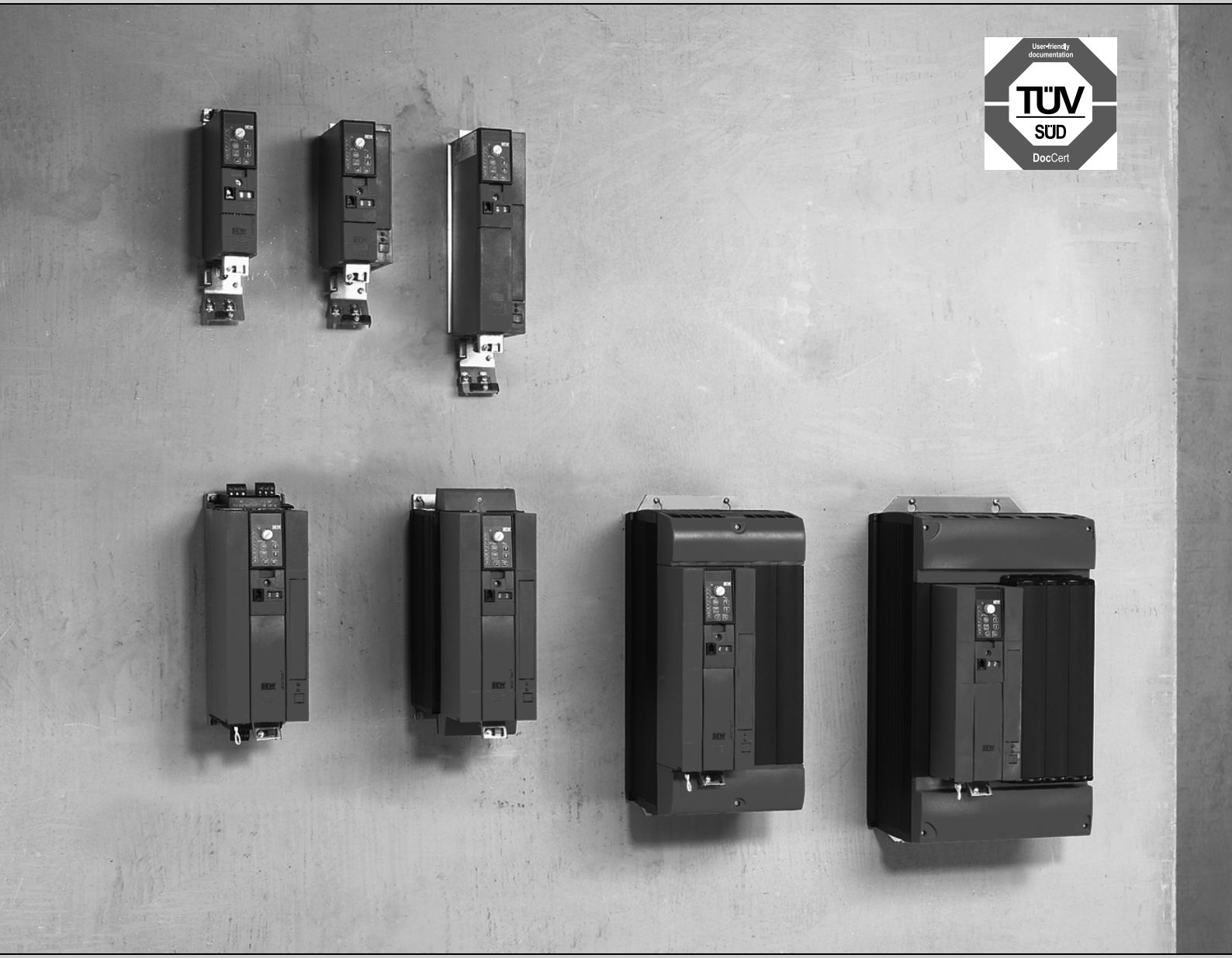
SEW EURODRIVE

Operating Instructions

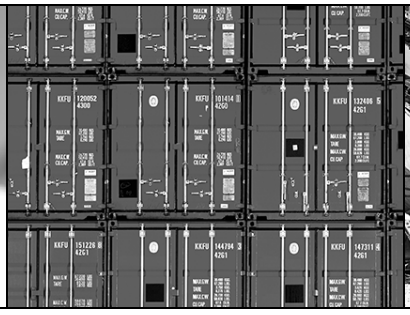


MOVITRAC® B

Edition 05/2013

20145756 / EN






Contents

1 General information

1.1 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.

1.2 Structure of the safety notes

1.2.1 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.	–

1.2.2 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.

1.2.3 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.

1.3 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!

1.4 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.

1.5 Copyright

1.6 Product names and trademarks

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

2 Safety notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and 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.

2.1 Preliminary information

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

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

2.2 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.

2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who are familiar with the setup, mechanical installation, 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.

2.4 Designated use

Frequency inverters are components for controlling asynchronous AC motors. Frequency inverters are components intended for installation in electrical systems or machines. Never connect capacitive loads. Operation with capacitive loads results in 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.

2.4.1 Safety functions

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

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

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**.

2.4.2 Document content

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

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

2.5 Other applicable publications

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

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

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

2.6 Transport/storage

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately about any damage. It may be necessary to preclude startup. Observe the climate conditions according to chapter "General technical data (page 145)".

2.7 Installation

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

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

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

The following applications are prohibited unless 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.

2.8 Electrical connection

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

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

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

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

Ground the unit.

2.9 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.

2.10 Operation

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

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

Keep all covers and housings closed during operation.

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

Mechanical blocking or 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.

2.11 Unit temperature

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

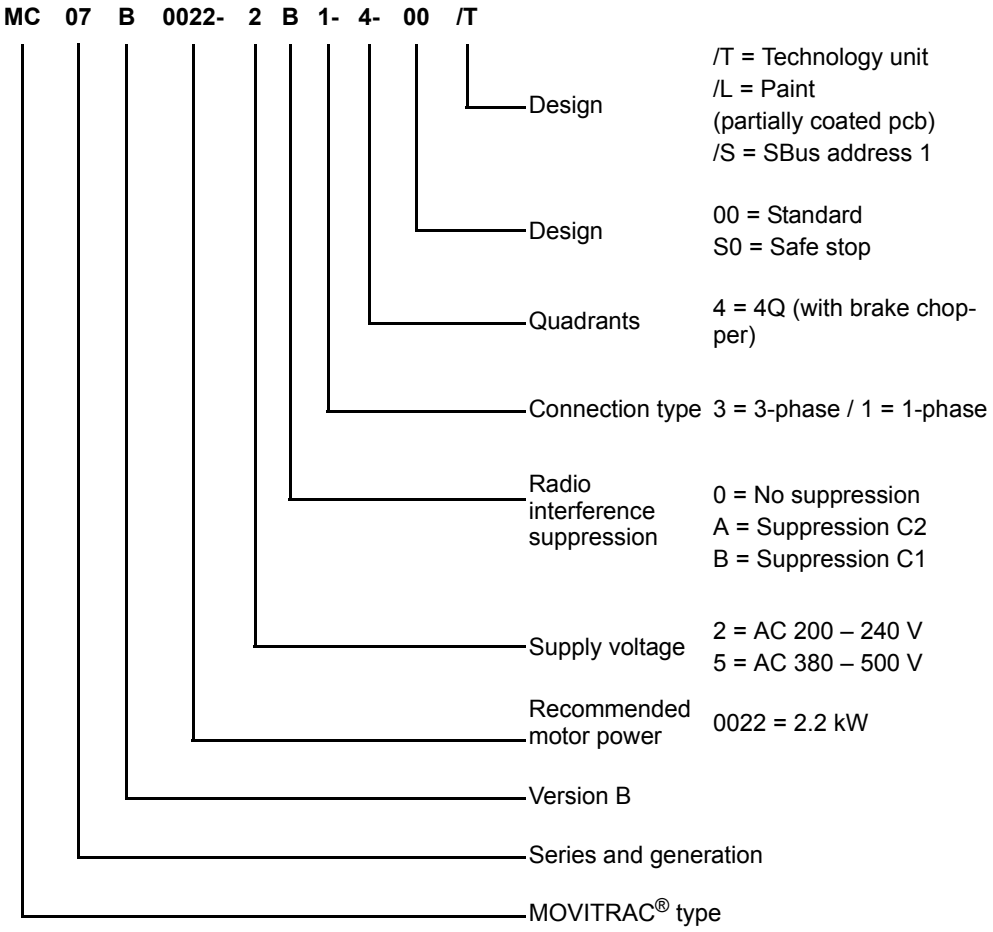
The braking resistors can reach a surface temperature of significantly more than 70 °C.

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

3 Unit structure

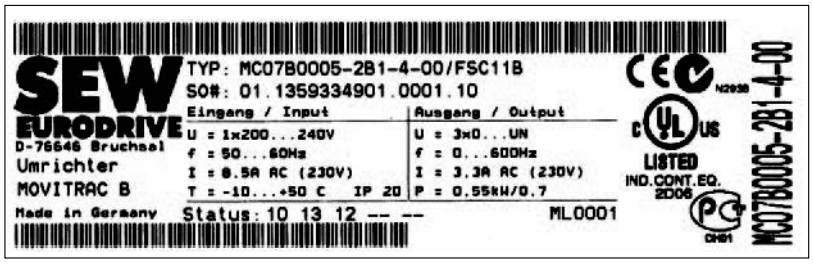
3.1 Type designation

The following diagram shows a type designation:



3.2 Nameplate

The following figure shows a nameplate:



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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		

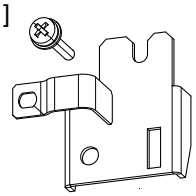
The unit status is indicated above the lower barcode. It documents the unit's hardware and software states.

3.3 Scope of delivery

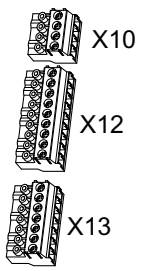
The parts listed below are delivered in an accessory bag for each unit size.

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]



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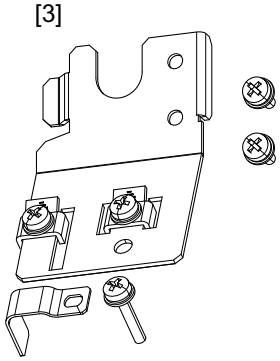
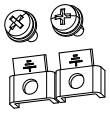
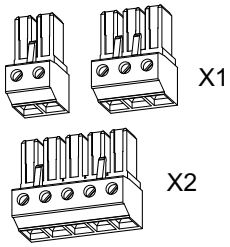


[4]



[5]



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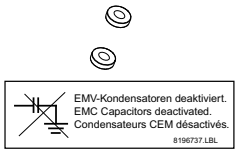
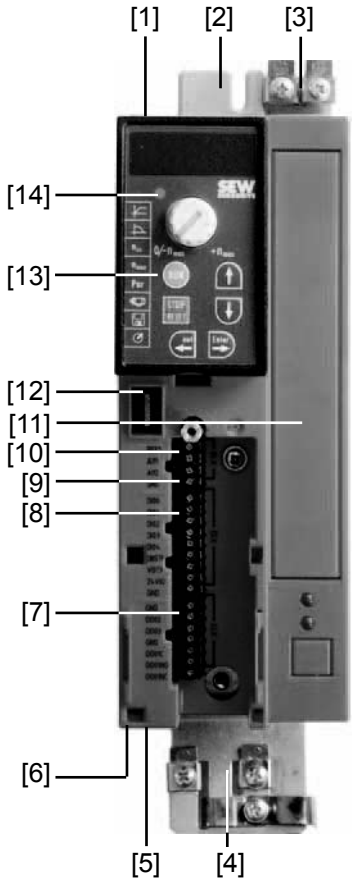


3.4 Sizes 0XS / 0S / 0L



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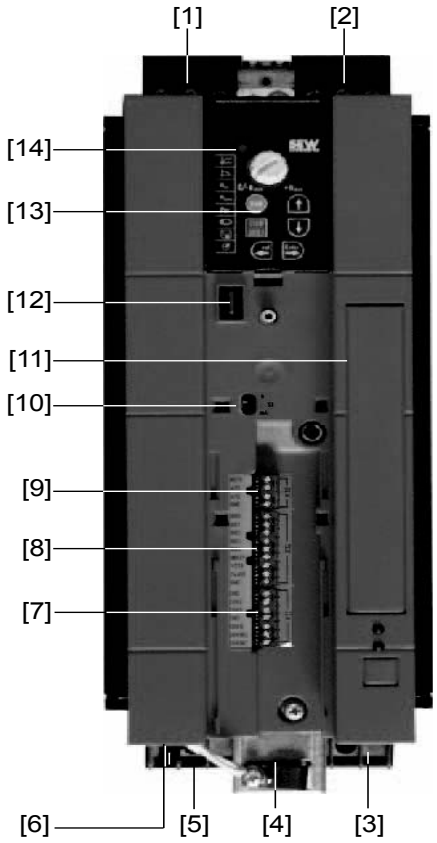
[1] X1: Power supply connection:
3-phase: L1 / L2 / L3
1-phase: L / N
[2] Fixing strap
[3] PE connection
[4] Shield plate for motor cable, fixing strap underneath
[5] X2: Motor connection U / V / W / Brake connection +R / -R
[6] X17: Safety contact for safe stop
(only MC07B...-S0: sizes 0S / 0L, 400 / 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)

3.5 Sizes 1 / 2S / 2



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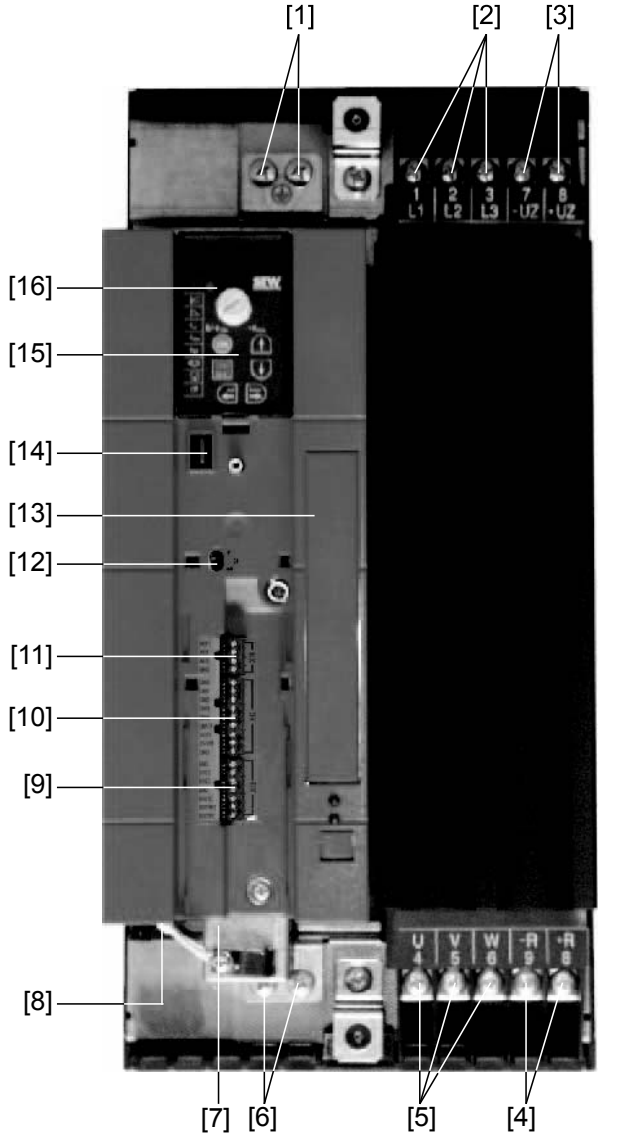
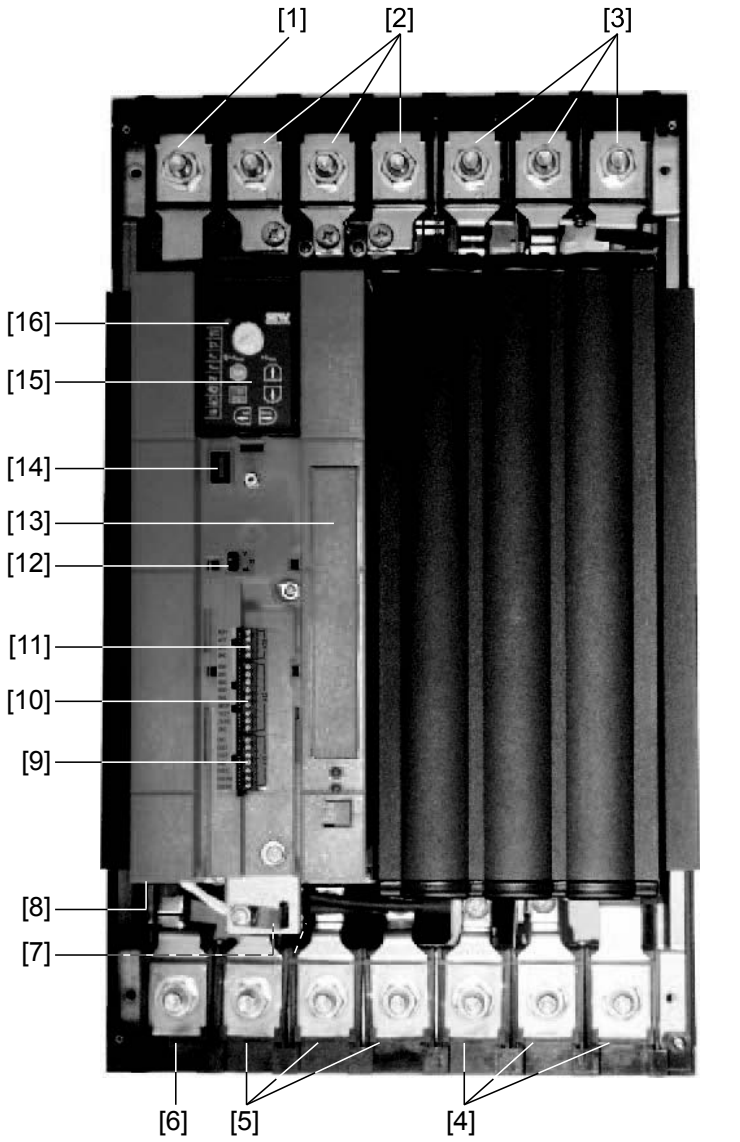
[1] X1: Power supply connection 3-phase: L1 / L2 / L3 / PE screw
[2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$
[3] X3: Braking resistor connection R+ / R– / PE
[4] Electronics shield clamp
[5] X2: Motor connection U / V / W / PE screw
[6] X17: Safety contact for safe stop (only 400 / 500 V)
[7]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

3.6 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)

3.7 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)

4 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.

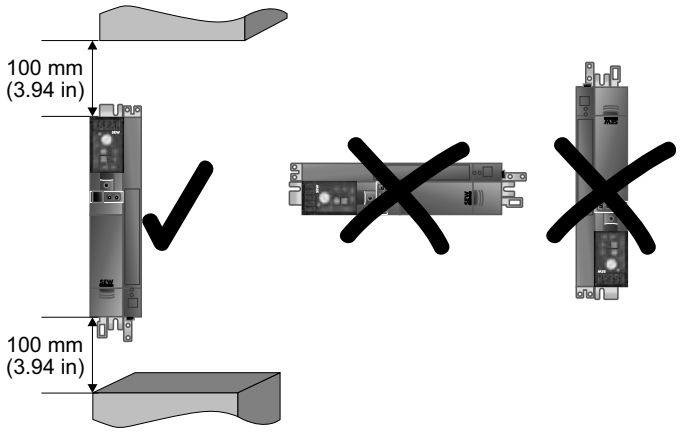
To prevent electric shocks due to stored charges:

- 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.

4.1 Installation notes for basic unit – mechanical aspects

4.1.1 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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4.2 Installation notes for basic unit – electrical aspects

4.2.1 Recommended tools

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

4.2.2 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 147).
- 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

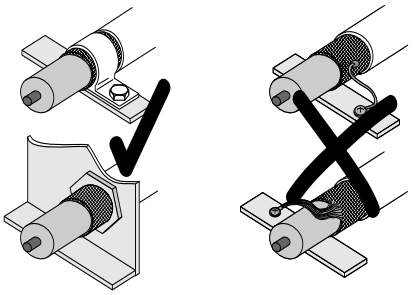
INFORMATION

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).

4.2.3 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.

4.2.4 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.

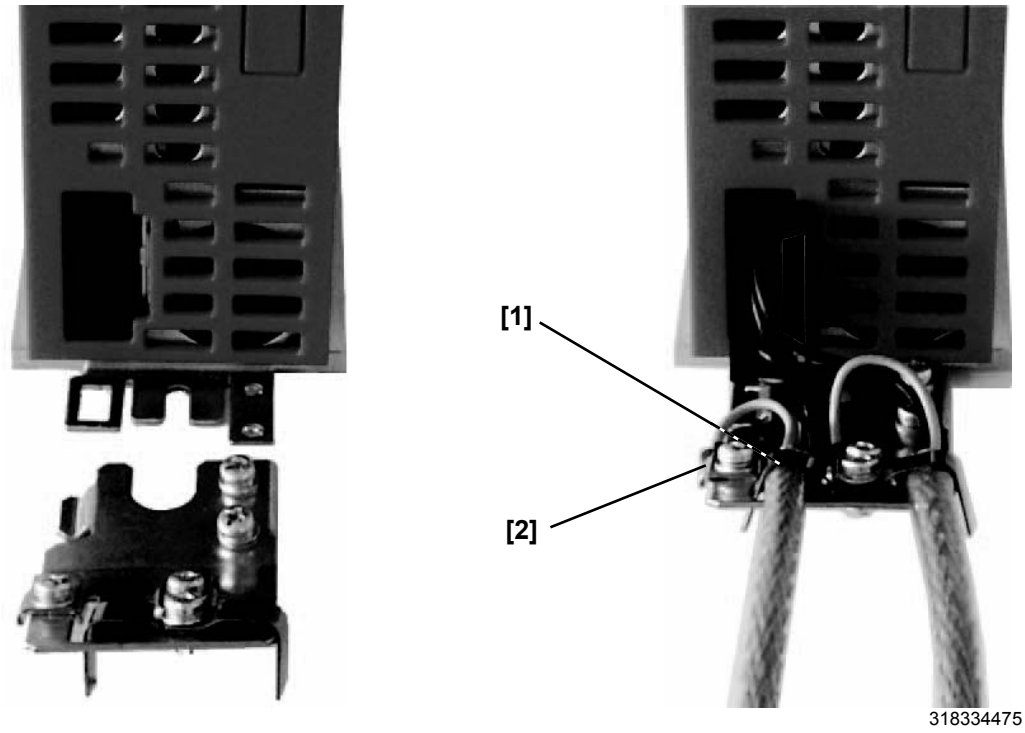
Installation of shield plate for the power section

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.

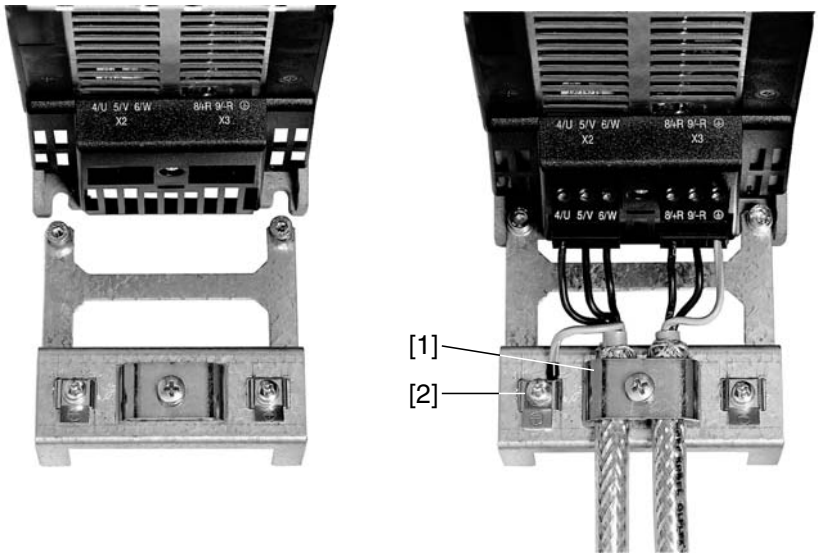


[1] Shield plate
[2] PE connection

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.



