at 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 digital 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).

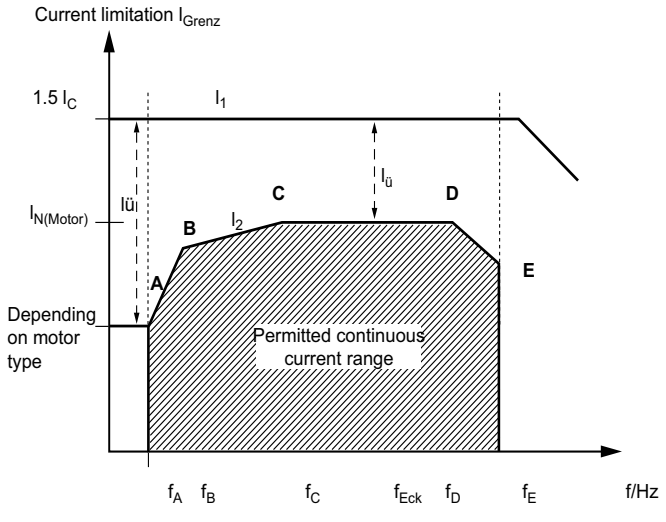
9.9 Group drive

For information regarding group drives, refer to chapter "Project Planning / ... / multi-axis drive, group drive" (page 133).

9.10 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 operation.

After startup, *P560* can only be activated if a motor approved for Ex 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 EDR.71 – 225" operating instructions for more information.

9.11 Communication and unit profile

MOVITRAC® B offers digital access to all drive parameters and functions via the communication interfaces.

The frequency inverter is controlled via fast, cyclic process data. You can use this process data channel to enter setpoints such as the setpoint speed, ramp generator time for acceleration/deceleration, etc. as well as trigger various drive functions such as enable, control inhibit, normal stop, rapid stop, etc. You can also use this channel to read back actual values from the frequence inverter, such as the actual speed, current, unit status, fault number and reference signals.

In combination with the IPOS$^{plus®}$ positioning and sequence control integrated in the frequency inverter, you can also use the process data channel as direct connection between PLC and IPOS$^{plus®}$. In this case, the process data are not evaluated by the frequency inverter but directly by the IPOS$^{plus®}$ program.

While the process data exchange generally occurs cyclically, the drive parameters can be read or written acyclically using READ and WRITE services. This parameter data exchange enables you to implement applications in which all the important drive parameters are stored in the master programmable controller, so that there is no need to make manual parameter settings on the frequency inverter itself.

The use of a fieldbus system requires additional drive system monitoring such as time monitoring of the fieldbus (fieldbus timeout) or even special emergency stop concepts.

You can customize the monitoring functions of MOVITRAC® B to suit your specific application. You can determine, for instance, which fault response of the frequency inverter should be triggered in the event of a bus error. For many applications, a rapid stop would be the preferred response, but you can also freeze the latest setpoints.

As the functions of the control terminals are still active in fieldbus operation, you can still implement fieldbus-independent emergency stop concepts via the terminals of the frequency inverter.

The MOVITRAC® B inverter offers numerous diagnostic options for startup and service purposes. For example, you can use the DBG60B keypad to control both setpoint values sent from the higher-level controller as well as the actual values. You are also supplied with a variety of additional information about the status of the communication interfaces.

An even more convenient diagnostic option provides the MOVITOOLS® MotionStudio engineering software. It lets you set all drive and communication parameters and displays detailed information of interfaces and unit status.

9.11.1 Process data

Process data (PD) are all time-critical (realtime) data of a process that have to be processed or transmitted quickly. They are characterized by high dynamic properties and actuality.

Process data are, for example, setpoints and actual values of the frequency inverter, but also peripheral states of limit switches. Process data are exchanged cyclically between programmable controller and frequency inverter.

The actual control of the MOVITRAC® B frequency inverter is implemented via process data.

Process input data (PI) and process output data (PO) are basically handled separately. This means you can define the specific process output data (setpoints) to be sent in the application from the controller to the inverter and the process input data (actual values) to be sent from the MOVITRAC® B frequency inverter in opposite direction to the higher-level controller.

To control the inverter via communication interface, the inverter must first be switched to the relevant control signal source and setpoint source. Distinguishing between control signal and setpoint source allows for the most various combinations. For example, the drive can be controlled via fieldbus and uses the analog setpoint as setpoint. Next, the parameters for describing the process output data are used for informing the frequency inverter how to interpret the received process data.

Parameter *P100 setpoint source* is used to specify the communication interface which the frequency inverter uses for processing the setpoint.

Parameters	Communication interface
P100 setpoint source	RS485
	Fieldbus
	SBus
	...

Parameter *P101 control signal source* is used to specify how the frequency inverter is controlled. The inverter expects the control world of the source set in this parameter.

Parameters	Inverter control via
P101 control signal source	Terminals
	RS485
	Fieldbus
	SBus

Setting: TERMINALS

With this setting, the frequency inverter is controlled using only digital inputs and, if required, using the IPOS$^{plus®}$ control program.

Setting: RS485, FIELDBUS, SBus

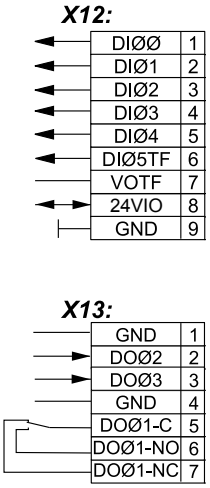
With this setting, the control word defined in the process output data channel is updated by the set control signal source (RS485 / FIELDBUS / system bus).

The digital inputs and the IPOS$^{plus®}$ control program continue to be involved in the control process.

⚠ NOTICE

For safety reasons, you must also **always** enable the frequency inverter at the terminals for control via process data. Consequently, you must wire or program the terminals in such a way that the inverter is enabled via the digital inputs.

The following figure gives an example of terminal wiring and parameter setting for controlling the frequency inverter solely using process data.



X12

DI00 = Fault reset

DI01 = CW/Stop

DI02 = CCW/Stop

DI03 = Enable/Stop

DI04 = n11/n21

DI05TF = n12/n22

VOTF = Supply voltage for TF/TH

24VIO4 = + 24 V input/output

DGND = Reference potential for binary signals

X13

GND = Reference potential for binary signals

DO02 = Brake released

DO03 = Ready

GND = Reference potential

DO01-C = Relay contact/fault

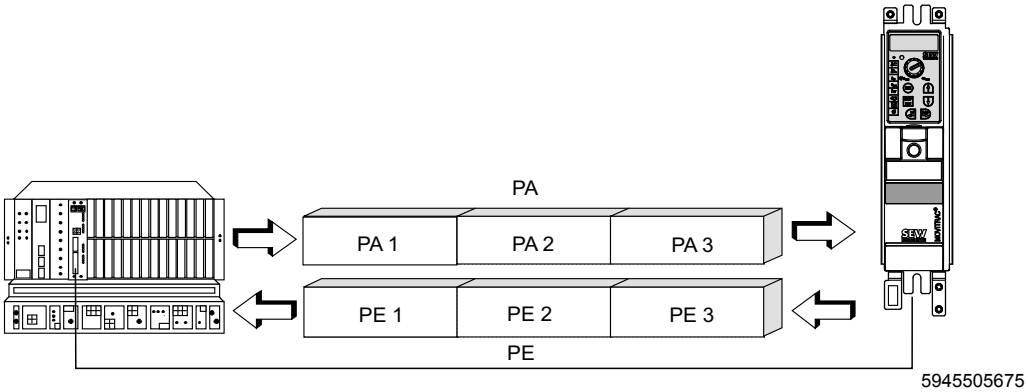
DO01-NO = Normally open contact relay

DO01-NC = Normally closed contact relay

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9.11.2 Process data configuration

The MOVITRAC® B frequency inverter can be controlled with 1 to 10 (with RS485 with 1 to 3) process data words via the communication interfaces. The number of process input data (PI) and process output data (PO) is identical.



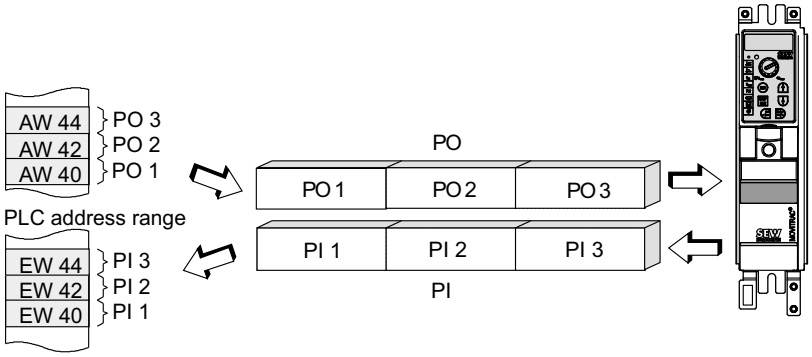
The process data configuration is set using DIP switches on the option card or via the SBus master when starting up the bus system (e.g. PROFIBUS-DP or RS485). In this way, the frequency inverter is automatically given the right setting. You can use the keypad or the MOVITOOLS® MotionStudio fieldbus monitor to check the current process data configuration under the menu item *P090 Fieldbus PD configuration*.

Depending on the fieldbus interface in use, the following process data configurations are active:

P090 PD configuration	
1 process data word + parameter channel	1PD+PARAM
1 process data word	1PD
2 process data words + parameter channel	2PD+PARAM
2 process data words	2PD
....	....
10 process data words + parameter channel	10PD+PARAM
10 process data words	10PD

Note: 3 PD for bus cards, 10 PD for FSE24B of the front module type.

For process data control of the frequency inverter, only the number of process data is relevant (that is 1PD - 10PD). These process data are usually mapped in the I/O or peripheral area when programmable logic controllers are used as fieldbus master. This means the I/O or peripheral area of the PLC must provide sufficient memory space for the process data of the frequency inverter (see following figure). The address between process data of the frequency inverter and the PLC address area is usually assigned on the fieldbus master interface module.



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9.11.3 Process data description

The process data description defines the content of the process data to be transmitted. The user can individually assign all the process data words.

The following 6 fieldbus parameters are available for defining the first three process data words:

- P870 setpoint description PO1
- P871 setpoint description PO2
- P872 setpoint description PO3
- P873 actual value description PI1
- P874 actual value description PI2
- P875 actual value description PI3

If one of the above mentioned parameters is changed, acceptance of process output data for setpoint processing via fieldbus is automatically disabled. Only when the fieldbus parameter is activated again,

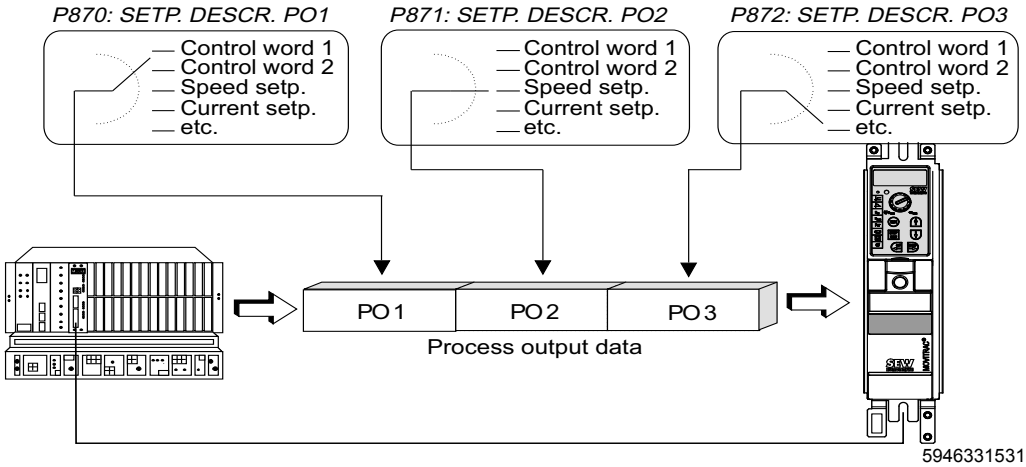
- P876 PO data enable = ON

will the received process output data be processed according to the new actual and setpoint value descriptions.

Process data words 4 to 10 can only be read and written using IPOS$^{plus®}$.

Setpoint description of PO data

The parameters *setpoint description POx* define the content of those process output data words that the higher-level programmable controller sends via the fieldbus system (see following figure).



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You can use the process output data words PO1, PO2 and PO3 to transmit the mentioned setpoints across the process output data channel. You can decide yourself in which process data word the more significant part (high) or the less significant part (low) is transmitted.

Assignment	Meaning	Scaling
NO FUNCTION	The setting *NO FUNCTION* has the effect that the frequency inverter does not use this process output data word for processing setpoints. The content of the process output data word programmed to *NO FUNCTION* is ignored although the controller might specifiy a real setpoint via the fieldbus system. The NO FUNCTION setting just disables the processing of the process output data word in the inverter system. However, you can access the process output data at any time using IPOS$^{plus®}$.	
SPEED	Set to *SPEED*, the MOVITRAC® B frequency inverter interprets the setpoint value transmitted by this process data word to be the speed setpoint if the selected operating mode (*P700 operating mode 1*, *P701 operating mode 2*) allows a speed setpoint. If there is no speed setpoint programmed although a communication interface (FIELDBUS, RS485, system bus) has been set as setpoint source, the frequency inverter will use speed setpoint = 0.	1 digit = 0.2 / min
CURRENT	Set to *CURRENT*, the frequency inverter will interpret the setpoint specified in this process data word as current setpoint if a variant with torque control is set as operating mode (*P700 Operating mode 1*). Else, the frequency inverter ignores the current setpoint.	1 digit = 0.1 % I_N
MAX. SPEED	Set to *MAX. SPEED*, the MOVITRAC® B frequency inverter interprets the transmitted setpoint as speed limit. The speed limit is specified in rpm and is interpreted as value for both directions of rotation. The supported value range of the speed limit via fieldbus corresponds to the value range of parameter *P302 Maximum speed 1*. Specifying the speed limit via fieldbus automatically disables parameters *P302 Maximum speed 1, P312 maximum speed 2*.	1 digit = 0.2 / min
MAX. CURRENT	Set to *MAX. CURRENT*, the MOVITRAC® B frequency inverter interprets the transmitted process output data as current limit. The current limit is specified in percent with reference to the nominal inverter current in the unit % I_N. It is interpreted as value for both directions of rotation. The supported value range of the current limit via fieldbus corresponds to the value range of parameter *P303 Current limit 1*. The current limits that can be set using parameters *P303 Current limit 1* and *P313 Current limit 2* are still valid when the current limit is specific using process data. This means these parameters are to be regarded as maximum effective current limit.	1 digit = 0.1 % I_N
SLIP	Set to *SLIP* means the MOVITRAC® B frequency inverter interprets the transmitted process output data word as slip compensation value. Specifying the slip compensation via fieldbus automatically disables parameters *P324 Slip compensation 1* and *P334 Slip compensation 2*. Specifying the slip compensation via process data channel is only technically meaningful in the *VFC N-CONTROL* operating mode because the torque can be influenced directly by changing the slip compensation. The value range of this slip compensation value is identical with the value range of parameter *P324 Slip compensation 1* and corresponds to a speed range of 0 - 500 rpm. If the slip specified using process data is outside this value range, the maximum will take effect when the minimum and maximum values are exceeded.	1 digit = 0.2 / min

Assignment	Meaning	Scaling
RAMP	Set to *RAMP*, the MOVITRAC® B frequency inverter interprets the transmitted setpoint value as an acceleration or deceleration ramp. The specified value corresponds to a time in ms and refers to a speed change of 3000 rpm. The rapid stop and emergency stop function is not affected by this process ramp. When transmitting the process ramp via fieldbus system, ramps t11, t12, t21 and t22 become ineffective.	1 digit = 1 ms
CONTROL WORD 1 / CONTROL WORD 2	The assignment of process output data with control word 1 or 2 allows for activating nearly all the drive functions via fieldbus system. For a description of control words 1 and 2, please refer to the chapter "Control word definition".	
SPEED [%]	Set to *SPEED [%]* means the MOVITRAC® B frequency inverter interprets the setpoint transmitted in this process data word as speed setpoint in percent. The relative speed setpoint always refers to the currently applicable maximum speed limit, which means either P302/312 or MAX. SPEED or PO speed limit.	4000_{hex} = 100% n_{max}
IPOS PO-DATA	The setting *IPOS PO-DATA* has the effect that the frequency inverter does not use this process output data word for processing setpoints. The inverter system ignores the content of the process output data word programmed to *IPOS-PO-DATA* and is available for sole processing in the IPOS$^{plus®}$ control program. Within IPOS$^{plus®}$, you can use the command *GetSys PO-Data* to directly access the process output data of the communication interfaces. For more detailed information, refer to the IPOS$^{plus®}$ positioning and sequence control system manual.	Three words with individually coded 16 bits each can be exchanged between the higher-level controller and IPOS$^{plus®}$.

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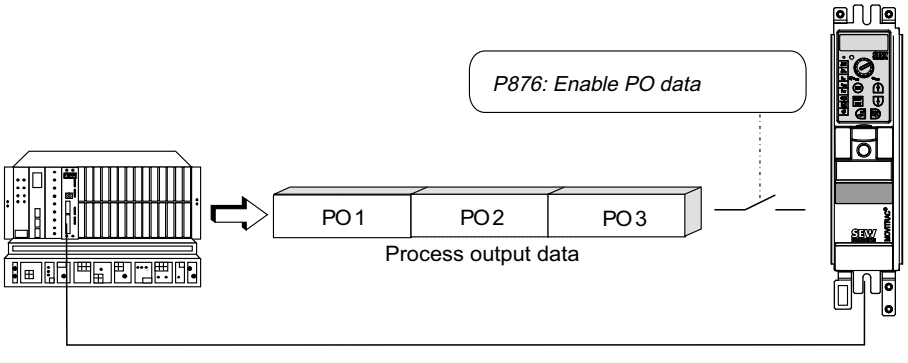
Special cases of PO data processing

Setting the process output data description separately allows for a great variety of combinations. Not all of them are technically meaningful, however.

In addition to the process output data, the digital input terminals are generally also used. In special cases, also the analog setpoint of the MOVITRAC® B frequency inverter is used.

Setpoint specification via fieldbus missing	If a communication interface is entered as setpoint source and if no setpoint is programmed for the process output data description, then the setpoint = 0 is generated in the inverter.
No control word specification via fieldbus	If a communication interface is entered as control signal source and if no control word is programmed for the process output data description, then the ENABLE control command is specified in the inverter.
Double assignment of the process output data channel	If several process output data words have the same setpoint description, only the process output data word that is read first will apply. The order in which the process output data words are processed in the frequency inverter is PO1 - PO2 - PO3. This means if PO2 and PO2 have the same setpoint description, only PO2 will take effect. The content of PO3 is ignored.

PO data enable



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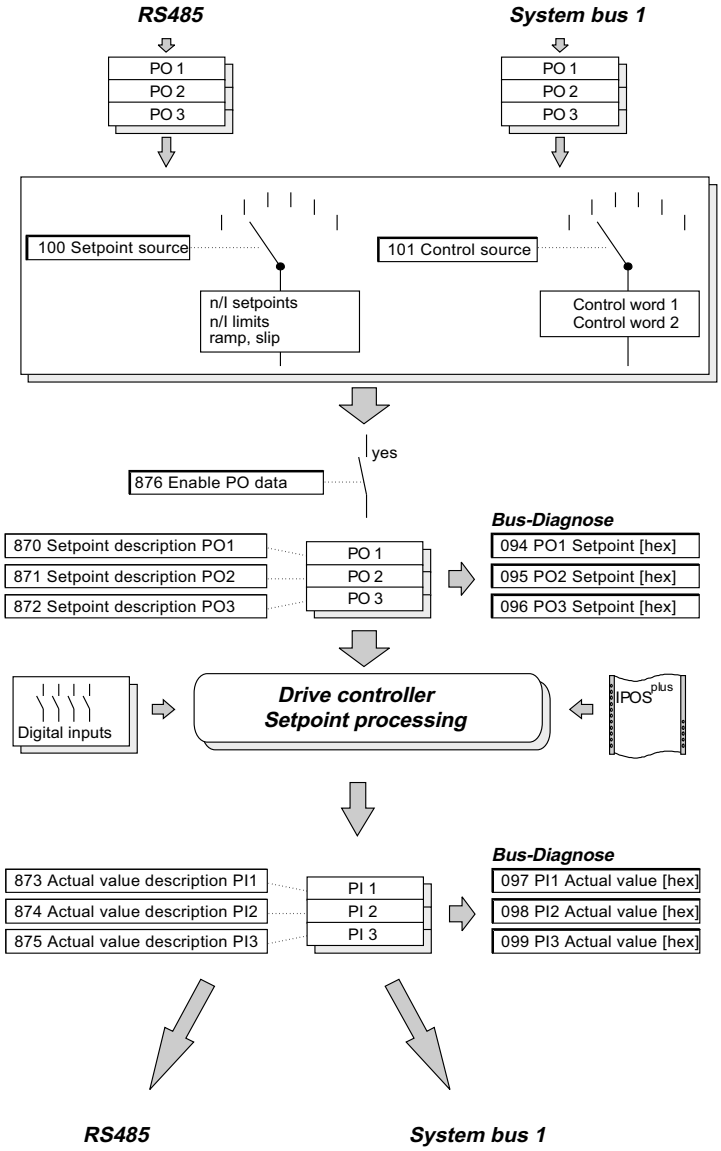
Changing the parameter *Setpoint description PO1 - PO3* causes the automatic disabling of process output data with *PO data enable* = *No*. The process output data channel is

not available for processing until the parameter *PP data enable is set to YES* (e.g. by the higher-level controller).

NO	Process output data deactivated. Setpoint processing of the frequency inverter continues until the fieldbus setpoints are activated again with the last valid (frozen) process output data.
YES	Process output data enabled. The frequency inverter uses the process output data specified by the master.

PO/PI data processing

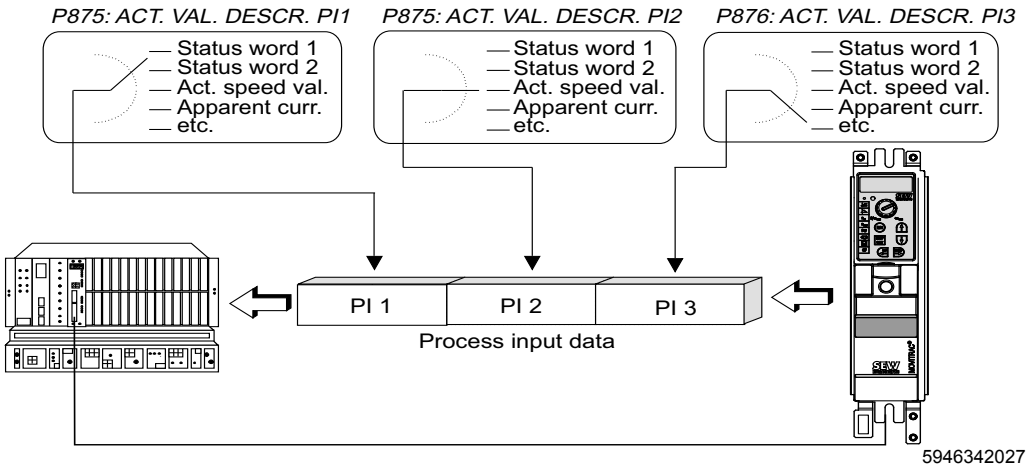
The process input data of the inverter (actual values, condition information, etc.) can be read by all communication interfaces of the inverter and is therefore not connected with the control signal and setpoint source.



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Actual value description of PI data

The parameters *Actual value description PI1 - PI3* define the content of the process input data words transmitted by the frequency inverter to the higher-level controller (see figure below). Each process data word is defined with an individual parameter. Therefore, three parameters are necessary for describing the process input data.



The following parameters can be transmitted across the process data channel using process input data words PI1 to PI3. 32-bit values, such as the actual position, are transmitted in two process data words. You can decide yourself in which process data word the more significant part (high) and the less significant part (low) is transmitted.

Assignment	Meaning	Scaling
NO FUNCTION	Assigning a process input data word with *NO FUNCTION* means that the inverter system does not update this process input data word. In this case, MOVITRAC® B returns the value 0000hex to the higher-level controller.	
SPEED	Set to *SPEED*, the frequency inverter returns the current actual speed in rpm to the higher-level automation system. The actual speed value can only be sent back properly if the inverter can determine the actual motor speed via speed feedback. For applications with slip compensation, the deviation from the real motor speed solely depends on the accuracy of the slip compensation set by the user.	1 digit = 0.2 / min
OUTPUT CURRENT	Set to *OUTPUT CURRENT*, the frequency inverter returns the current actual value of the output current in [% In] to the higher-level automation system (in percent, with reference to the nominal current of the inverter).	1 digit = 0.1% I_N
ACTIVE CURRENT	By assigning a process input word *ACTIVE CURRENT*, the frequency inverter provides the actual active current value % I_n to the higher-level automation system.	1 digit = 0.1 % I_N
STATUS WORD 1 / STATUS WORD 2	Assigning status word 1 or status word 2 to the process input data allows for accessing status information as well as fault and reference messages.	
SPEED [%]	Set to *SPEED [%]*, the frequency inverter returns the current actual speed in % n_{max} / P302 to the higher-level automation system.	4000_{hex} = 100% n_{max}
IPOS PI-DATA	Set to *IPOS PI* (IPOS Process Input Data), an individual actual value can be transmitted from the IPOS$^{plus®}$ program to the higher-level controller via process input data. This setting allows for exchanging up to 48 individually coded bits between the IPOS$^{plus®}$ program and the higher-level controller using the process data channel. You can directly write process input data in IPOS$^{plus®}$ using the command *SetSys PI* data. For more detailed information, refer to the "IPOS$^{plus®}$ positioning and sequence control system" manual.	Three words with individually coded 16 bits each can be exchanged between the higher-level controller and IPOS$^{plus®}$.