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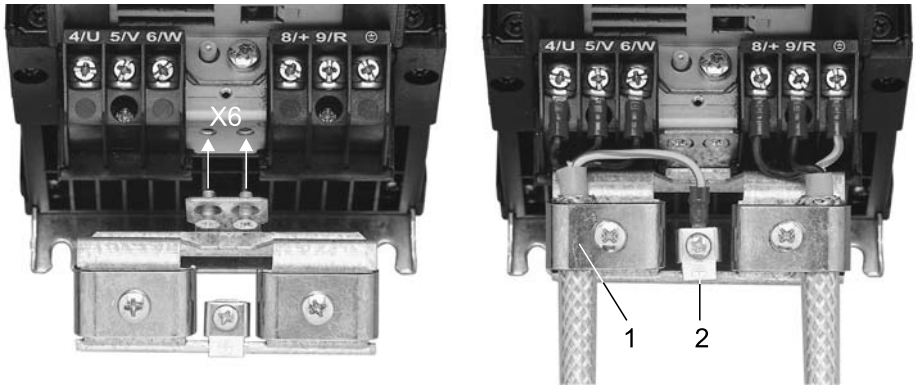
[1] Shield plate
[2] PE connection

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.



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[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.

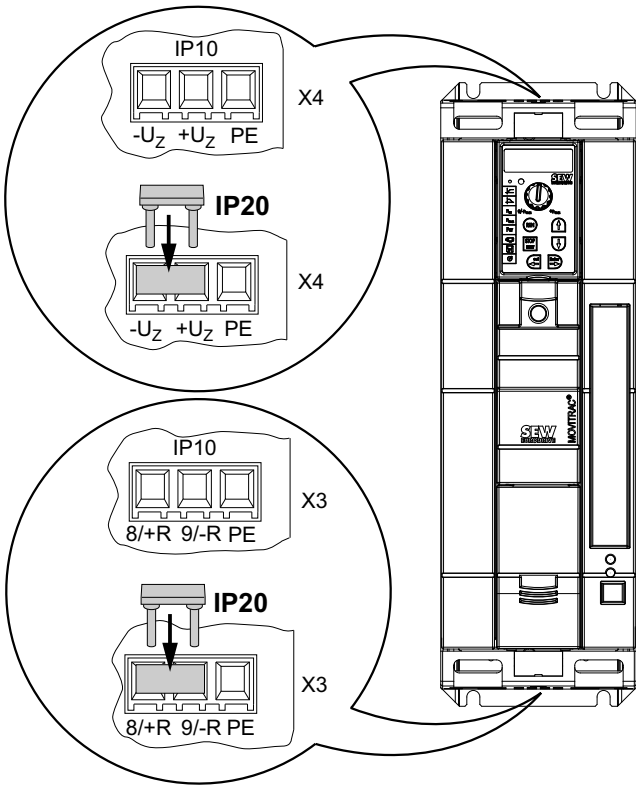
Size 2S

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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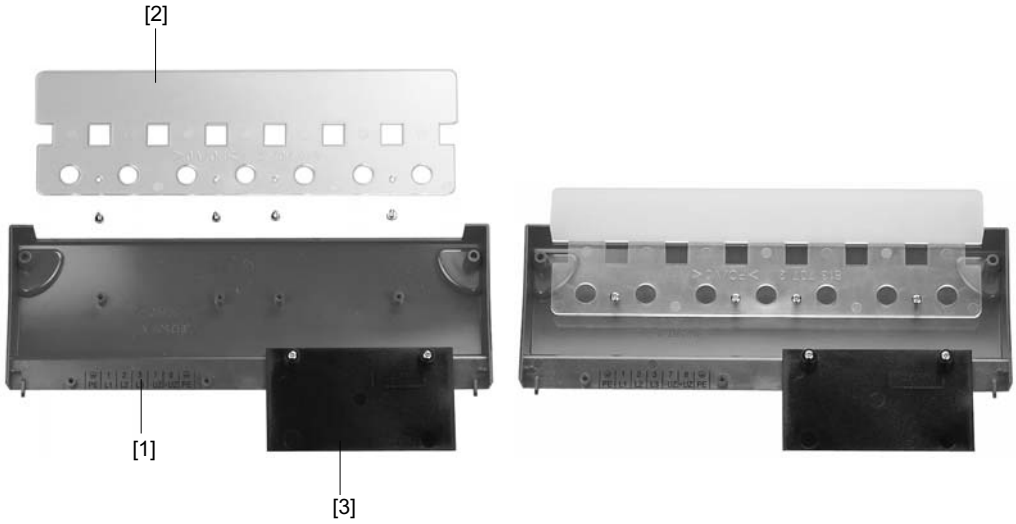
Sizes 4 / 5

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)

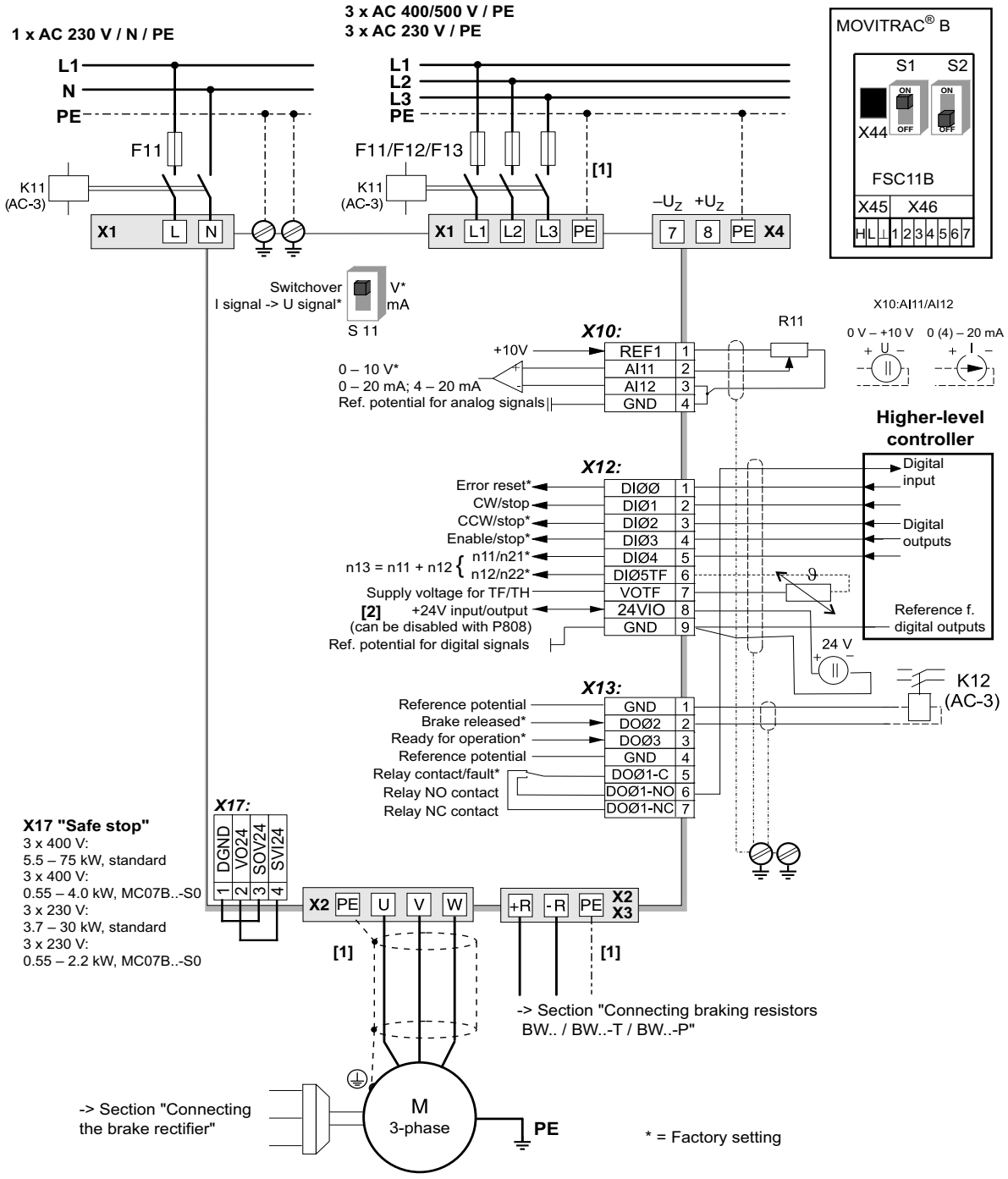
MOVITRAC® B units of size 4 and 5 can only achieve degree of protection IP10 when the following conditions are met:

- 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.

4.2.5 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.

4.2.6 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.

4.2.7 Deactivating the EMC capacitors – size 0 only

⚠ DANGER

Severe or fatal injuries from electric shock.

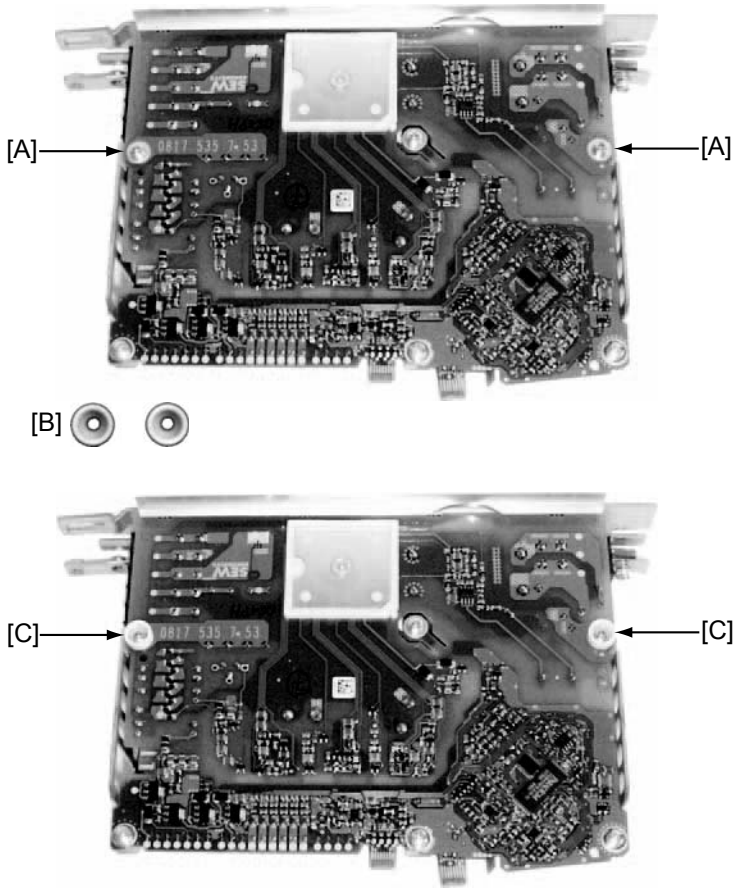
- Disconnect the inverter from the power. Disconnect the DC 24 V supply and the line voltage.
- Wait 10 seconds.
- Ensure that the unit is de-energized.
- Take appropriate measures to avoid electrostatic charges (use discharge strap, conductive shoes, etc.) before removing the cover.
- Touch only the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

4.2.8 Separate cable ducts

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

4.2.9 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.

4.2.10 Utilization category of contactors

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

4.2.11 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

4.2.12 Cable lengths for individual drives

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

4.2.13 Unit output

- Only connect ohmic/inductive load (motor).

4.2.14 Switched inductances

⚠ CAUTION

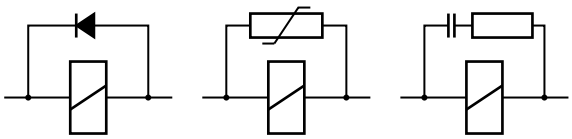
Switched inductances

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.

4.2.15 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

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

– 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.

4.2.16 Interference emission

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

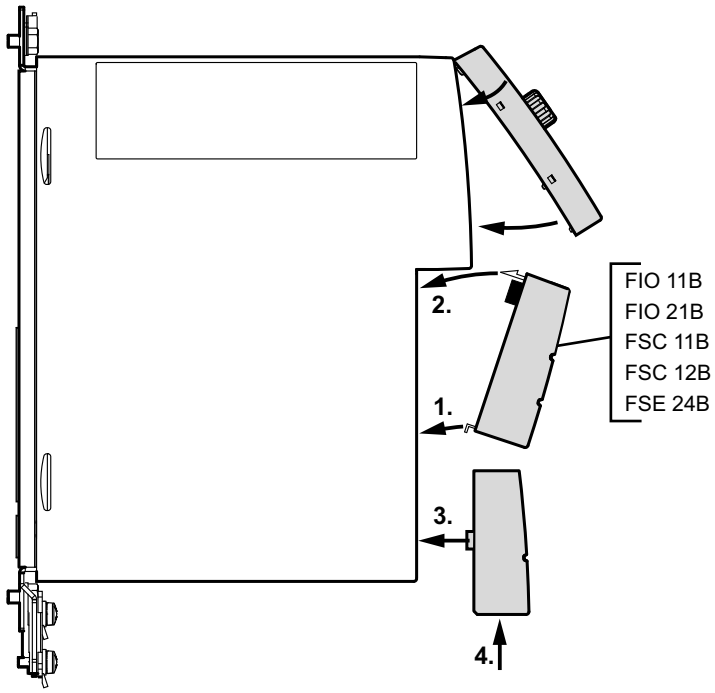
4.2.17 Digital outputs

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

4.3 Installing accessories and options – mechanical aspects

4.3.1 Attaching the front modules

Attach the front modules as follows:



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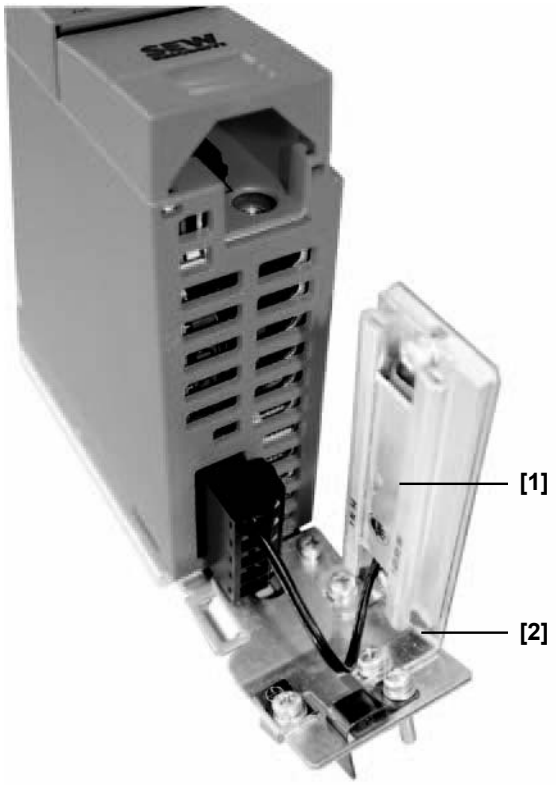
4.3.2 PTC braking resistors BW1 / BW3 with FKB10B

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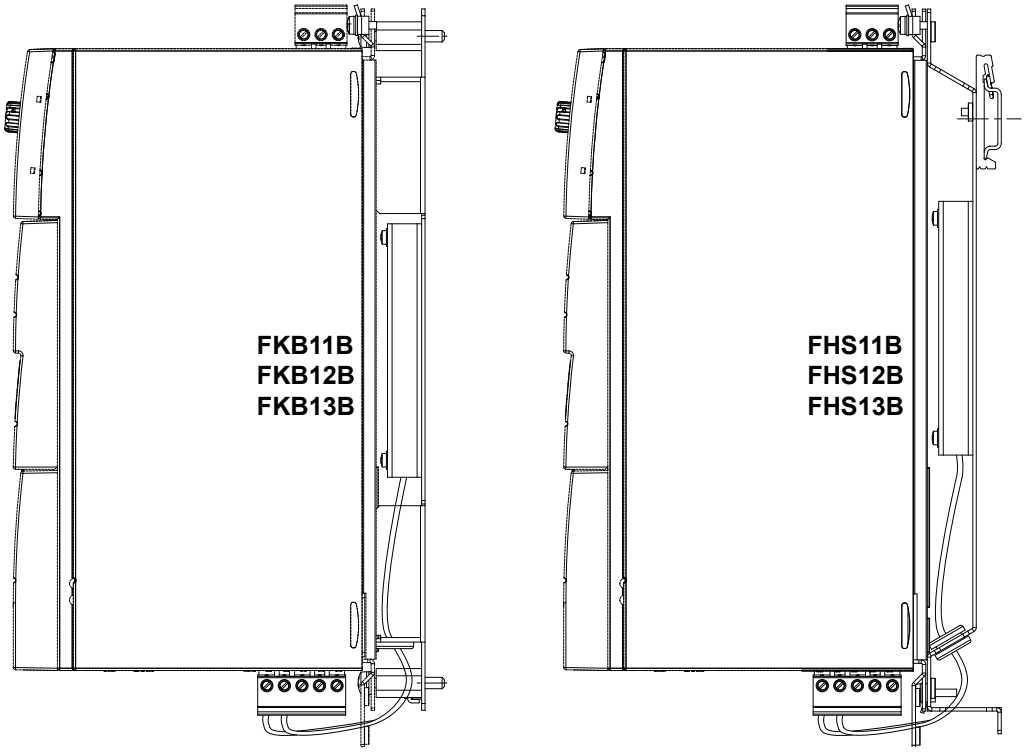
4.3.3 Flat-design resistors with FKB11B / FKB12B / FKB13B and FHS11B / FHS12B / FHS13B

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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4.4 Installing accessories and options – electrical aspects

4.4.1 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.

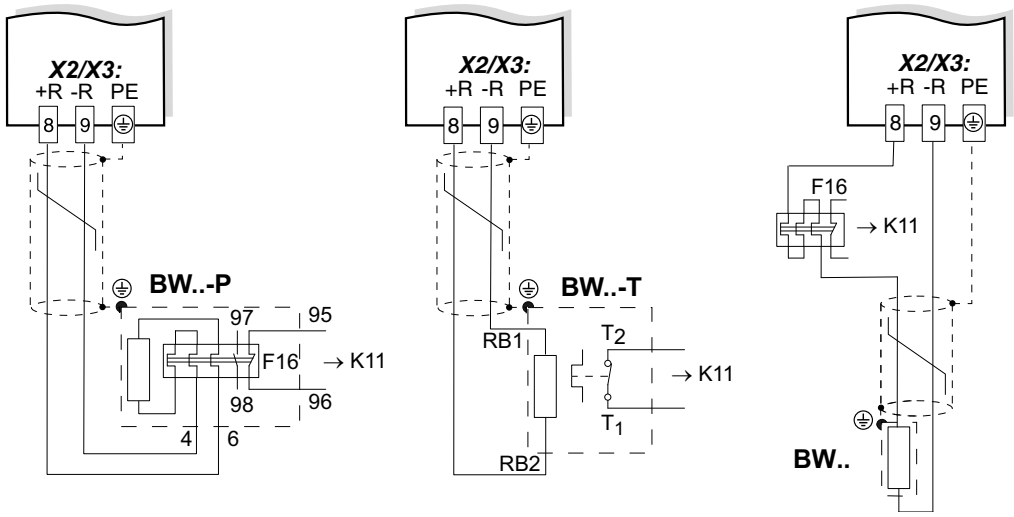
4.4.2 Connecting braking resistor BW..-P / BW..-T / BW.. to X3 / X2

⚠ 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	–	–

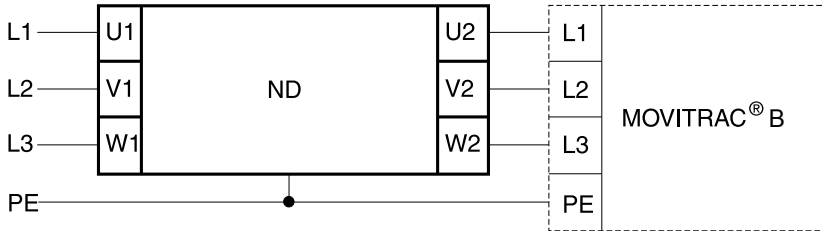
1) Permitted installation: On horizontal or vertical surfaces with brackets at the bottom and perforated sheets at top and bottom. **Improper installation:** On vertical surfaces with brackets at the top, right or left.

4.4.3 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.

4.4.4 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

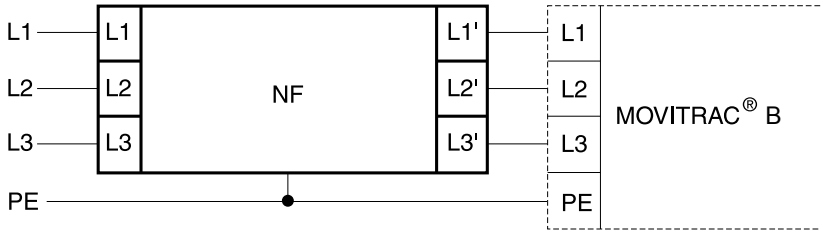
4.4.5 NF line filters

- 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



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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.

4.4.6 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.

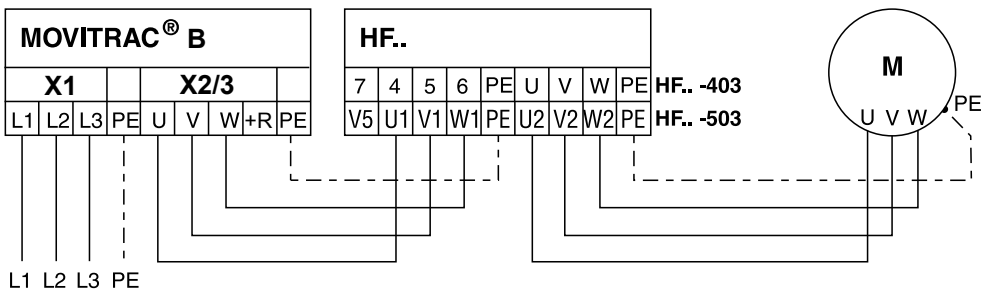
4.4.7 HF output filters

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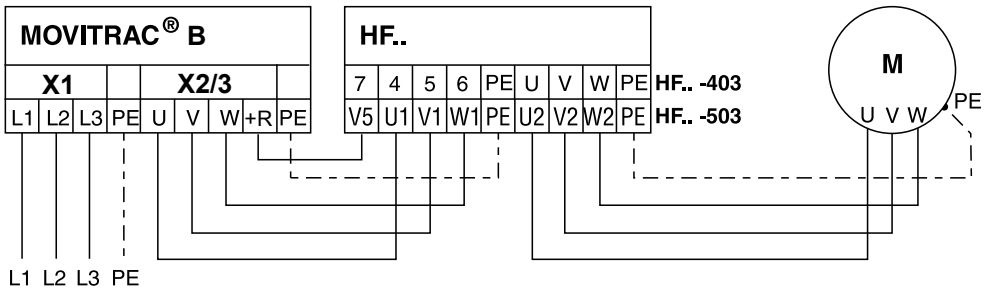
HF output filter connection without $V_{DC\ link}$ connection (PWM frequency only 12 or 16 kHz)



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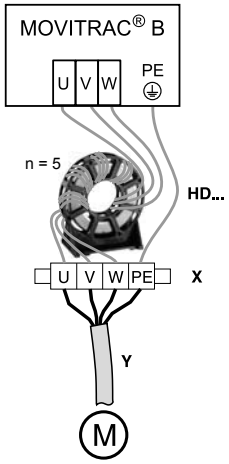
4.4.8 HD output chokes

- 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:

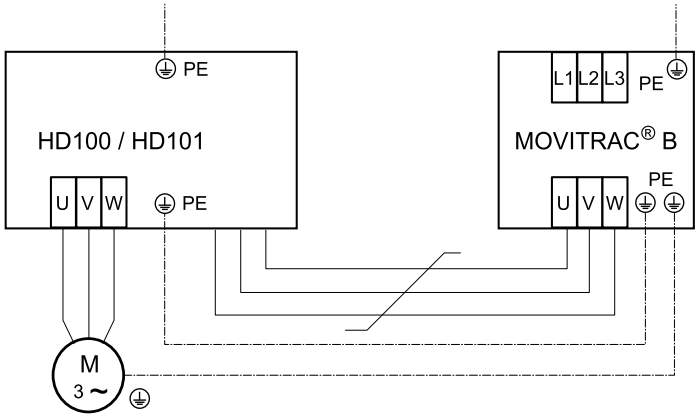
  Install the output choke under the respective inverter. Leave a ventilation space of at least 100 mm (3.94 in) below and above the output choke. Provide a clearance of 10 mm (0.39 in) on each side.

  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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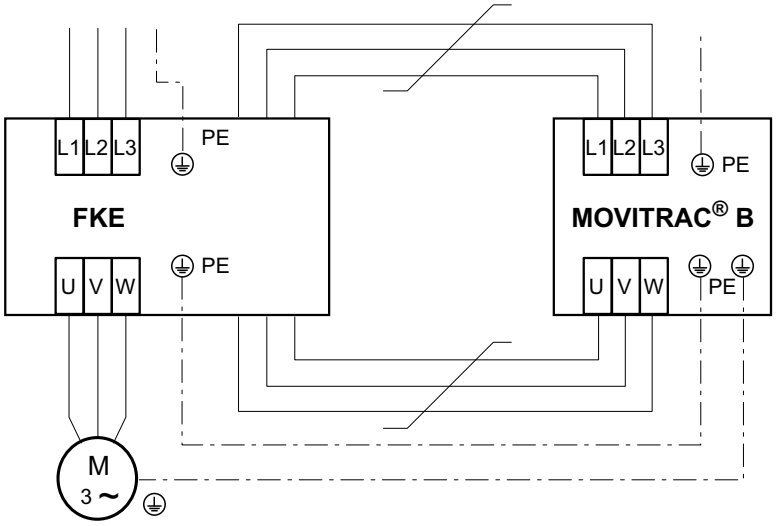
4.4.9 FKE12B / FKE13B EMC-modules

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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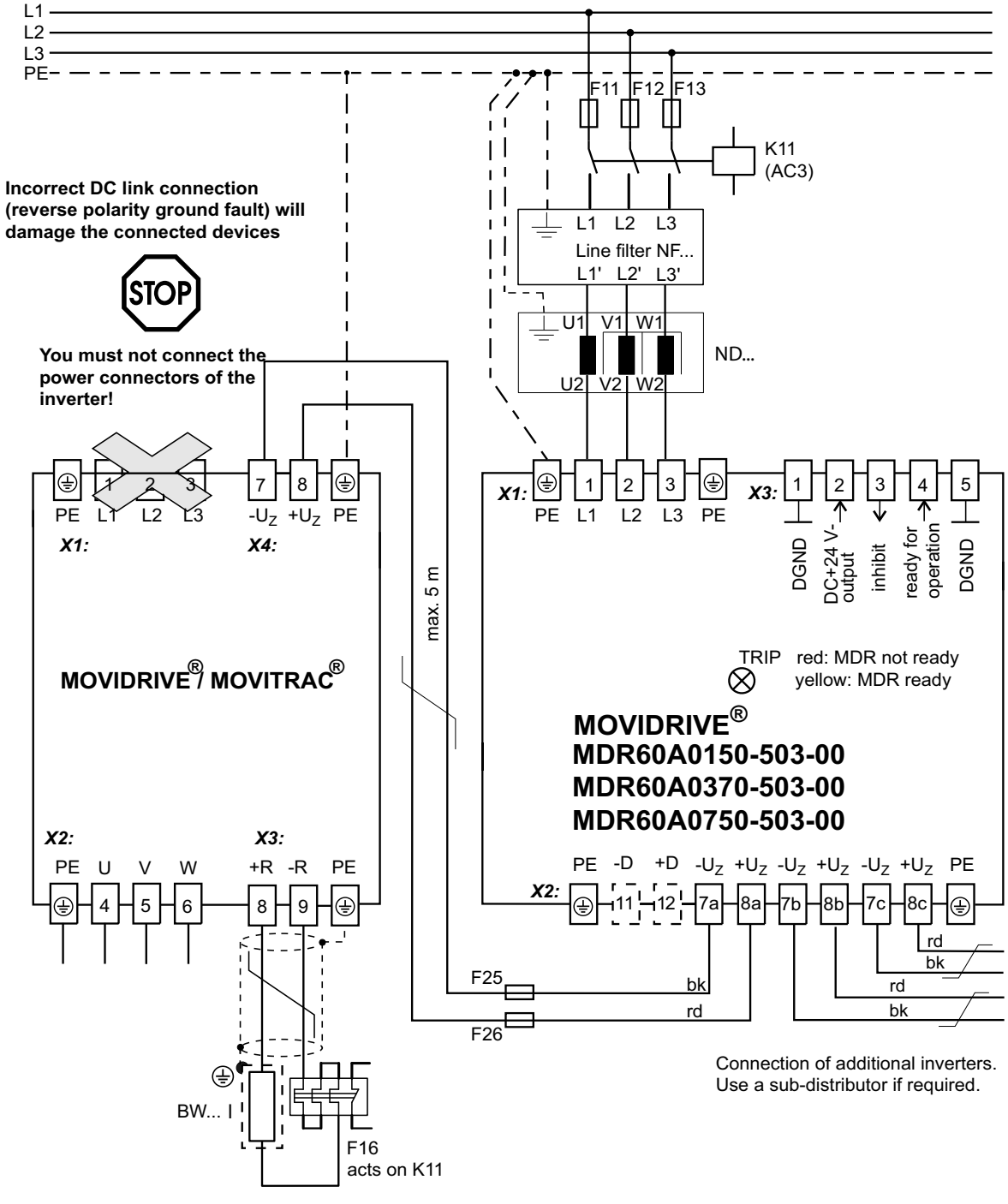
4.4.10 Connection of the regenerative power supply unit

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



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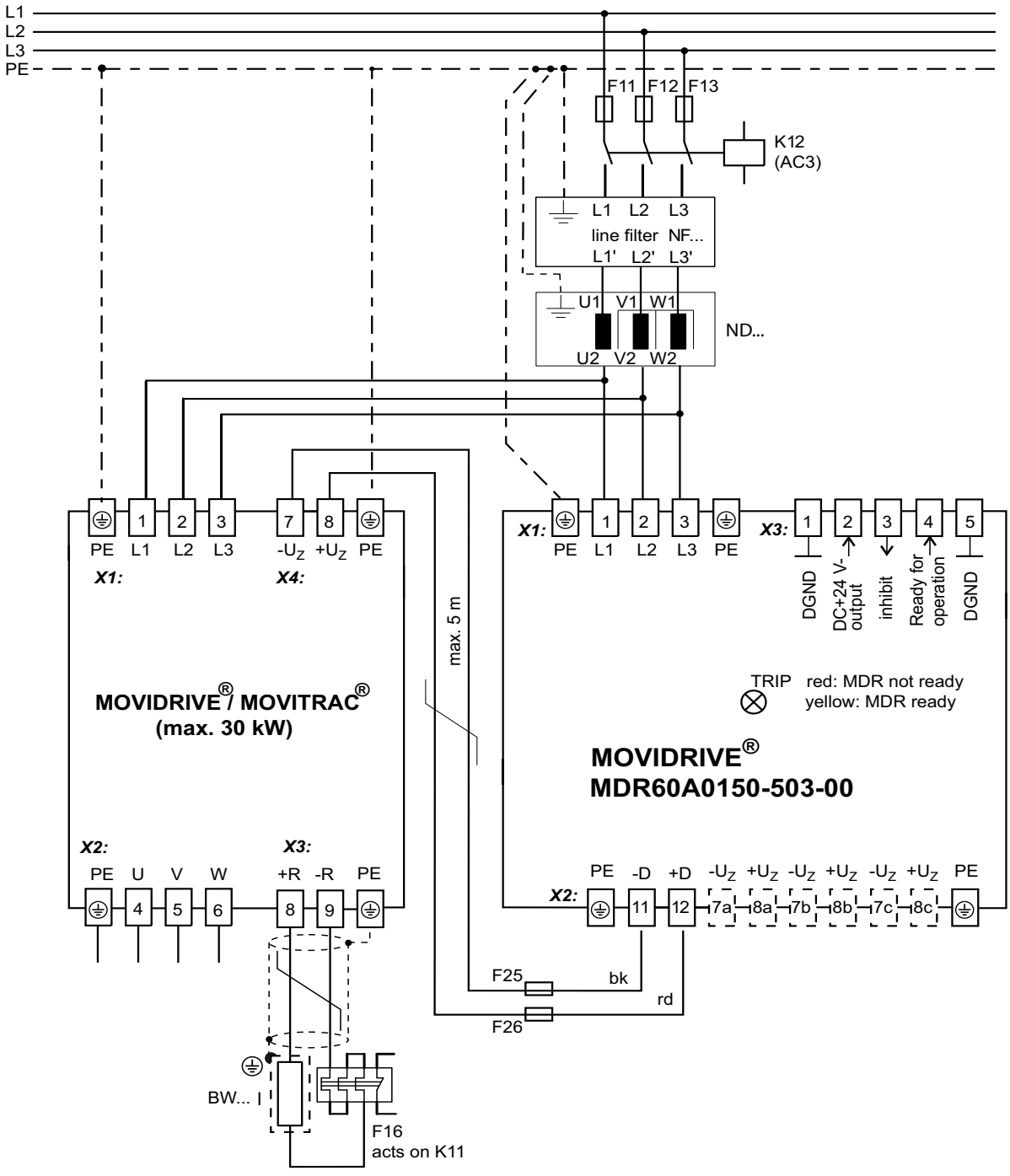
DC link connection with MDR60A0150 regenerative power supply unit as brake module



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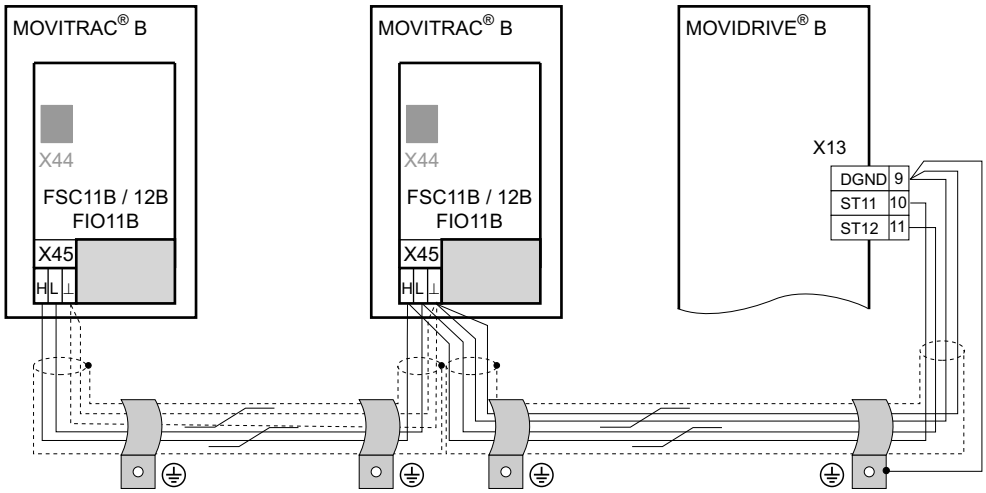
4.4.11 Connection of RS485 interface

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.

4.4.12 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.

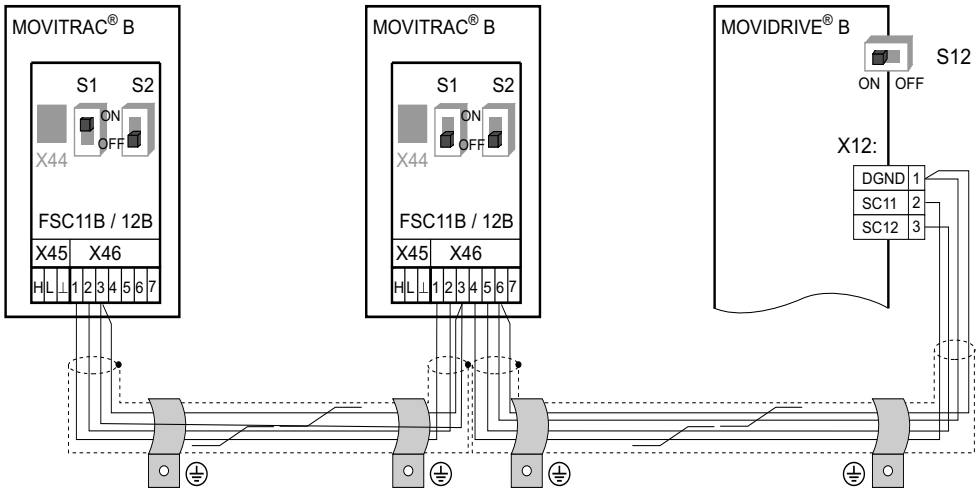
FIO21 does not have a switchable terminating resistor of 120 ohms integrated. The enclosed resistor must be connected for bus termination between X46:4 and X46:5.

FSC11	FSC12	FSC11/12	FSC11	FSC12
S1	S1:8	X46:1;:2	X46:4;:5	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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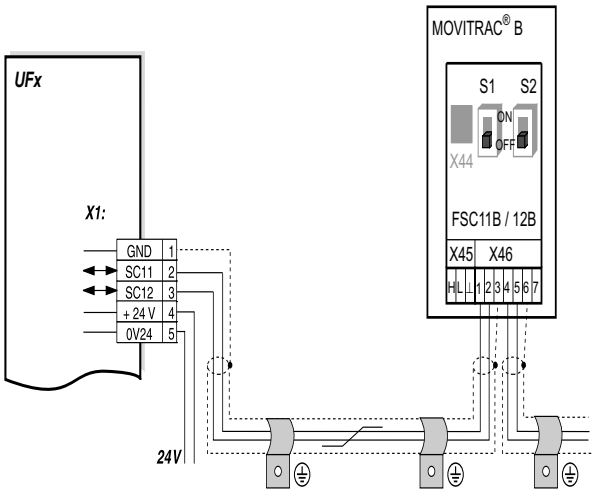
MOVITRAC® B system bus connection with UFx



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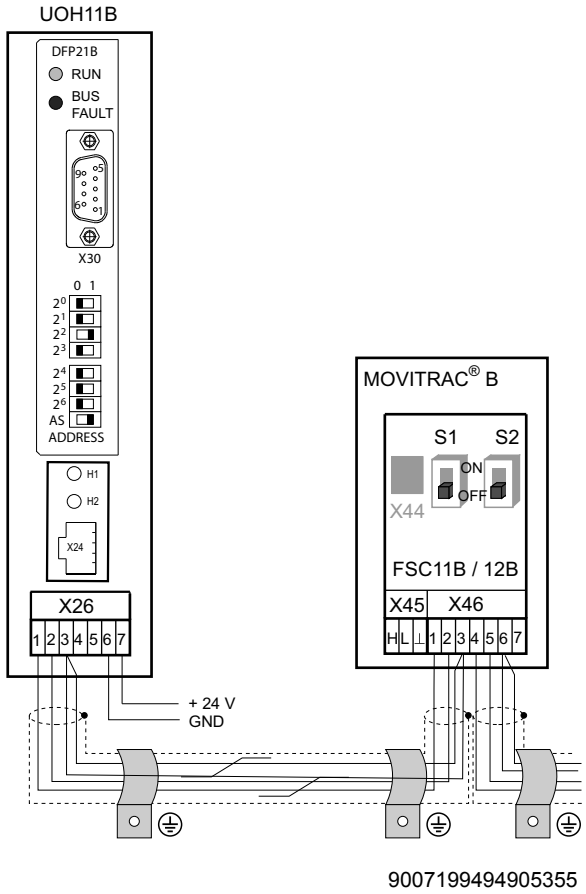
MOVITRAC® B system bus connection with DFx/UOH11B gateways or DFx integrated in MOVITRAC® B



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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.

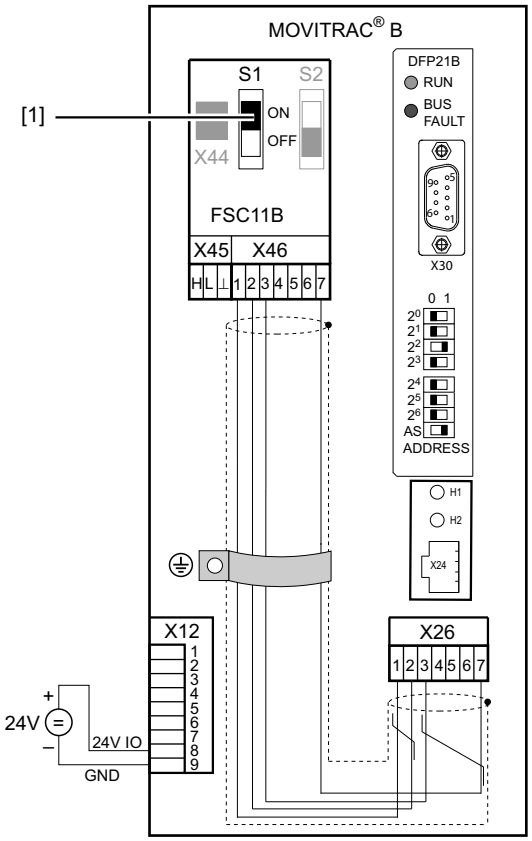
Connecting the system bus (SBus) to DFP21B

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



6140139531

[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

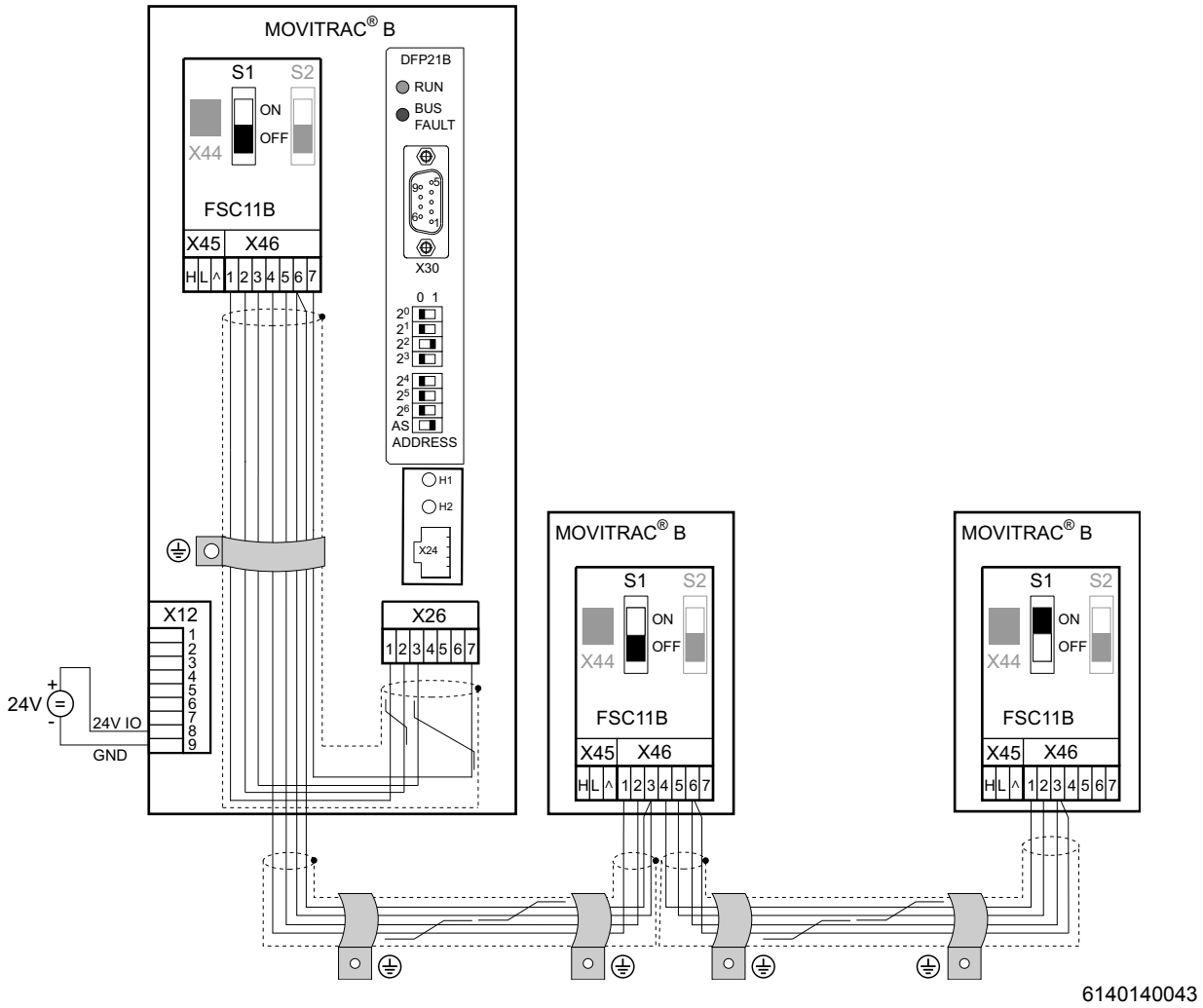
X12	
X12:8	+24 V input

X12	
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



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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.

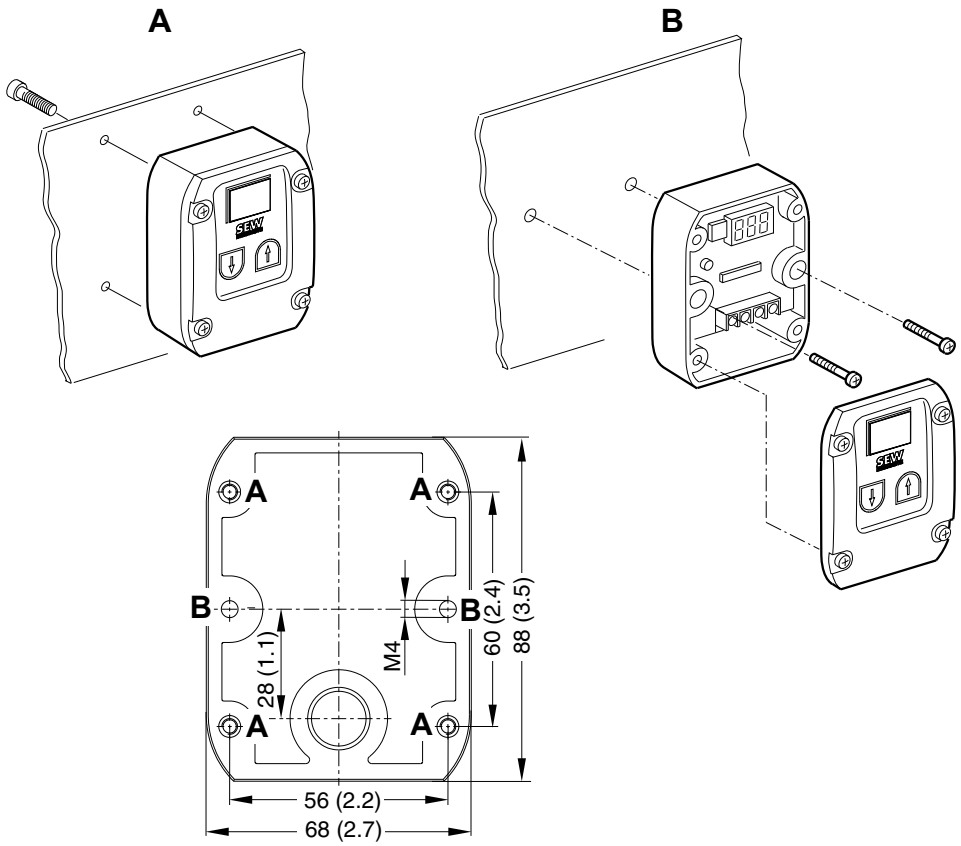
INFORMATION

- 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.