Scaling of process data

The process data are always transmitted as fixed-point values to make for simple calculation in the ongoing system process. Parameters with identical units of measurement

receive the same scaling so that the higher-level automation device can directly compare the set and actual values in the application program. There are three process data types:

- Speed in rpm
- Current in % I_N (nominal current)
- Ramp in ms

The different versions of the control or status word are coded as bit field and will be described in a separate chapter.

Process data	Type	Resolution	Reference	Range
Speed setpoint / Actual speed value / Speed limit slip compensation	Integer 16	1 digit = 0.2 rpm		-6553.6 – 0 – +6553.4 rpm 8000_{hex} – 0 – $7FFF_{hex}$
Relative speed setpoint [%] / Relative actual speed value [%]	Integer 16	1 digit = 0.0061% (4000_{hex} = 100%)	Maximum speed of the inverter	- 200% – 0 – + 200% - 0.0061% 8000_{hex} – 0 – $7FFF_{hex}$
Apparent current actual value / Actual active current value / Current setpoint Current limitation	Integer 16	1 digit = 0.1% I_N	Nominal current of the frequency inverter	-3276.8% – 0 – +3276.7% 8000_{hex} .– 0 – $7FFF_{hex}$
Process ramp up / process ramp down	Unsigned 16	1 digit = 1 ms	delta-f = 100 Hz	0 ms – 65535 ms 0000hex – $FFFF_{hex}$

Positive speed values correspond to a CW rotation with proper connection of the motor.

Examples

Process data	Value	Scaling	Transferred process datum
Speed	CW 400 rpm	400/0.2 = 2000_{dec} = $07D0_{hex}$	2000_{dec} or $07D0_{hex}$
	CCW 750 rpm	- (750/0.2) = 3750_{dec} = $F15A_{hex}$	-3750_{dec} or $F15A_{hex}$
Relative speed	CW 25 % f_{max}	25 x (16384/100) = 4096_{dec} = 1000_{hex}	4096_{dec} or 1000_{hex}
	CCW 75 % f_{max}	-75 x (16384/100) = -12288_{dec} = $D000_{hex}$	-12288_{dec} or $D000_{hex}$
Current	45% I_N	(45/0.1) = 450_{dec} = $01C2_{hex}$	450_{dec} or $01C2_{hex}$
	115.5% I_N	(115.5/0.1) = 1155_{dec} = 0483_{hex}	1155_{dec} or 0483_{hex}
Ramp	300 ms	300 ms → 300_{dec} = $012C_{hex}$	300_{dec} or $012C_{hex}$
	1.4 s	1.4 s = 1400 ms 400_{dec} = 0578_{hex}	1400_{dec} or 0578_{hex}

9.11.4 Sequence control

Definition of the control word

The control word is 16 bits wide. Each bit has been assigned a frequency inverter function. The low byte consists of 8 fixed function bits that are always valid. The assignment of the more significant control bits varies for the different control words.

Functions that are generally not supported by the frequency inverter cannot be activated by the control word. The individual control word bits are considered as reserved and must be set to logical 0 by the user.

Basic control block

The less-significant part of the control word (bits 0 to 7) contains 8 fixed function bits for the most important drive functions. The following overview shows the assignment of the basic control block.

Bit	Function
0	Controller inhibit = "1" / enable = "0"
1	Enable = "1" / rapid stop = "0"
2	Enable = "1" / stop = "0"
3	Reserved
4	Ramp generator selection: Integrator 1 = "1" / integrator 2 = "0"
5	Parameter set switchover: Parameter set 2 = "1" / parameter set 1 = "0"
6	Reset: reset pending fault = "1" / not active = "0"
7	Reserved
8	Depends on control word
9	
10	
11	
12	
13	
14	
15	

Linking safety-relevant control commands

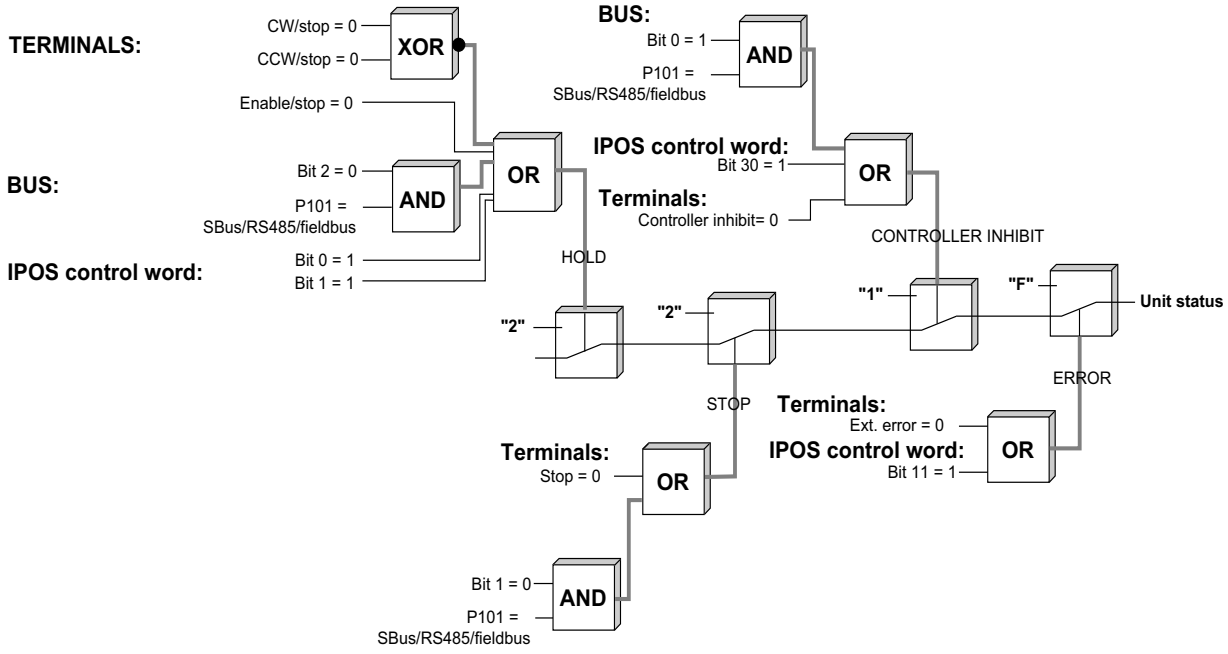
Basically, the control commands

- CONTROLLER INHIBIT
- RAPID STOP / STOP
- STOP
- ENABLE

can be activated simultaneously using the set control signal source, the digital inputs, and the IPOS$^{plus®}$ control program. To link these control functions under safety-relevant aspects, the individual control commands are prioritized. For enabling the frequency inverter, for example, the following figure shows that all three processing blocks (terminal processing, control word processing, and IPOS$^{plus®}$ program) have to generate the enable. As soon as one of the three processing blocks triggers a control command of higher priority (such as *STOP* or *CONTROLLER INHIBIT*), the higher prioritized command will become effective.

After switching on the frequency inverter, IPOS$^{plus®}$ generally issues the control command *ENABLE* so that the drive can be controlled immediately even without the IPOS$^{plus®}$ program.

The digital inputs will generally remain active even if the frequency inverter is controlled via the process data *(P101 control signal source = RS485/FIELDBUS/SBus)*. Safety-relevant functions, such as controller inhibit and enable are equally processed by the terminal strip and the fieldbus. This means the frequency inverter must have first been enabled at the terminals to control via fieldbus. All other functions that can be activated via terminals and the control word, will be processed with an OR function. The following figure shows the device status depending on the various control signal sources (terminals, bus, or IPOS® control word).



For safety reasons, the basic control block is defined in such a way that the frequency inverter with the control word setting 0000_{hex} will assume the state *No enable* because all commercially available fieldbus master systems will reset the outputs to 0000_{hex} in the event of a fault. In this case, the frequency inverter will execute a rapid stop and then activate the mechanical brake.

Control commands

Controlling the frequency inverter with bits 0 - 2

If the frequency inverter was enabled at the terminals, it can be controlled with bits 0 - 2 for applications with speed feedback of the basic control block.

Bit 2: Enable/stop
Bit 1: Enable / rapid stop
Bit 0: Controller inhibit/enable

Priority	Control command:	Bit 2	Bit 1	Bit 0	
High	**Controller inhibit:**	X	X	1	e.g. 01_{hex}, 03_{hex}, 05_{hex}, 07_{hex},
	Rapid stop:	X	0	0	e.g. 00_{hex}, 04_{hex}
	Stop:	0	1	0	e.g. 02_{hex}
Low	**Enable:**	1	1	0	06_{hex}

X = irrelevant

Control command "controller inhibit"

You can disable the power output stages of the frequency inverter and set them to high impedance using the control command *controller inhibit*. At the same time, the frequency inverter activates the mechanical motor brake so that the drive will immediately come to a standstill through mechanical braking. Motors without mechanical brake will coast to standstill when using this control command.

You can activate the "*controller inhibit*" control command by setting *bit 0*: *Controller inhibit/enable* in the control word because all other bits are not relevant. This setting will assign the highest priority to this control bit in the control word.

Control command "rapid stop"

Using the *rapid stop* control command lets you have the frequency inverter brake the motor at the currently applicable rapid stop ramp. The following rapid stop ramps set via parameters basically take effect:

- P136 T13 stop ramp (with active parameter set 1)
- P146 T23 stop ramp (with active parameter set 2)

The process ramp that may have been set via fieldbus does not affect the rapid stop.

This control command is activated by resetting *bit 1*: *Enable/rapid stop*.

Control command "stop"

The control command *stop* causes the frequency inverter to bring the motor to a stop. If the process ramp is transmitted via the fieldbus system, this control command will use the currently indicated ramp value as brake ramp. Else, the frequency inverter uses the typical integrator ramp for this control command depending on the set parameters and integrator set.

The *stop* control command is triggered with *bit 2: enable/stop*.

Control command "enable"

You enable the inverter via fieldbus system using the control command *enable*. If the process ramp is transmitted via the fieldbus system, this control command will use the currently indicated ramp value as brake ramp. Else, the frequency inverter uses the typical integrator *ramp up* for this control command depending on the set parameters and the ramp generator set.

All three bits must be set to *enable* (110_{bin}) for the control command *enable*.

Selecting the valid parameter set

The applicable parameter set is selected using bit 5 in the control word. A parameter set can only be changed in *controller inhibit* condition.

This bit is ORed with the input terminal function *parameter set changeover*. This means the logical state "1" of the input terminal OR the control word bit activates parameter set 2.

Reset after a fault

In case of a fault, bit 6 of the control word will execute a reset via the process data channel. A reset can only be triggered with a 0/1 edge in the control word.

Control word 1

Control word 1 includes the most important drive functions of the basic control block as well as the function bits for setpoint functions that are generated in the MOVITRAC® B frequency inverter in the higher-order byte.

Bit	Function	Assignment
0	Fixed definition	Controller inhibit "1" / enable "0"
1		Enable "1" / rapid stop "0"
2		Enable "1" / stop "0"
3		Reserved
4		Integrator switchover
5		Parameter set switchover
6		Reset
7		Reserved
8	Direction of rotation for motor potentiometer	0 = CW direction of rotation 1 = CCW direction of rotation
9 10	Motor potentiometer acceleration Motor potentiometer deceleration	10 9 0 0 = no change 1 0 = down 0 1 = up 1 1 = no change
11 12	Selection of the internal fixed setpoints n11 - n13 or n21 - n23	12 11 0 0 = Speed setpoint via process output data word 2 0 1 = Internal setpoint n11 (n21) 1 0 = Internal setpoint n12 (n22) 1 1 = Internal setpoint n13 (n23)
13	Fixed setpoint switchover	0 = Fixed setpoints of the active parameter set can be selected using bit 11/12 1 = Fixed setpoints of the other parameter set can be set using bit 11/12
14	Reserved	Set reserved bits to zero.
15	Reserved	Set reserved bits to zero.

These internal setpoint functions are activated by setting parameter P100 to fixed setpoint or motor potentiometer and setting the matching bits in control word 1. Any speed setpoint entered via an SBus process output data word will no longer be effective.

Motor potentiometer via fieldbus

The setpoint function motor potentiometer is controlled via the fieldbus interface in the same way as with the standard input terminals. The process ramp that may be entered via an additional process output data word has no effect on the motor potentiometer function. Only the following motor potentiometer integrators will be used:

- P150 T3 ramp up
- P151 T4 ramp down

Control word 2

Control word 2 contains the function bits for the most important drive functions in the basic control block; the virtual input terminals in the higher-order part. These are freely-programmable input terminals that are not physically available due to missing hardware (option cards). In this way, the input terminals are represented on the virtual input terminals of the fieldbus. Each virtual terminal is assigned to an optional and **physically unavailable** input terminal. Its functionality can be programmed as required.

Bit	Function	Definition
0	Controller inhibit "1" / enable "0"	Fixed definition
1	Enable "1" / rapid stop "0"	
2	Enable "1" / stop "0"	
3	Reserved	
4	Integrator switchover	
5	Parameter set switchover	
6	Reset	
7	Reserved	
8	Virtual terminal 1 = P610 / digital input DI10	Virtual input terminals
9	Virtual terminal 2 = P611 / digital input DI11	
10	Virtual terminal 3 = P612 / digital input DI12	
11	Virtual terminal 4 = P613 / digital input DI13	
12	Virtual terminal 5 = P614 / digital input DI14	
13	Virtual terminal 6 = P615 / digital input DI15	
14	Virtual terminal 7 = P616 / digital input DI16	
15	Virtual terminal 8 = P617 / digital input DI17	



⚠ NOTICE

If the FIO21B option is plugged into the frequency inverter in addition to the fieldbus interface, then the inputs of the FIO21B option have priority. In this case, the virtual inputs are not evaluated.

Status word definition

The status word is 16 bits wide. The less significant byte, the basic status block, consists of 8 status bits with fixed definition that reflect the most important drive states. The assignment of the more significant status bits varies for different status words.

Basic status block

The basic status block of the status word contains the condition information required for nearly any drive application.

Bit	Function/assignment	Definition
0	Output stage enabled "1" / output stage inhibited "0"	Fixed definition
1	Inverter ready "1" / inverter not ready "0"	
2	PO data enabled "1" / PO data disabled "0"	
3	Current ramp generator set: Integrator 2 "1" / integrator 1 "0"	
4	Current parameter set: Parameter set 2 "1" / parameter set 1 "0"	
5	Fault/warning: Fault/warning pending "1" / no fault "0"	
6		
7		

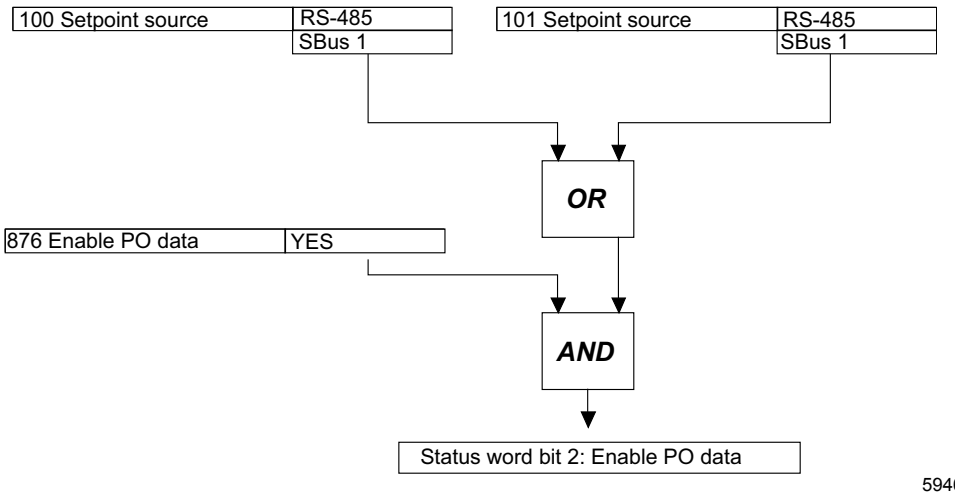
"Inverter ready" signal

The value *inverter ready = 1* in status bit 1 of the status word indicates that the frequency inverter is ready to respond to control commands from an external control. The inverter is not ready, if

- MOVITRAC® B signals a fault
- The factory setting is active (setup)
- No supply voltage is present

"PO data enabled" signal

With *PO data enabled = 1*, bit 2 signals that the frequency inverter responds to control values and setpoints from the communication interfaces. The following figure shows the conditions that have to be met for the PO data to be enabled:



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Fault/warning

With bit 5 in the status word, the inverter signals a possible fault or warning. The result of a **fault** is always that the frequency inverter is no longer ready for operation. A **warning** can occur temporarily without affecting the operating behavior of the inverter. This is why you should also evaluate status bit 1 *inverter ready* to exactly filter a fault (requirement: line voltage ON).

Bit 1: Ready	Bit 5: Fault/warning	Meaning
0	0	Inverter not ready for operation
0	1	Fault
1	0	Inverter is ready for operation
1	1	Warning

Status word 1

Status word 1 contains the status information in the basic status block and the *unit status* or the *fault number* in the higher-level status byte. The unit status is displayed when fault bit = 0, and the fault number is displayed in case of a fault (fault bit = 1). The fault bit is reset by resetting the fault, and the current unit status is displayed again. You find information on the meaning of the fault numbers and the device status in the system manual or in the MOVITRAC® B operating instructions.

Bit	Function	Definition
0	Output stage enabled	Fixed definition
1	Inverter ready	
2	PO data enabled	
3	Current ramp generator set	
4	Current parameter set	
5	Fault/warning	
6	Reserved	
7	Reserved	
8	**Fault/warning?** Bit 5 = 1 → fault number: 01 Overcurrent 02 ... Bit 5 = 0 → unit status: 0x1 Controller inhibit 0x2 ...	Unit status / fault number
9		
10		
11		
12		
13		
14		
15		

Status word 2

Status word 2 contains both the status information in the basis status block and the virtual output terminals DO10 - DO17 in the higher-level byte. By programming the terminal functions for the output terminals, all the conventional signals can be processed via the fieldbus system.

Bit	Function	Definition
0	Output stage enabled	Fixed definition
1	Inverter ready	
2	PO data enabled	
3	Current ramp generator set	
4	Current parameter set	
5	Fault/warning	
6	Reserved	
7	Reserved	
8	Virtual terminal 1 = P630 / digital output DO10	Virtual output terminals
9	Virtual terminal 2 = P631 / digital output DO11	
10	Virtual terminal 3 = P632 / digital output DO12	
11	Virtual terminal 4 = P633 / digital output DO13	
12	Virtual terminal 5 = P634 / digital output DO14	
13	Virtual terminal 6 = P635 / digital output DO15	
14	Virtual terminal 7 = P636 / digital output DO16	
15	Virtual terminal 8 = P637 / digital output DO17	



⚠ NOTICE

If the FIO21B option is plugged into the frequency inverter in addition to the fieldbus interface, then the inputs of the FIO21B option have priority. In this case, the virtual inputs are not evaluated.

Fault number and unit status

INFORMATION

You find a current list with fault numbers and unit states in the parameter directory matching the firmware of your units. For more detailed information, refer to the MOVITRAC® B operating instructions and the system manual.

Device status

The status word shows the operating state of MOVITRAC® B and, in the event of a fault, a fault or warning code.

Device status (high byte in status word 1)	Meaning	Status LED
0	24 V operation (inverter not ready)	Flashing yellow
1	Controller inhibit active	Flashing yellow
2	No enable	Flashing yellow
3	Standstill current	Flashing green
4	Release of	Flashing green
5	Control	Flashing green
8	Factory setting	
13	Flying start	Flashing green
14		
Fault number is indicated in the status word	Fault indicator (flashing)	Flashing red
The actual unit status is indicated	Manual mode	Flashing green
16	Inverter is waiting for data	Flashing green-yellow
17	"Safe Stop" active	Flashing yellow

⚠ 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.

"Flashing U" display when using FBG11B.

9.11.5 Monitoring functions

For safe operation of the MOVITRAC® frequency inverter via communication interfaces, additional monitoring functions have been implemented that trigger an operator-defined drive function in the event of a bus fault. Two individual parameters are available for each communication interface.

- Timeout interval
- Timeout response

This parameter defines an application-specific drive behavior in case of a communication error.

Timeout error message / timeout interval / timeout response

The frequency inverter generates a timeout if no new data is received via the bus system within a preset time frame (timeout interval). The timeout response can be set and defines the malfunction (fault/warning) and the fault response of the drive.

Timeout error message

MOVITRAC® B generates a separate **timeout error message for every communication interface**:

Communication interface	Fault number	Timeout error message
RS485	F 43	RS485 TIMEOUT
SBus	F 47	SBUS 1 TIMEOUT

Timeout interval

The **timeout interval** can be set individually for each communication interface.

Communication interface	Parameter number	Parameter name	Timeout interval
RS485	812	RS485 timeout interval	0.00 seconds
SBus	883	SBus 1 timeout interval	0.10 seconds

Timeout response

The **timeout response** can be set individually for each communication interface.

Parameter number	Parameter name	Timeout response
833	Response RS485 TIMEOUT	RAPID STOP/WARN.
836	Response to SBus1 TIMEOUT	RAPID STOP/WARN.

Timeout monitoring is useful for all communciation interfaces. However, it may vary considerably between the individual bus systems.

Parameters for fieldbus timeout	Value range
Unit	Seconds
Range	0.01 s to 650.00 s in 10 ms steps
Special case	0 or 650.00 = Fieldbus timeout deactivated
Factory setting	0.5 s

INFORMATION

With MOVILINK® via RS485 and SBus, the matching timeout interval must be set manually in P812 or P883. For control via CANopen or FSE24B, the timeout interval is automatically set in parameter P883.

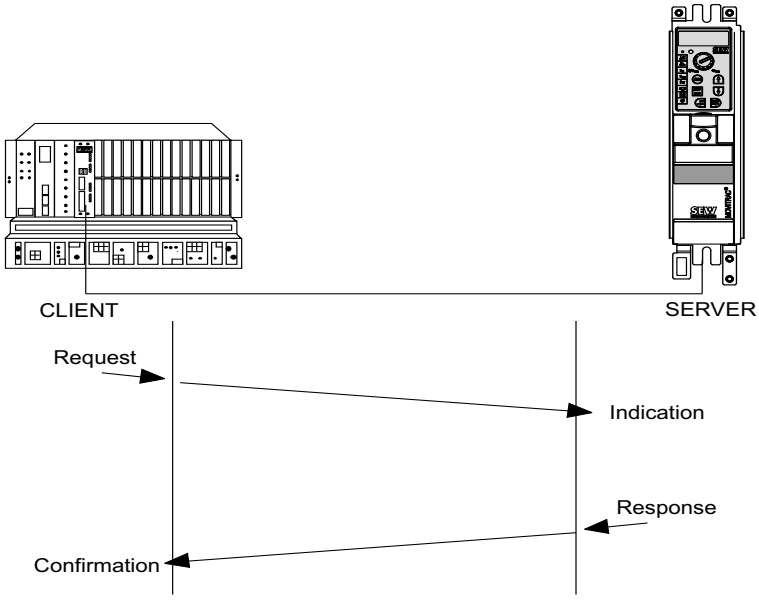
9.11.6 Setting the inverter parameters

The drive parameters of the inverter are usually accessed using the bus-specific READ and WRITE services. Additional services can be executed for all bus system using the MOVILINK® parameter channel. This parameter channel is available in all bus systems and is explained in detail below.

Also refer to the documentation for the fieldbus interface to obtain additional programming information on using the MOVILINK® parameter channel with the various bus systems.

Parameter setting procedure

The parameters of the MOVITRAC® B frequency inverter are usually set based on a client/server model. This means the frequency inverter provides the requested information only when prompted by the higher-level programmable controller. This means that MOVITRAC® B usually only has server functionality (see following figure).



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Structure of the MOVILINK® parameter channel

The MOVILINK® parameter channel enables access to all drive parameters of the frequency inverter, regardless of the bus in use. Special services are available within this parameter channel to being able to read various parameter information. It is made up of a management byte, a reserved byte, an index word and four data bytes.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Manage-ment	Subindex	High index	Low index	MSB data	Data	LSB	LSB data
		Parameter index			4-byte data		

Management of the parameter channel (byte 0)

The entire parameter setting sequence is coordinated with byte 0 "Management". This byte provides important service parameters such as service identifier, data length, version and status of the service performed.