4.4.13 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



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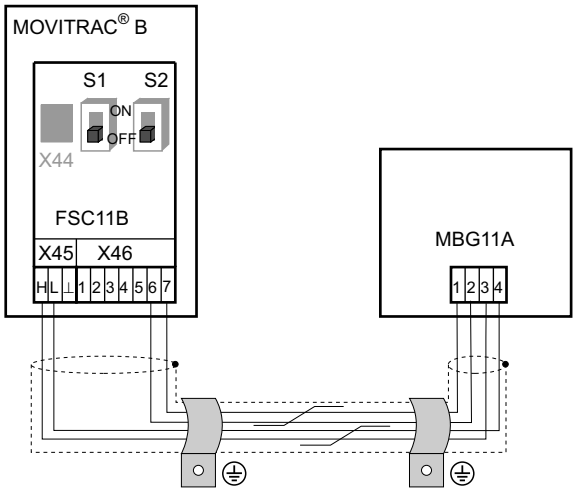
Connection



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4.4.14 Connection of the interface adapter option UWS21B

Part number

Interface adapter UWS21B: 1 820 456 2

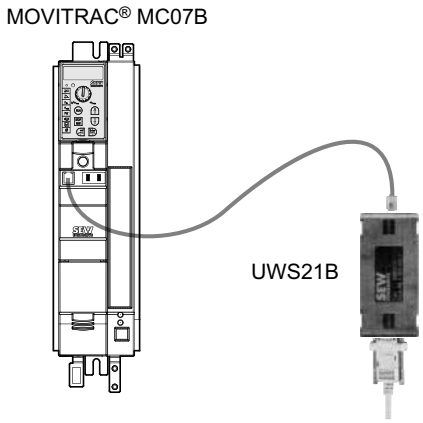
Scope of delivery

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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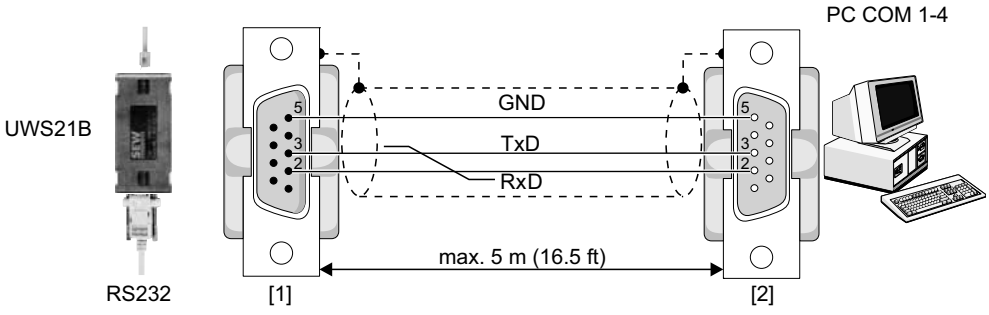
Connecting inverter and PC

- 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).



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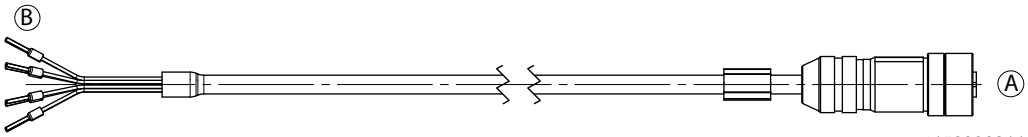
[1] 9-pin D-sub connector
[2] 9-pin D-sub socket

4.4.15 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".

4.4.16 Line protection and earth-leakage circuit breaker

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

  Severe or fatal injuries

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

4.4.17 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".

4.4.18 Brake rectifier connection

INFORMATION

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

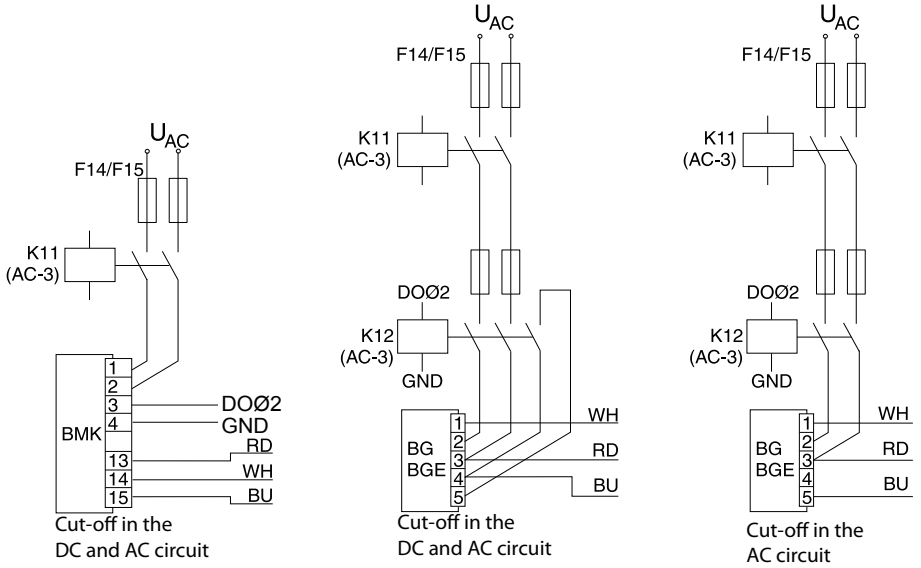
Use only contactors of utilization category AC-3 for K11 and K12.

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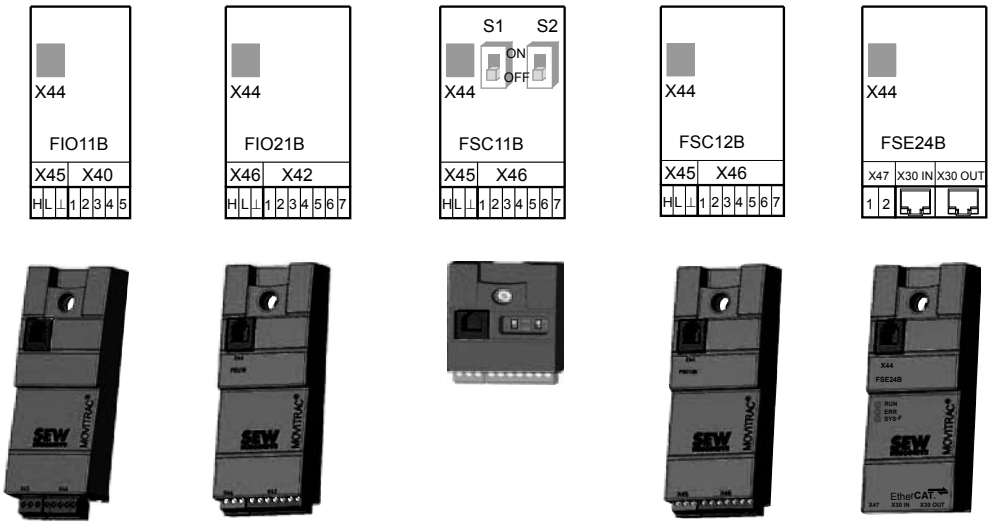
Note the corresponding connection regulations for brakes without BG/BGE or BME. Refer to the SEW publication "Drive Engineering - Practical Implementation: SEW Disk Brakes".

4.4.19 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

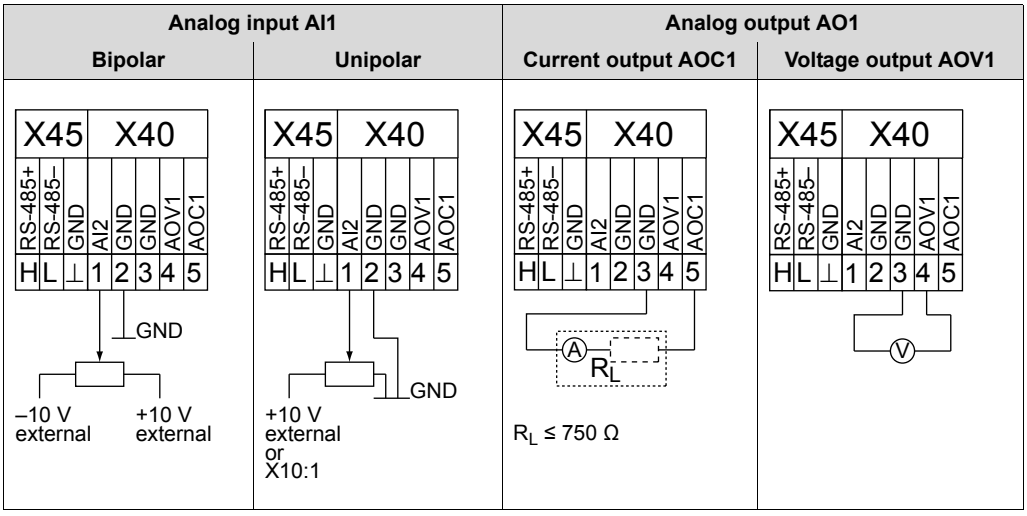
  Possible consequences include malfunctions that could lead to irreparable damage to the unit.

  – 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.

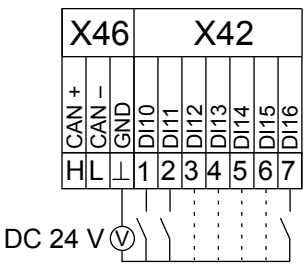
INFORMATION

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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5 Startup

5.1 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.

5.1.1 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.

5.1.2 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.

5.2 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.

5.2.1 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.

5.2.2 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.

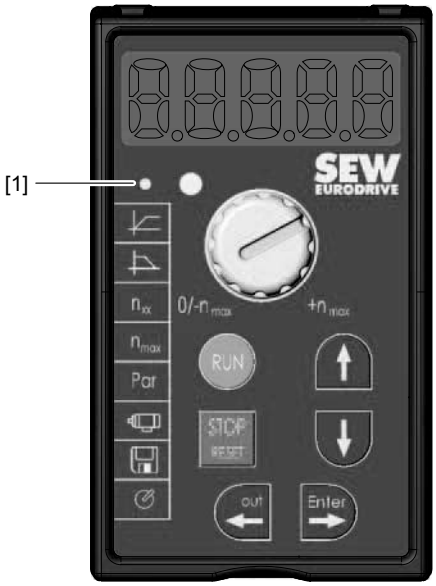
INFORMATION

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

5.3 Keypads

5.3.1 FBG11B – Basic keypad

Key arrangement and symbols on the keypad:



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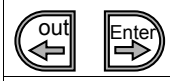
[1] LED display when IPOS® program is started

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

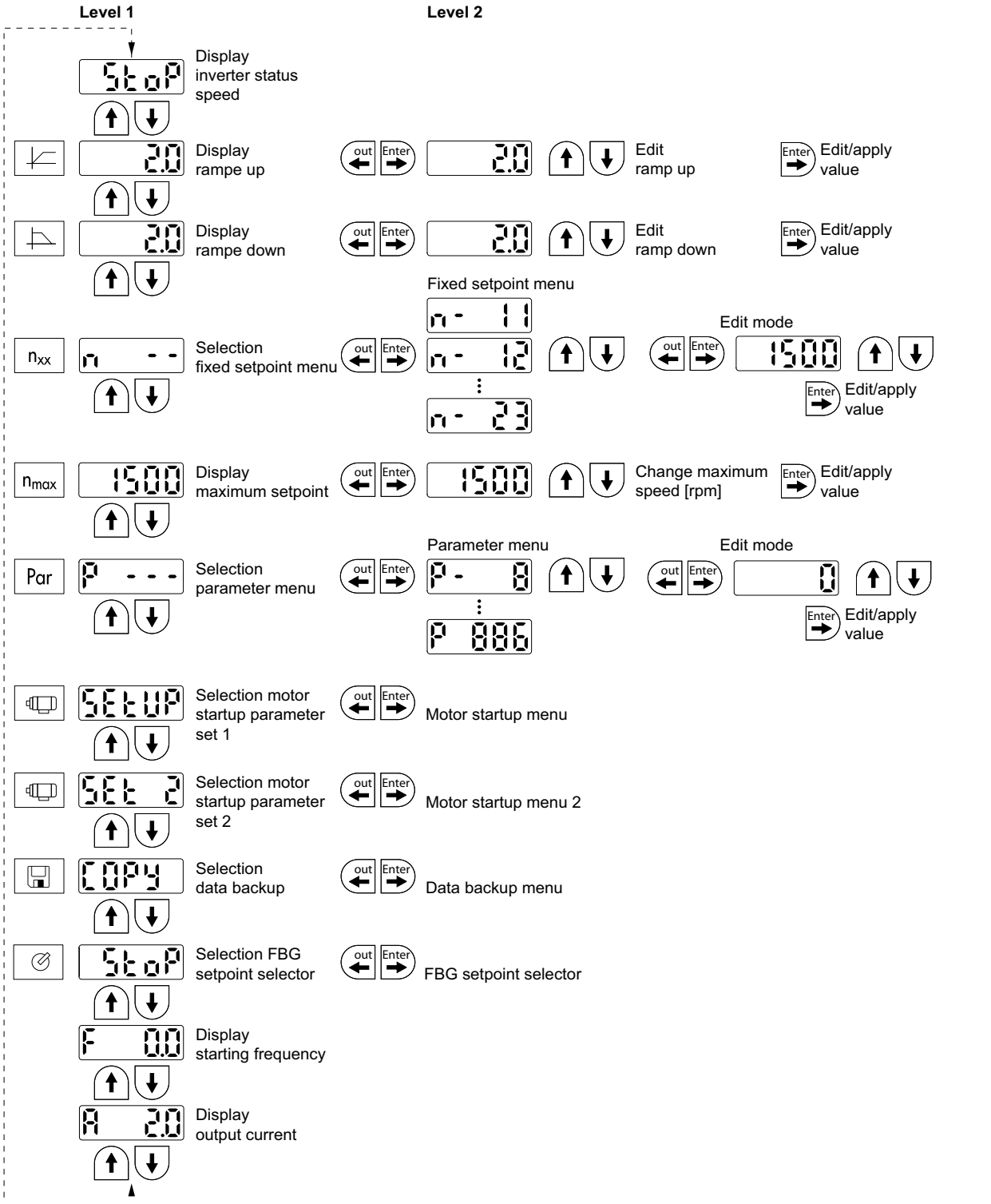
After switching off the power supply, a drive that was previously stopped using the STOP/RESET key will no longer be stopped.

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.

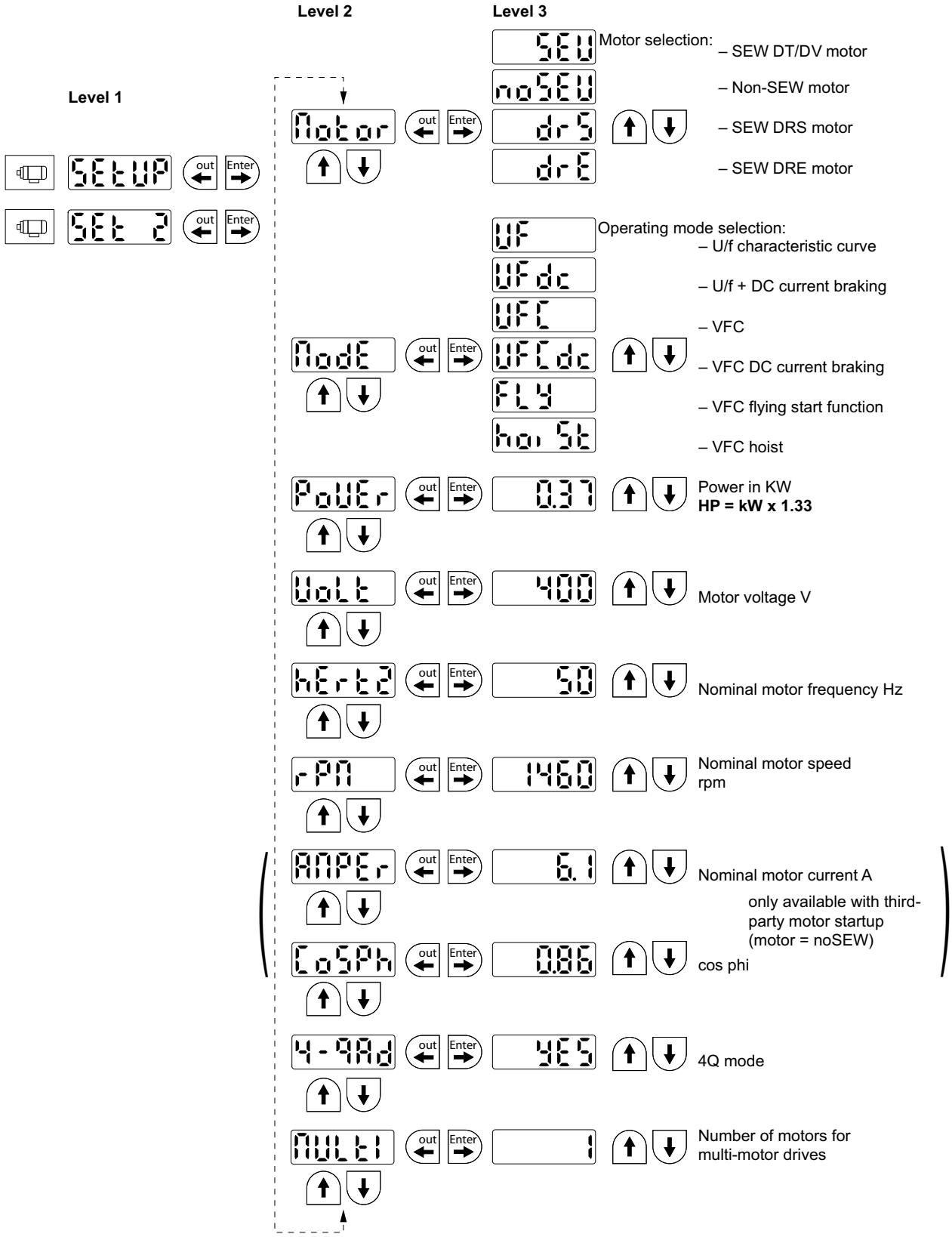
Warnings

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 125) 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 set-point adjuster" operating mode.

Removing the FBG11B keypad will trigger a stop response.

5.3.2 DBG60B – Advanced keypad

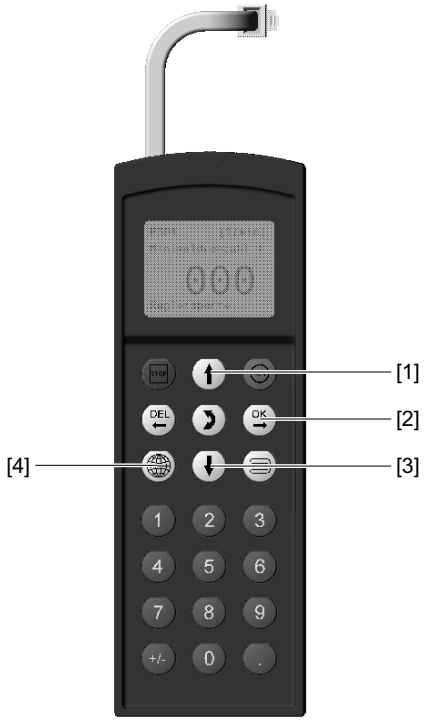
Required data

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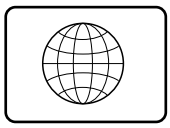
[1]	↑ key	Move up to the next menu item
[2]	OK key	Confirm entry
[3]	↓ key	Move down to the next menu item
[4]	Language key	A list of languages is displayed

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.

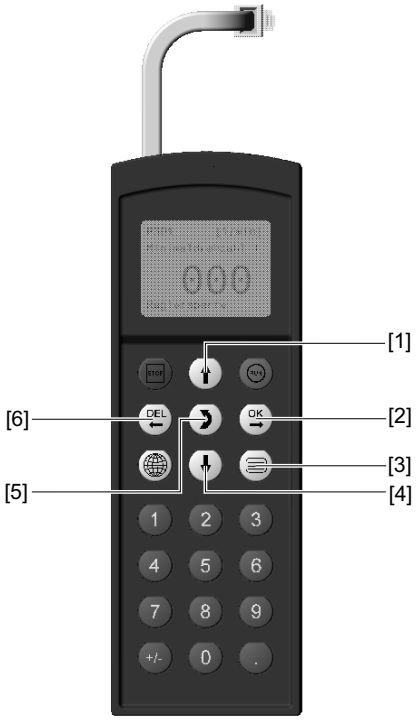


Proceed as follows to select the language:

- 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.

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

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

```
PARAMETER MODE
VARIABLE MODE
BASIC VIEW
```

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

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

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

```
STARTUP
PREPARE FOR
STARTUP
```

```
C00*STARTUP

PARAMETER SET 1
PARAMETER SET 2
```

5. Set the motor type.

```
C22*MOTORS
SINGLE MOTOR
IDENT. MOTORS
DIFFERENT MOTORS
```

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

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

```
C01*OPER. MODE 1
STANDARD V/f
VFC1
```

a. When selecting STANDARD V/f operating mode:

```
C28*DC BRAKING

NO
YES
```

b. When selecting VFC operating mode:

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

7. Select the motor type. If a 2 or 4-pole SEW-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 X13.

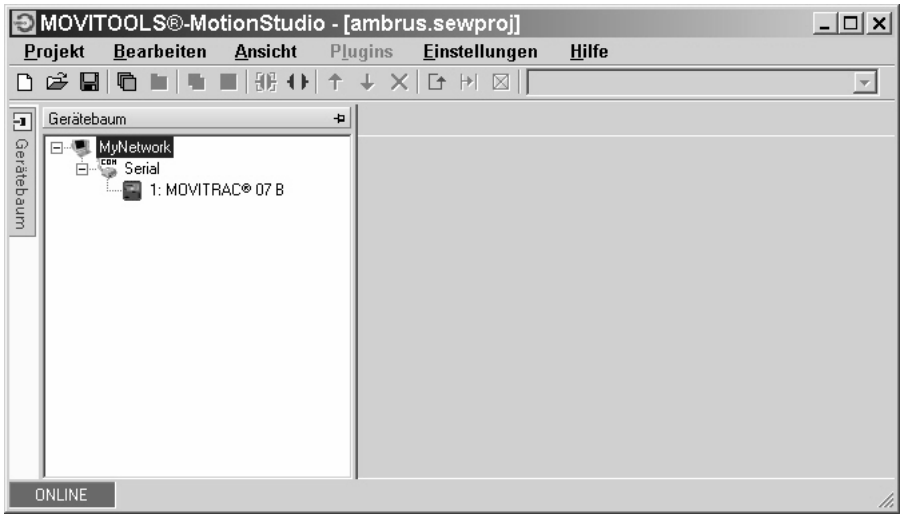
  – Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.

5.4 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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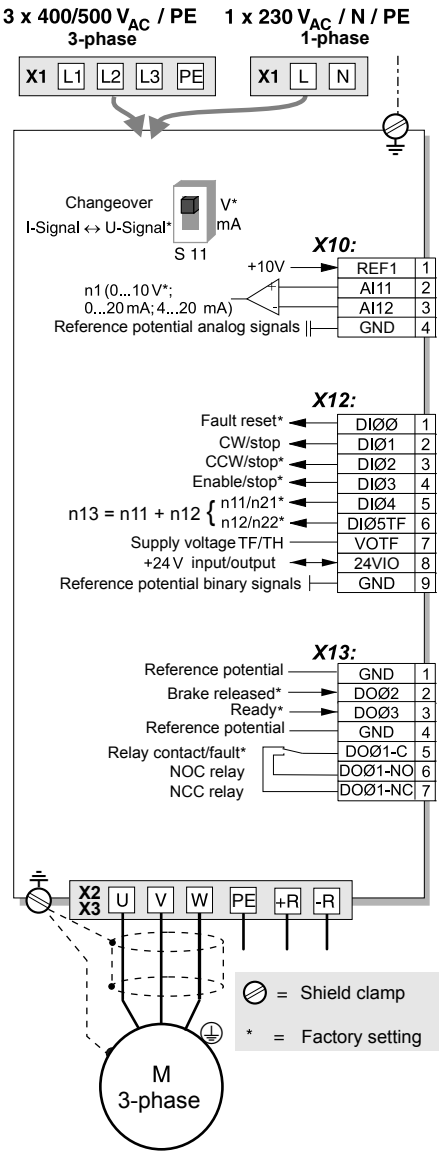
You can perform a startup by right-clicking on one of the units. Refer to the online help for more information.

5.5 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.

5.5.1 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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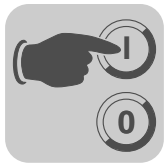
5.5.2 Notes

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.