Index addressing (bytes 1 – 3)

Byte 2 index high, byte 3 index low, and byte 1 sub-index determine the parameter to be read or written via the fieldbus system. All parameters of the MOVITRAC® B frequency inverter are listed in the MOVITRAC® B system manual. Each parameter is assigned a specific number (index). This number is used to read or write the parameter.

Data range (bytes 4 – 7)

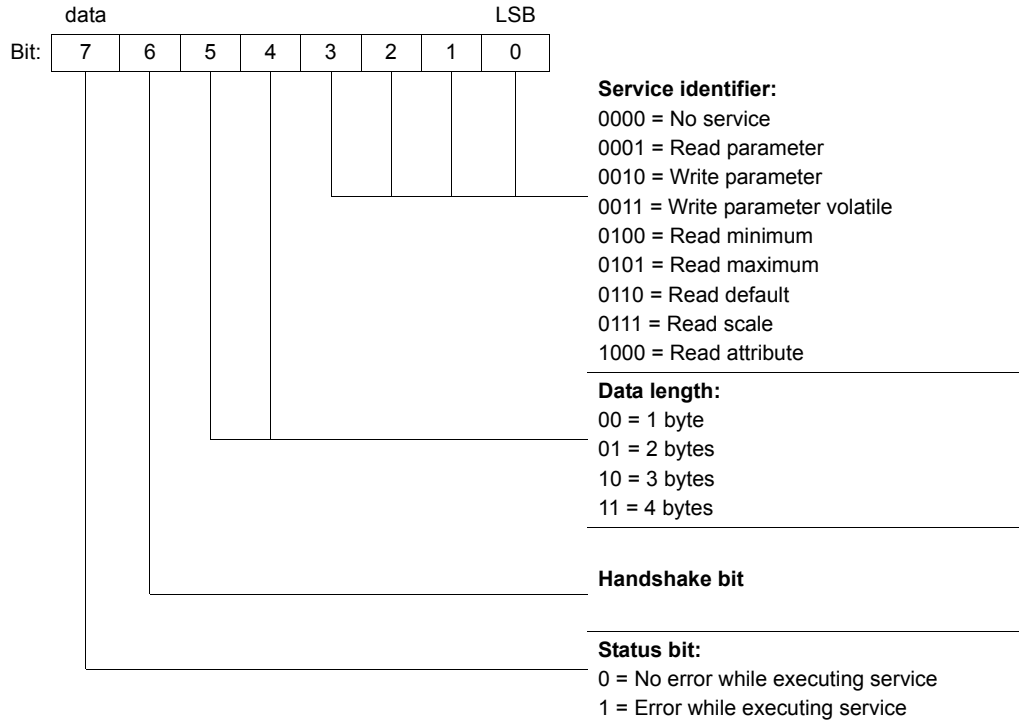
The data is located in byte 4 to byte 7 of the parameter channel. This means 4 bytes of data can be transmitted per service. The data is always entered with right-justification; that is, byte 7 contains the least significant data byte (Data LSB) whereas byte 4 is the most significant data byte (Data MSB).

Management byte

Bits 0 – 3 contain the service identifier and define the service to be executed.

Bits **4 and 5** specify the data length in bytes. The data length for SEW frequency inverters should be set to 4 bytes.

Byte 0: Management



Bit 6 is the handshake bit. It has a different meaning depending on the bus system:

- With SBus 1 (CAN) and set handshake bit (= 1), the response telegram is sent after the synchronization telegram.
- With RS485 and fieldbus, the handshake bit serves as acknowledgement bit between client and server when using the cyclic transmission method. As the parameter channel is transmitted cyclically in this variant, probably with the process data, the implementation of the service in the inverter must be triggered by edge control using handshake bit 6. For this purpose, the value of this bit is toggled for each new service to be executed. The inverter uses the handshake bit to signal whether the service has been executed or not. The service has been executed as soon as the handshake bit received in the controller is identical with the transmitted handshake bit.

Status bit 7 indicates whether the service was executed properly or whether errors occurred.

Response

The response to a parameterization request is structured as follows:

- The management byte of the response telegram is structured like that in the request telegram.
- The status bit indicates whether the service was executed successfully:
  - If the status bit is set to "0", bytes 4 to 7 of the response telegram will contain the requested data.
  - If the status bit is set to "1", an error code is indicated in the data area (bytes 4 to 7), see chapter "Incorrect service execution" (page 266).

Description of parameter services

Bits 0 - 3 of the management byte are used to define the individual parameter services. MOVITRAC® B supports the following parameter services:

No service

This coding indicates that there is no parameter service.

Read parameter

This parameter service is used to read a drive parameter.

Write parameter

This parameter service is used for non-volatile writing of a drive parameter. The written parameter value is stored non-volatile (e.g. in EEPROM). This service should not be used for cyclic write accesses because the memory modules allow for only a limited number of write cycles.

Write parameter volatile

This parameter service is used to write a drive parameter volatile, if the parameter permits this. The written parameter value is only stored in the non-permanent RAM of the inverter, which means it is lost when the inverter is switched off. The value written last with write parameter is still available when the inverter is switched back on.

Read minimum

This service can be used to determine the smallest value (minimum) that can be set for a drive parameter. The coding corresponds to the parameter value.

Read maximum

This service can be used to determine the largest drive parameter value (maximum) that can be set. The coding corresponds to the parameter value.

Read default

This service can be used to determine the factory setting (default) of a drive parameter. The coding corresponds to the parameter value.

Read Scale

This service can be used to determine the scaling of a parameter. The inverter provides a so-called measurement index and a conversion index.

Byte 4	Byte 5	Byte 6	Byte 7
MSB data	Data	LSB	LSB data
Reserved		Quantity index	Conversion index

Quantity index:

The quantity index is used for coding physical values. This index provides a communication partner with information about which physical quantity is involved with the corresponding parameter value. The values are coded according to the sensor/actuator profile of the PROFIBUS user organization (PNO). The entry FF_{hex} means that no measurement index is specified. You can also gather the measurement index from the parameter list of the inverter.

Conversion index:

The conversion index is used for converting the transmitted parameter value into a basic SI unit. The values are coded according to the sensor/actuator profile of the PROFIBUS user organization (PNO).

Example:

Drive parameter: P131 ramp t11 down CW

Measurement index: 4 (= time with second as measurement unit)

Conversion index: 3 (10^{-3} = milli)

Transmitted numerical value: 3000dec

The frequency inverter interprets the numerical value received via bus as follows: 3000 s × 10^{-3} = 3 s

Read attribute

This service can be used for reading the access attributes and the index of the next parameter. The following table shows the coding of the data for this parameter service.

Byte 4	Byte 5	Byte 6	Byte 7
MSB data	Data	LSB	LSB data
Next available index		Access attributes	

The coding of the access attributes is unit-specific. For MOVITRAC® B inverters, the attribute definition results from the following table:

Byte 6 Bit	Byte 7 Bit	Meaning
	0	1 = Parameter allows write access
	1	1 = Parameter is permanently saved on EEPROM
	2	1 = Factory setting overwrites RAM value
	3	1 = Factory setting overwrites EEPROM value
	4	1 = EEPROM value is valid after initialization
	5	1 = Controller inhibit condition not necessary for write access
	6	1 = Password required
8	7	00 = Parameter is generally valid 01 = Parameter is assigned to parameter set 1 10 = Parameter is assigned to parameter set 2 11 = Parameter is assigned to both parameter sets
9 - 15		Reserved

Parameter list

For detailed information on coding and access attributes of all parameters, refer to the parameter list.

Incorrect service execution

The service was performed by the inverter if the received handshake bit is the same as the sent handshake bit.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Manage-ment	Subindex	High index	Low index	**Error class**	**Error code**	**Add. Code High**	**Add. Code Low**

↓

Status bit = 1: incorrect service execution

Return codes for parameter setting

In the event of an incorrect parameterization, the frequency inverter sends back various return codes to the parameterized master. These codes provide detailed information about the cause for the error. All of these return codes are structured in accordance with EN 50170. The inverter distinguishes between the following elements:

- Error class
- Error code
- Additional code

These return codes apply to all MOVITRAC® B communication interfaces.

Error class

The error class element provides a more exact classification of the error type. The following error classes are distinguished in accordance with EN 50170.

Class (hex)	Designation	Meaning
1	vfd state	Status error of the virtual field device
2	application reference	Error in application program
3	definition	Definition error
4	resource	Resource error
5	service	Error during execution of service
6	access	Access error
7	ov	Error in the object list
8	other	Other error (see additional code)

The error class is generated by the communication software of the fieldbus interface if there is an error in communication. This statement does not apply to *Error class 8 = Other error*. Return codes sent from the frequency inverter system are all included in *Error class 8 = other error*. The error can be identified more precisely using the additional code element. The Ethernet error code is "0".

Error code

The error code element allows for a more detailed identification of the error cause within the error class and is generated by the communications software of the fieldbus interface in the event of faulty communication.

Additional code

The additional code contains SEW-specific return codes for faulty parameterization of the frequency inverter. They are returned to the master under *Error class 8 = other error*. The following table shows all possible codings for the additional code.

MOVILINK®			
	Additional code		
Error class	**High**	**Low**	**Description**
0x05	00	0x00	Unknown error
		0x01	Illegal Service
		0x02	No Response
		0x03	Different Address
		0x04	Different Type
		0x05	Different Index
		0x06	Different Service
		0x07	Different Channel
		0x08	Different Block
		0x09	No Scope Data
		0x0A	Illegal Length
		0x0B	Illegal Address
		0x0C	Illegal Pointer
		0x0D	Not enough memory
		0x0E	System Error
		0x0F	Communication does not exist
		0x10	Communication not initialized
		0x11	Mouse conflict
		0x12	Illegal Bus
		0x13	FCS Error
		0x14	PB Init
		0x15	SBUS - Illegal Fragment Count
		0x16	SBUS - Illegal Fragment Type
		0x17	Access denied
			Not used

MOVILINK®			
	Additional code		
Error class	High	Low	Description
0x08	00	0x00	No Error
		0x10	Illegal Index
		0x11	Not yet implemented
		0x12	Read only
		0x13	Parameter Blocking
		0x14	Setup runs
		0x15	Value too large
		0x16	Value too small
		0x17	Required hardware does not exist
		0x18	Internal Error
		0x19	Access only via RS485 (via X13)
		0x1A	Access only via RS485 (via XT)
		0x1B	Parameter protected
		0x1C	"Controller inhibit" required
		0x1D	Value invalid
		0x1E	Setup started
		0x1F	Buffer overflow
		0x20	"No enable" required
		0x21	End of File
		0x22	Communication Order
		0x23	"IPOS Stop" required
		0x24	Autosetup
		0x25	Encoder Nameplate Error
		0x29	PLC State Error

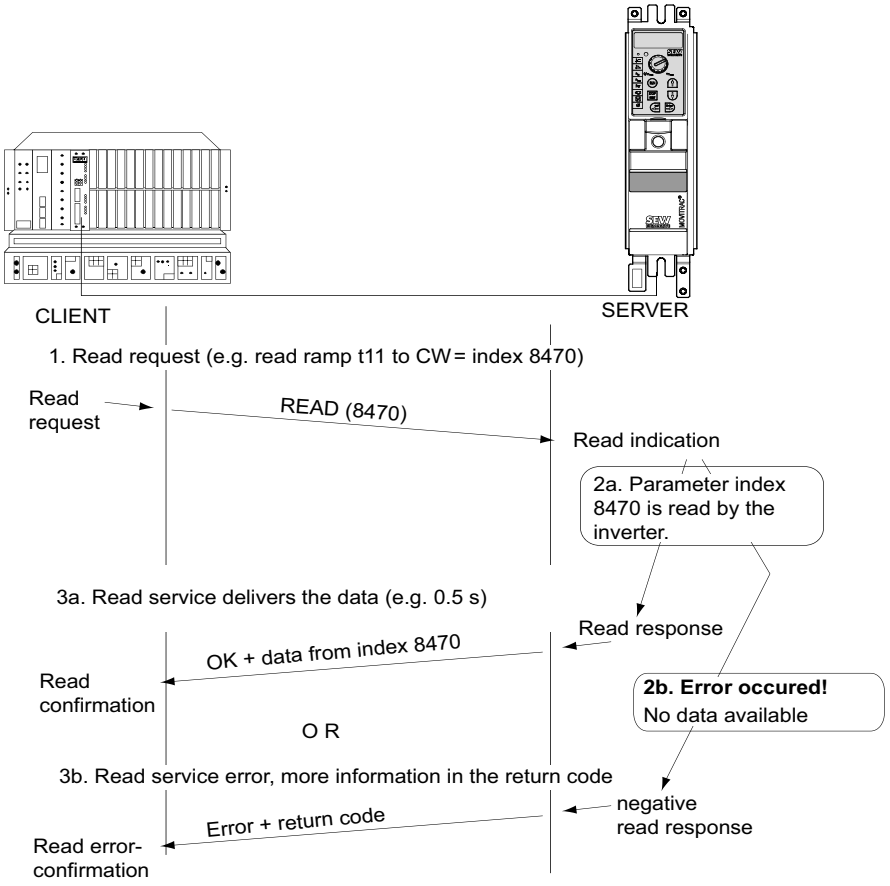
Example: Parameterization error

An incorrect index was entered when executing a read or write service.

	Code (hex)	Meaning
Error class	0x08	Other
Error code	0x00	-
Add. code high	0x00	-
Add. code low	0x10	Illegal Index

Example: Reading a parameter (READ)

A parameter is read via communication interfaces with a *read request* from the programmable controller of the MOVITRAC® B frequency inverter (see figure below).



If the read service cannot be executed in the frequency inverter, the programmable controller will receive a *negative read response*. In this way, the programmable controller receives a negative acknowledgement *(read error confirmation)* with exact identification of the error.

Reading a parameter cyclically

For the cyclic transmission method, the handshake bit has to be changed to activate service processing (execution of read service). When using acyclic PDU types, every inverter processes every request telegram and in this way always executes the parameter channel.

Parameters are set as follows:

1. Enter the index of the parameter to be read in byte 2 (index high) and byte 3 (index low).
2. Enter the service identifier for the READ service in the management byte (byte 0).
3. In cyclical PDU types, you transfer the read service to the inverter only by changing the handshake bit. In acyclical PDU types, the parameter channel is always evaluated.

Since this is a read service, the sent data bytes (bytes 4 - 7) and the data length (in the management byte) are ignored and do not need to be set.

The inverter now processes the read service and sends the service confirmation back by setting the handshake bit to an equal value.

Byte 0: Management

7	6	5	4	3	2	1	0
0	0/1	1	1	0	0	0	1

Service identifier:
0001 = Read

Data length:
11 = 4 bytes

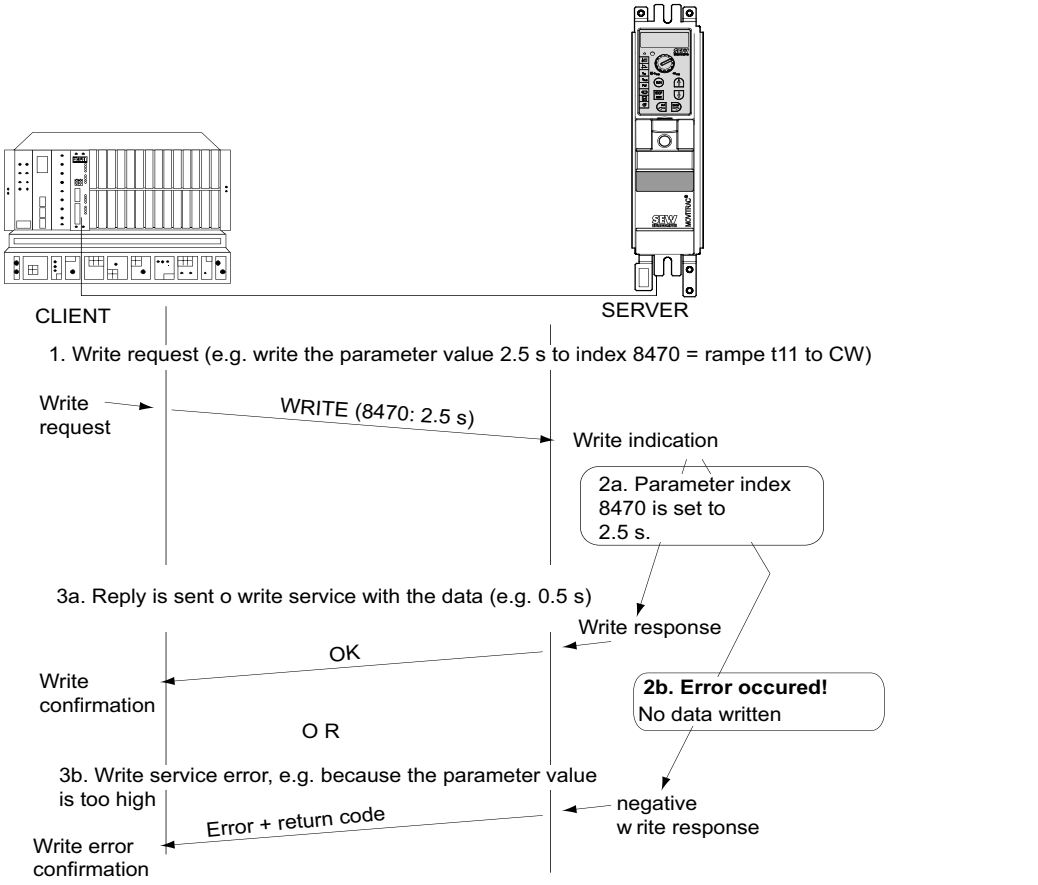
Handshake bit:
Must be changed with every new job.

Status bit:
0 = No error while executing service
1 = Error while executing service

X = Not relevant
0/1 = Value of the bit changes

Example: Writing a parameter (WRITE)

A parameter is written as it is read via the fieldbus interface (see figure below).



If the write service cannot be executed in the frequency inverter, for example because incorrect parameter data were transmitted, the programmable controller will receive a *negative read response*. In this way, the programmable controller receives a negative acknowledgement *(write error confirmation)* with exact identification of the error.

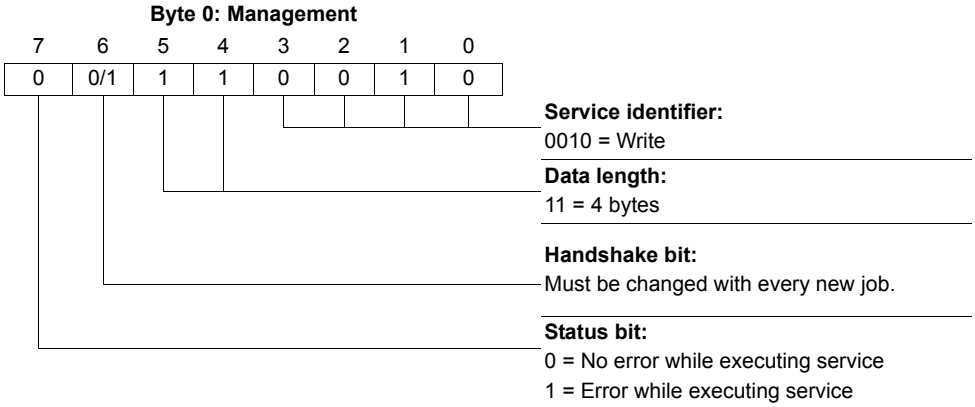
Writing a parameter cyclically

For the cyclic transmission method, the handshake bit has to be changed to activate service processing (execution of WRITE service). When using acyclic PDU types, every inverter processes every request telegram and in this way always executes the parameter channel.

Parameters are set as follows:

1. Enter the index of the parameter to be written in byte 2 (index high) and byte 3 (index low).
2. Enter the data to be written in bytes 4 - 7.
3. Enter the service identifier and the data length for the write service in the management byte (byte 0).
4. In cyclical PDU types, the WRITE service is not transferred to the inverter until the handshake bit is changed. In acyclical PDU types, the parameter channel is always evaluated.

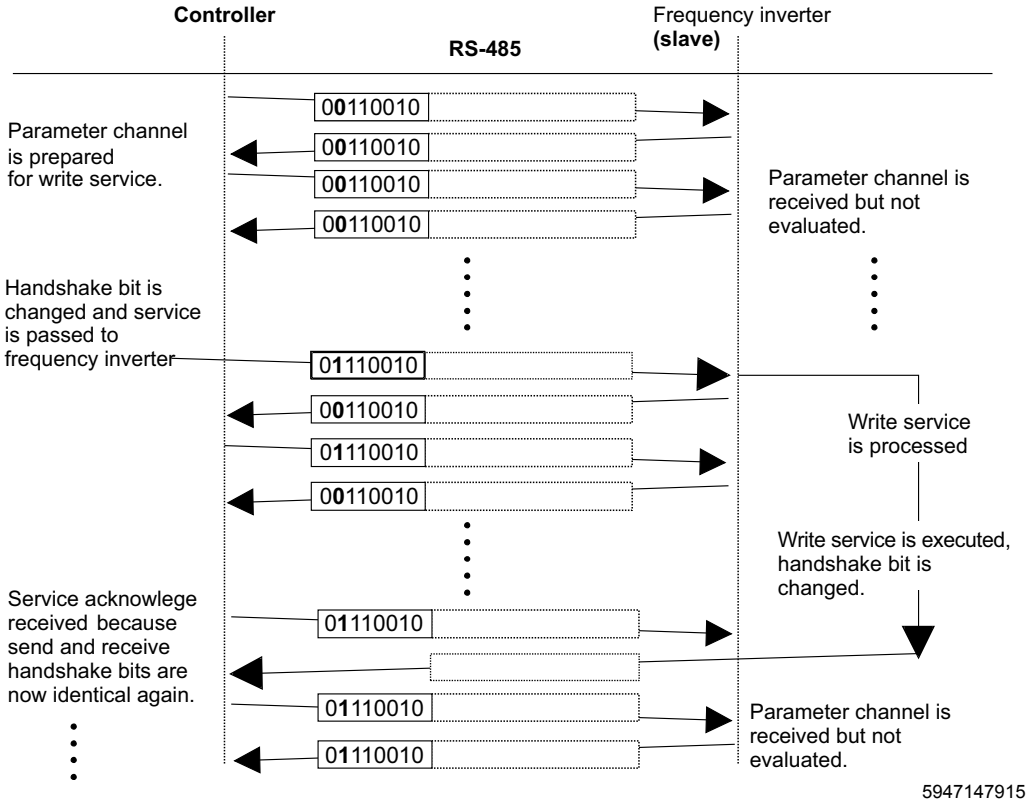
The inverter now processes the write service and sends the service confirmation back by changing the handshake bit.



0/1 = Bit value is changed

The data length is 4 bytes for all parameters of SEW frequency inverters.

Using the WRITE service as an example, the following figure represents a process of setting parameters between the controller and inverter using a cyclic PDU type. To simplify the sequence, only the management byte of the parameter channel is shown here.



The frequency inverter only receives and returns the parameter channel while the controller is preparing the parameter channel for the write service. The service is not activated until the moment when the handshake bit is changed (in this example, when it changes from "0" to "1"). The frequency inverter now interprets the parameter channel and processes the write service; however, it continues to respond to all telegrams with handshake bit = 0. Confirmation that the service has been executed occurs when the handshake bit in the response telegram of the frequency inverter is set to the same value. The master now detects that the received handshake bit is once again the same as the one which was sent. It can now prepare another parameter setting procedure.

9.11.7 Notes on parameterization

By setting the parameters of the MOVITRAC® B frequency inverter via the fieldbus system, you can generally reach all drive parameters. As some drive parameters are directly related to the communication via fieldbus, it is important to note the following:

Parameter setting in CONTROLLER INHIBIT status

Some parameters can only be changed (written) in *CONTROLLER INHIBIT* drive status. The inverter signals this by a negative acknowledgement of the write service. Refer to the parameter list to see what parameters are subject to this limitation. In general, these parameters can be changed during a fault or *24 V operation*.

Factory setting

Activating the factory setting means nearly all parameters are reset to their default values. The consequence for bus operation is that the control signal source and setpoint source are reset to their default values.

INFORMATION

The frequency inverter must be enabled at the terminals for control via process data. This means that the drive is enabled under certain conditions when the inverter is reset to the factory settings. Make sure before activating the factory settings that the signals of the digital inputs will not enable the frequency inverter once the factory settings have been restored. As a precaution, do not switch on the supply system voltage until you have completed inverter parameterization.

Parameter lock

The parameter lock is activated by setting *P803 Parameter lock* = *Yes*. It protects all adjustable parameters from being changed. Activating parameter lock is useful when all inverter parameters have been set and need not be changed anymore. With this parameter, you can prevent drive parameters from being modified, for example via keypad.

INFORMATION

The parameter lock generally prevents the writing of parameters. Consequently, write access via communication interfaces is also blocked when the parameter lock is active.

9.12 External setpoint selection

External setpoint selection

Control via

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

9.12.1 Setpoint direction

You can specify the set direction of rotation as follows:

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

9.12.2 Setpoint speed

You can specify the setpoint speed using:

- Setpoint adjuster if *P121 Addition FBG setpoint adjuster* is set to ON
- *P100 Setpoint source*
  - Fixed setpoints
  - Fixed setpoints with analog input
  - Process data word SBus or RS485
  - Motor potentiometer

9.12.3 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.

9.12.4 Startup for MBG11A setpoint adjuster

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

10 Parameters

You usually need the parameter menu only for startup and in case of service. 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

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

10.1 Overview of parameters

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

Parameter group 0.. Display value	
Parameter group 00. process values	
P000 speed (signed)	
P001 user display for DBG11B	
P002 Frequency (signed)	
P004 Output current (absolute value)	
P005 Active current (signed)	
P008 DC link voltage	
P009 Output current	
Parameter group 01. Status displays	
P010 Inverter status	
P011 Operating state	
P012 Fault status	
P013 Current parameter set	
P014 Heat sink temperature	
P015 effective power	
Parameter group 02. analog setpoints	
P020 Analog input AI1	
P021 Analog input AI2 (optional)	
Parameter group 03. Digital inputs	
P030 Digital input DI00	Fault reset
P031 Digital input DI01	CW/stop
P032 Digital input DI02	CCW/stop
P033 Digital input DI03	Enable
P034 Digital input DI04	n11/n21
P035 Digital input DI05	n12/n22
P039 Digital inputs DI00 – DI05	
Parameter group 04. Digital inputs of option	
P040 Digital input DI10	No function
P041 Digital input DI11	No function
P042 Digital input DI12	No function
P043 Digital input DI13	No function
P044 Digital input DI14	No function

P045 Digital input DI15	No function
P046 Digital input DI16	No function
P047 Virtual digital input DI17	No function
P048 Digital inputs DI10 – DI17	
Parameter group 05. Digital outputs	
P051 Digital output DO01	/FAULT
P052 Digital output DO02	BRAKE RELEASED
P053 Digital output DO03	READY FOR OPERATION
P059 Digital outputs DO01 – DO03	
Parameter group 07. unit data	
P070 Device type	
P071 nominal output current	
P072 Front module	
P073 Front module firmware	
P076 Basic unit firmware	
P077 DBG firmware	
Parameter group 08. error memory	
P080 – P084 faults t-0 – t-4	
Parameter group 09. bus diagnostics	
P090 PD configuration	
P091 Fieldbus type	
P092 Fieldbus baud rate	
P093 Fieldbus address	
P094 PO1 setpoint	
P095 PO2 setpoint	
P096 PO3 setpoint	
P097 PI1 actual value	
P098 PI2 actual value	
P099 PI3 actual value	
Parameter group 1.. Setpoints/ramp generators	
Parameter group 10. Setpoint selection / frequency input	
P100 Setpoint source	1 / unipolar / fixed setpoint
P101 Control signal source	0 / terminals
P102 frequency scaling fFI1max	0.1 – 10 – 120.00 kHz
P103 FI1 reference	0 / n_{max}
P104 Setpoint reference speed and analog inputs	0 – 3000 – 6000 rpm
P105 AI1 wire break detection	7 / Rapid stop / Warning
P106 FI1 characteristic x1	0 – 100 %
P107 FI1 characteristic y1	–100 – 0 – +100%
P108 FI1 characteristic x2	0 – 100%
P109 FI1 characteristic y2	–100 – 0 – +100%
Parameter group 11. analog input 1 (0 – 10 V)	
P112 AI1 Operating mode	1 / 10 V, reference maximum speed
P116 AI1 characteristic x1	0 – 100 %
P117 AI1 characteristic y1	–100 – 0 – +100%
P118 AI1 characteristic x2	0 – 100%
P119 AI1 characteristic y2	–100 – 0 – +100%

Parameter group 12. analog input AI2 / FBG setpoint adjuster (option)	
P120 AI2 operating mode	0 / no function
P121 Addition FBG setpoint adjuster	0 / off
P122 Direction of rotation FBG manual mode	0 / unipolar CW
P126 AI2 characteristic curve x1	–100 – 0 – +100 % (–10 – 0 – +10 V)
P127 AI2 characteristic curve y1	–100 – 0 – +100% ($-n_{max}$ – 0 – $+n_{max}$ / 0 – I_{max})
P128 AI2 characteristic curve x2	–100 – 0 – +100% (–10 – 0 – +10 V)
P127 AI2 characteristic curve y2	–100 – 0 – +100% ($-n_{max}$ – 0 – $+n_{max}$ / 0 – I_{max})
Parameter group 13. / 14. speed ramps 1 / 2	
P130 / P140 ramp t11 / t21 up	0 – 2 – 2000 s
P131 / P141 ramp t11 / t21 down	0 – 2 – 2000 s
P134 / P144 ramp t12 / t22 up = down	0 – 10 – 2000 s
P135 / P145 S pattern t12 / t22	0 / 1 / 2 / 3
P136 / P146 stop ramp 13 / t23 up = down	0 – 2 – 20 s
P139 / P149 Ramp monitoring 1 / 2	Yes / No
Parameter group 15. motor potentiometer function	
P150 ramp t3 up = down	0.2 – 20 – 50 s
P152 Save last setpoint	Off
Parameter group 16. / 17. Fixed setpoints 1 / 2	
P160 / P170 Internal setpoint n11 / n21	-5000 – 150 – 5000 rpm
P161 / P171 Internal setpoint n12 / n22	-5000 – 750 – 5000 rpm
P162 / P172 Internal setpoint n13 / n23	-5000 – 1500 – 5000 rpm
P163 / P173 n11 / n21 PI controller	0 – 3 – 100%
P164 / P174 n12 / n22 PI controller	0 – 15 – 100%.
P165 / P175 n13 / n23 PI controller	0 – 30 – 100%
Parameter group 2.. Controller parameters	
Parameter group 25. PI controller	
P250 PI controller	0 / off
P251 P-gain	0 – 1 – 64
P252 I-component	0 – 1 – 2000 s
Parameter group 3.. Motor parameters	
Parameter group 30. / 31. limits 1 / 2	
P300 / P310 Start/stop speed 1/2	0 – 150 rpm
P301 / P311 Minimum speed 1 / 2	0 – 15 – 5500 rpm
P302 / P312 Maximum speed 1 / 2	0 – 1500 – 5500 rpm
P303 / P313 Current limit 1/2	0 – 150% I_N
Parameter group 32. / 33. motor adjustment 1 / 2	
P320 / P330 Automatic adjustment 1/2	On
P321 / P331 Boost 1/2	0 – 100%
P322 / P332 IxR compensation 1/2	0 – 100%
P323 / P333 Premagnetization time 1/2	0 – 2 s
P324 / P334 Slip compensation 1/2	0 – 500 rpm
Parameter group 34. motor protection	
P340/P342 Motor protection 1/2	OFF / ON ASYNCHRONOUS
P341/P343 Type of cooling 1/2	FAN COOLED
P345/P346 IN UL monitoring	0.1 – 500 A

Parameter group 4.. Reference signals	
Parameter group 40. Speed reference signal	
P400 Speed reference value	0 – 750 – 5000 rpm
P401 Hysteresis	0 – 100 – 500 rpm
P402 Delay time	0 – 1 – 9 s
P403 signal = "1" if	0 / n < n_{ref}
Parameter group 43. Current reference signal	
P430 Current reference value	0 – 100 – 150% I_N
P431 Hysteresis	0 – 5 – 30 % I_N
P432 Delay time	0 – 1 – 9 s
P433 Signal = "1" if	0 / I < I_{ref}
Parameter group 44. Imax signal	
P440 Hysteresis	0 – 5 – 50 % I_N
P441 delay time	0 – 1 – 9 s
P442 Signal = "1" if	0 / I = I_{max}
Parameter group 45.. PI controller_reference signal	
P450 PI actual value reference	0.0 – 100.0%
P451 Signal = "1" if	1 / PI actual value > PI ref
Parameter group 5.. Monitoring functions	
Parameter group 50. speed monitoring 1 / 2	
P500/P502 Speed monitoring 1/2	On / motor operation / regenerative operation
P501/P503 Delay time 1/2	0 – 1 – 10 s
Parameter group 54. Gear unit/motor monitoring	
P540 Drive vibration response/warning	Display fault
P541 Drive vibration response/fault	Rapid stop/warning
P542 Oil aging response/warning	Display fault
P543 Oil aging response/fault	Display fault
P544 Oil aging/overtemperature	Display fault
P545 Oil aging/ready	Display fault
P549 Brake wear response	Display fault
Parameter group 56. Ex-e motor current limitation	
P560 Ex-e motor current limitation	On / off
P561 Frequency A	0 – 5 – 60 Hz
P562 Current limit A	0 – 50 – 150%
P563 Frequency B	0 – 10 – 104 Hz
P564 Current limit B	0 – 80 – 200%
P565 Frequency C	0 – 25 – 104 Hz
P566 Current limit C	0 – 100 – 200%
P567 frequency D	0 – 50 – 104 Hz
P568 current limit D	0 – 100 – 200%
Parameter group 57. Ex-e motor current limitation	
P570 frequency E	0 – 87 – 104 Hz
P571 current limit E	0 – 100 – 200%
Parameter group 6.. Terminal assignment	
Parameter group 60. Digital inputs	
P601 Digital input DI02	CCW/stop
P602 Digital input DI03	Enable
P603 Digital input DI04	n11/n21

P604 Digital input DI05	n12/n22
P608 Digital input DI050	Fault reset
Parameter group 61. Digital inputs of option	
P610 Digital input DI10	No function
P611 Digital input DI11	No function
P612 Digital input DI12	No function
P613 Digital input DI13	No function
P614 Digital input DI14	No function
P615 Digital input DI15	No function
P616 Digital input DI16	No function
P617 Virtual digital input DI17	No function
Parameter group 62. Digital outputs of basic unit	
P620 Digital output DO01	/FAULT
P621 Digital output DO02	BRAKE RELEASED
P622 Digital output DO03	READY
Parameter group 63. Digital outputs DO	
P630 Virtual digital outputs	
Parameter group 64. Analog outputs AO1 (optional)	
P640 AO1 analog output	0 / no function
P641 AO1 reference	0 / 3000 rpm, 100 Hz, 150%
P642 AO1 operating mode	0 / no function
P646 AO1 characteristic curve x1	-100 – 0 – +100%
P647 AO1 characteristic curve y1	–100 – +100%
P648 AO1 characteristic curve x2	–100 – 0 – +100%
P649 AO1 characteristic curve y2	-100 – +100 %
Parameter group 7.. Control functions	
Parameter group 70. Operating mode 1/2	
P700/P701 Operating mode 1/2	21 = V/f characteristic
Parameter group 71. Standstill current 1/2	
P710/P711 Standstill current 1/2	0 – 50% I_{Mot}
Parameter group 72. setpoint stop function 1 / 2	
P720 / P723 setpoint stop function 1 / 2	Off
P721/P724 Stop setpoint 1/2	0 – 30 – 500 rpm
P722/725 Start offset 1/2	0 – 30 – 500 rpm
Parameter group 73. Brake function 1/2	
P731/P734 Brake release time 1/2	0 – 2 s
P732/P735 Brake application time 1/2	0 – 2 s
Parameter group 74. Speed skip function	
P740/P742 Skip center 1/2	0 – 1500 – 5000 rpm
P741/P743 Skip bandwidth 1/2	0 – 300 rpm
Parameter group 75. Master-slave function	
P750 Slave setpoint	0: MASTER-SLAVE OFF
P751 Scaling of slave setpoint	–10 – 0 – 1 – 10
Parameter group 76. Manual mode	
P760 Lock RUN / STOP keys	Off
Parameter group 77. Energy saving function	
P770 Energy saving function	Off
Parameter group 8.. Device functions	

Parameter group 80. setup	
P800 Short menu (FBG11B only)	Short
P801 Language (DBG60B)	
P802 Factory setting	No
P803 Parameter lock	Off
P804 Reset statistic data	No action
P805 Nominal line voltage	50 – 500 V
P806 Copy DBG to MOVITRAC ®B	Yes/no
P807 Copy MOVITRAC ®B to DBG	Yes/no
P808 24VIO auxiliary voltage output X12:8	1 / On: 24 V switched on
P809 IPOS® activation	
Parameter group 81. Serial communication	
P810 RS485 Address	0 – 99
P811 RS485 group address	100 – 199
P812 RS485 timeout interval	0 – 650 s
P819 Fieldbus timeout interval	
Parameter group 82. Brake operation 1 / 2	
P820/P821 4-quadrant operation 1/2	On
Parameter group 83. Fault responses	
P830 "External fault" terminal response	4 / rapid stop / malfunction (stop with locking)
P833 Response to RS485 timeout	7 / rapid stop / warning
Parameter group 84. Reset behavior	
P840 Manual reset	No
P841 Auto reset	Off
P842 Restart time	1 – 3 – 30 s
Parameter group 85. actual speed value scaling	
P850 Scaling factor numerator	1 – 65535
P851 scaling factor denominator	1 – 65535
P852 User unit	rpm
P853 Scaled speed FBG	
Parameter group 86. modulation 1 / 2	
P860/P861 PWM frequency 1/2	4 kHz
P862/P863 PWM fix 1/2	Off
Parameter group 87. Process data parameter setting	
P870 Setpoint description PO1	Control word 1
P871 Setpoint description PO2	Speed
P872 Setpoint description PO3	No function
P873 Actual value description PI1	STATUS WORD 1
P874 Actual value description PI2	SPEED
P875 Actual value description PI3	OUTPUT CURRENT
P876 PO data enable	Yes
Parameter group 88. Serial communication SBus	
P880 SBus protocol	0 / MoviLink
P881 SBus address	0 – 63
P882 SBus group address	0 – 63
P883 SBus timeout delay	0 – 650 s
P884 SBus baud rate	500 / 500 kBaud
P886 CANopen address	1 – 2 – 127

Parameter group 9.. IPOS® parameters	
P938 Speed for task 1	0 – 9
P939 Speed for task 2	0 – 9

10.2 Explanation of the parameters

If there are several options, the factory setting is underlined.

The parameters for motor startup are described in chapter "Startup with the FGB keypad" (page 220).

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



Selection in the FBG11B long menu



Selection in the FBG11B short and long menus


Direct selection in the FBG11B keypad and in the FBG11B long menu


Selection within FGB motor startup

The following symbols explain the parameters:



These parameters are switch-selectable and available in parameter sets 1 and 2.


These parameters can only be changed in inverter status "INHIBITED" (= output stage at high resistance).



The startup function automatically changes this parameter.

10.2.1 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 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 nominal unit current. The display value is positive when torque is applied in positive direction of rotation, and negative when torque is applied in negative direction of rotation.

P008 DC link voltage



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:

- LOCKED
- ENABLED

P011 Operating state

The following operating states are possible:

- 24 V OPERATION
- CONTROLLER INHIBIT
- NO ENABLE
- STANDSTILL CURRENT
- ENABLE
- FACTORY SETTING
- FAULT
- SAFE TORQUE OFF

P012 Fault status

Fault number and fault in plain text.

P013 Current parameter set

Parameter set 1 or 2

P014 Heat sink temperature

Heat sink temperature of the inverter in °C

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P015 effective power

Actual effective power in watts.

Parameter group 02. analog setpoints

P020 Analog input AI1

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

Lon6

P021 Analog input AI2 (optional)

Voltage in V (–10 to +10 V)

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Parameter group 03. Digital inputs

P030 Digital input DI00

State of digital input DI00 (fault reset)

P031 Digital input DI01

State of digital input DI01 (fixed assignment: CW/stop)

P032 Digital input DI02

State of digital input DI02 (CCW/stop)

P033 Digital input DI03

State of digital input DI03 (enable)

P034 Digital input DI04 State of digital input DI04 (n11/n21)

P035 Digital input DI05 State of digital input DI05 (n12/n22)

P039 Digital inputs DI00 – DI05 Collective display of digital inputs

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Parameter group 04. Digital inputs of option

P040 Digital input DI10 State of digital input DI10 (no function)

P041 Digital input DI11 State of digital input DI11 (no function)

P042 Digital input DI12 State of digital input DI12 (no function)

P043 Digital input DI13 State of digital input DI13 (no function)

P044 Digital input DI14 State of digital input DI14 (no function)

P045 Digital input DI15 State of digital input DI15 (no function)

P046 Digital input DI16 State of digital input DI16 (no function)

P047 Virtual digital input DI17 State of virtual digital input DI17

P048 Digital inputs DI10 – DI17 Collective display of digital inputs

Lon6

Parameter group 05. Digital outputs

P051 Digital output DO01 State of digital output DO01 (/MALFUNCTION)

P052 Digital output DO02 State of digital output DO02 (BRAKE RELEASED)

P053 Digital output DO03 State of digital output DO03 (READY)

P059 Digital outputs DO01 – DO03

Collective display of digital outputs

Lon6

Parameter group 07. unit data

P070 Device type

The device type is displayed, e.g. MC07B0008-2B1

P071 nominal output current

Nominal unit current displayed in A

P072 Front module

Display of the front module

P073 Front module firmware

Part number and firmware version for front module

P076 Basic unit firmware

Part number and version of the firmware

P077 DBG firmware

Part number and version of the firmware

Parameter group 08. error memory

P080 – P084 faults t-0 – t-4

Lon6

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

The device saves the following information when a fault occurs. MOVITOOLS® MotionStudio can display this information if required:

- *P036/P053 State of digital inputs / digital outputs*
- *P013 Current parameter set*
- *P011 Operating state 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 Process data output word 1, setpoint in hex

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P095 PO2 setpoint Process data output word 2, setpoint in hex

Lon6

P096 PO3 setpoint Process data output word 3, setpoint in hex

Lon6

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

10.2.2 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 digital 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 digital 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 no fixed setpoint is selected, n_{min} applies. The digital inputs specify the direction of rotation.

8 = MASTER-SBus.

The setpoint comes from the master in master/slave mode via the system bus. 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 digital input DI04 specifies the setpoint.

The optimum pulse duty factor (pulse width of the high and low signal) should be 1:1. The factor determines the rising edge and the falling edge of the input signal. Use *P102 Frequency scaling* (page 220) to determine at which input frequency the system setpoint 100% is reached. The direction of rotation is specified by the digital inputs CW/stop and CCW/stop.

Frequency scaling	Minimum response time (delay)	Frequency input resolution
25 – 120 kHz	20 ms	50 Hz
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

0 / terminals

The digital inputs determine the control.

1 / RS485

The RS485 interface and the digital inputs determine the control.

3 / SBus

The system bus and the digital 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.

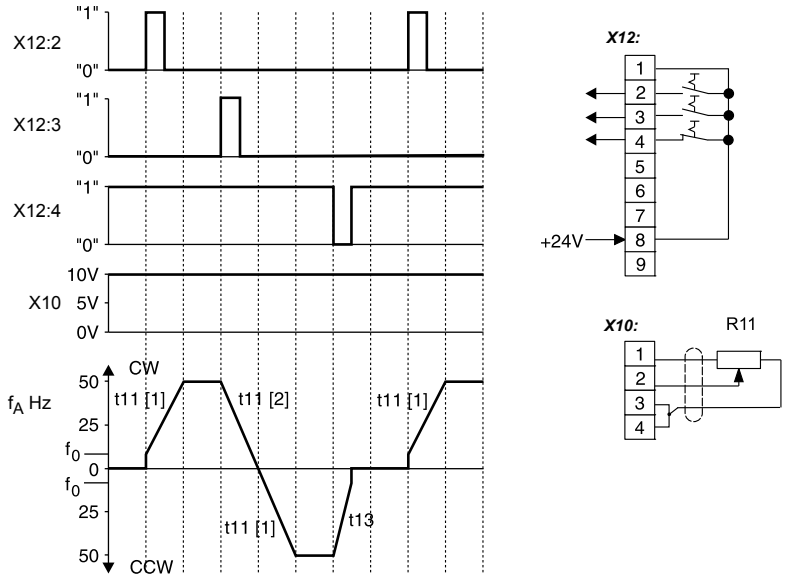
- Connect start key CW with contact to digital input "CW/Stop".
- Connect start key CCW with contact to digital input "CCW/Stop".
- Connect stop key with normally open input "Enable/Stop".

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	CW rotation
X12:3	CCW/stop	CCW	CCW rotation
X12:4	Enable/stop	t11 [1]	t11 up
X10	Setpoint input AI	t11 [2]	t11 down
f_A	Output frequency	t13	Stop ramp
f_0	Start/stop frequency		

P102 frequency scaling f_{FI1max}

Setting range: 0.1 – 10 – 120.00 kHz

P103 FI1 reference

0 / n_{max}

1 / $n_{reference}$

P104 Setpoint reference speed and analog inputs

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

Setting range: 0 – 3000 – 6000 rpm

P105 AI1 wire break detection

Wire break 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

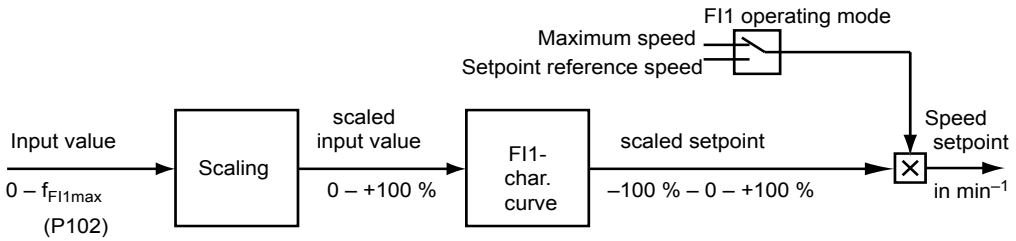
The inverter brakes the drive at the specified stop ramp (*P136 / P146*). The inverter brakes with DC braking in 2-quadrant operation. Once the stop speed is reached, the inverter inhibits the output stage and the brake is applied. The error is signaled immediately. The inverter revokes the ready signal and sets the programmed error output. A restart is only possible after a fault reset has been performed during which the inverter is reinitialized.

7 / Rapid stop / Warning

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

FI1 characteristic curve frequency input

The frequency input can be configured using a characteristic curve:



P106 FI1 characteristic x1

Setting range: 0 – 100%

Lon6

P107 FI1 characteristic y1

Setting range: –100 – 0 – +100%

Lon6

P108 FI1 characteristic x2

Setting range: 0 – 100%

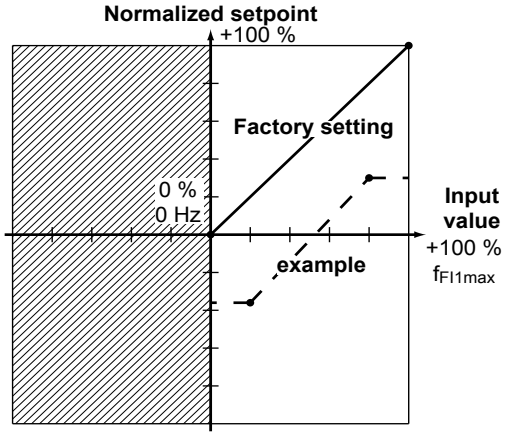
Lon6

P109 FI1 characteristic y2

Setting range: –100 – 0 – +100%

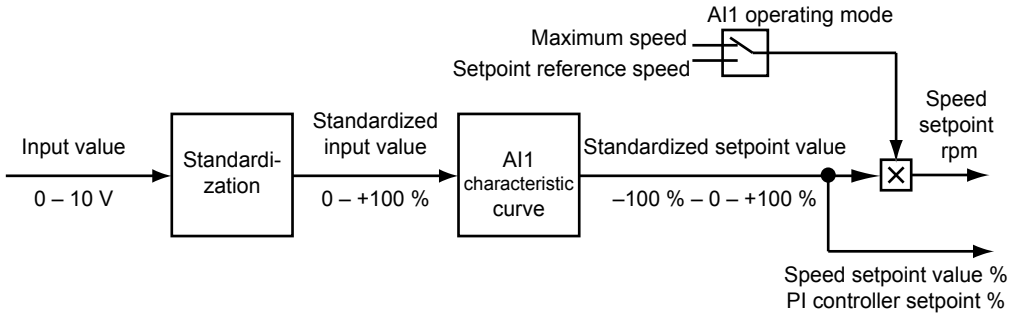
Lon6

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

Short

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 x1

Short

Setting range: 0 – 100%

P117 AI1 characteristic y1

Short

Setting range: –100 – 0 – +100%

P118 AI1 characteristic x2

Short

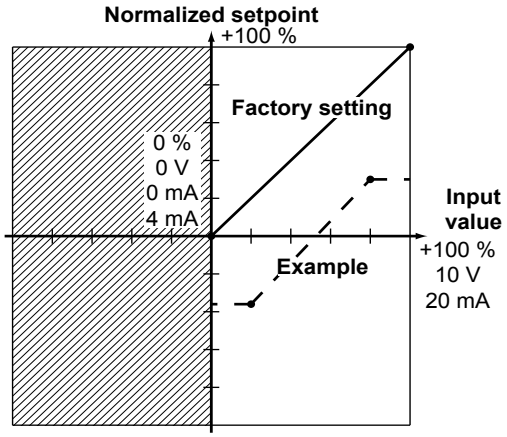
Setting range: 0 – 100%

P119 AI1 characteristic y2

Short

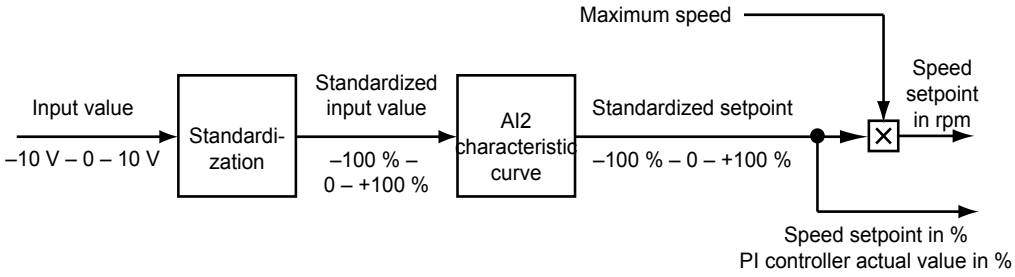
Setting range: –100 – 0 – <u>+100</u>%

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 setpoint adjuster (option)

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



P120 AI2 operating mode

Lon6

<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 setpoint adjuster

Short

<u>0 / off</u>

The unit does not take into account the value from the setpoint adjuster of the FBG11 keypad.