5.5.3 Restoring the factory settings (P802)

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

5.5.4 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.

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

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

5.5.6 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.

5.5.7 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.

5.5.8 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.

5.5.9 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.

5.5.10 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.

5.5.11 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.

5.5.12 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.

5.5.13 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".

5.5.14 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.

5.5.15 Determining the assignment of digital inputs (P60x)

For detailed information, refer to section "Parameter group 6.. Terminal assignment".

5.5.16 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.

5.6 Starting the motor in manual mode

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

5.6.1 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.

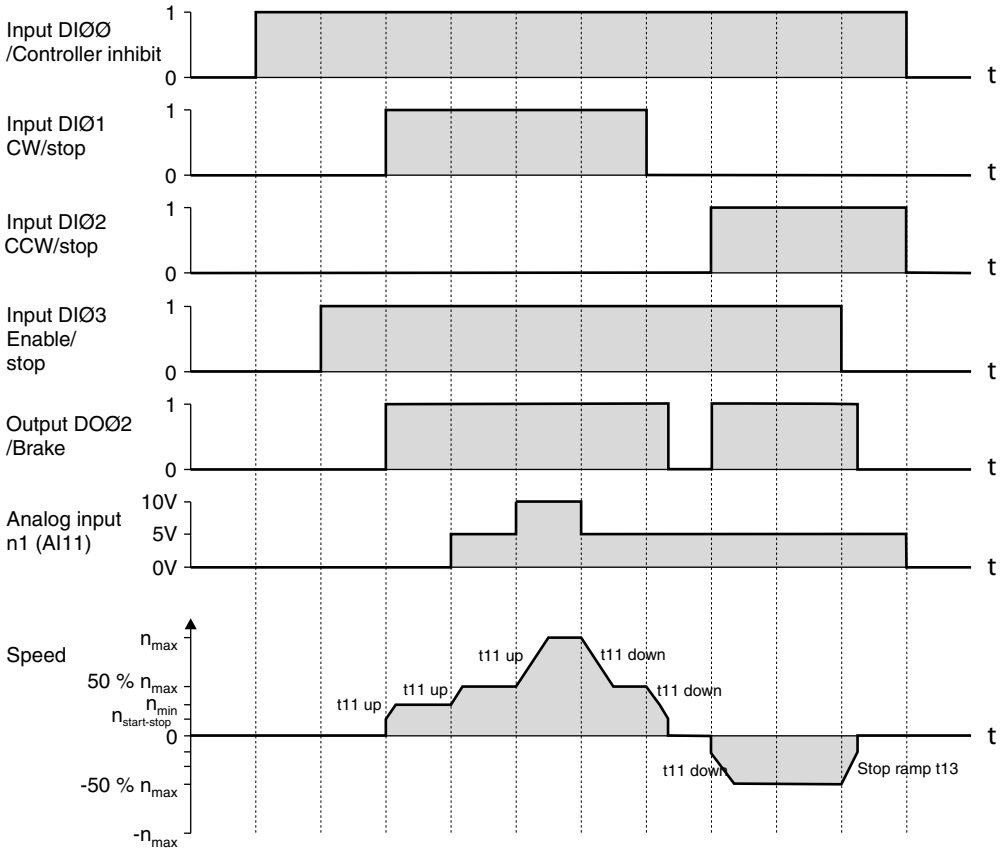
Function	X11:2 (AI11) Analog input n1	X12:1 (DIØØ) /Controller inhibit[1)]	X12:2 (DIØ1) CW/stop[2)]	X12:3 (DIØ2) CCW/stop	X12:4 (DIØ3) Enable/stop	X12:5 (DIØ4) n11/n21	X12:6 (DIØ5) n12/n22
Controller inhibit	X	0	X	X	X	0	0
Stop	X	1	X	X	0	0	0
Enable and stop	X	1	0	0	1	0	0
Clockwise at 50% n_{max}	5 V	1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

5.6.2 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.

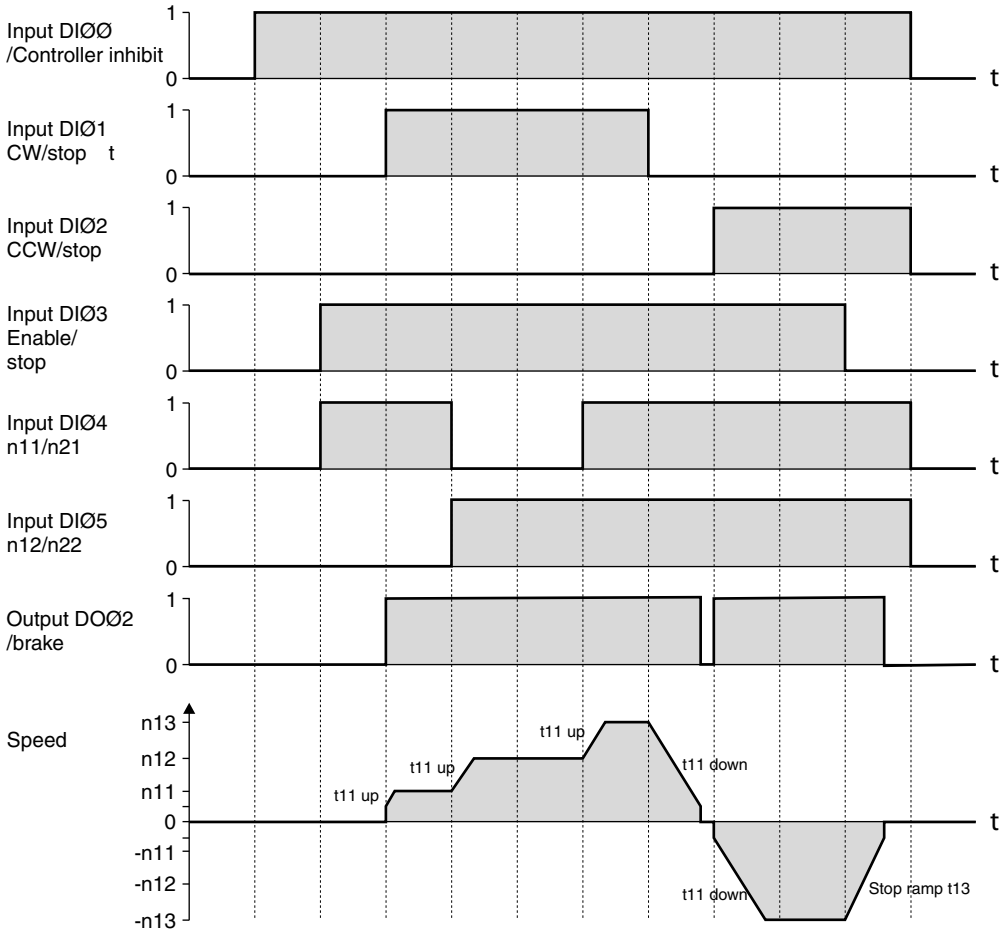
Function	X12:1 (DIØØ) /Controller inhibit[1)]	X12:2 (DIØ1) CW/stop[2)]	X12:3 (DIØ2) CCW/stop	X12:4 (DIØ3) Enable/Stop	X12:5 (DIØ4) n11/n21	X12:6 (DIØ5) n12/n22
Controller inhibit	0	X	X	X	X	X
Stop	1	X	X	0	X	X
Enable and stop	1	0	0	1	X	X
Clockwise at n11	1	1	0	1	1	0
Clockwise at n12	1	1	0	1	0	1
Clockwise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

5.7 PI controller (P25x)

For information regarding the PI controller, refer to chapter "Project Planning / PI controller".

5.8 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).

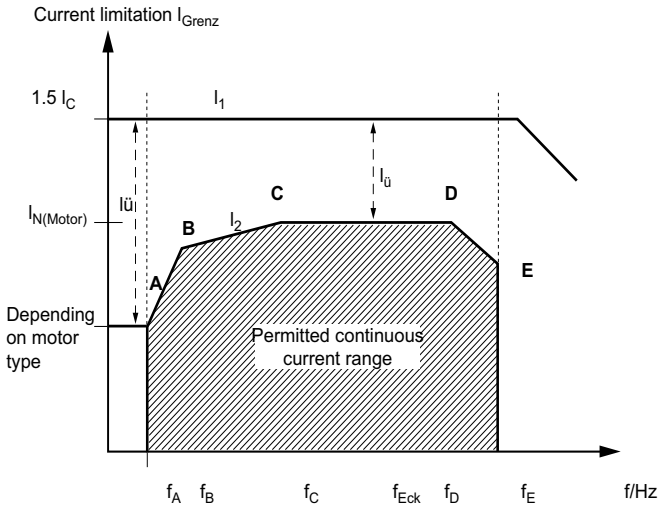
5.9 Group drive

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

5.10 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.

5.11 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.

5.11.1 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

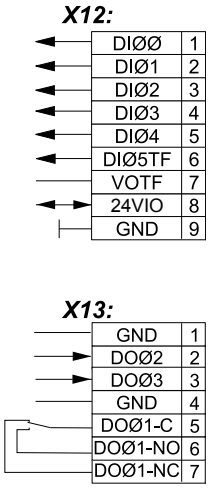
With this setting, the control word defined in the process output data channel is updated by the set control signal source (RS485 / FIELDBUS / system bus).

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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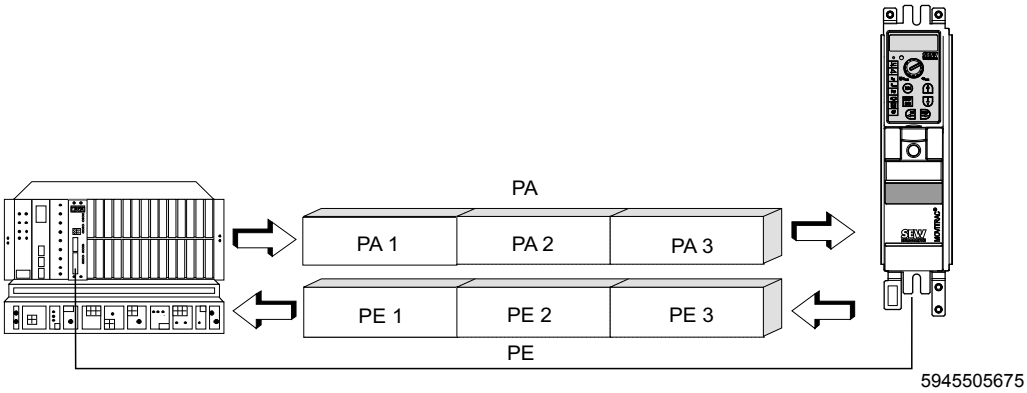
5.11.2 Process data configuration

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.



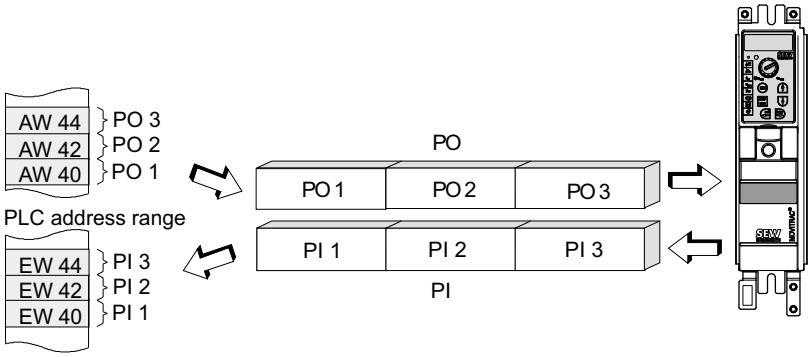
The process data configuration is set using DIP switches on the option card or via the SBus master when starting up the bus system (e.g. PROFIBUS-DP or RS485). In this way, the frequency inverter is automatically given the right setting. You can use the keypad or the MOVITOOLS® MotionStudio fieldbus 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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5.11.3 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,

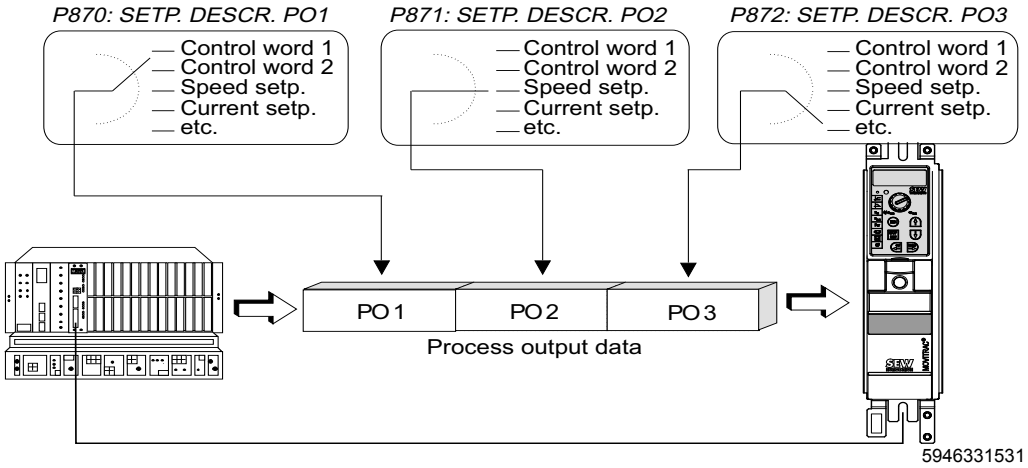
- P876 PO data enable = ON

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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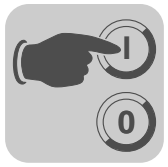


You can use the process output data words PO1, PO2 and PO3 to transmit the mentioned setpoints across the process output data channel. You can decide yourself in which process data word the more significant part (high) or the less significant part (low) is transmitted.

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$^{plus®}$.

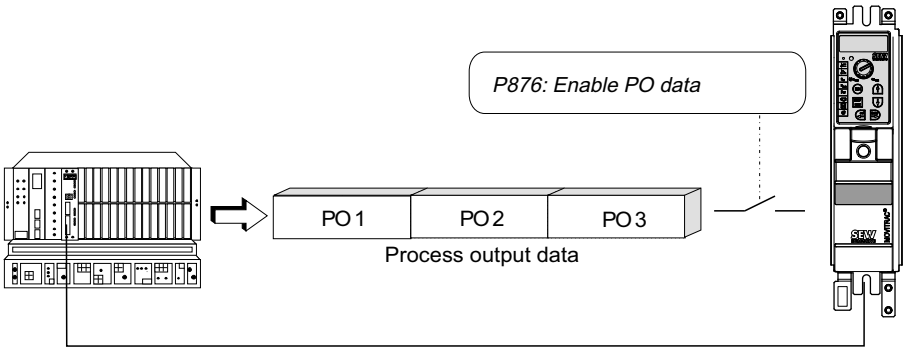
Special cases of PO data processing

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



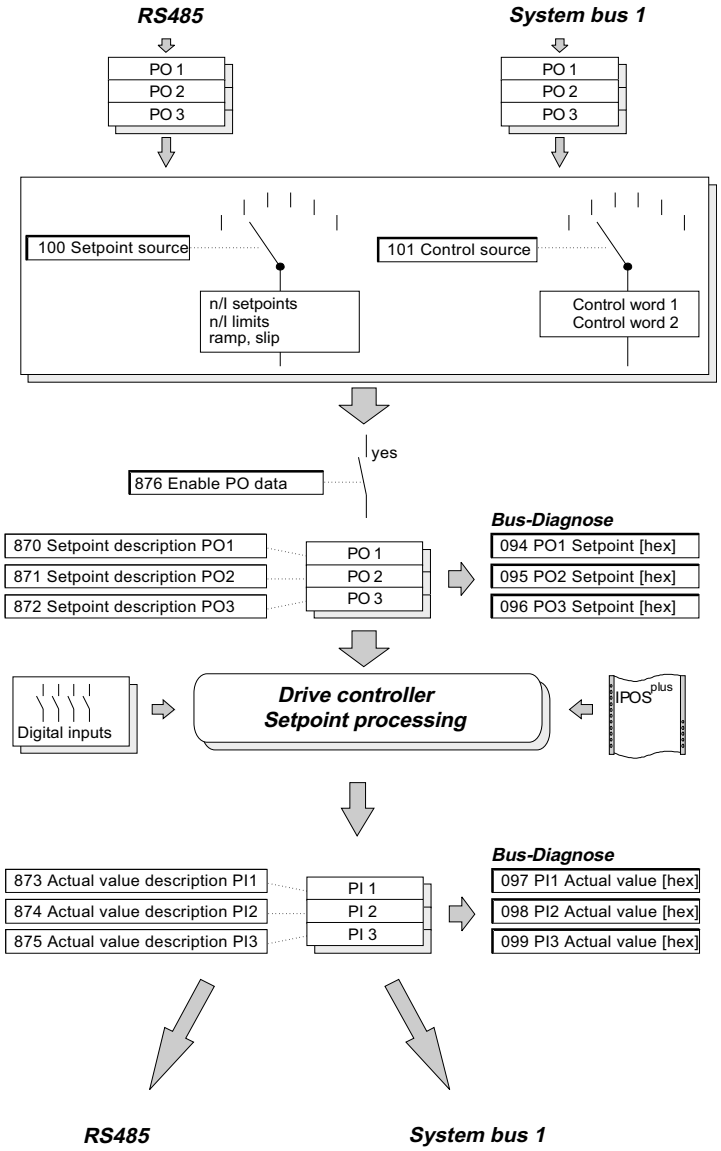
Changing the parameter *Setpoint description PO1 - PO3* causes the automatic disabling of process output data with *PO data enable* = *No*. The process output data channel is

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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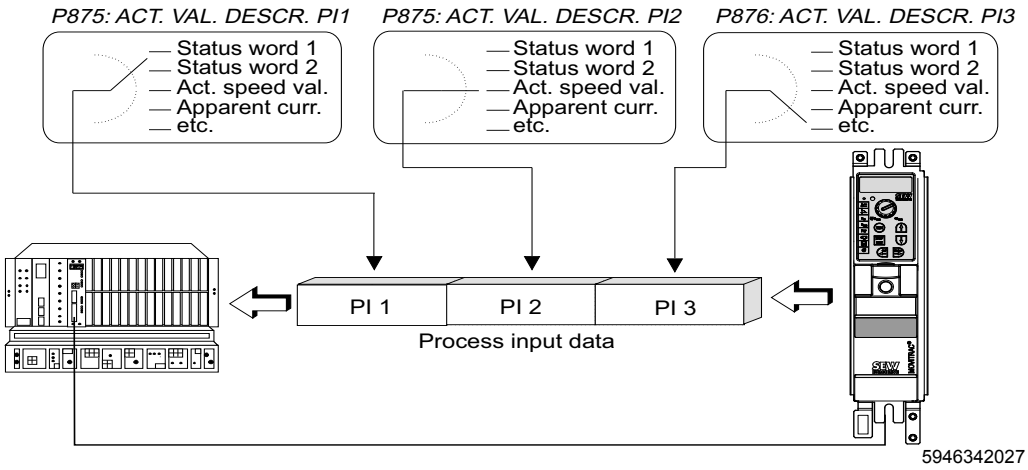
Actual value description of PI data

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.



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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}
Position	35 rev. CCW	-35 x 4096 = - 143360_{dec} = FFFD $D000_{hex}$	FFFD $D000_{hex}$ high low
	19 rev. CW	19 x 4096 = 77824_{dec} = 0001 3000_{hex}	0001 3000_{hex} high low

5.11.4 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

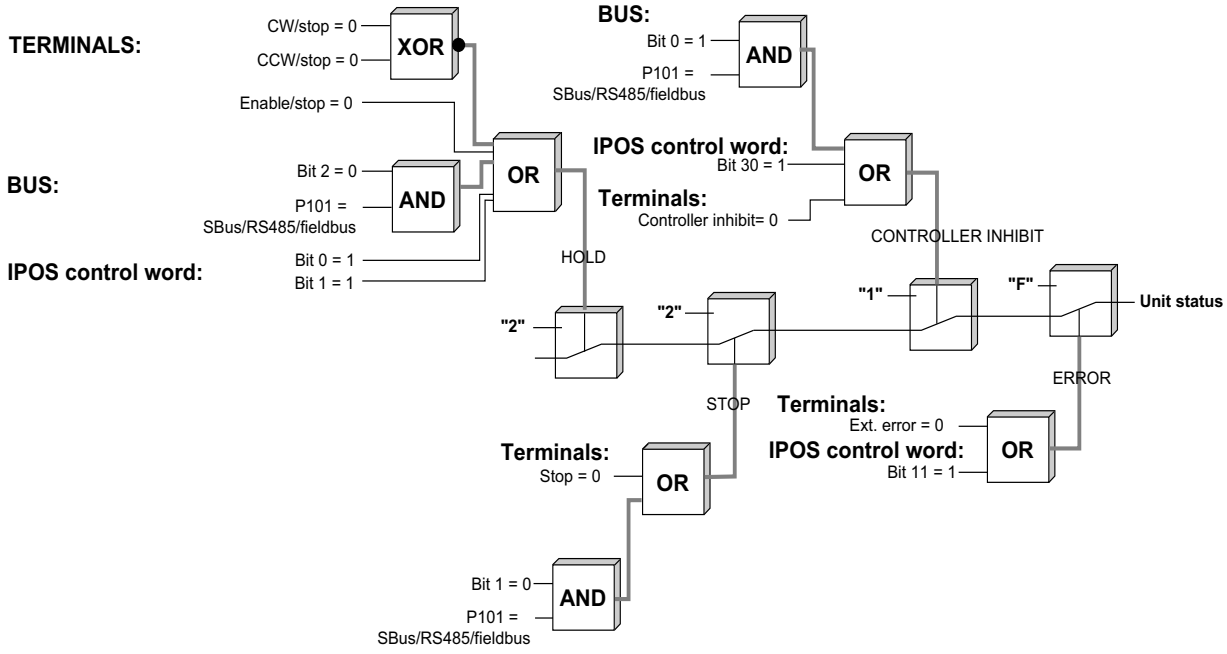
Basically, the control commands

- 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. B. 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.

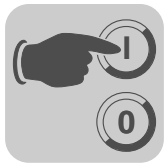
Control command "rapid stop"

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		

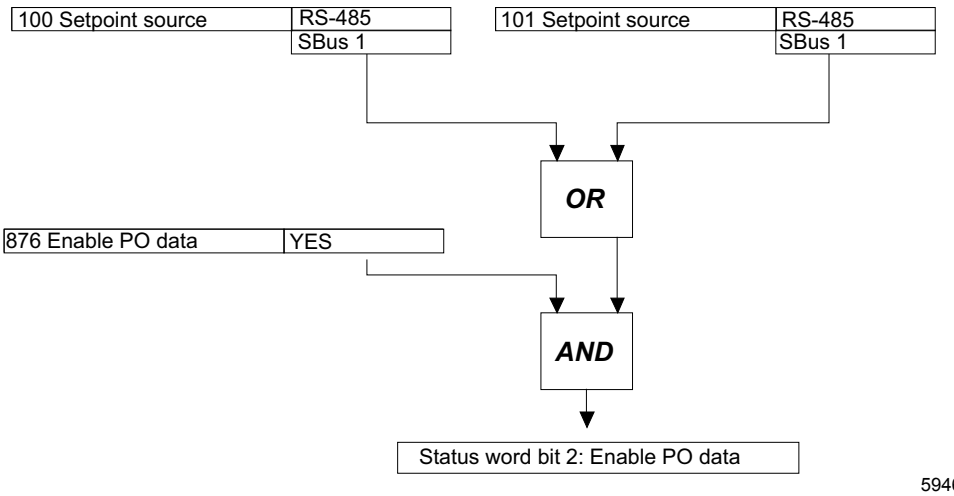
"Inverter ready" signal

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.

5.11.5 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.

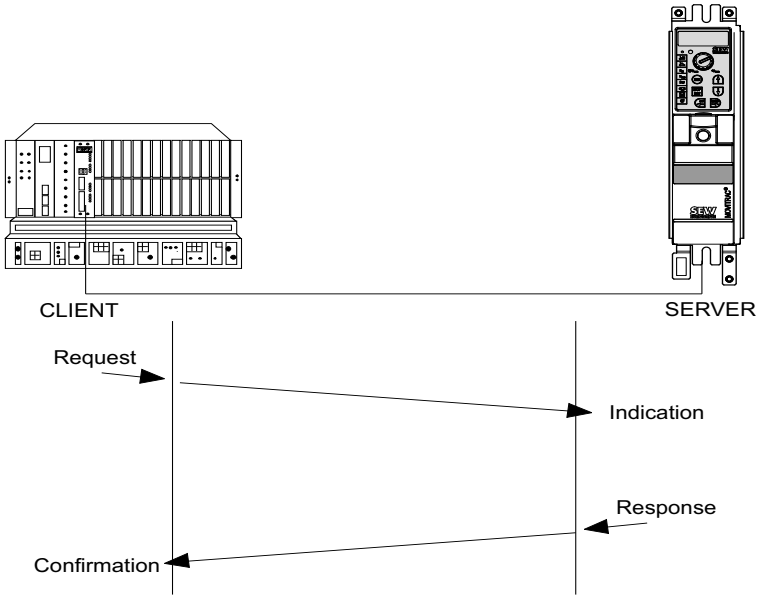
5.11.6 Setting the inverter parameters

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.

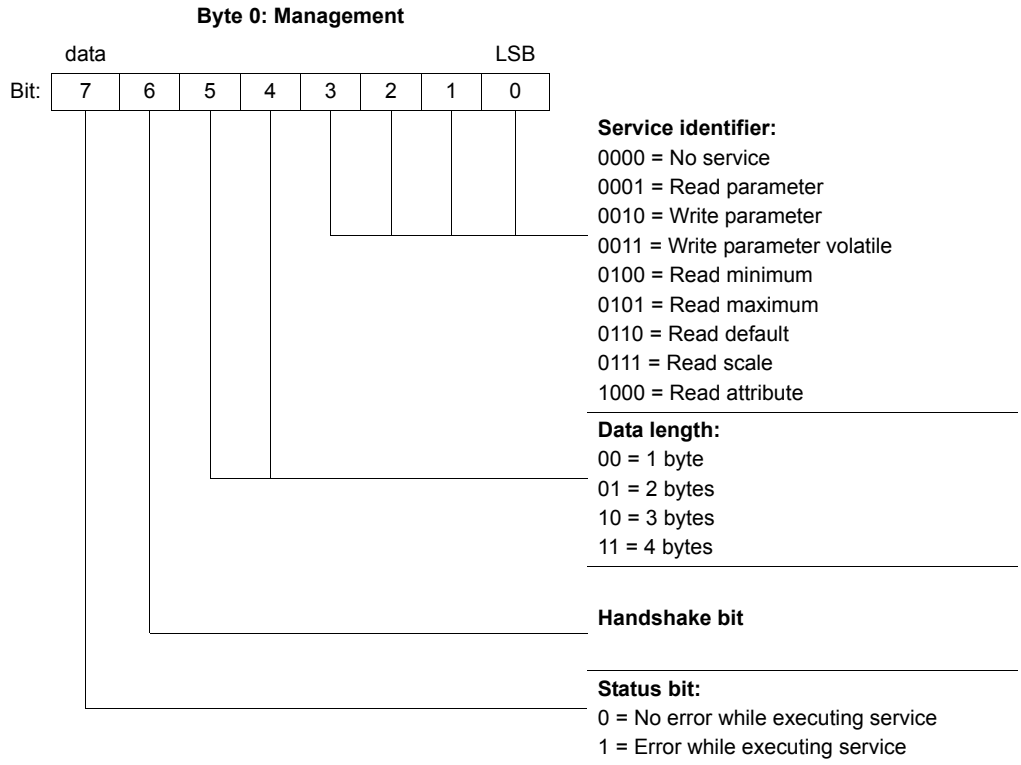
Data range (bytes 4 – 7)

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.



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 109).

Description of the 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

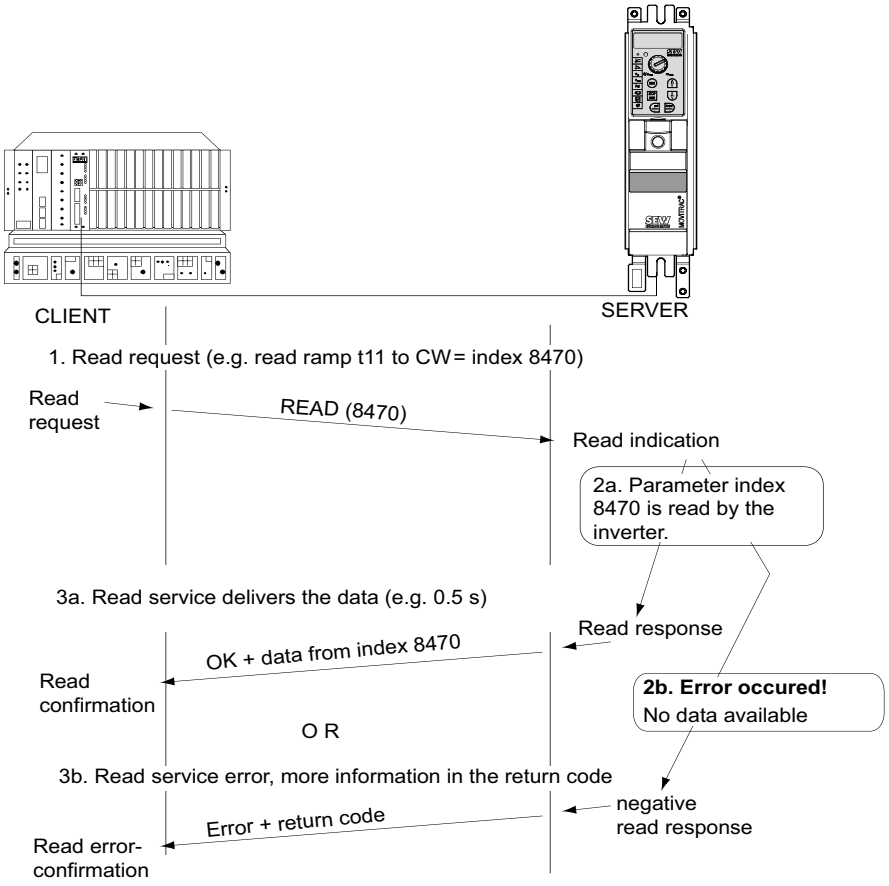
Example: Parameterization error

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).



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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

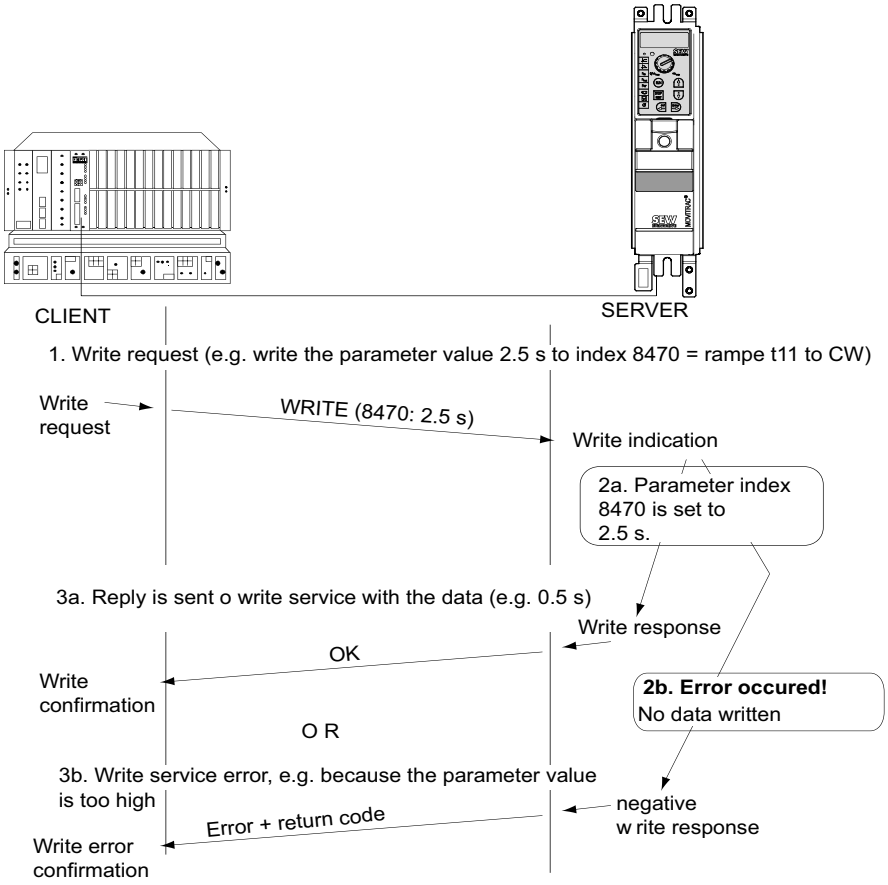
Handshake bit:
Must be changed with every new job.

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).



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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.

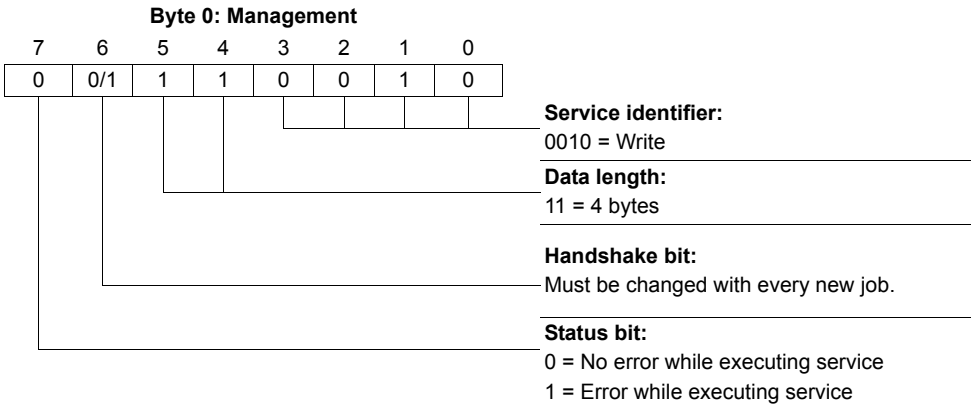
Writing a parameter cyclically

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.

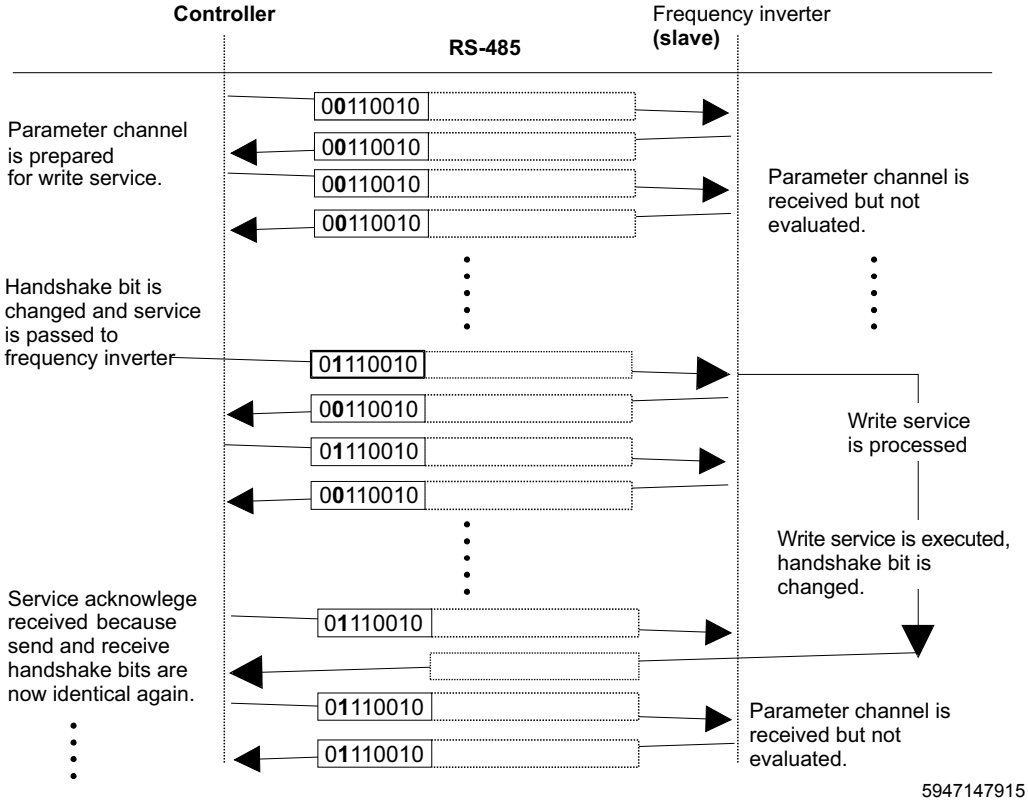
The inverter now processes the write service and sends the service confirmation back by changing the handshake bit.



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.

5.11.7 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.

5.12 External setpoint selection

External setpoint selection

Control via

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

5.12.1 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*.

5.12.2 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

5.12.3 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.

5.12.4 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

5.13 Overview of parameters

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

For a detailed parameter description, refer to the system manual or go to www.sew-eurodrive.com.

Parameter group 0.. Display value	
P00x 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	
P01x 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	
P02x parameter group 02. Analog setpoints	
P020 analog input AI1	
P021 analog input AI2 (optional)	
P03x parameter group 03. Digital inputs	
P030 digital input DI00	Fault reset
P031 digital input DI01	
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	
P04x 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
P048 digital inputs DI10 – DI16	
P05x 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	
P07x parameter group 07. Unit data	
P070 unit type	
P071 nominal output current	
P072 front module	
P073 firmware front module	

P076 basic unit firmware	
P077 firmware DBG	
P08x parameter group 08. Fault memory	
P080 – P084 faults t-0 – t-4	
P09x 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	
P1xx parameter group 1.. Setpoints/ramp generators	
P10x parameter group 10. Setpoint selection / frequency input	
P100 setpoint source	1 / unipolar / fixed setpoint
P101 control signal source	0 / terminals
P102 frequency scaling f_{FI1max}	0.1 – 10 – 120.00 kHz
P103 FI1 reference	0 / n_{max}
P104 setpoint reference speed and analog inputs	0 – 3000 – 6000 1/min
P105 AI1 wire breakage 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%
P11x parameter group 11. Analog input 1 (0 – 10 V)	
P112 AI1 Operating mode	1 / 10V, 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%
P12x 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 operation	0 / unipolar CW
P126 AI2 characteristic x1	–100 – 0 – +100 % (–10 – 0 – +10 V)
P127 AI2 characteristic y1	–100 – 0 – +100% (–n_{max} – 0 – +n_{max} / 0 – I_{max})
P128 AI2 characteristic x2	–100 – 0 – +100% (–10 – 0 – +10 V)
P127 AI2 characteristic y1	–100 – 0 – +100% (–n_{max} – 0 – +n_{max} / 0 – I_{max})
P13x / 14x 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 t13 / t23 up = down	0 – 2 – 20 s
P139 / P149 ramp monitoring 1 / 2	Yes / nein
P15x parameter group 15. Motor potentiometer function	
P150 ramp t3 up = down	0.2 – 20 – 50 s
P152 save last setpoint	Off
P16x / P17x parameter group 16. / 17. Fixed setpoints 1 / 2	
P160 / P170 internal setpoint n11/n21	–5000 – 150 – 5000 1/min
P161 / P171 internal setpoint n12 / n22	–5000 – 750 – 5000 1/min
P162 / P172 internal setpoint n13/n23	–5000 – 1500 – 5000 1/min
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%
P2xx parameter group 2.. Controller parameters	
P25x parameter group 25. PI controller	
P250 PI controller	0 / off
P251 P-gain	0 – 1 – 64
P252 I-component	0 – 1 – 2000 s
P3xx parameter group 3.. Motor parameters	
P30x / 31x parameter group 30. / 31. Limits 1 / 2	
P300/P310 start/stop speed 1/2	0 – 150 1/min
P301 / P311 minimum speed 1 / 2	0 – 15 – 5500 1/min
P302 / P312 maximum speed 1 / 2	0 – 1500 – 5500 1/min
P303 / P313 current limit 1 / 2	0 – 150% I_N
P32x / P33x 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 adjustment 1/2	0 – 100%
P323/P333 premagnetization time 1/2	0 – 2 s
P324/P334 slip compensation 1/2	0 – 500 1/min
P34x 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
P4xx parameter group 4.. Reference messages	
P40x parameter group 40. Speed reference signal	
P400 speed reference value	0 – 750 – 5000 1/min
P401 hysteresis	0 – 100 – 500 1/min
P402 deceleration time	0 – 1 – 9 s
P403 signal = "1"	0 / $n < n_{ref}$
P43x 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"	0 / $I < I_{ref}$
P44x parameter group 44. Imax signal	
P440 hysteresis	0 – 5 – 50% I_N
P441 delay time	0 – 1 – 9 s
P442 signal = "1"	0 / $I = I_{max}$

P45x parameter group 45. PI controller reference signal	
P450 PI actual value reference	0.0 – 100.0%
P451 signal = "1"	1 / PI actual value > PI ref
P5xx parameter group 5.. Monitoring functions	
P50x parameter group 50. Speed monitoring 1 / 2	
P500 / P502 speed monitoring 1 / 2	Off (up to firmware status x.10) On / motor / regenerative
P501 / P503 deceleration time 1 / 2	0 – 1 – 10 s
P54x parameter group 54. Gear unit/motor monitoring	
P540 drive vibration response/warning	Display error
P541 drive vibration response/fault	Rapid stop/warning
P542 response to oil aging/warning	Display error
P543 response to oil aging/fault	Display error
P544 oil aging/overtemperature	Display error
P545 oil aging/ready	Display error
P549 response to brake wear	Display error
P56x 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
566 current limit C	0 – 100 – 200%
P567 frequency D	0 – 50 – 104 Hz
P568 current limit D	0 – 100 – 200%
P57x parameter group 57. Motor protection	
P570 frequency E	0 – 87 – 104 Hz
P571 current limit E	0 – 100 – 200%
P6xx parameter group 6.. Terminal assignment	
P60x 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
P61x 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
P62x parameter group 62. Digital outputs of basic unit	
P620 digital output DO01	/FAULT
P621 digital output DO02	BRAKE RELEASED
P622 digital output DO03	READY
P63x parameter group 63. Digital outputs DO	

P630 virtual digital outputs	
P64x 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 x1	-100 – 0 – 100%
P647 AO1 characteristic y1	–100 – +100%
P648 AO1 characteristic x2	–100 – 0 – +100%
P649 AO1 characteristic y2	-100 – 100%
P7xx parameter group 7.. Control functions	
P70x parameter group 70. Operating mode 1 / 2	
P700/P701 operating mode 1/2	21 = V/f characteristic
P71x parameter group 71. Standstill current 1 / 2	
P710/P711 standstill current 1/2	0 – 50 % I_{Mot}
P72x 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 1/min
P722/P725 start offset 1 / 2	0 – 30 – 500 1/min
P73x 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
P74x parameter group 74. Speed skip function	
P740/P742 skip center 1/2	0 – 1500 – 5000 1/min
P741/P743 skip band width 1 / 2	0 – 300 1/min
P75x parameter group 75. Master-slave function	
P750 slave setpoint	0: MASTER-SLAVE OFF
P751 scaling of slave setpoint	–10 – 0 – 1 – 10
P76x parameter group 76. Manual operation	
P760 lockout RUN/STOP keys	Off
P77x parameter group 77. Energy saving function	
P770 energy saving function	Off
P8xx parameter group 8.. Unit functions	
P80x parameter group 80. Setup	
P800 short menu (FBG11B only)	Short
P801 language DBG60B	
P802 factory setting	No
P803 parameter lock	Off
P804 reset statistics 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	1 / On: 24 V switched on
P809 IPOS activation	
P81x 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	

P82x parameter group 82. Brake operation 1 / 2	
P820/P821 4-quadrant operation 1 / 2	On
P83x parameter group 83. Fault responses	
P830 response terminal "external error"	4 / rapid stop / malfunction (stop with locking)
P833 response to RS485 timeout	7 / rapid stop / warning
P836 response to SBus timeout	7 / rapid stop / warning
P84x parameter group 84. Reset behavior	
P840 manual reset	No
P841 auto reset	Off
P842 restart time	1 – 3 – 30 s
P85x parameter group 85. Scaling actual speed value	
P850 scaling factor numerator	1 – 65535
P851 scaling factor denominator	1 – 65535
P852 user-defined unit	1/min
P853 scaled speed FBG	
P86x parameter group 86. Modulation 1 / 2	
P860/P861 PWM frequency 1 / 2	4 kHz
P862/P863 PWM fix 1 / 2	Off
P87x 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
P88x 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 kBd
P886 CANopen address	1 – 2 – 127
P9xx parameter group 9.. IPOS parameters	
P938 speed for task 1	0 – 9
P939 speed for task 2	0 – 9

6 Operation

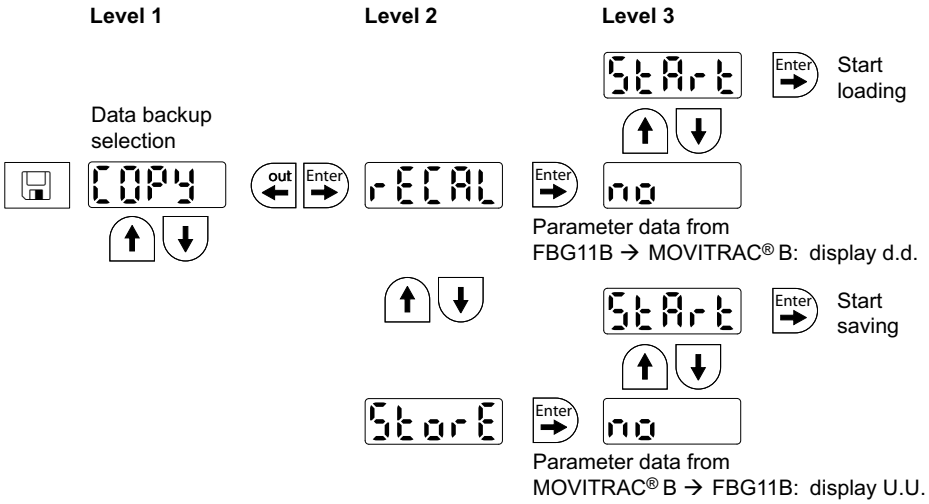
6.1 Data backup

6.1.1 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.

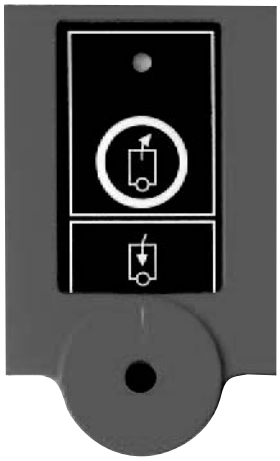
6.1.2 Data backup using DBG60B

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.

6.1.3 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.

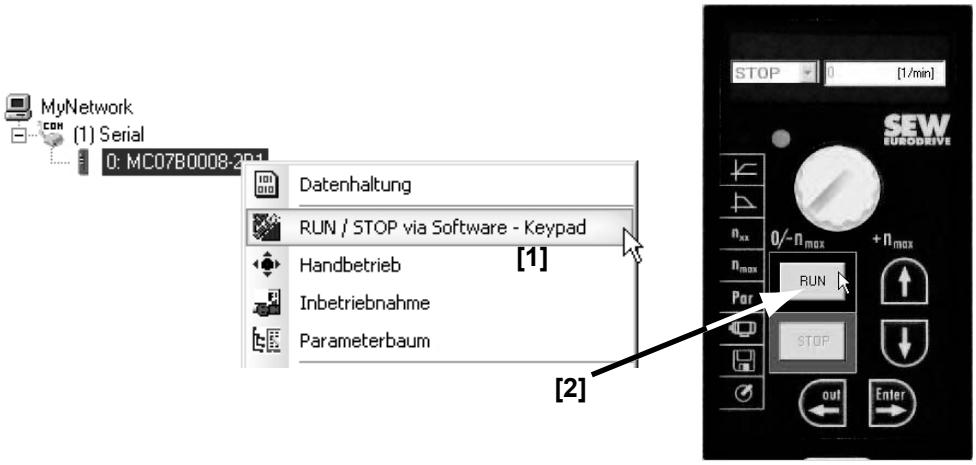
Press the <RUN> key on FBG11B or DBG60B, or switch the unit off and on again.