1 / ON

The value from the setpoint adjuster 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 setpoint adjuster 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** act on **fixed setpoints**.

P122 Direction of rotation FBG manual mode

Short

Setting the setpoint using the setpoint adjuster of the FBG11 keypad in FBG manual mode.

0 / Unipolar CW

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

Lon6

Setting range: –100 – 0 – +100% (–10 – 0 – +10 V)

P127 AI2 characteristic curve y1

Lon6

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

P128 AI2 characteristic curve x2

Lon6

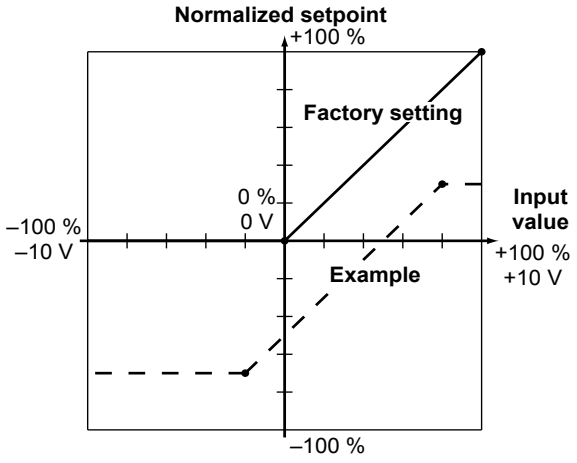
Setting range: –100 – 0 – +100% (–10 – 0 – +10 V)

P127 AI2 characteristic curve y2

Lon6

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

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



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

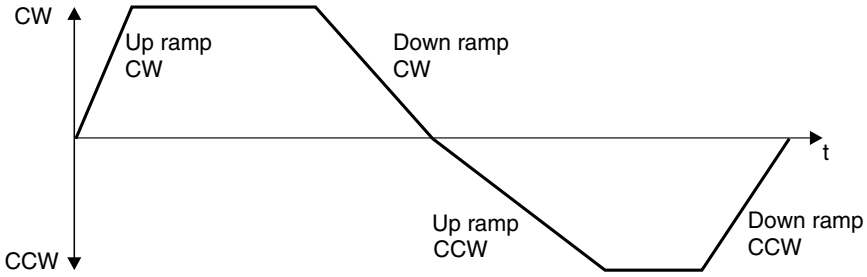




P130 Ramp t11 up CW / *P140 Ramp t21 up CW*

Setting range: 0 – 2 – 2000 s

The ramp times refer to a setpoint step change of Δn = 3000 rpm. The ramp takes effect when the speed setpoint is changed and the enable signal is revoked via the CW/CCW terminal.



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

P131 / P141 ramp t11 / t21 down

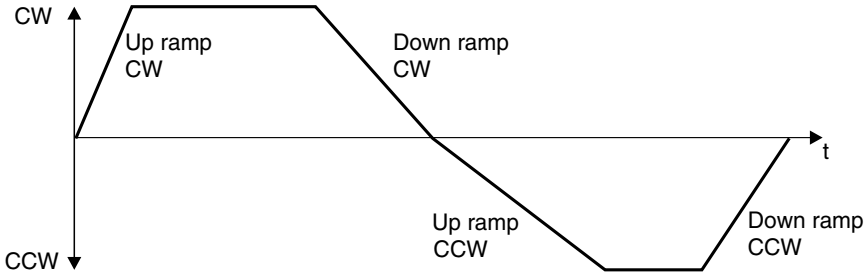




P131 Ramp t11 down CW / *P141 Ramp t21 down CW*

Setting range: 0 – 2 – 2000 s

The ramp times refer to a setpoint step change of Δn = 3000 rpm. The ramp takes effect when the speed setpoint is changed and the enable signal is revoked via the CW/CCW terminal.



277883403

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 by a digital input (→ *P601 – P608*), which is set to the function "Speed ramp switchover".

P135 / P145 S pattern t12 / t22

Lon6

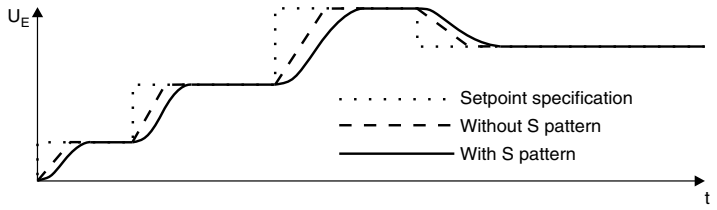
1 2

This function is only active when selecting t12/t22.

Setting range: <u>0</u> / 1 / 2 / 3 (0 = off, 1 = weak, 2 = medium, 3 = strong)

The second 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. Revoking the setpoint or a stop via the input terminals causes the started S curve to be completed. This allows the drive to continue to accelerate despite the fact that the setpoint has been withdrawn.

P136 / P146 stop ramp 13 / t23 up = down

Lon6

1 2

Setting range: 0 – <u>2</u> – 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 must also be increased when the ramp timeout is definitely triggered by a preset ramp that cannot be traveled.

This parameter is an additional monitoring function for speed monitoring. However, it only applies to the deceleration ramp. This means the parameter can be used to monitor the deceleration 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 motor potentiometer setpoint that has been set last:

- 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 digital inputs using arguments n11 / n21 or n12 / n22 and FIXED SETPT. SW.OVER (parameter *60_*). You activate the fixed setpoints n13/n23 by assigning the functions n11/n21 and n12/n22 to two digital inputs and applying a "1" signal to the 2 inputs.

P160 / P170 Internal setpoint n11 / n21



Setting range: -5000 – 150 – 5000 rpm

P161 / P171 Internal setpoint n12 / n22



Setting range: -5000 – 750 – 5000 rpm

P162 / P172 Internal setpoint n13 / n23



Setting range: -5000 – 1500 – 5000 rpm

P163 / P173 n11 / n21 PI controller

Setting range: 0 – 3 – 100%. See chapter "PI controller" (page 154).

P164 / P174 n12 / n22 PI controller

Setting range: 0 – 15 – 100%. See chapter "PI controller" (page 154).

P165 / P175 n13 / n23 PI controller

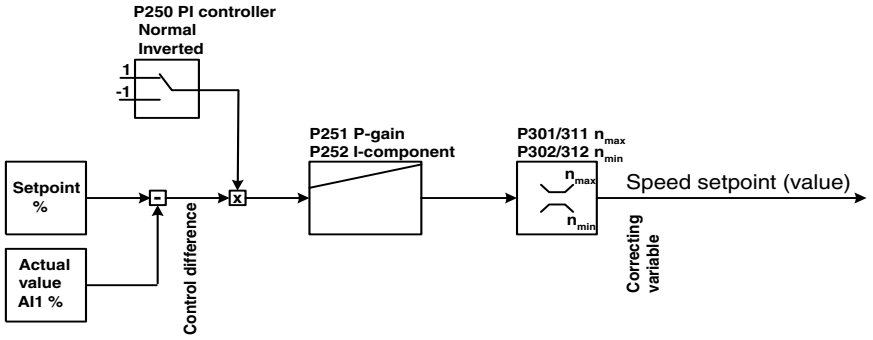
Setting range: 0 – 30 – 100%. See chapter "PI controller" (page 154).

10.2.3 Parameter group 2.. Controller parameters

Parameter group 25. PI controller

For further information regarding the parameters, refer to chapter "PI controller" (page 154).

PI controller



327699339

P250 PI controller

<u>0 / off</u>

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 – <u>1</u> – 2000 s

10.2.4 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

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 VFC & hoist operating mode, the drive is enabled at least with the rated motor slip speed.

During startup, the start/stop speed is set to 50% of 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. The minimum stop speed is 15 rpm.

P301 / P311 Minimum speed 1 / 2

Setting range: 0 – <u>15</u> – 5500 rpm

This speed is the lower limit that may 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.
- When using the "simple positioning" application module and the "hardware limit switch" function, moving clear of the limit switch must be possible even at slow speeds. This function is not active when the hardware limit switch is hit at n_{min}.

P302 / P312 Maximum speed 1 / 2

Setting range: 0 – <u>1500</u> – 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 VFC and VFC + DC BRAKING operating mode, you may enter the following maximum speed values depending on the number of poles:

- 2-pole: max. 5500 rpm
- 4-pole: max. 4000 rpm
- 6-pole: max. 2600 rpm
- 8-pole: max. 2000 rpm

Fault *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

Setting range: 0 – <u>150</u>% 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 "ENABLE" 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 compensation 1/2

Lon6

1 2

AUTO

Setting range: 0 – 100%

The inverter sets the value automatically when *P320 / P330 Automatic adjustment* = "on". Only experts are allowed to manually change this parameter for optimization purposes.

P323 / P333 Premagnetization time 1/2

Lon6

1 2

AUTO

Setting range: 0 – 2 s

Premagnetization builds a magnetic field in the motor when you enable the inverter.

P324 / P334 Slip compensation 1/2

Lon6

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 as a manual entry. Do not enter a value of more than 20% different from the rated slip to compensate for fluctuations between various motors.

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

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.
	Error response of the inverter when reaching P006/P007 motor utilization 1/2 of 110%. Emergency stop/fault

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.

P341/P343 Type of cooling 1/2

1 2

Setting range: FAN COOLED / 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

Lon6

1 2

AUTO

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.

10.2.5 Parameter group 4.. Reference signals

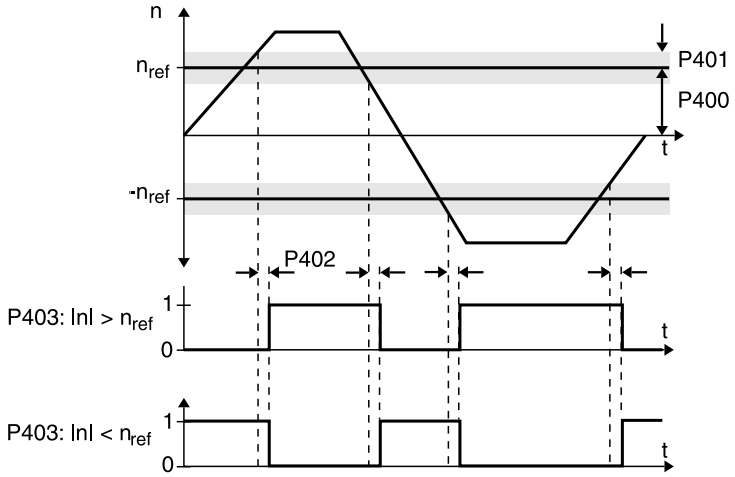
The following reference values are used for detecting and reporting certain operating states. All signals of parameter group 4.. can be output via digital outputs.

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

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 Delay time

Setting range: 0 – <u>1</u> – 9 s

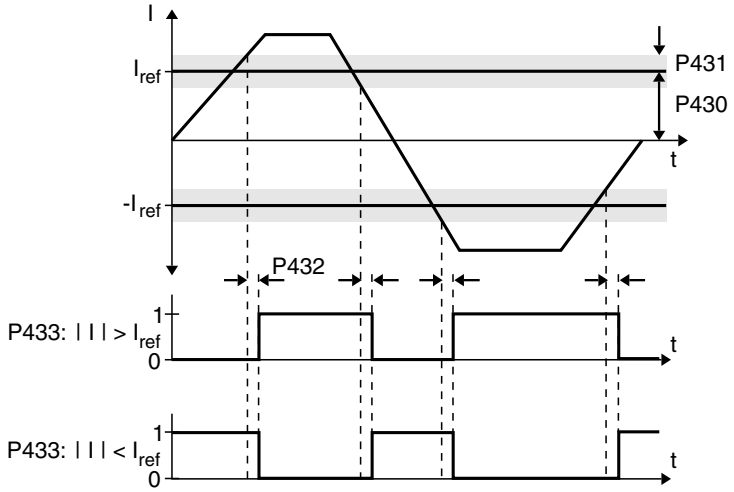
P403 signal = "1" if

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

1 / n > n_{ref}

Parameter group 43. Current reference signal

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



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P430 Current reference value

Setting range: 0 – <u>100</u> – 150% I_N

Lon6

P431 Hysteresis

Setting range: 0 – <u>5</u> – 30% I_N

Lon6

P432 Delay time

Setting range: 0 – <u>1</u> – 9 s

Lon6

P433 Signal = "1" if

<u>0 / I < I_{ref}</u>

1 / I > I_{ref}

Lon6

Parameter group 44. Imax signal

Signal if the inverter has reached the current limitation. An external current limitation (e.g. P120) is not taken into account.

P440 Hysteresis

Setting range: 0 – <u>5</u> – 50% I_N

Lon6

P441 delay time

Setting range: 0 – <u>1</u> – 9 s

Lon6

P442 Signal = "1" if

<u>0 / I = I_{max}</u>

1 / I < I_{max}

Lon6

Parameter group 45.. PI controller_reference signal

Also see chapter "PI controller / reference signal" (page 158).

These parameters determine whether and how the PI reference signal responds

P450 PI actual value reference

Lon6

0.0 – 100.0%

P451 Signal = "1" if

Lon6

0 / PI Actual value < PI Ref

1 / PI actual value > PI ref

10.2.6 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

Lon6

1 2

Off

On / motor operation / regenerative operation

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

P500 cannot be disabled in "VFC hoist" operating mode.

P501/P503 Delay time 1/2

Lon6

1 2

Setting range: 0 – 1 – 10 s

The set current limit can be reached briefly during acceleration, deceleration, or load peaks. You prevent the speed monitoring from responding too sensitively by setting the delay time. Monitoring responds when the current limit is reached for the duration of the delay time.

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 *Controller inhibit* or *No enable* inverter state.

The digital 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	The error is not displayed, and there is no error response. The issued error is completely ignored.
1 / Display fault	The fault is displayed, the fault output is set (if programmed). The unit does not carry out any other fault response. The fault can be reset (terminal, RS485, fieldbus, SBus, auto-reset).
2 / Immediate stop / Fault	The inverter switches off immediately and issues an error message. 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 has been performed 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. An error message is sent immediately. The ready signal is revoked and the error output is set, if programmed. A restart is only possible after an error reset has been performed 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. An error message is sent 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 Drive vibration response/warning

Lon6

Display fault

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

P541 Drive vibration response/fault

Lon6

Rapid stop/warning

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

P542 Oil aging response/warning

Lon6

Display fault

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

P543 Oil aging response/fault

Lon6

Display fault

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

P544 Oil aging/overtemperature

Lon6

Display fault

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

P545 Oil aging/ready

Lon6

Display fault

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

P549 Brake wear response

Lon6

Display fault

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

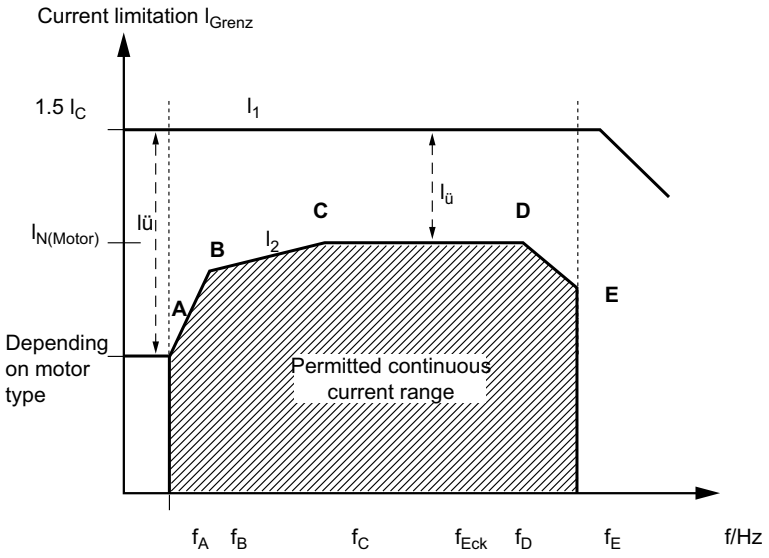
Parameter group 56. Ex-e motor current limitation

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 indicated by underline. The factory settings apply to the delivery status.

Permanent operation at frequencies smaller than frequency A is not permitted. The following always applies:

- Frequency A < frequency B < frequency C < frequency D < frequency E
- Current limit A < current limit B < current limit C

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



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P560 Ex-e motor current limitation

AUTO

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

Setting range: On / off

On: Current limitation for Ex-e motors enabled

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

P561 Frequency A

AUTO

Setting range: 0 – 5 – 60 Hz

Value for minimum operating frequency f_A. The operation time with frequency A is 60 seconds regardless of the current value. After this time, the inverter switches off and issues the error message *F110 Ex-e protection*.

P562 Current limit A

AUTO

Setting range: 0 – 50 – 150%

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

P563 Frequency B

AUTO

Setting range: 0 – 10 – 104 Hz

Value for operating frequency f_B.

P564 Current limit B

AUTO

Setting range: 0 – 80 – 200%

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

P565 Frequency C

AUTO

Setting range: 0 – 25 – 104 Hz

Value for operating frequency f_C.

P566 Current limit C

AUTO

Setting range: 0 – 100 – 200%

Current 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 – 50 – 104 Hz

Value for operating frequency f_D.

P568 current limit D

AUTO

Setting range: 0 – 100 – 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. Ex-e motor current limitation

P570 frequency E

AUTO

Setting range: 0 – 87 – 104 Hz

P571 current limit E

AUTO

Setting range: 0 – 100 – 200%

Current limitation that is permitted with operating frequency f_E.

10.2.7 Parameter group 6.. Terminal assignment

Parameter group 60. Digital inputs

DI01 with fixed assignment CW/stop

Function	Effect in case of		Effective with inverter status	
	0 signal	1 signal	Disabled	Enabled
0: No function	–	–	–	–
1: Enable/stop	Stop at stop ramp*P136 / P146*	Enable	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	–	–	No	Yes
11: /External fault	External fault (*F26*)	–	No	Yes
12: Fault reset	Reset on positive edge ("0" to "1")	–	Yes	Yes
19: Free-running slave	Master-slave operation	Free-running slave	No	Yes
20: Setpoint acceptance active	Do not accept	Accept setpoint	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	Enable	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 Digital input DI02 CCW/stop

Short



P602 Digital input DI03 Enable

Short



P603 Digital input DI04 n11/n21

Short



P604 Digital input DI05 n12/n22

Short



P608 Digital input DI050 Fault reset

Short



Parameter group 61. Digital inputs of option

P610 Digital input DI10 No function

Short



P611 Digital input DI11 No function

Short



P612 Digital input DI12 No function



P613 Digital input DI13 No function



P614 Digital input DI14 No function



P615 Digital input DI15 No function



P616 Digital input DI16 No function

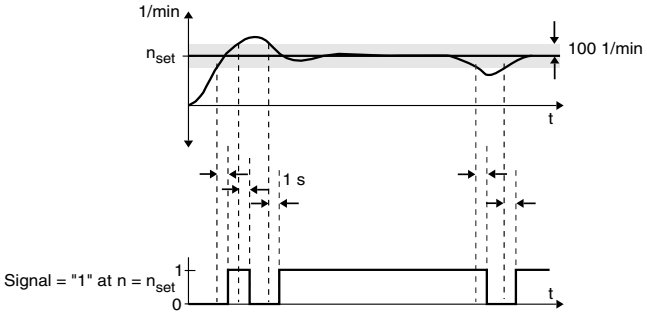


P617 Virtual digital input DI17 No function



Parameter group 62. Digital outputs of basic unit

Use digital output DO02 only for controlling the brake rectifier.

Function	Meaning of	
	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
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	$n \neq n_{setp}$	$n = n_{set}$
	Signal if the speed is equal to or not equal to the setpoint speed. 	
12: Current reference signal	$I > I_{ref}$ / $I < I_{ref}$ *(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	IPOS fault signal®	–
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 Digital output DO01 /FAULT

Short

P621 Digital output DO02 BRAKE RELEASED

Short

P622 Digital output DO03 READY (selection 5 (BRAKE RELEASED) not possible)

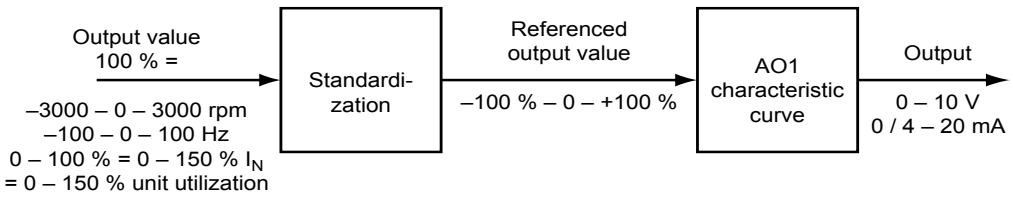
Short

Parameter group 63. Digital outputs DO

P630 Virtual digital outputs Following a description of how the virtual digital outputs are assigned, see also P620. They can only be assigned using MOVITOOLS® MotionStudio.

Parameter group 64. Analog outputs AO1 (optional)

Analog output AO1 is only available with the optional analog module FIO11B



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P640 AO1 analog output

Lon6



<u>0 / No function</u>

The value 0% is output.

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 (absolute value)

±100% corresponds to ±3000 rpm

12/ Actual frequency (signed)

Rotating field frequency

±100% corresponds to ±100 Hz

P641 AO1 reference

Lon6



<u>0 / 3000 rpm, 100 Hz, 150%</u>

1 / n_{max}

2 / $n_{set\ reference}$

P642 AO1 operating mode

Lon6



<u>0 / No function</u>

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 characteristic curve x1

-100 – <u>0</u> – +100%

–3000 rpm – 0 – +3000 rpm

–100 Hz – 0 – 100 Hz

0 – 100% I_N

0 – 100% = 0 – 150% unit utilization

P647
AO1 characteristic curve y1

<u>–100</u> – +100%

P648
AO1 characteristic curve x2

–100 – 0 – <u>+100%</u>

–3000 rpm – 0 – +3000 rpm

–100 Hz – 0 – 100 Hz

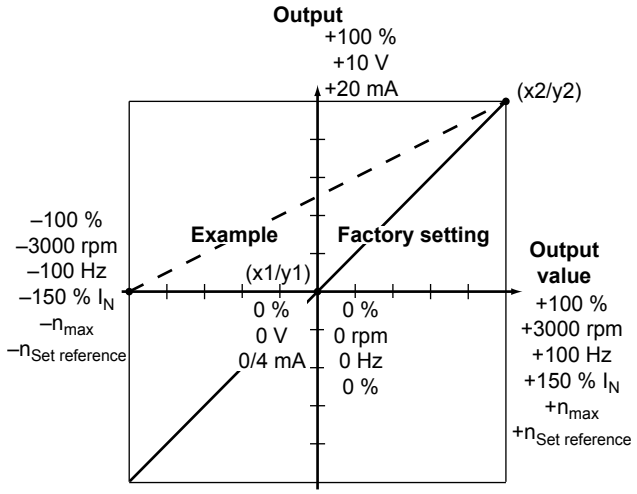
0 – 100% I_N

0 – 100% = 0 – 150% unit utilization

P649
AO1 characteristic curve y2

<u>-100</u> – +100%

The two coordinates x1/y1 and x2/y2 describe the characteristic curve used to evaluate the analog output.



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10.2.8 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 that 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. They are set 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:

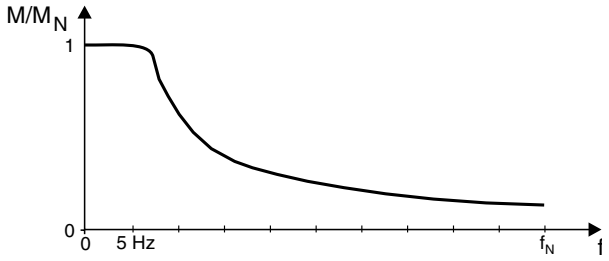
- 2 or 3-phase motor phase interruption: Error *F82 output open*
- Premagnetization time too short or incorrect motor/inverter combination: Fault *F81 start condition*
- Motor phase failure due to active speed monitoring *P500/502*: Fault *F08 speed monitoring*

NOTICE:

- Control must be implemented in such a way that the **direction of rotation of the drive can only be changed when it is at standstill**.
- A 1-phase motor phase failure cannot always be detected reliably.
- SEW-EURODRIVE strongly recommends that you set the speed monitoring time to a small value.
- Requirement for correct performance of the hoist function: The motor brake is controlled by the inverter.
- Speed monitoring is set by changing parameters *P501 / P503*. The sagging of hoists cannot be avoided safely if the delay time is set to an excessively high value.

VFC & DC braking / V/f characteristic curve & DC braking:

DC braking means the asynchronous motor brakes by using current injection. The motor brakes without a 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.



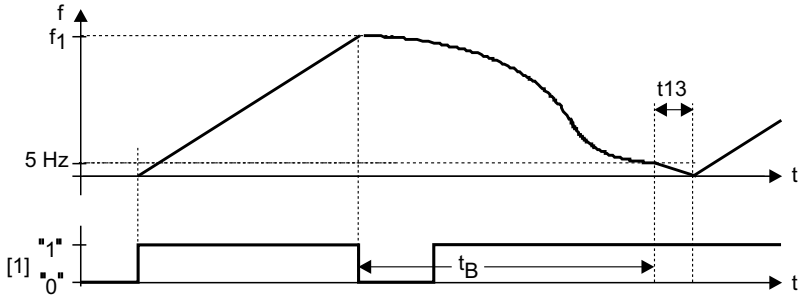
17888011

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 (page 320) for brake control.

NOTICE:

With DC braking, guided stops are not possible and certain ramp values cannot be observed. 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.



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n_1 = Setpoint speed

[1] = Enable

t13 = Stop ramp

t_B = Braking phase

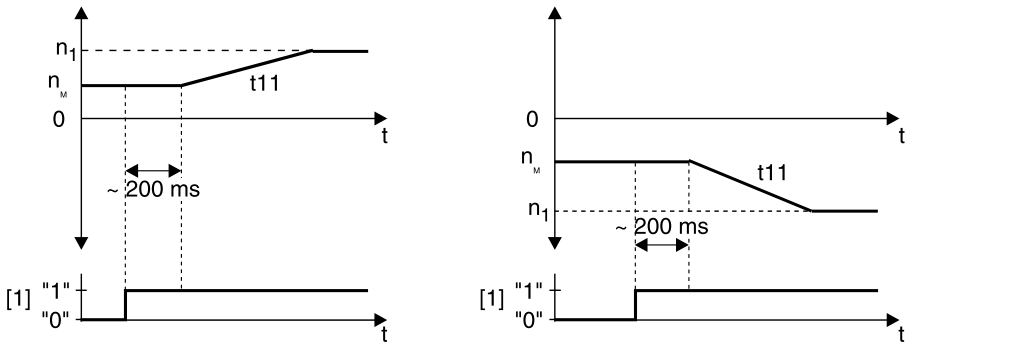
VFC & flying start function:

The flying start function lets you synchronize the inverter to a motor that is already in operation. This function is used in particular with drives that are not braked actively, run on for a long time or are turned by a flowing medium, e.g. pumps and fans. The maximum flying start time is approx. 200 ms.

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.



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 for 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)

3 / VFC & DC braking (field-oriented control 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.

- 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.
- A rapid start will only take place if the set standstill current is greater than or equal to the rated magnetizing current.
- In the operating mode VFC & hoist, the rated magnetizing current is always used if *P710 standstill current* is active.

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.

10

P710/P711 Standstill current 1/2

0 – 50% I_{Mot}

Lon6

1 2

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 setpoint stop function 1 / 2

Lon6

1 2

Off

On

P721/P724 Stop setpoint 1/2

Lon6

1 2

0 – 30 – 500 rpm

P722/725 Start offset 1/2

Lon6

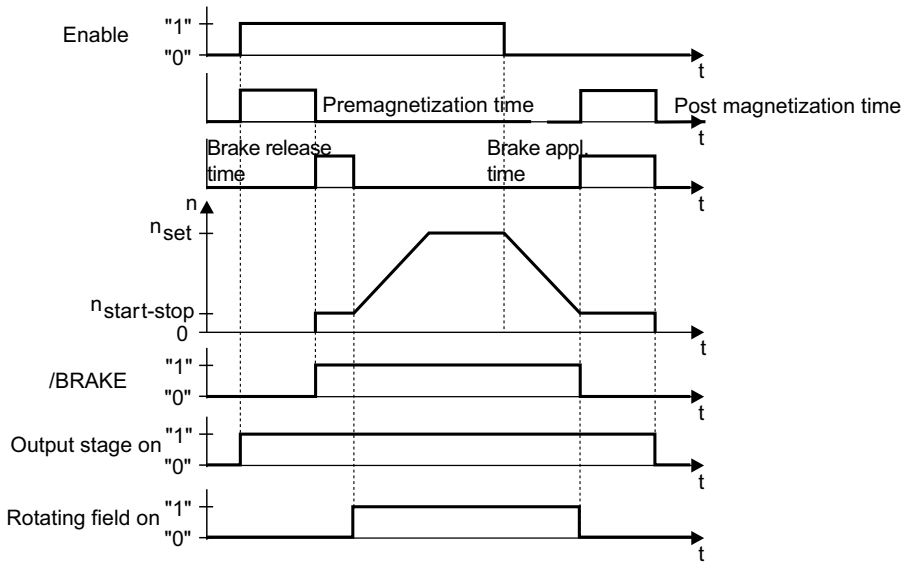
1 2

0 – 30 – 500 rpm

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 digital output which has the assignment of the "/BRAKE" function (24 V = brake released). Use DO02 for the brake control system.

The brake is applied immediately when "/CONTROLLER INHIBIT" = "0".



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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.

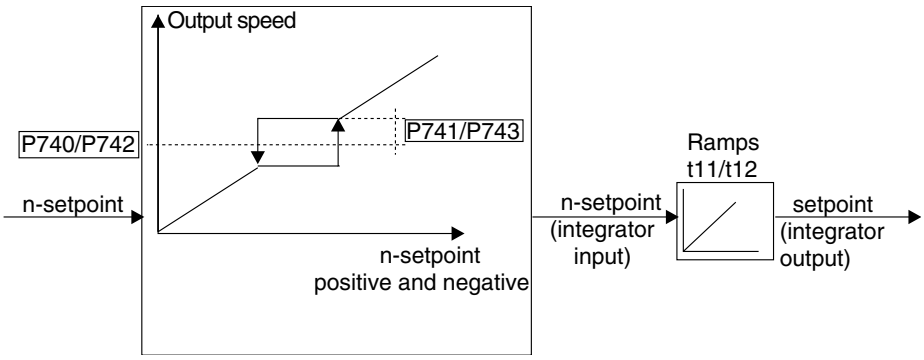
P732/P735 Brake application time 1/2

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 in particular in hoists.

Parameter group 74. Speed skip function

Skip center frequency and skip bandwidth are values and automatically have an effect on positive and negative setpoints when activated. The function is disabled when the "skip bandwidth" 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 bandwidth 1/2

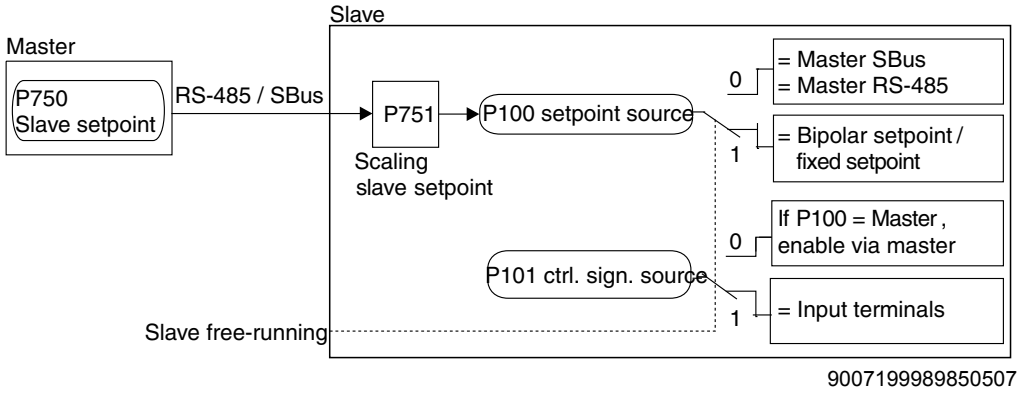
Setting range: 0 – 300 rpm

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 at 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 digital inputs basic unit*, it is possible to separate the slave from the master setpoint and switch to local control mode (like control signal source bipolar/fixed setpoint).

For the slave, the process data (*P87x*) are automatically assigned as follows:

– PO1 = Control word 1
– PO2 = Speed
– PO3 = IPOS® PO data
– PI1 = Status word 1
– PI2 = Speed
– PI3 = IPOS® PI data



P811 RS485 Group address or *P882 SBus Group address* must be set to the same value for 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 setpoint* 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): *P883 SBus timeout interval* is in effect when there is a communication link via SBus. If *P883 SBus timeout interval* = "0", data transmission via SBus 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 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 mode

P760 Lock RUN / STOP keys

Lon6

Off (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)

Also refer to section "External setpoint selection (page 274)".

Parameter group 77. Energy saving 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

Lon6

Off

On

10.2.9 Parameter group 8.. Device functions

Parameter group 80. setup

P800 Short menu (FBG11B only)

Short

Long

Short

Use *P800 short 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

Lon6

No (do not restore factory setting)

Std / standard (restore factory setting)

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 EEPROM 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.

Statistic data must be reset separately with *P804 Reset statistic data*. Setting the parameter to "yes" will restore the factory settings. During this time, the display shows `SEt`. The previous operating state 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`

Off (you can change all parameters)

On (You can only change *P803* and *P840*)

Set *P803 Parameter lock* to "on" to prevent that any changes are made to the parameters. An exception are *P840* manual reset and *P803* itself. The parameter lock makes sense, for example, after having optimized the MOVITRAC® 07 settings. 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 statistic data

No action (no reset is performed)

Fault memory (the content of the fault memory is reset)

P804 Reset statistic data lets you reset the statistic data stored in the EEPROM (fault memory). These data are not affected when restoring the factory settings. The parameter automatically reverts to "no" after a reset.

10

P805 Nominal line voltage

`Lon6`

Setting range: 50 – 500 V

Limits the output voltage of the inverter.

Always set this value to a smaller value than the supplying line voltage.

P806 Copy DBG to MOVITRAC ®B

Yes/no

The parameter data in DBG60B is transferred to MOVITRAC® B.

P807 Copy MOVITRAC ®B to DBG

Yes/no

The parameter data in MOVITRAC® B is transferred to DBG60B.

P808 24VIO auxiliary voltage output

`Lon6`

X12:8

0 / Off: 24 V switched off

1 / On: 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

Setting range: 0 – 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

Setting range: 100 – 199

P812 RS485 time-out interval

Setting range: 0 – 650 s

P819 Fieldbus timeout interval

Display parameters for the timeout interval in s set for the EtherCAT® master. Applies only to EtherCAT® module FSE24B.

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 fault *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 fault *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 operation 1/2

Off

On

Parameter group 83. Fault 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 "External fault" terminal response

Lon6

2 / Immediate stop / fault (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.

4 / Rapid stop / fault (stop with locking)

(factory setting for *P830*)

This fault response causes a stop at the set stop ramp (*P136 / P146*). This fault stop is subject to time monitoring. If the drive does not reach the start / stop speed within a specified time period, the unit goes to 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 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.

7 / Rapid stop / warning

(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.

P833 Response to RS485 timeout

Lon6

Description: See parameter *P830 response terminal "External fault"*.

Parameter group 84. Reset behavior

P840 Manual reset Yes

MOVITRAC® B resets the present fault. *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 manual reset does not have any effect if there is no fault present.

No

No reset.

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

P841 Auto reset ON

Lon6

The auto reset function is activated. In the event of a fault, this function automatically resets the device after *P842 Restart time*. A maximum of five auto resets is possible during an auto reset phase. If 5 faults occur that are reset by an auto-reset, no more auto-resets are possible until:

- a manual reset is performed using the input terminal,
- a manual reset is performed using the serial interface (MOVITOOLS® MotionStudio, higher-level 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 time Setting range: 1 – 3 – 30 s

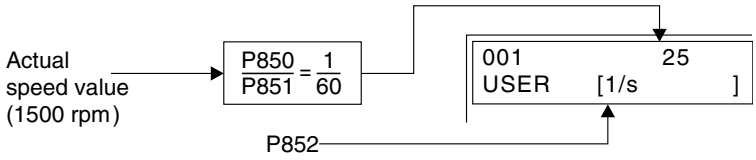
Lon6

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

Setting range: 1 – 65535

Lon6

P851 scaling factor denominator

Setting range: 1 – 65535

Lon6

10

P852 User 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

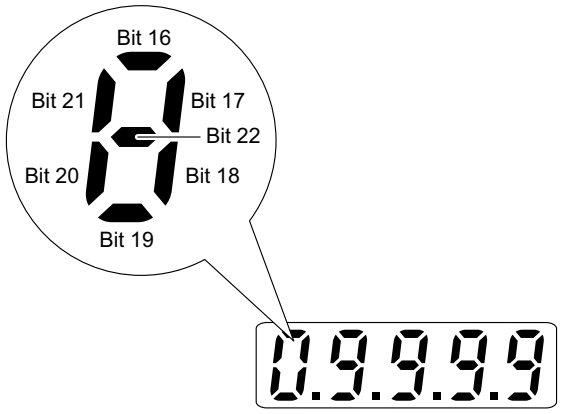
1 / Scaled speed = motor speed × *P850* / *P851*

2 / H0 [0 – 99999] = positive values 0 to 99999 With this setting, the direction of rotation is indicated by a running dot.

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

4 / H0 = special format 09999

Settings 2 to 4 can only be performed using 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

Using higher clock frequencies can have a positive influence on the development of noise. Bear in mind that high clock frequencies result in increased switching losses in the output stage of the inverter. Another effect is that the maximum permitted length of the motor cable is reduced.

P862/P863 PWM fix 1/2

Lon6

1 2

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

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

The inverter automatically switches back to lower switching frequencies when the unit utilization reaches a specific level if the clock frequency for parameter set 1/2 is not fixed to the set value using P862/P863 PWM fixed 1/2. The modulation frequency reduces switching losses in the output stage and, consequently, unit utilization.

If the clock frequency is set to a fixed value, please note the maximum permitted nominal output current for higher clock frequencies. Observe chapter "Overload capacity" (page 122).

Parameter group 87. Process data parameter setting

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 IPOS$^{plus®}$
13 / PI controller setpoint %	PI controller setpoint

P870 Setpoint description PO1

Control word 1

Lon6

P871 Setpoint description PO2

Speed

Lon6

P872 Setpoint description PO3

No function

Lon6

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

STATUS WORD 1

Lon6

P874 Actual value description PI2

SPEED

Lon6

P875 Actual value description PI3

OUTPUT CURRENT

Lon6

P876 PO data enable

No

The last valid process output data remain in effect.

Yes

The process output data last sent by the master via communication interface will take effect.

Lon6

Parameter group 88. Serial communication SBus

P880 SBus protocol

LonB

Setting range SBus

0 / MoviLink

1 / CANopen

With FSE24B, the setting is automatically set to MOVILINK®.

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.

With FSE24B, the address is set to "0".

On delivery, the MOVITRAC® B address is always set to "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. In this way, all MOVITRAC® B units with the same SBus group address can be addressed via this address using a multicast telegram. 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 delay

LonB

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

LonB

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

125 / 125 kBaud

250 / 250 kBaud

500 / 500 kBaud

1000 / 1000 kBaud

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

For FSE24B, the baud rate is set to 500 kBaud.

P886 CANopen address

LonB

Setting range: 1 – 2 – 127

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

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

10.2.10 Parameter group 9.. IPOS® parameters

P938 Speed for task 1

Setting range: 0 – 9 additional assembler commands/ms

The standard setting for task 1 is 1 assembler command/ms. The speed can be increased by up to 9 additional assembler commands/ms with *P938*. *P938* and *P939* share the resources for the speed increase; that is, task 1 and task 2 **together** can be assigned a total of 9 additional assembler commands/ms. Example:

Task 1 **+ 2 additional assembler commands/ms** = 3 assembler commands/ms

Task 2 **+ 7 additional assembler commands/ms** = 9 assembler commands/ms

P939 Speed for task 2

Setting range: 0 – 9 additional assembler commands/ms

The standard setting for task 2 is 2 assembler commands/ms. The speed can be increased by up to 9 additional assembler commands/ms with *P939*. *P939* and *P938* share the resources for the speed increase; that is, task 1 and task 2 **together** can be assigned a total of 9 additional assembler commands/ms. Example:

Task 1 **+ 2 additional assembler commands/ms** = 3 assembler commands/ms

Task 2 **+ 7 additional assembler commands/ms** = 9 assembler commands/ms

10.3 Operating modes

INFORMATION

- The maximum output frequency in the VFC operating modes is 150 Hz.

10.3.1 VFC 1/2 and V/f characteristic curve

Default setting for asynchronous motors. Suitable for general applications, such as conveyor belts, trolleys, and hoists with counterweight. A flux-oriented motor model is used (not for V/f characteristic operating mode). This model is optimally adapted to the motor after the startup function in MOVITOOLS® MotionStudio or in the DBG60B keypad has been carried out. It is necessary to enter the motor type (SEW motor) or the nameplate data (motor from another manufacturer) as part of the startup function. The following parameters are preset (parameter set 1/2):

Settings after the startup function	
P303 / P313 Current limit 1/2	I_{max} (inverter) = 150% I_{N_Mot}
P302 / P312 Maximum speed 1 / 2	Depends on number of poles and rated motor frequency e.g. 2-pole / 50 Hz -> 3000 rpm e.g. 4-pole / 60 Hz -> 1800 rpm
P301 / P311 Minimum speed 1 / 2	15 rpm
P130 / P140 ramp t11 / t21 up	2 s
P136 / P146 stop ramp 13 / t23 up = down	2 s
	2 s
P500/P502 Speed monitoring 1/2	MOTOR & REGENERATIVE
P501/P503 Delay time 1/2	1 s
P100 Setpoint source	UNIPOL./FIXED SETPOINT
P101 Control signal source	TERMINALS
	ON
P731/P734 Brake release time 1/2	For SEW motors: Setting in accordance with motor data. **For non-SEW motors: Set the correct value manually!**
P300 / P310 Start/stop speed 1/2	15 rpm
P820/P821 4-quadrant operation 1/2	ON
P324 / P334 Slip compensation 1/2	Setting in accordance with specified motor data
P321 / P331 Boost 1/2	0
P322 / P332 IxR compensation 1/2	Setting in accordance with specified motor data
P320 / P330 Automatic adjustment 1/2	ON
P323 / P333 Premagnetization time 1/2	Setting in accordance with specified motor data

INFORMATION

- SEW-EURODRIVE recommends using the *P320 / P330 Automatic adjustment 1/2* parameter activated in the factory setting. This means the *P322 / P332 IxR compensation 1/2* parameter is set automatically during the pre-magnetization time through the calibration of the motor.
- SEW-EURODRIVE recommends not changing the *P321 / P331 Boost 1/2* parameter from its factory setting (=0).

10.3.2 VFC 1/2 & hoist

VFC hoist only in parameter set 1. Disabling 4-quadrant operation (*P820/P821 4-quadrant operation 1/2*) is ignored.

In "VFC&Hoist" operating mode, the start/stop speed (*P300 / P310 Start/stop speed 1/2*) is set to the slip speed of the motor or is limited to at least 15 rpm.

The minimum speed (*P301 / P311 Minimum speed 1 / 2*) is internally limited to 15 rpm in "VFC&Hoist" operating mode.

The hoist function automatically provides all functions necessary for operating an unbalanced hoist. In particular, monitoring functions are activated for safety reasons. These may prevent the drive from starting: These are:

- Monitoring the output current during the pre-magnetization phase.
- Avoiding sag when the brake is released through load precontrol.

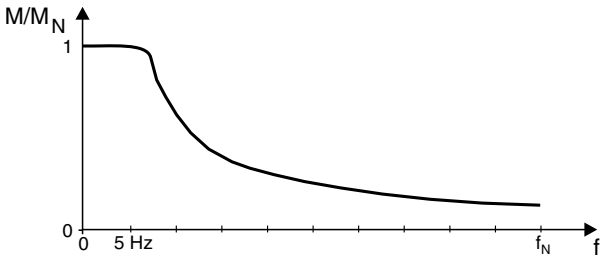
Faulty constellations	Triggered fault
2 or 3-phase motor phase failure	F82 = Output open
Premagnetization time too short or incorrect motor/inverter combination.	F81 = Start condition error
Motor phase failure due to active speed monitoring (factory setting) *P500/P502 Speed monitoring 1/2*, *P501/P503 Delay time 1/2*	F08 = n-monitoring error

INFORMATION

- A single-phase motor phase failure cannot always be detected reliably.
- Speed monitoring is always active.
- Correct performance of the hoist function requires the motor brake to be controlled via the inverter.
- 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.

10.3.3 VFC 1 / 2 & DC BRAKE and V/f DC BRAKING

The DC braking function allows the asynchronous motor to be decelerated using a direct current injection. The motor can be braked without a braking resistor using the inverter.



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A constant current with a rotating field frequency of 5 Hz is supplied during the braking process. The braking torque = 0 at standstill. At a low speed, the braking torque is high, at higher speeds, the braking torque decreases. The braking time and consequently the duration of the braking current depends on the load connected to the motor. DC braking is stopped once the rotating field frequency of the motor reaches 5 Hz and the motor is stopped using the rapid stop ramp. Current is impressed with rated motor current according to the startup function. In all cases, the inverter limits the current to max. 125% I_N. For controlling the brake, see the braking function.

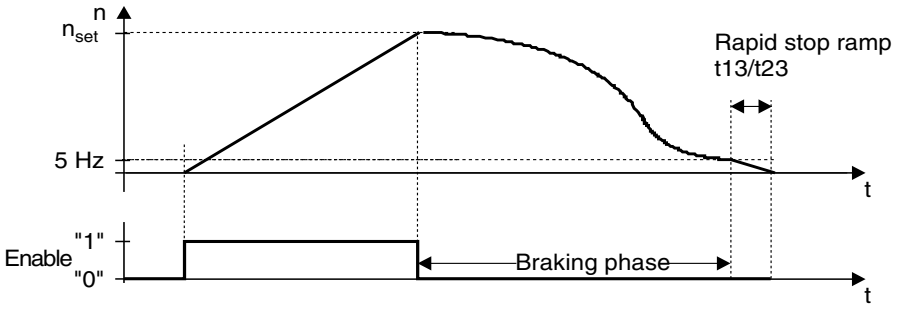


NOTICE

No guided stop.

Can cause damage to the system.

With DC braking, guided stops are not possible and certain ramp values cannot be observed. The main purpose of DC braking is to drastically reduce the time the motors need for coasting to a halt.



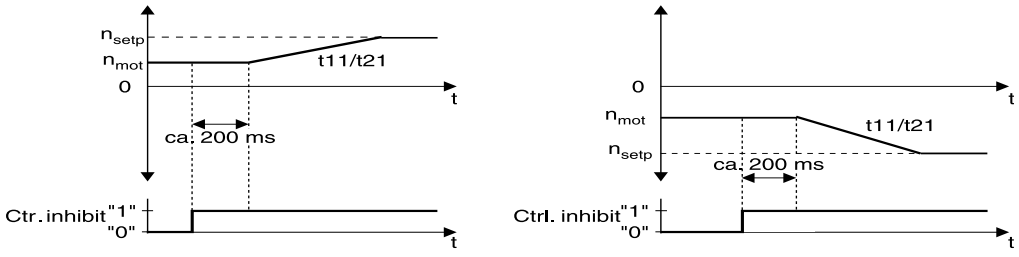
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INFORMATION

- The **braking procedure is not interrupted** if the digital input "Enable" receives a "1" signal again during the braking phase. DC braking is completed before the drive is accelerated.
- The drive stops with ramp t11/t21 or t12/t22 if a binary input is programmed to the function "CW/Stop (CCW/Stop)" in "VFC 1/2 & DC BRAK." operating mode and "CW/Stop (CCW/Stop)" receives a "0" signal. The stop is continued and **no DC braking initiated** if the digital input "Enable" is switched from "1" to "0" during the ramp time.
  To **start DC braking**, you must **first switch "Enable" from "1" to "0"**. This must happen at least 10 ms before switching "CW/Stop (CCW/Stop)" from "1" to "0".

10.3.4 VFC 1 / 2 & Flying start

The flying start function lets you synchronize the inverter to a motor that is already in operation. This function is used in particular with drives that are not braked actively, run on for a long time or are turned by a flowing medium, e.g. pumps and fans. The maximum flying start time is approx. 200 ms.