6.1.4 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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6.2 Status displays

6.2.1 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:

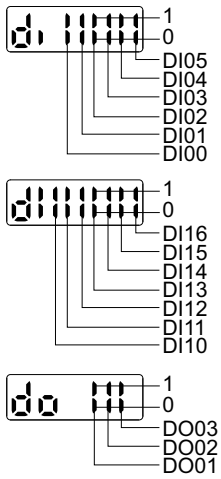
- Digital input terminal set to controller inhibit and active.
- Controller inhibit due to PC manual mode via MOVITOOLS® MotionStudio.
- Temporary controller inhibit: Is triggered if a change of parameter *P100 setpoint source* would directly cause an enable signal. The temporary controller inhibit is removed once the enable signal is reset for the first time.
- Controller inhibit set via IPOS® control word H484.

6.2.2 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 - - -`.

6.3 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

6.4 DBG60B keypad

6.4.1 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

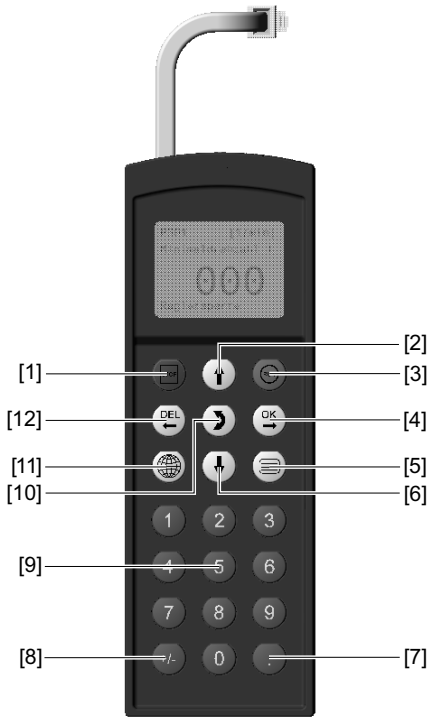
6.4.2 Information messages

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

6.4.3 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

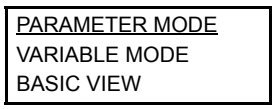
You can use the DBG60B to copy entire parameter sets from one MOVITRAC® B unit to other MOVITRAC® B units. Proceed as follows:

- 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.

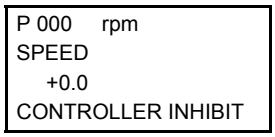
Parameter mode DBG60B

Proceed as follows to set the parameters in parameter mode:

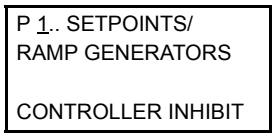
1. Press the context key to activate the context menu. The first menu item is "PARAMETER MODE".



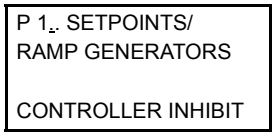
2. Press the OK key to start PARAMETER MODE. The first display parameter P000 "SPEED" appears. Use the ↑ or ↓ key to select main parameter groups 0 to 9.



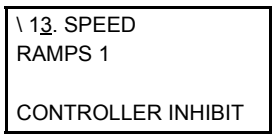
3. Use the ↑ or ↓ key to select the desired main parameter group. The flashing cursor is positioned under the number of the main parameter group.



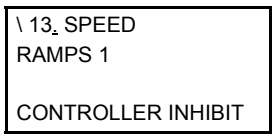
4. Press the OK key to activate the parameter subgroup selection in the required main parameter group. The flashing cursor moves one position to the right.



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

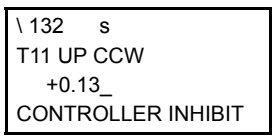


6. Press the OK key to activate the parameter selection in the required parameter subgroup. The flashing cursor moves one position to the right.

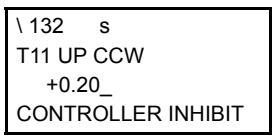


7. Use the ↑ or ↓ key to select the desired parameter. The flashing cursor is positioned under the third digit of the parameter number.

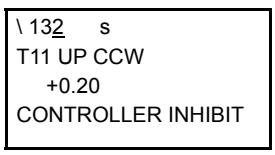
8. Press the OK key to activate the setting mode for the selected parameter. The cursor is positioned under the parameter value.



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.

7 Service / list of faults

7.1 Device information

7.1.1 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

7.1.2 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.

7.1.3 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.

7.2 List of faults (F00 – F113)

No.	Designation	Response	Possible cause	Measures
00	No error	–	–	–
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	Measures
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	• Eliminate 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	Measures
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	• Startup the Ex-e motor
			• Incorrect parameterization of the frequency points	• Frequency A < frequency B • Frequency B < frequency C
			• Incorrect parameterization of the current limits	• Current limit A < current limit B • Current limit B < current limit C
36	Option missing	Immediate switch-off with inhibit	• Type of option card not allowed	• Use correct option card
			• Setpoint source, control signal source or operating mode not permitted for this option card	• Set correct setpoint source • Set correct control signal source • Set 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 while executing the system software	• 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	Measures
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 • Longer rest periods
94	EEPROM checksum	Immediate switch-off with inhibit	• Defective EEPROM	• Contact SEW Service
97	Copy error	Immediate switch-off with inhibit	• Parameter module is removed during copying process • Switching off/on during copying process	Prior to 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 error	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	• Replace brake lining (see "Motors" operating instructions)

No.	Designation	Response	Possible cause	Measures
110	Ex-e protection	Emergency stop	• Duration of operation below 5 Hz exceeded	• Check configuration • Shorten duration of operation below 5 Hz
111	System bus (SBus) error	This error number signals the EtherCAT or fieldbus master that the communication between FSE24B and MOVITRAC® B is interrupted. MOVITRAC® B would detect error 47.		• Check FSE24B plug connection
113	Analog input wire break	Programmable	• AI1 analog input wire break	• Check wiring
116	Error application module *Suberror:* 14: Encoder error 29: Limit switch contacted 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.

7.3 SEW electronics service

7.3.1 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**.

7.3.2 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

7.4 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.

7.5 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

8 Technical data

8.1 Technical data of the basic unit

8.1.1 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.

8.1.2 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.

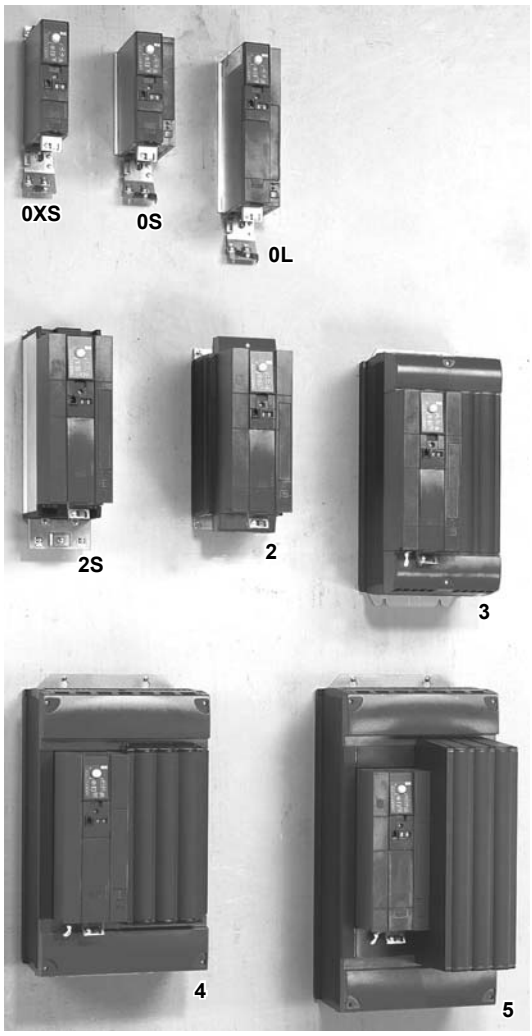
MOVITRAC® B	All sizes
Installation altitude	Up to h ≤ 1000 m (3281 ft) without restrictions. At h ≥ 1000 m (3281 ft), the following restrictions apply: • From 1000 m (3281 ft) to max. 4000 m (13 120 ft): – I_N reduction by 1% per 100 m (328 ft) • From 2000 m (6600 ft) to max. 4000 m (13 200 ft): – The 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.

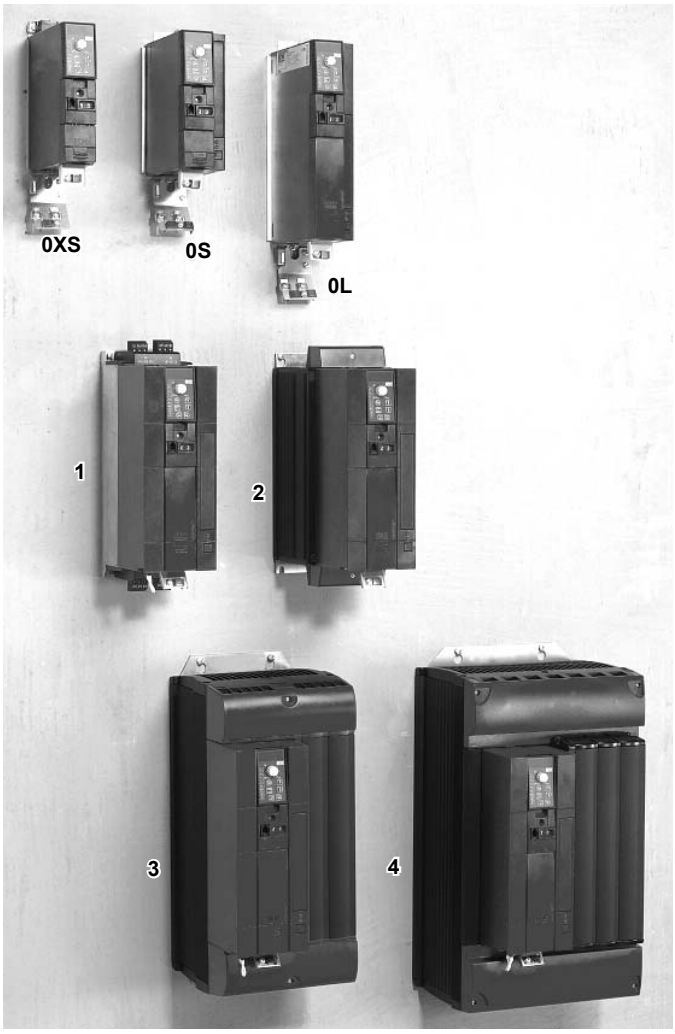
8.1.3 Technical data of MOVITRAC® B, 3 × 400 V AC

Overview of MOVITRAC® B

400 / 500 V



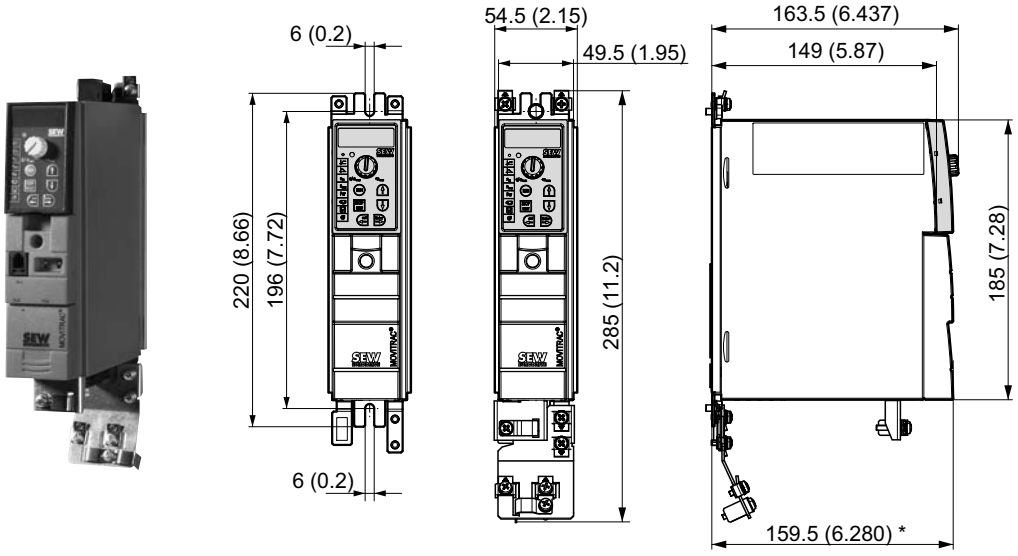
230 V



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).



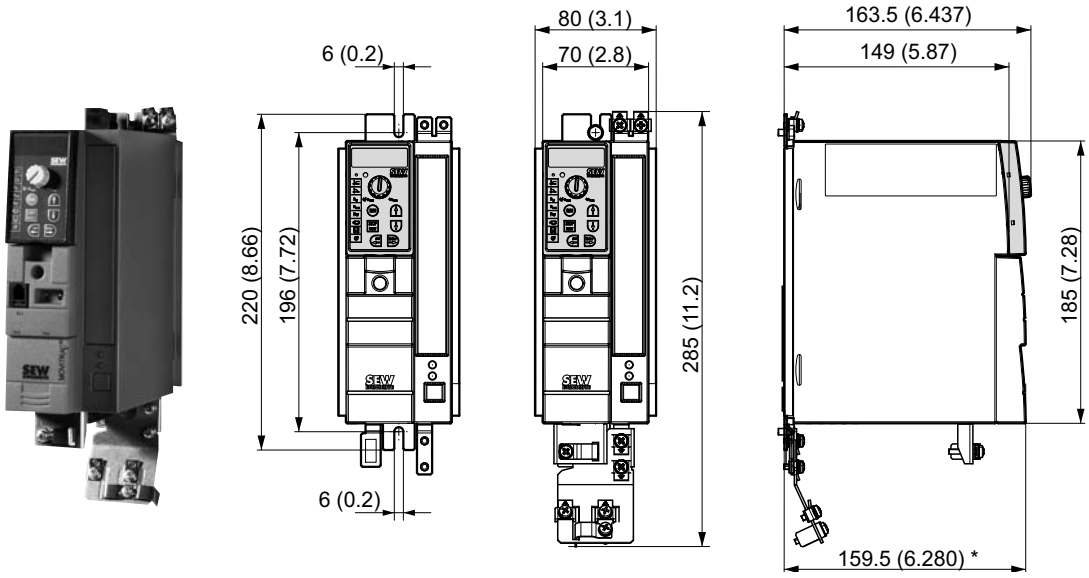
* With front module FSE24B +4 mm (0.16 in)

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)

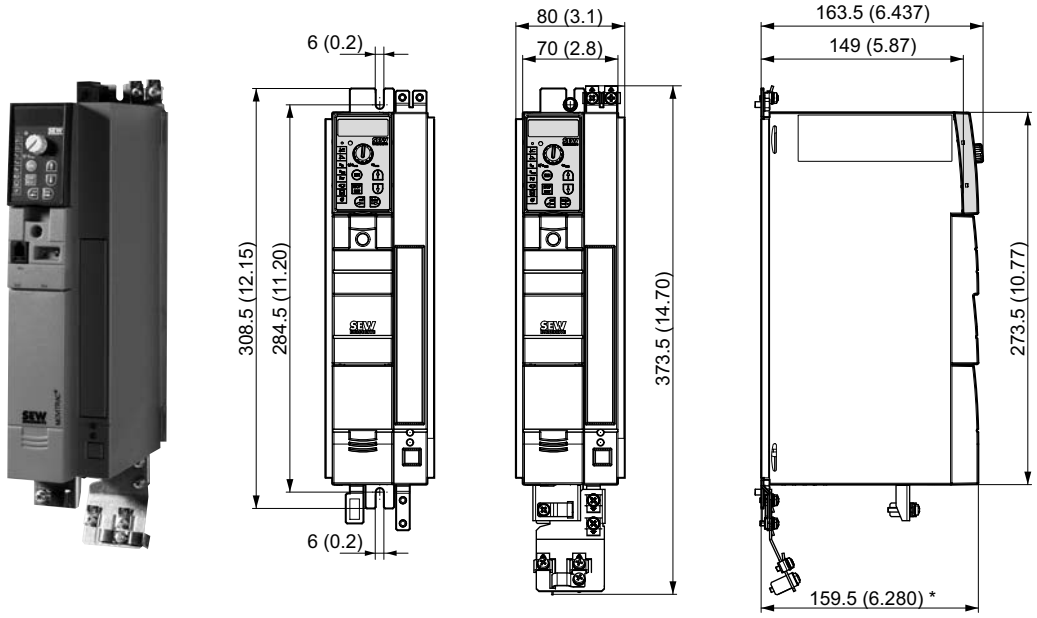
MOVITRAC® MC07B (3-phase supply system)		**0005-5A3-4-x0**	**0008-5A3-4-x0**	**0011-5A3-4-x0**	**0015-5A3-4-x0**
Part number, standard unit (-00) **Part number "Safe stop" (-S0[1])**		**828 517 9** **828 995 6**	**828 518 7** **828 996 4**	**828 519 5** **828 997 2**	**828 520 9** **828 998 0**
INPUT[2]					
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).



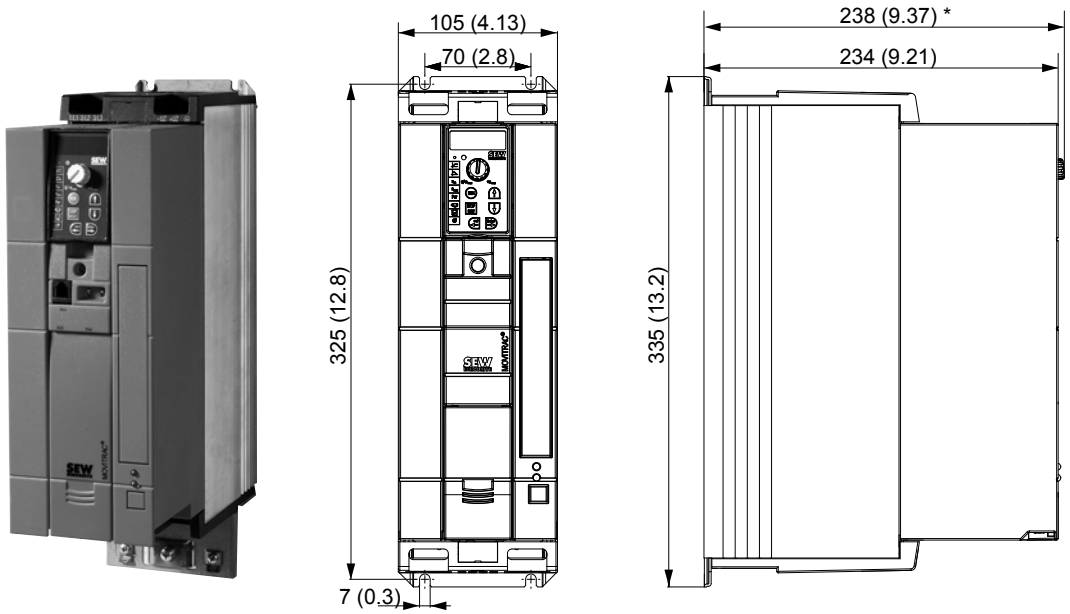
* With front module FSE24B +4 mm (0.16 in)

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

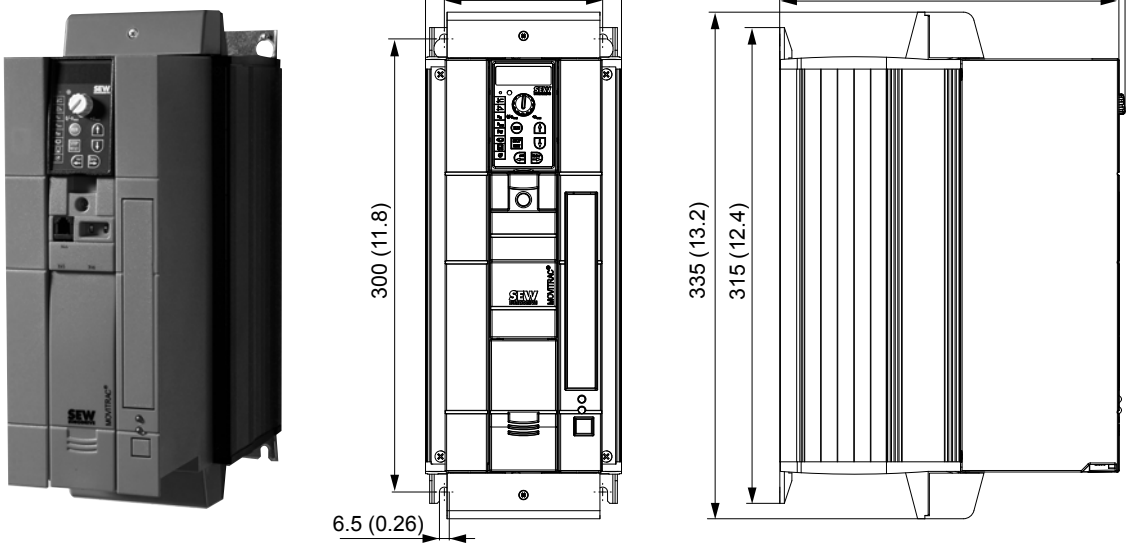


* With front module FSE24B +4 mm (0.16 in)

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

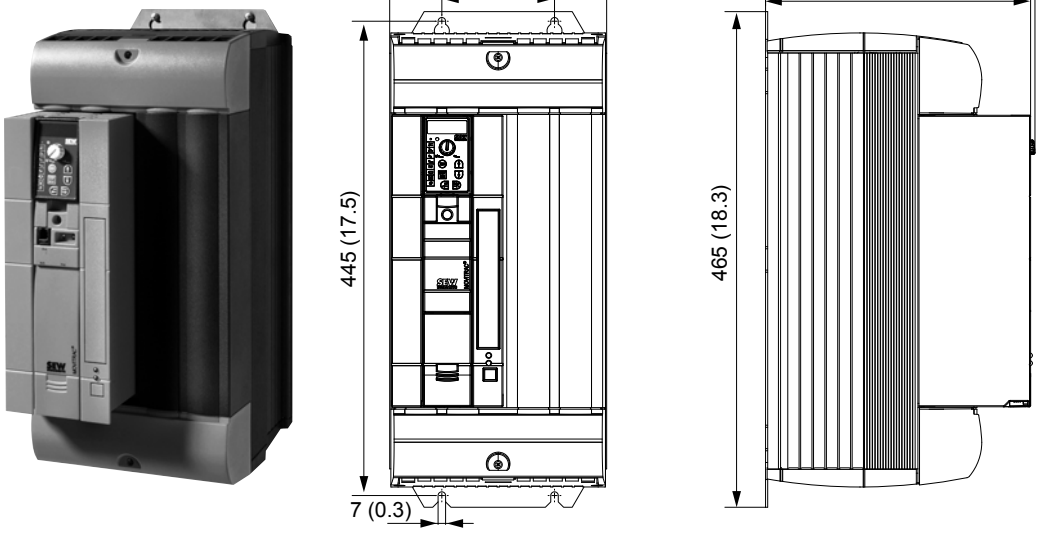


* With front module FSE24B +4 mm (0.16 in)

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

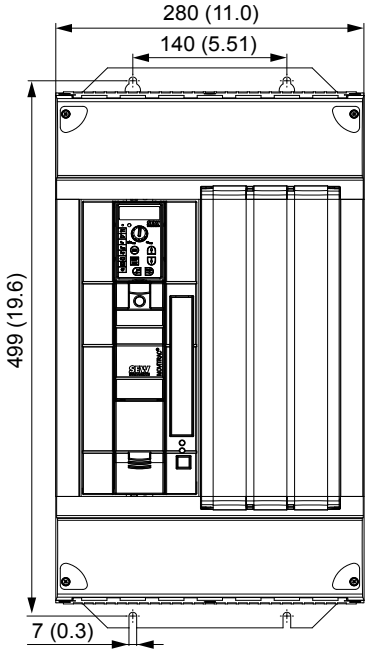


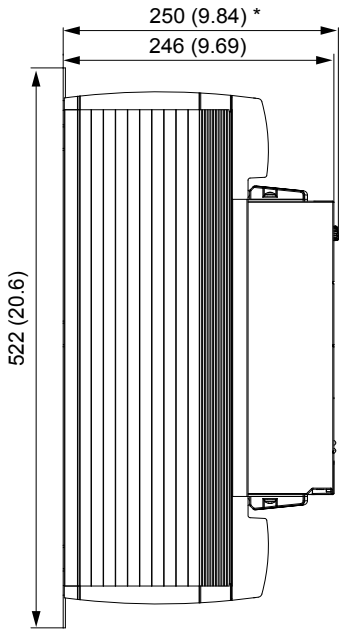
* With front module FSE24B +4 mm (0.16 in)