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If the inverter fails to detect a "flying start point", it assumes that the motor is at a standstill and commences the integrator start from n = 0. Consequently, the motor decelerates to n = 0 followed by a run up to n_{setp}. This behavior can arise in particular with very low resistance motors in the speed range below n = 300 rpm (4-pole motor).

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- **Do not use the flying start function in hoist applications!**
- Ensure that the motor cannot start unintentionally.

INFORMATION

- The flying restart function does not function if there is an output filter connected to the inverter.
- Due to exact motor data, the proper function of the flying start function has only been tested with SEW motors. SEW-EURODRIVE does not guarantee a proper function of the flying start function for non-SEW motors.

11 Operation

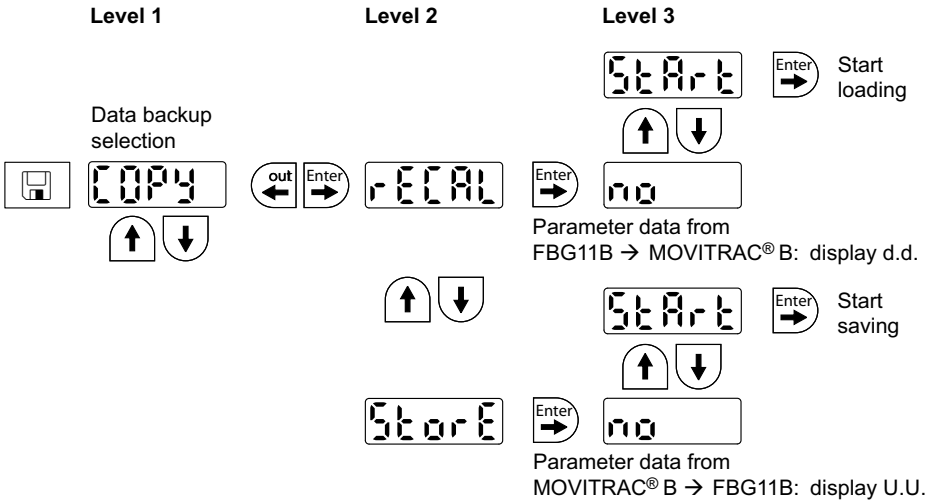
11.1 Data backup

11.1.1 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.

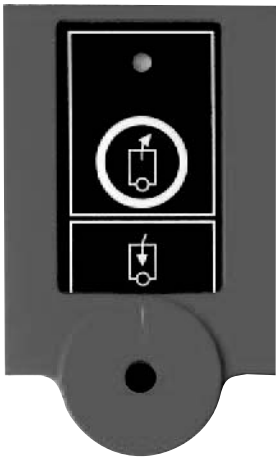
11.1.2 Data backup using DBG60B

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.
- Press the run key of FB11B or DBG60B, or switch the unit off and on again.

11.1.3 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.



When you load the data back to the inverter again, presse the <arrow up button> on the UBP11A parameter module.

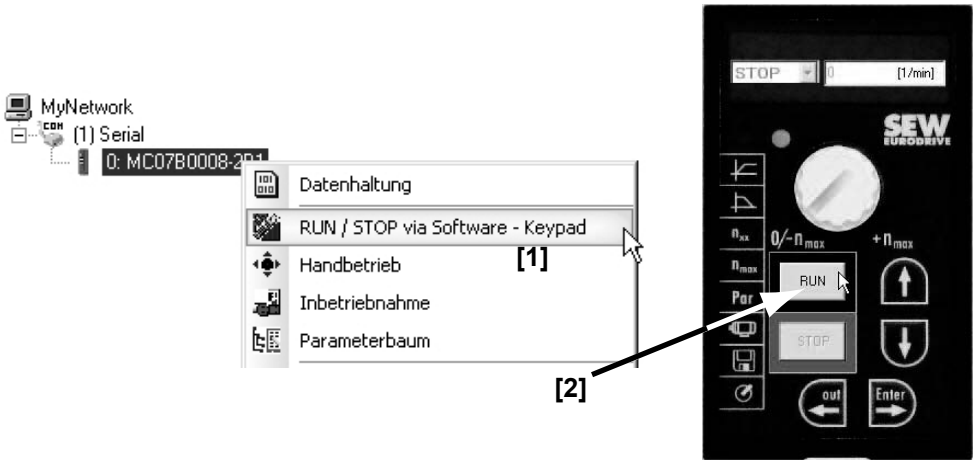
Press the <RUN> key on FBG11B or DBG60B, or switch the unit off and on again.

11.1.4 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] from the software keypad [2]

Instead, you can enable the inverter again by switching it on and off, or by pressing the <RUN> key on FBG11B.



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11.2 Status displays

11.2.1 Basic unit / FBG11B keypad

The status displays on the unit are as follows:

Status	Display (optionally with FBG11B keypad)	Basic unit status LED flash code	Unit status codes (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	Faults 43 / 47	Flashing green/yellow	
Copy	Fault 97	Flashing red/yellow	
System error	Faults 10 / 17 – 24 / 25 / 32 / 37 / 38 / 45 / 77 / 80 / 94	Constant red light	
Overvoltage / phase failure	Faults 4 / 6 / 7	Slow red flashing	
Overload	Faults 1 / 3 / 11 / 44 / 84	Rapid red flashing	
Monitoring	Faults 8 / 26 / 34 / 81 / 82	2 x red flashing	
Motor protection	Faults 31 / 84	3 x red flashing	

1) "U" flashing (status 17) if connected to supply system, "24U" flashing (status 0) if in backup mode.

Saving parameter set to FBG11B → display u. u.

Saving parameter set to unit → display d. d.

- ⚠ **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)

Controller inhibit (OFF) can be caused by the following conditions:

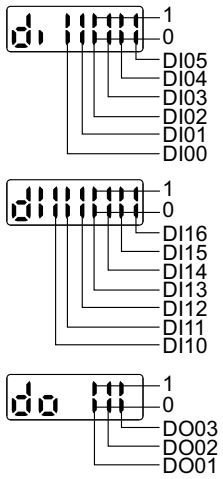
- Digital input terminal set to controller inhibit and active.
- Controller inhibit due to PC manual mode via MOVITOOLS® MotionStudio.
- Temporary controller inhibit: Is triggered if a change of parameter *P100 setpoint source* would directly cause an enable signal. The temporary controller inhibit is removed once the enable signal is reset for the first time.
- Controller inhibit set via IPOS® control word H484.

11.2.2 Status of digital inputs / outputs

The following parameters are available in the parameter menu as display parameters:

- *P039 Digital inputs of basic unit*
- *P048 Digital inputs option*
- *P059 Digital outputs*

The status is displayed as binary. Every digital 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 digital input or output is set, and the lower segment lights up when the digital input or output is not set. The two 7-segment displays on the right indicate whether *P039* (di = digital inputs basic unit), *P048* (dI = digital inputs option), or *P059* (do = digital outputs) are output.



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If no FIO21B with digital inputs is available, the display will show `dI - - -`.

11.3 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

11.4 DBG60B keypad

11.4.1 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

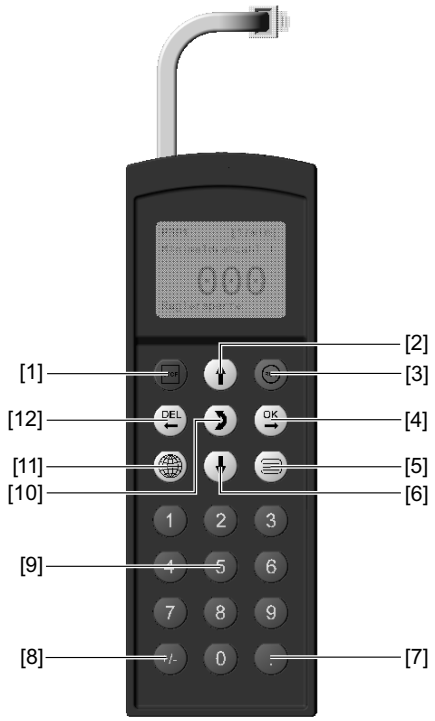
11.4.2 Information messages

Information messages on the DBG60B (ca. 2 s in duration) or in MOVITOOLS® MotionStudio/SHELL (message that can be acknowledged):

No.	Text DBG60B/SHELL	Description
1	ILLEGAL INDEX	Index addressed via interface not available.
2	NOT IMPLEMENT.	• Attempt to execute a function that is not implemented. • An incorrect communication service has been selected. • Manual mode 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 mode must be completed using X13:ST11/ST12 (RS 485).
11	ONLY TERMINAL	Manual mode must be exited via TERMINAL (DBG60B or UWS21B).
12	NO ACCESS	Access to selected parameter denied.
13	CTRL. INHIBIT MISSING	Set terminal DIØØ "/Controller inhibit" = "0" for the selected function.
14	INVALID VALUE	Attempt to enter an invalid value.
--		
16	PARAM. NOT SAVED	Overflow of EEPROM buffer, e.g. through cyclic write access. Parameter not 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

11.4.3 Functions of the DBG60B keypad

Key assignments for DBG60B



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[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

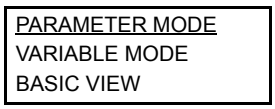
You can use the DBG60B to copy entire parameter sets from one MOVITRAC® B unit to other MOVITRAC® B units. Proceed as follows:

- In the context menu, select the menu item "COPY TO DBG". Confirm your selection by pressing OK.
- After the copying process has finished, plug the keypad in the other inverter.
- In the context menu, select the menu item "COPY TO MC07B". Confirm your selection by pressing OK.
- After copying, press RUN.

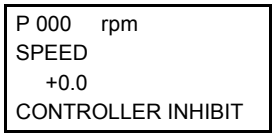
Parameter mode DBG60B

Proceed as follows to set the parameters in parameter mode:

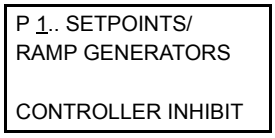
1. Press the context key to activate the context menu. The first menu item is "PARAMETER MODE".



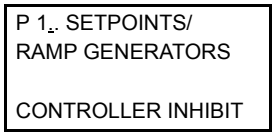
2. Press the OK key to start PARAMETER MODE. The first display parameter P000 "SPEED" appears. Use the ↑ or ↓ key to select main parameter groups 0 to 9.



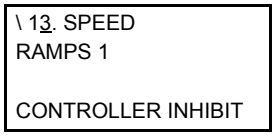
3. Use the ↑ or ↓ key to select the desired main parameter group. The flashing cursor is positioned under the number of the main parameter group.



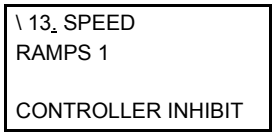
4. Press the OK key to activate the parameter subgroup selection in the required main parameter group. The flashing cursor moves one position to the right.



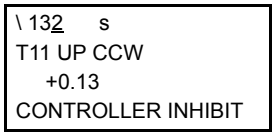
5. Use the ↑ or ↓ key to select the desired parameter subgroup. The flashing cursor is positioned under the number of the parameter subgroup.



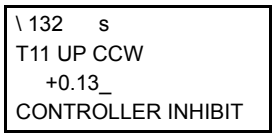
6. Press the OK key to activate the parameter selection in the required parameter subgroup. The flashing cursor moves one position to the right.



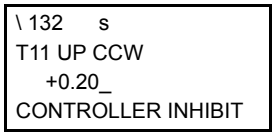
7. Use the ↑ or ↓ key to select the desired parameter. The flashing cursor is positioned under the third digit of the parameter number.



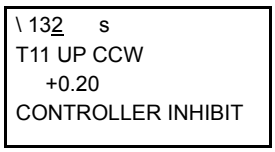
8. Press the OK key to activate the setting mode for the selected parameter. The cursor is positioned under the parameter value.



9. Use the ↑ or ↓ key to set the required parameter value.



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.



11. Use the ↑ or ↓ key to select another parameter, or press the DEL key to switch to the menu of the parameter subgroups.

\ 13. SPEED RAMPS 1
CONTROLLER INHIBIT

12. Use the ↑ or ↓ key to select another parameter subgroup or press the DEL key to switch to the menu of the main parameter groups.

P 1.. SETPOINTS/ RAMP GENERATORS
CONTROLLER INHIBIT

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

PARAMETER MODE
VARIABLE MODE
BASIC VIEW

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 parameters 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.

12 Service / list of faults

12.1 Device information

12.1.1 Fault memory

The inverter stores the error message in fault memory *P080*. The inverter does not save a new fault until the error message has been acknowledged. The local operating panel shows the most recent 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 digital inputs / digital outputs
- Operating state of the inverter
- Inverter state
- Heat sink temperature
- Speed
- Output current
- Active current
- Unit utilization
- DC link voltage

12.1.2 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 fault response causes a stop at the set stop ramp (*P136* / *P146*). This fault stop is subject to time monitoring. If the drive does not reach the start / stop speed within a specified time period, the unit goes to the fault state, the output stage is inhibited and an existing brake is applied. The fault message *F34 Ramp timeout* is generated. The original fault message is overwritten. If the drive reaches the start/stop speed, the unit goes to the fault state, the brake is applied and the output stage is inhibited. The "fault message" is set and the "ready message" is revoked.

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

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.

12.1.3 Reset

Reset basic unit

An error message can be reset by:

- Reset via input terminals with an appropriately assigned digital input. DIØØ is factory set to fault reset.

Reset keypad

An error message can be acknowledged by:

- Manual reset on the keypad (STOP/RESET key).

The STOP/RESET key has priority over a terminal enable or an enable via the interface.

The STOP/RESET key can be used for performing a reset after a fault has occurred with a programmed error response. A reset inhibits the drive. To enable the drive, press the RUN key.

Interface reset

An error message can be acknowledged by:

- Manual reset in MOVITOOLS® MotionStudio / *P840 Manual reset* = *Yes*, or in the status window of the reset button.

12.2 List of faults (F00 – F113)

No.	Designation	Response	Possible cause	Measure
00	No fault	–	–	–
01	Overcurrent	Immediate switch-off with inhibit	• Short circuit at output	• Eliminate short circuit
			• Output switching	• Switching with inhibited output stage only
			• Motor too large	• Connect a smaller motor
			• Faulty output stage	• Consult SEW Service if the fault cannot be reset
03	Ground fault	Immediate switch-off with inhibit	• Ground fault in motor	• Replace motor
			• Ground fault in inverter	• Replace MOVITRAC® B
			• Ground fault in the motor supply lead	• Eliminate ground fault
			• Overcurrent (see *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 braking resistor
			• Short circuit in the braking resistor circuit	• Rectify the short circuit
			• Braking resistance too high	• Check technical data of braking resistor
			• Brake chopper defective	• Replace MOVITRAC® B
			• Ground fault	• Eliminate ground fault
06	Line phase failure	Immediate switch-off with inhibit (only with 3-phase inverter)	• Phase failure	• Check the line cable
			• Line voltage too low	• Check the line voltage
07	DC link overvoltage	Immediate switch-off with inhibit	• DC link voltage too high	• Extend deceleration ramps • Check supply cable to 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 the 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 error	Immediate switch-off with inhibit	• Inverter electronics is faulty, possibly due to EMC	• 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 trip	Stop without inhibit • "Ready" signal is maintained	• Motor too hot, TF sensor has tripped	• Let motor cool off and reset fault
			• TF sensor of motor not connected or connected incorrectly • Connection of MOVITRAC® B and TF on motor interrupted	• Check connections 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 only parameter set 1
			• No Ex-e motor taken into operation	• Take Ex-e motor into operation
			• 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 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	• Error 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 error	• 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)]	• Fault 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 error	• Contact SEW Service
80	RAM test	Immediate switch-off	• 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 • Long 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 while copying	Prior to fault acknowledgement: • Load factory setting or complete data set from parameter module
98	CRC error flash	Immediate switch-off	• Internal unit error, flash memory defective.	• Send unit in for repair
100	Vibration/warning	Display fault	• Vibration sensor warning (see "DUV10A diagnostic unit" operating instructions)	• Determine cause for vibration, operation possible until *F101*
101	Vibration fault	Rapid stop	• Vibration sensor signals fault	• SEW-EURODRIVE recommends that you remedy the cause of the vibrations immediately
102	Oil aging/warning	Display fault	• Oil aging sensor warns	• Schedule oil change
103	Oil aging/fault	Display fault	• Oil aging sensor signals fault	• SEW-EURODRIVE recommends that you change the gear unit oil immediately.
104	Oil aging/overtemperature	Display fault	• Oil aging sensor signals overtemperature	• Let oil cool down • Check if the gear unit cools properly
105	Oil aging/ready signal	Display fault	• Oil aging sensor is not ready for operation	• Check voltage supply of oil aging sensor • Check and, if necessary, replace the oil aging sensor
106	Brake wear	Display fault	• Brake lining worn down	• Replace brake lining (see "Motors" operating instructions)

No.	Designation	Response	Possible cause	Measure
110	Ex-e protection	Emergency stop	• Duration of operation below 5 Hz exceeded	• Check project planning • Shorten duration of operation below 5 Hz
111	System bus (SBus) error	This fault 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 wire break	Programmable	• AI1 analog input wire break	• Check wiring
116	Error application module *Suberror:* 14: Encoder error 29: Limit switch reached 42: Lag error 78: Software limit switch reached			

1) To set speed monitoring, changer parameter *P500* / *P502* and *P501* / *P503*. The sagging of hoists cannot be avoided safely if the delay time is set to an excessively high value.

2) No reset required, error message disappears after communication is reestablished.

12.3 SEW electronics service

12.3.1 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 **0800** and then enter the key combination **SEWHELP**. Or simply dial **0800 739 4357**.

12.3.2 Send in for repair

Contact **SEW Electronics Serviceif you cannot rectify a fault**.

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 the application (application, control via terminals or serial)
- Connected motor (motor voltage, star or delta connection)
- Nature of the error
- Peripheral circumstances
- Your own presumptions as to what has happened
- Unusual events preceding the problem

12.4 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.

12.5 Disposal

Observe the applicable national regulations.

Dispose of the following materials separately in accordance with the country-specific regulations in force, such as:

- Electronics scrap (circuit boards)
- Plastics
- Sheet metal
- Copper
- Aluminum

13 Address list

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 D-76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Service Competence Center	**Mechanics / Mechatronics**	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
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
Drive Technology Center	**North**	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 800 SEWHELP +49 800 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	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

France			
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Algiers**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com

Argentina			
Assembly **Sales**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**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

Belgium			
Assembly **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	**Industrial Gears**	**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

Brazil			
Production **Sales** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

Brazil			
Assembly **Sales** **Service**	**Rio Claro**	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 - Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **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

China			
	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
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co

Croatia			
Sales **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

Czech Republic			
Sales **Assembly** **Service**	**Hostivice**	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 Hour Service	HOT-LINE +420 800 739 739 (800 SEW SEW)	**Servis:** Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Copenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 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

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Hollola**	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
Service	**Hollola**	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911

Greece			
Sales	**Athens**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu

India			
Registered Office **Assembly** **Sales** **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

India			
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**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 96 980 999 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Société Industrielle & Commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1173 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Kenya			
Sales	**Nairobi**	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi	Tel. +254 20 6537094/5 Fax +254 20 6537096 info@barico.co.ke

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
		After Sales Service	service@medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be

Madagascar			
Sales	**Antananarivo**	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg

Malaysia			
Assembly **Sales** **Service**	**Johor**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **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

Morocco			
Sales **Service**	**Mohammedia**	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma

Namibia			
Sales	**Swakopmund**	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 sales@dbmining.in.na

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	SEW-EURODRIVE 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

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Nigeria			
Sales	**Lagos**	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos Nigeria	Tel. +234 (0)1 217 4332 team.sew@eisnl.com http://www.eisnl.com

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

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

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 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			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com

Serbia			
Sales	**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

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-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

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za

South Africa			
	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 bgriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

South Korea			
Assembly **Sales** **Service**	**Ansan**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate #1048-4, Shingil-Dong, Danwon-Gu, Ansan-City, Kyunggi-Do Zip 425-839	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

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Swaziland			
Sales	**Manzini**	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 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

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRİVE Tekstilkent Ticaret Merkezi B-13 Blok No:70 Esenler / İstanbul	Tel. +90-262-9991000-04 Fax +90-262-9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Assembly **Sales** **Service**	**Dnipropetrovsk**	ООО «СЕВ-Евродрайв» ул.Рабочая, 23-В, офис 409 49008 Днепропетровск	Тел. +380 56 370 3211 Факс. +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

USA			
Production **Assembly** **Sales** **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
Assembly **Sales** **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
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

Vietnam			
Sales	**Ho Chi Minh City**	**All sectors except harbor and 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
		Harbor and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn

Zambia			
Sales	**Kitwe**	EC Mining Limited Plots No. 5293 & 5294,Tangaanyika Road, Off Mutentemuko Road, Heavy Industrial Park, P.O.BOX 2337 Kitwe	Tel. +260 212 210 642 Fax +260 212 210 645 sales@ecmining.com http://www.ecmining.com



Index

A

AC brakemotors, connection....133
Active current, display value....283
Actual value description of process input data....249
Actual value description PI....331
Addition FBG setpoint adjuster....293
Address CANopen....332
AI1 characteristic curve....292, 293
AI1 operating mode....292
AI2 characteristic curve....294
AI2 operating mode....293
Ambient temperature....21
Analog input AI1....284, 292
Analog input AI2....284, 293
Analog output....314
Analog outputs AO1....313
Analog setpoint specification....235
Analog setpoints....284
AO1 characteristic curve....315
AO1 Operating mode....314
AO1 reference....314
Application examples....144
Applications....118
Auto reset....328
Automatic adjustment....300
Auxiliary supply output....44
Auxiliary voltage output 24VIO....325

B

Basic unit firmware....286
Baud rate....207
Bending space....137
Binary inputs....189, 284
Binary outputs....189, 285
Boost....300
Brake activation....133
Brake application time....321
Brake operation....326
Brake parameters....133
Brake rectifier....133
  Connection....211
Brake release time....321
Braking resistor....91
  BW, connection....193
  Connection....193
  FKB10B, installation....100
  Flat design....92, 126
  Grid resistor....93, 126
  Mounting rail installation....88
  Project planning....124
  PTC....91, 125
  Submounting....100
  Wire resistor....93, 126
Braking resistor connection....193
Bus diagnostics....286

C

Cable cross-section....188
cable cross-section....137
Cable length....140, 188
  SBus....203
Cable sets for the DC link connection, MDR60A regenerative power supply units....88
Cable specification, SBus....213
CANopen address....332
CE marking....20
Changing parameters, FBG11B keypad....219
Churning losses....120
class B limit....195
Climate class....21
Cold plate....185
Communication interface FSC11B....60, 212
Communication interface FSC12B....61
Connection....206
Connector
  X31 digital inputs and outputs....75
Contactor....188
Control card type DHP11B
  LEDs....75
Control commands....253
  Controller inhibit....253
  Enable....254
  Rapid stop....253
  Stop....254
Control functions....316

Control signal source 289
FIELDBUS 243
RS-485 243
SBus 243
TERMINALS 242
Control signals, interrelations 142
Control word definition 251
Basic control block 251
Control word 1 255
Motor potentiometer function via fieldbus 255
Control word 2 256
Controller parameters 298
Copy DBG → MOVITRAC® B 325
Copy MOVITRAC® B to DBG 325
Copyright 165
Core cross section 137
CSA 20
cUL 20
Current limit 299
Current limit A 308
Current limit B 308
Current limit C 308
Current limit D 308
Current limit E 308
Current limitation 307
Current parameter set 284
Current reference value 304

D

Data backup 218, 338
DBG60B 338
FBG11B 338
MOVITOOLS® MotionStudio 340
UBP11A 339
DBG firmware 286
DBG60B keypad
Displays 344
Setting parameters 228
DBG60B operator terminal 47
Manual operation 229
Startup 223
DBM60B 49
DBM60B/DKG60B housing 49
DC BRAKING 336
DC link voltage, display value 283
Deactivating the EMC capacitors 186
Degree of protection 21
Degree of protection of braking resistors 92
Delay time 305
Device functions 324
Device status 260
Device type 286
DFD11B DeviceNet 66
DFE24B EtherCAT® 67
DFE32B PROFINET 68
DFE33B PROFINET 70
DFP21B PROFIBUS 64
DFS11B PROFIBUS 65
DFS21B PROFINET 69
Digital input 310, 311, 313
Digital inputs 44, 284, 285, 309, 310
Digital module FIO21B 214
Digital outputs 44, 285, 286, 312
Dimension drawings
Braking resistors BW... / BW...-T / BW...-P 97
BW1.4-170 braking resistor 99
DBG60B 48
DBM60B/DKG60B 49
HF...-403 output filter 114
HF...-503 output filter 113
Line choke ND020.. / ND030.. / ND045.. / ND085 103
Line choke ND150.. 104
Line filter NF009-503 – NF150-503 106
MOVIDRIVE® MDR60A0150 85
MOVIDRIVE® MDR60A0370 86
MOVIDRIVE® MDR60A0750 87
Output chokes HD001-HD003 108
USB11A 54
UWS11A 52
UWS21B 53
Direction of rotation FBG manual operation 294
Display values 283
DKG60B 49
Duty type 21
Dynamic applications 120

E

Earth-leakage circuit breaker 210
Effective power 284
Electromagnetic compatibility (EMC) 128
Electromagnetic interference 21
Electronics cables 154
Electronics data 44
Functional safety 45
Electronics service 355
Electronics shield terminals 180
Embedded safety notes 164



EMC 128
EMC limits 195
EMC-compliant installation 180
Enabling the direction of rotation 274
Energy saving function 324
Engineering software 18
Enter (FBG11B operator terminal) 217
Error memory 286, 349
Error responses 327
EtherCAT® DFE24B 67
EtherCAT® module FSE24B 63
Ex e motor 307
Exclusion of liability 165
Ex-e motor current limitation 307
Extended storage 355
External setpoint potentiometer 144
External setpoint selection 274
External voltage supply DC 24 V 44, 135

F

Factory setting 324
Faults 258
  F01 overcurrent 350
  F03 Ground fault 350
  F04 Brake chopper 351
  F06 Line phase failure 351
  F07 DC link overvoltage 351
  F08 Speed monitoring 351
  F09 Startup 351
  F10 IPOS-ILLOP 351
  F100 Vibration/warning 353
  F101 Vibration/fault 353
  F102 Oil aging/warning 353
  F103 Oil aging/fault 353
  F104 Oil aging/overtemperature 353
  F105 Oil aging/ready 353
  F106 Brake wear 353
  F11 Overtemperature 351
  F110 Ex-e protection 354
  F111 System bus (SBus) error 354
  F113 Analog input wire break 354
  F116 MOVI-PLC® timeout 354
  F25 EEPROM 351
  F26 External terminal 351
  F31 TF/TH sensor tripped 352
  F32 IPOS index overflow 352
  F34 Ramp timeout 352
  F35 Ex-e protection operating mode 352
  F36 Option missing 352
  F37 System watchdog 352
  F38 System software 352
  F43 RS485 Timeout 352
  F44 Unit utilization 352
  F45 Initialization 352
  F47 System bus 1 timeout 353
  F77 IPOS control word 353
  F80 RAM test 353
  F81 Start condition 353
  F82 Open output 353
  F84 Motor protection 353
  F94 EEPROM checksum 353
  F97 Copy error 353
  F98 CRC error flash 353
Fault display, FBG11B operator terminal 219
Fault number and unit status 260
Fault status 284
Fault t-0 ... t-4 286
Faults
  F17 ... F24 System error 351
FBG setpoint generator 218

FBG11B keypad
Startup 220
Status displays 341
Status of binary inputs/outputs 342
FBG11B operator terminal 46, 217
Functions 217
Operation 218
Fieldbus
Address 286
Baud rate 286
Fieldbus connection 64
Fieldbus gateways 71
Fieldbus interface
DeviceNet DFD11B 66
EtherCat® DFE24B 67
PROFIBUS DFS11B 65
PROFINET DFE32B 68
PROFINET DFE33B 70
PROFINET DFS21B 69
Fieldbus parameter setting 330
Fieldbus type 286
FIO11B analog module 57, 59, 212, 214
FIO21B digital module 214
Fixed setpoint 218
Fixed setpoints 237, 297
FI1 characteristic curve 291
FI1 characteristic curve frequency input 290
FI1 reference 290
FKE EMC-module 115, 198
Flat-design braking resistor 92
Folding ferrites ULF11A 107
Frequency A 308
Frequency B 308
Frequency C 308
Frequency D 308
Frequency E 308
Frequency scaling 290
Frequency, display value 283
Front module 286
EtherCAT® module FSE24B 63
FBG11B operator terminal 46
FIO11B analog module 57
FIO21B analog module 59
FSC11B communication module 60
Front modules 56
FSC11B communication interface 60, 212
FSC12B communication front option 61
FSC12B communication interface 61
FSE24B 212
FSE24B EtherCAT module 63
Functional safety 45
Fusing 137

G

Gear unit monitoring 306
GOST-R 20
Grid resistor
Braking resistor 93
Group drive 221
Group drives 133

H

HD output choke 196
Heat sink temperature 122, 284
HF output filter 149, 195
HF output filters 111
hoist 335
Hoists 118
Hysteresis 303, 304

I

I component 298
Immediate stop/fault 290, 327
Immediate switch-off 349
Input contactor 194
Input fuses 132
Installation
DFP21B option card in MOVITRAC® B 204
Installation altitude 22
Insulation monitoring device 187
Interference emission 129, 189
Interference immunity 21, 129
Internal setpoint 297
Interrelation between control signals 142
In-UL monitoring 302
Inverter state 218
Inverter status 283
Inverter/motor combinations 121
IPOS activation 325
IT systems 130, 186, 187
IxR compensation 300

K

Keypad DBG60B
Setting parameters 228
Keypad FBG11B
Startup 220



L

Language DBG60B 324
Leakage current 21, 130
LEDs 75
  Flash codes 341
Limit value class 129, 195
Limits 298
Line contactor 131
Line protection 137, 210
List of faults 350
Lock RUN/STOP keys 324
Low output frequencies 123

M

Mains connection 131
Manual mode
  DBG60B operator terminal 229
Manual operation 324
  FBG11B keypad 221
Manual reset 328
Manual speed control module 221
Maximum setpoint 218
Maximum speed 221, 299
MBG11A setpoint adjuster 51
MBG11A speed control module 208
MBG11A speed control module, startup 275
MDR60A regenerative power supply units
  Cable sets for the DC link connection 88
  UL approval 81
Minimum clearance 177
Minimum speed 221
Minimum speed 1 / 2 299
Modulation 330
Monitoring 261
Monitoring functions 305
  Timeout error message 261
  Timeout interval 261
  Timeout response 261
Motor adjustment 299
Motor cable length 140
Motor cable, voltage drop 141
Motor connection 131, 133
Motor lead 188
Motor monitoring 306
Motor parameters 298
Motor potentiometer 296
Motor protection 301, 308
Motor protection 1/2 301
Motor selection 120
Motor start 235
Motor startup 218
Mounting position 177
Mounting rail installation
  Braking resistor 88
MOVI-PLC® 74
MOVI-PLC® motion and logic controller 74
MOVITOOLS® Motion Studio 18
MOVITOOLS® MotionStudio, startup 230
Multi-motor drive 133, 221

N

Nameplate 171
ND line choke 102, 194
NF line filter 105, 194, 195
Nominal line voltage 325
Nominal output current, display value 286
Notes
  Designation in the documentation 164
  General 164
Notes on parameterization 273
  CONTROLLER INHIBIT status 273
  Factory setting 273
  Parameter lock 273

O

Oil aging
  Overtemperature 306
  Ready signal 307
Online help 19
Operating mode 316, 318
  VFC 1/2 ..... 334, 336
  VFC 1/2, flying start 337
  VFC 1/2, hoist 335
  V/f characteristic curve 334
Operating modes 334
Operating state 284
Operating states, priority 142
Operator terminal DBG60B 47
  Startup 223
Operator terminal FBG11B
  Functions 217
  Operation 218
Option
  DBM60B/DKG60B housing 49
out (FBG11B operator terminal) 217
Output choke HD 108

Output current 218
Output current, display value 283
Output frequency 218
Output frequency, load capacity 123
Overload capacity 122
Overvoltage category 21

P

P-gain 298
Parameter description
  Overview in table format 276
Parameter lock 325
parameter menu 218
Parameter set 284
  Selection 254
  Switchover 161
Parameterization of the inverter 262
  Parameterization return codes 266
  Structure of the MOVILINK® parameter channel 263
Parameterization return codes
  Additional code 267
  Error class 266
  Error code 266
Parameters
  Control functions 316
  Controller parameters 298
  Device functions 324
  Display values 283
  Lock (P803) 325
  Monitoring functions 305
  Motor parameters 298
  Reference signals 303
  Setpoints/ramp generators 287
  Terminal assignment 309
Parametrization return codes 266
PC startup 230
PD configuration 286
PE input connection 189
Peak braking power 124
Permitted voltage system 131
PI actual value 305
PI controller 154, 297, 298, 305
  Actual value threshold 158
  Implementation 155
  Parameterization 156
  Structure 154
PI1 Actual value 287
PI2 Actual value 287
PI3 Actual value 287
PO data enable 331
PO setpoint 287
Pollution class 21
Power shield clamps 181
PO2 Setpoint 287
PO3 Setpoint 287
Premagnetization time 300
pressure control 154
Priority of operating states 142
Process data
  Setpoint description of process output data (PO data) 245
Process data description
  Actual value description of process input data 249
  Scaling of process data 249
Process input data words 331
Process output data words 330
Process values 283
PROFIBUS DFP21B 64
PROFIBUS DFP21B fieldbus interface 64
PROFIBUS DFS11B 65
PROFINET DFE32B 68
PROFINET DFE33B 70
PROFINET DFS21B 69
Project planning 117
PTC Braking resistor 91
PTC braking resistor 125
PWM fix 330
PWM frequency 122, 330
P000 Speed 283
P001 User display 283
P002 Frequency 283
P004 Output current 283
P005 Active current 283
P008 DC link voltage 283
P009 Output current 283
P010 Inverter status 283
P011 Operating state 284
P012 Fault status 284
P013 Current parameter set 284
P014 Heat sink temperature 284
P015 effective power 284
P020 Analog input AI1 284
P021 Analog input AI2 284
P030 Digital input DI00 284
P031 Digital input DI01 284
P032 Digital input DI02 284



P033 Digital input DI03 284
P034 Digital input DI04 285
P035 Digital input DI05 285
P039 Digital inputs DI00 – DI05 285
P040 Digital input DI10 285
P041 Digital input DI11 285
P042 Digital input DI12 285
P043 Digital input DI13 285
P044 Digital input DI14 285
P045 Digital input DI15 285
P046 Digital input DI16 285
P047 Virtual digital input DI17 285
P048 Digital inputs DI10 – DI17 285
P051 Digital output DO01 285
P052 Digital output DO02 285
P053 Digital output DO03 285
P059 Digital outputs DO01 – DO03 286
P070 Device type 286
P071 nominal output current 286
P072 Front module 286
P073 Front module firmware 286
P076 Basic unit firmware 286
P077 DBG firmware 286
P080 – P084 faults t-0 – t-4 286
P090 PD configuration 286
P091 Fieldbus type 286
P092 Fieldbus baud rate 286
P093 Fieldbus address 286
P094 PO1 setpoint 287
P095 PO2 setpoint 287
P096 PO3 setpoint 287
P097 PI1 actual value 287
P098 PI2 actual value 287
P099 PI3 actual value 287
P100 Setpoint source 287
P101 Control signal source 289
P102 Frequency scaling 290
P103 FI1 reference 290
P104 Setpoint reference speed 290
P105 AI1 wire break detection 290
P106 FI1 characteristic x1 291
P107 FI1 characteristic y1 291
P108 FI1 characteristic x2 291
P109 FI1 characteristic y2 291
P112 AI1 Operating mode 292
P116 AI1 characteristic x1 292
P117 AI1 characteristic y1 292
P118 AI1 characteristic x2 292
P119 AI1 characteristic y2 293
P120 AI2 Operating mode 293
P121 Addition FBG setpoint adjuster 293
P122 Direction of rotation FBG manual mode 294
P126 AI2 characteristic x1 294
P127 AI2 characteristic y1 294
P127 AI2 characteristic y2 294
P128 AI2 characteristic x2 294
P130 / P140 ramp t11 / t21 up 295
P131 / P141 ramp t11 / t21 down 295
P134 / P144 ramp t12 / t22 up = down 295
P135 / P145 S pattern t12 / t22 296
P136 / P146 stop ramp t13 / t23 up = down 296
P139 / P149 Ramp monitoring 1 / 2 296
P150 ramp t3 up = down 296
P152 Save last setpoint 296
P160 / P170 Internal setpoint n11 / n21 297
P161 / P171 Internal setpoint n12 / n22 297
P162 / P172 Internal setpoint n13 / n23 297
P163 / P173 n11 / n21 PI controller 297
P164 / P174 n12 / n22 PI controller 297
P165 / P175 n13 / n23 PI controller 297
P250 PI controller 298
P251 P-gain 298
P252 I-component 298
P300 / P310 Start/stop speed 1/2 298
P301 / P311 Minimum speed 1 / 2 299
P302 / P312 Maximum speed 1 / 2 299
P303 / P313 Current limit 1/2 299
P320 / P330 Automatic adjustment 1/2 300
P321 / P331 Boost 1/2 300
P322/P332 IxR compensation 1/2 300
P323/P333 Premagnetization time 1/2 300
P324 / P334 Slip compensation 1/2 300
P340/P342 Motor protection 1/2 301
P341/P343 Type of cooling 1/2 302
P345 / P346 IN-UL monitoring 302
P400 Speed reference value 303
P401 Hysteresis 303
P402 Delay time 303
P403 signal = "1" if 303
P430 Current reference value 304
P431 Hysteresis 304
P432 Delay time 304
P433 Signal = “1“ if 304
P440 Hysteresis 304
P441 Delay time 304
P450 PI actual value reference 305
P451 Signal = “1“ if 305
P500/P502 Speed monitoring 1/2 305

P501/P503 Delay time 1/2 305
P540 Drive vibration response/warning 306
P541 Drive vibration response/fault 306
P542 Oil aging response/warning 306
P543 Oil aging response/fault 306
P544 Oil aging/overtemperature 306
P545 Oil aging/ready 307
P549 Brake wear response 307
P560 Ex-e motor current limitation 307
P561 Frequency A 308
P562 Current limit A 308
P563 Frequency B 308
P564 Current limit B 308
P565 Frequency C 308
P566 Current limit C 308
P567 frequency D 308
P568 current limit D 308
P570 frequency E 308
P571 current limit E 308
P601 Digital input DI02 310
P602 Digital input DI03 310
P603 Digital input DI04 310
P604 Digital input DI05 310
P608 Digital input DI05 310
P610 Digital input DI10 310
P611 Digital input DI11 310
P612 Digital input DI12 311
P613 Digital input DI13 311
P614 Digital input DI14 311
P615 Digital input DI15 311
P616 Digital input DI16 311
P620 Digital output DO01 313
P621 Digital output DO02 313
P622 Digital output DO03 313
P630 Virtual digital outputs DO 313
P640 AO1 analog output 314
P641 AO1 reference 314
P642 AO1 operating mode 314
P646 AO1 characteristic x1 315
P647 AO1 characteristic y1 315
P648 AO1 characteristic x2 315
P649 AO1 characteristic y2 315
P700/P701 Operating mode 1/2 318
P710/P711 Standstill current 1/2 319
P720/P723 setpoint stop function 1 / 2 320
P721/P724 Stop setpoint 1/2 320
P722/P725 Start offset 1/2 320
P731/P734 Brake release time 1/2 321
P732/P735 Brake application time 1/2 321
P740/P742 Skip center 1/2 321
P741/P743 Skip bandwidth 1/2 321
P750 Slave setpoint 323
P751 Scaling of slave setpoint 323
P760 Lockout RUN/STOP keys 324
P770 Energy saving function 324
P800 Short menu (FBG11B only) 324
P801 Language DBG60B 324
P802 Factory setting 324
P803 Parameter lock 325
P804 Reset statistic data 325
P805 Nominal line voltage 325
P806 Copy DBG to MOVITRAC® B 325
P807 Copy MOVITRAC® B to DBG 325
P808 24VIO auxiliary voltage output 325
P809 IPOS activation 325
P810 RS485 Address 326
P811 RS485 group address 326
P812 RS485 timeout interval 326
P819 Fieldbus timeout interval 326
P820/P821 4-quadrant operation 1 / 2 326
P830 "External fault" terminal response 327
P833 Response to RS485 timeout 327
P840 Manual reset 328
P841 Auto reset 328
P842 Restart time 328
P850 Scaling factor numerator 329
P851 Scaling factor denominator 329
P852 User unit 329
P853 Scaled speed FBG 329
P860/P861 PWM frequency 1/2 330
P862/P863 PWM fix 1/2 330
P870 Setpoint description PO1 331
P871 Setpoint description PO2 331
P872 Setpoint description PO3 331
P873 Actual value description PI1 331
P874 Actual value description PI2 331
P875 Actual value description PI3 331
P876 PO data enable 331
P880 SBus protocol 332
P881 SBus address 332
P882 SBus group address 332
P883 SBus timeout delay 332
P884 SBus baud rate 332
P886 CANopen address 332
P938 Speed for task 1 333
P939 Speed for task 2 333



R

Ramp
- Down ... 218
- Monitoring ... 296
- t11/t21 down ... 295
- t11/t21 up ... 295
- t3 (motor potentiometer) ... 296
- Up ... 218

Ramp t12/t22 up = down ... 295
Reference signals ... 303
Regenerative power supply unit MDR60A
- Description ... 81
- Technical data ... 82

Relay output ... 44
Repair service ... 355
Reset ... 350
- Basic unit ... 350
- Behavior ... 328
- Interface ... 350
- Keypad ... 350
- Statistic data ... 325

Reset after a fault ... 254
Response
- Brake wear ... 307
- Drive vibration ... 306
- Oil aging ... 306
- RS485 timeout ... 327
- /EXT. FAULT ... 327

Response to drive vibration ... 306
Restart time ... 328
Return code
- 19 Parameter lock active ... 343
- 20 Factory setting in progress ... 343
- 23 Option card missing ... 343
- 27 Option card missing ... 343
- 28 Controller inhibit required ... 343
- 29 Invalid value for parameter ... 343
- 32 Enable ... 343
- 34 Error during execution ... 343
- 38 FBG11B incorrect data set ... 343

Return codes ... 343
Rights to claim under limited warranty ... 165
RS485
- Address ... 326
- Group address ... 326
- Installation ... 201
- Remote timeout ... 326

RUN (FBG11B operator terminal) ... 217

S

S pattern t12 / t22 ... 296
Safety contact ... 44
Safety notes ... 166
- Designation in the documentation ... 164
- Structure of the embedded safety notes ... 164
- Structure of the section-related safety notes ... 164

Safety-relevant control commands ... 252
Save the last setpoint ... 296
SBus
- Address ... 332
- Baud rate ... 332
- Group address ... 332
- Protocol ... 332
- Timeout interval ... 332

Scaled speed FBG ... 329
Scaling factor denominator ... 329
Scaling factor numerator ... 329
Scaling of process data ... 249
Scaling of slave setpoint ... 323
Section-related safety notes ... 164
Sequence control ... 251
- Control commands ... 253
- Control word definition ... 251
- Control word 1 ... 255
- Control word 2 ... 256
- Safety-relevant control commands ... 252
- Status word definition ... 257
- Status word 1 ... 258
- Status word 2 ... 259

Serial communication ... 326
Setpoint adjuster ... 218
- MBG11A ... 51

Setpoint description
- Of process output data (PO data) ... 245

Setpoint description PO ... 331
Setpoint description PO2 ... 331
Setpoint description PO3 ... 331
Setpoint direction ... 274
Setpoint input ... 44
Setpoint potentiometer ... 144, 296
Setpoint reference speed ... 290
Setpoint selection ... 287
Setpoint selection, external ... 274
Setpoint source ... 287
Setpoint specification, analog ... 235
Setpoint speed ... 274
Setpoint stop function ... 320
Setpoints/ramp generators ... 287

Setting parameters with the DBG60B keypad.....228
Setting the inverter parameters
Parameter setting procedure 262
Reading a parameter (example) 269
Writing a parameter (example) 271
Setup.....324
SEW unit profile
Notes on parameterization.....273
Parameterization of the inverter.....262
Process data.....242
Process data configuration 244
Process data description.....245
Shield plate
Control electronics 180
Power section 181
Short menu FBG11B.....324
Signal
Inverter ready.....257
PO data enabled.....257
Signal generation 154
Signal words in the safety notes 164
Signal = "1" if.....303, 304, 305
Skip bandwidth.....321
Skip center 321
Slave setpoint 323
Slip compensation.....300
Smallest wire bending space 137
Special cases of PO data processing 247
Speed
Display value.....283
Manual setting.....221
Maximum 221
Minimum 221
Monitoring 305
Ramps.....295
Reference signal 303
Reference value.....303
Speed control module
Manual 221
MBG11A, Startup.....275
Speed control module MBG11A.....208
Speed for task 1 333
Speed for task 2 333
Speed monitoring 1/2.....305
Speed-torque characteristic curve 119
Standard applications 159
Standstill current 319
Standstill current function 319
Start offset 320
Starting the motor 235
Startup
Brief description.....231
DBG60B operator terminal 223
FBG11B keypad 220
Hoist applications.....215
MBG11A speed control module.....275
Notes 215
PC.....230
Preliminary work and resources 215
Preliminary work and tools.....216
Requirements 215
Start/stop speed.....298
Status display
FBG11B keypad 219
Status displays.....283
Basic unit 341
Keypad.....341
LED, flash codes.....341
Status of binary inputs/outputs 342
Status word definition 257
Basic status block.....257
Status word 1 258
Status word 2 259
Stop 349
Stop ramp
t13 up = down P136.....296
t23 up = down P146.....296
Stop setpoint.....320
STOP / RESET (FBG11B operator terminal).....217
Stop/fault.....327
Storage temperature.....21
Structure of the MOVILINK® parameter channel 263
Submounting braking resistors 100
Supply system lead.....188
Switched-mode power supply UWU52A.....80
Switch-off response
Immediate switch-off.....349
Stop 349
Switch-off responses 349
Switchover, parameter set 161
System bus 206
System bus (SBus), installation 201
System overview.....10



T

Technical data
- AC 230 V / 1-phase / size 0L 43
- AC 230 V / 1-phase / size 0S 42
- AC 230 V / 1-phase / size 0XS 41
- AC 230 V / 3-phase / size 0L 35
- AC 230 V / 3-phase / size 0XS 33
- AC 230 V / 3-phase / size 2 37
- AC 230 V / 3-phase / size 3 38
- AC 230 V / 3-phase / size 4 39
- AC 400/500 V / 3-phase / size 0L 26
- AC 400/500 V / 3-phase / size 0S 25
- AC 400/500 V / 3-phase / size 0XS 24
- AC 400/500 V / 3-phase / size 2 28
- AC 400/500 V / 3-phase / size 2S 27
- AC 400/500 V / 3-phase / size 3 29
- AC 400/500 V / 3-phase / size 4 30
- AC 400/500 V / 3-phase / size 5 31
- DFP21B option 64, 65
- General information 21
- MDR60A regenerative power supply unit 82
- MOVIDRIVE® MDR60A0150 83
- MOVIDRIVE® MDR60A0370 83
- MOVIDRIVE® MDR60A0750 84
- MOVIDRIVE® MDR60A1320 84
- Overview 23, 32, 40

Technical support 19
Temperature control 154
Terminal assignment 309
Terminal response times 44
Terminal X17 45
TF temperature sensor 44, 210
TF thermistor 120, 210
TH bimetallic switch 210
Thermal class 155 (F) 120
Timeout (warning) 350
Touch guard 183
Touch guard BS 98
Transport temperature 21
Trolleys 118
Type designation 171
Type of cooling 21, 302

U

UBP11A 50
UBP11A parameter module 50
UL approval 20
- MDR60A regenerative power supply units 81

UL-compliant installation 178
ULF11A folding ferrites 107, 195
Unit data 286
Unit design
- Size 0XS / 0S / 0L 173
- Size 1 / 2S / 2 174
- Size 3 175
- Size 4 / 5 176

Unit information 349
Unit status 171
Unit status codes 341
Unit structure 171
Use of this documentation 164
User display 283
User unit 329
UWU52A 80

V

Verzögerungszeit 303, 304
VFC 1/2 ....334, 335, 336
VFC 1/2, flying start 337
Virtual digital outputs 313
Voltage drop 141
- Motor cable 137

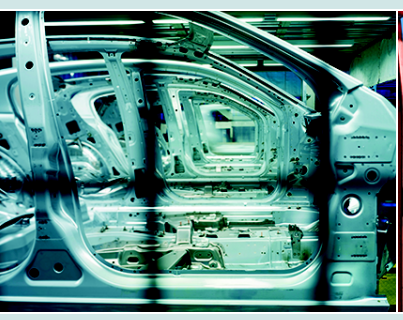
Voltage supply system 131
Voltage supply, external DC 24 V 135
Voltage-frequency characteristic curve 120
V/f characteristic curve 334

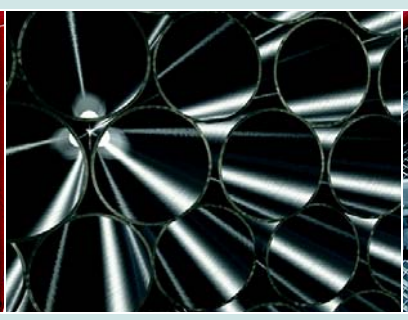
W

Warnings, FBG11B operator terminal 219
Wire break detection 290
Wire resistor, braking resistor 93
Wiring diagram 185
- DC link connection with MDR60A0150 as brake module 200
- DC link connection with MDR60A0150/0370/0750 199

0 ... 9

4-quadrant operation 326








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