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



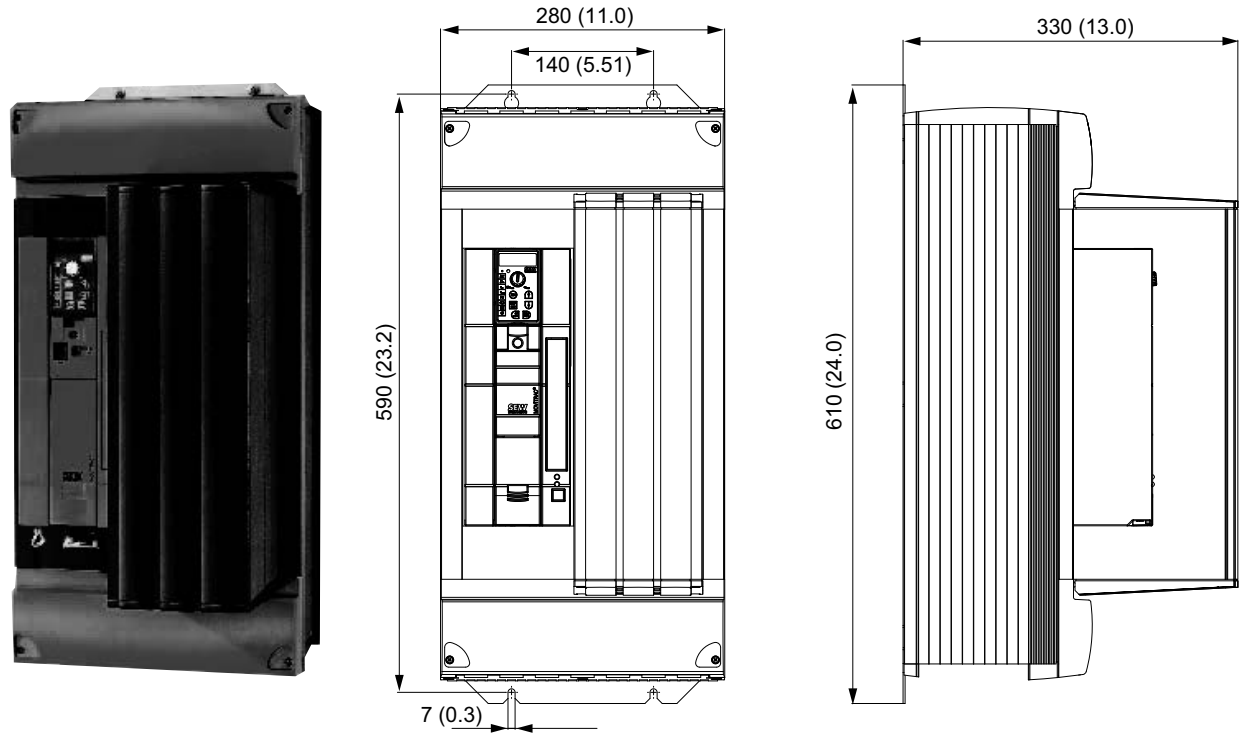


* With front module FSE24B +4 mm (0.16 in)

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



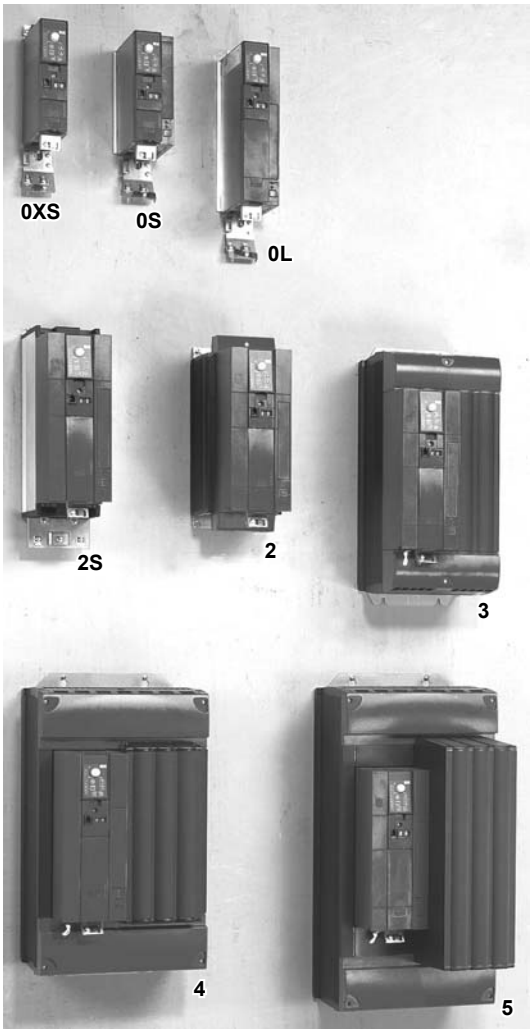
MOVITRAC® MC07B (3-phase supply system) **Part number ("Safe stop" integrated)**		**0550-503-4-00** **829 527 1**	**0750-503-4-00** **829 529 8**
INPUT[1]			
Nominal line voltage	V_{line}	3 × AC 380 – 500 V	
Nominal line frequency	f_{line}	50/60 Hz ±5%	
Nominal line current (at V_{line} = 3 × AC 400 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.

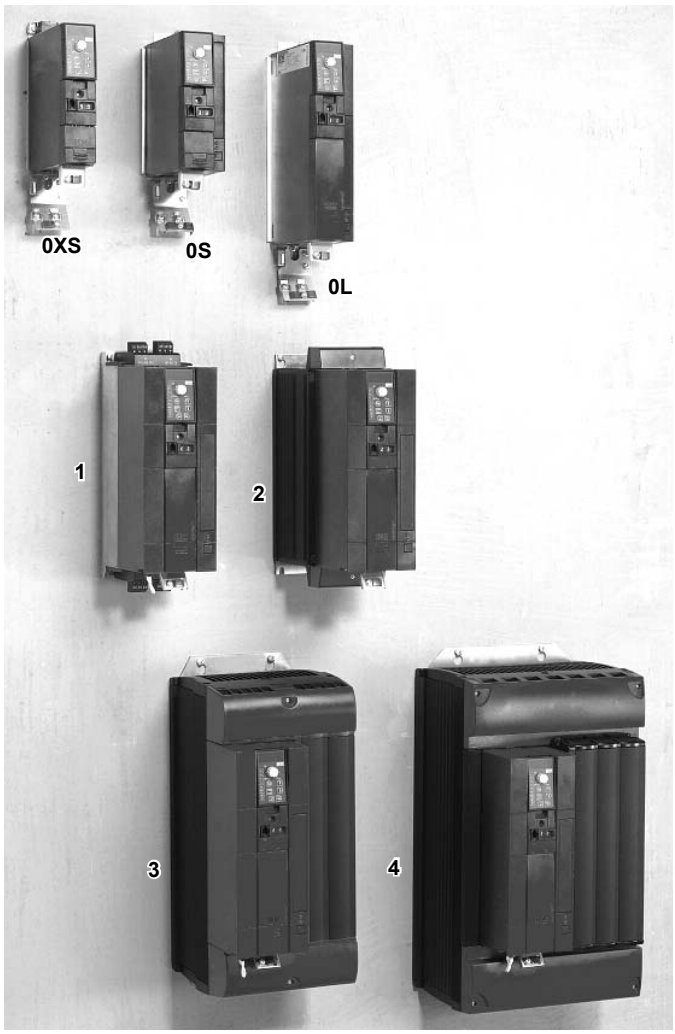
8.1.4 Technical data of MOVITRAC® B, 3 × AC 230 V

Overview of MOVITRAC® B

400 / 500 V

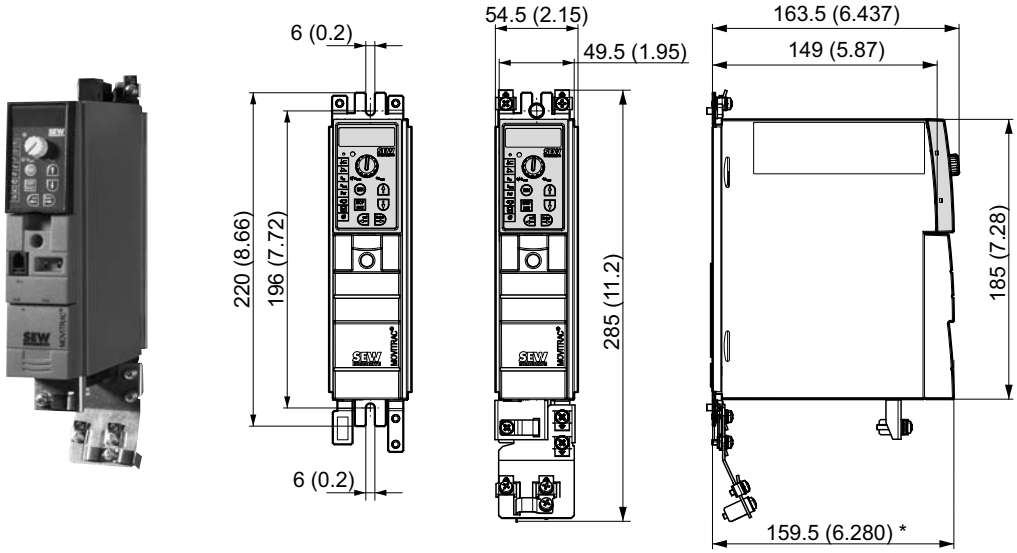


230 V



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

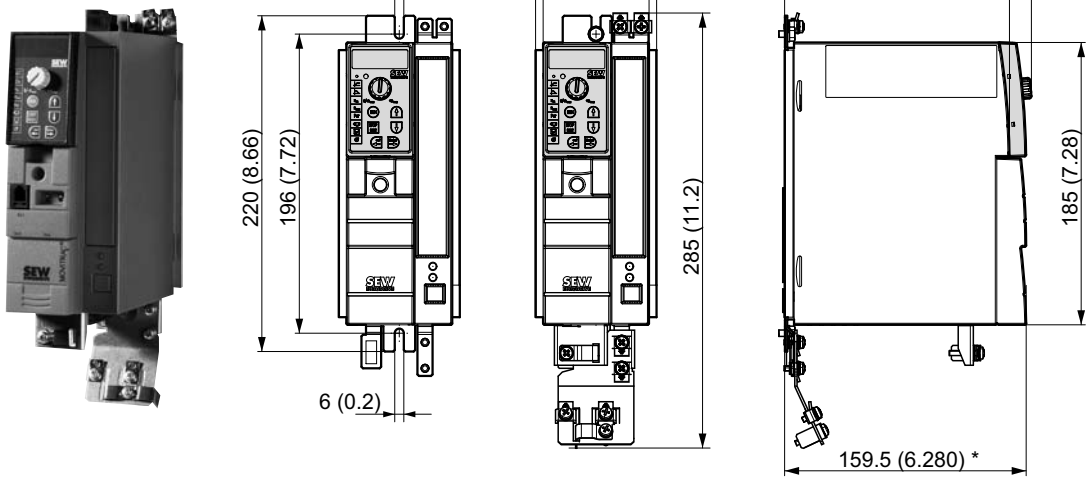
AC 230 V / 3-phase / size 0XS / 0.25 / 0.37 kW / 0.34 / 0.50 HP



* 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

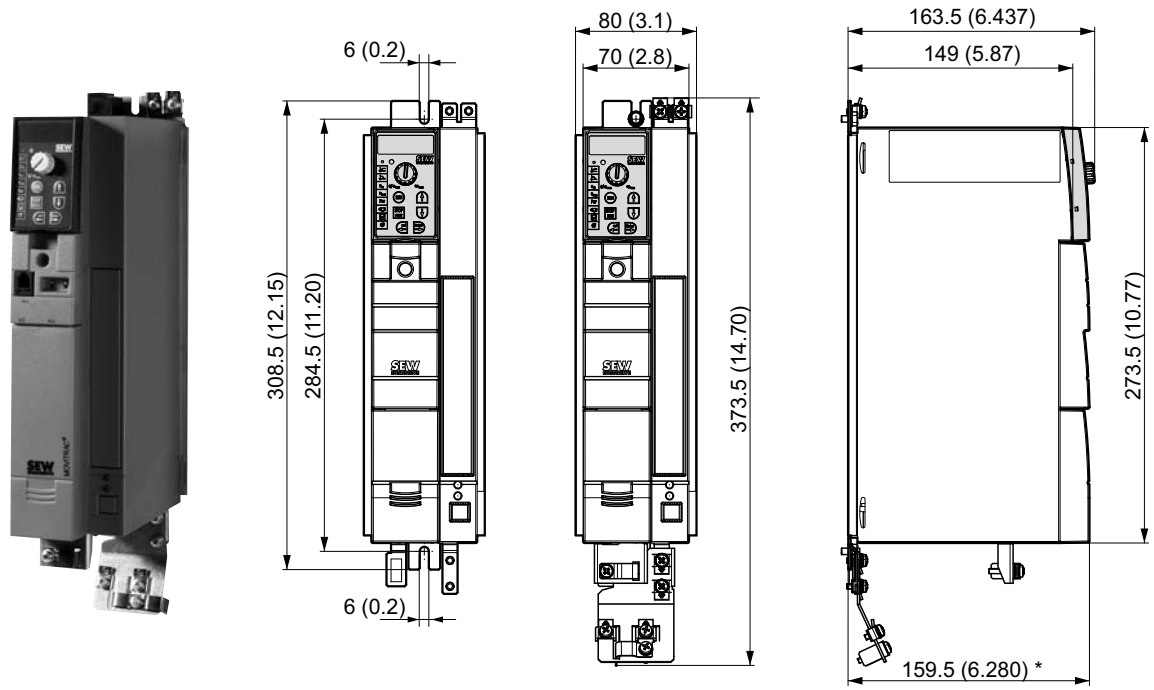


* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system)		**0005-2A3-4-x0**	**0008-2A3-4-x0**
Part number, standard unit (-00) **Part number "Safe stop" (-S0[1])**		**828 501 2** **829 987 0**	**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

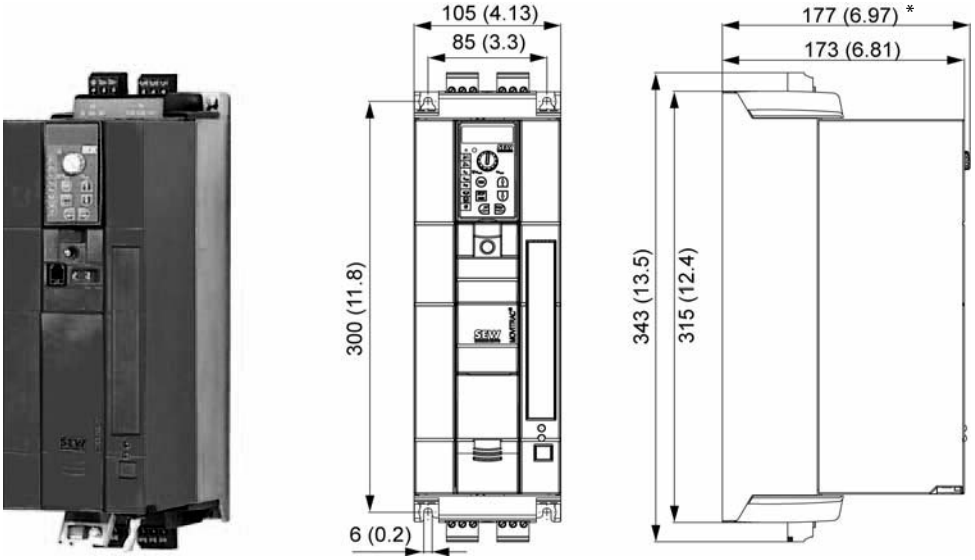


* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase supply system)		**0011-2A3-4-00**	**0015-2A3-4-00**	**0022-2A3-4-00**
Part number standard design (-00)		**828 503 9**	**828 504 7**	**828 505 5**
Part number "Safe technology" (-S0[1])		**829 989 7**	**829 990 0**	**829 991 9**
INPUT				
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.

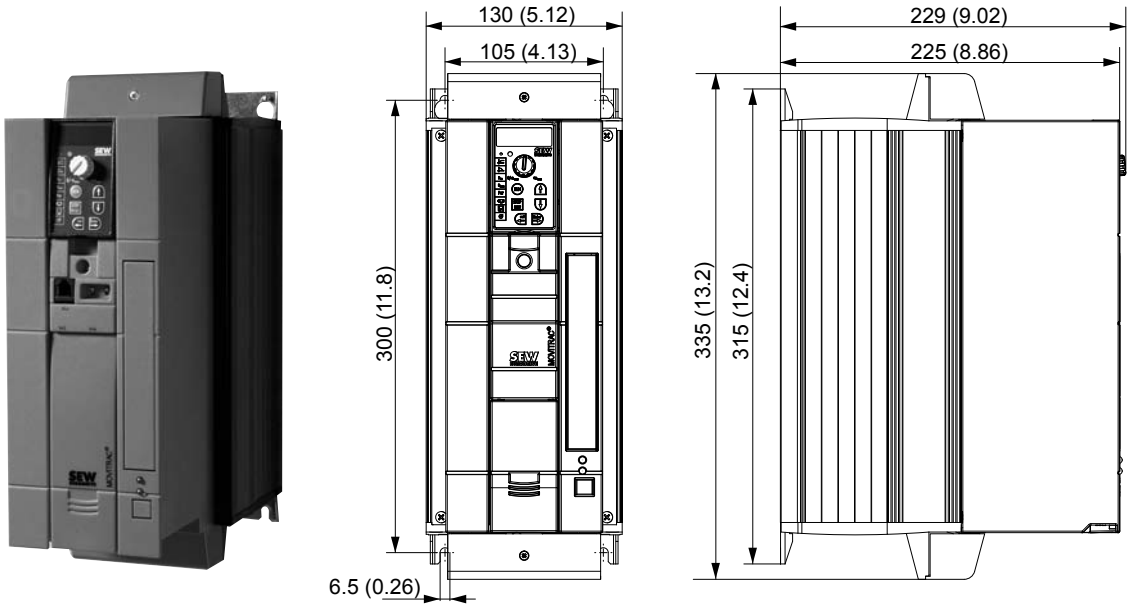
AC 230 V / 3-phase / size 1 / 3.7 kW / 5.0 HP



* 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

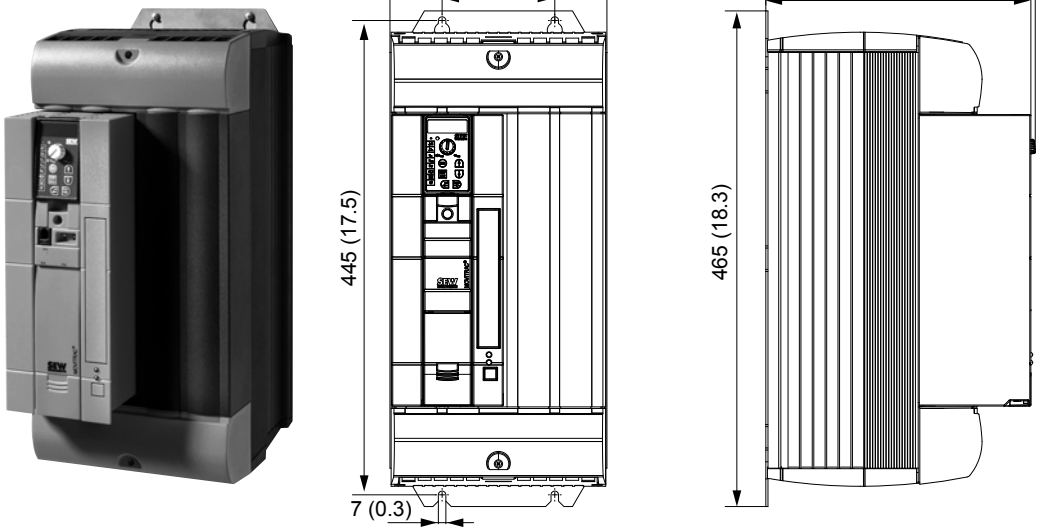
AC 230 V / 3-phase / size 2 / 5.5 / 7.5 kW / 7.4 / 10 HP



* 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	

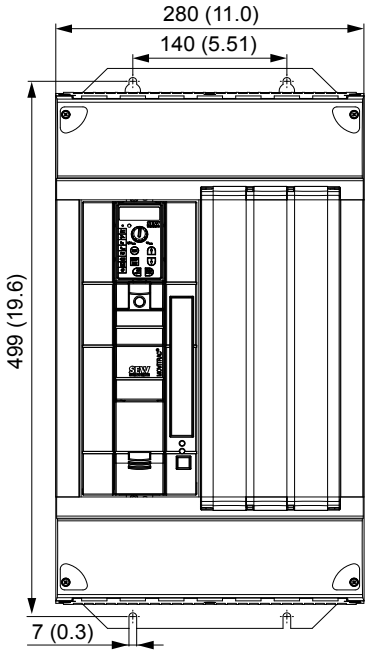
AC 230 V / 3-phase / size 3 / 11 / 15 kW / 15 / 20 HP

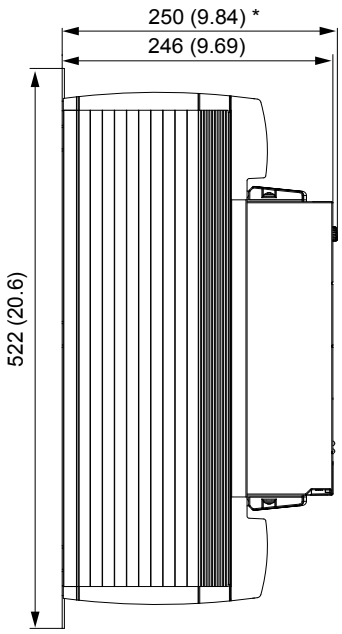


* With front module FSE24B +4 mm (0.16 in)

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





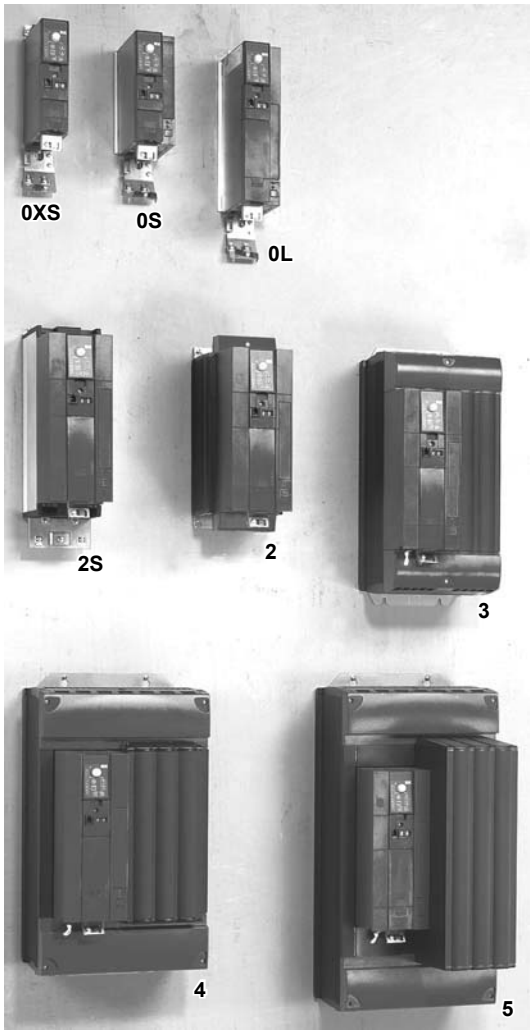
* With front module FSE24B +4 mm (0.16 in)

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	

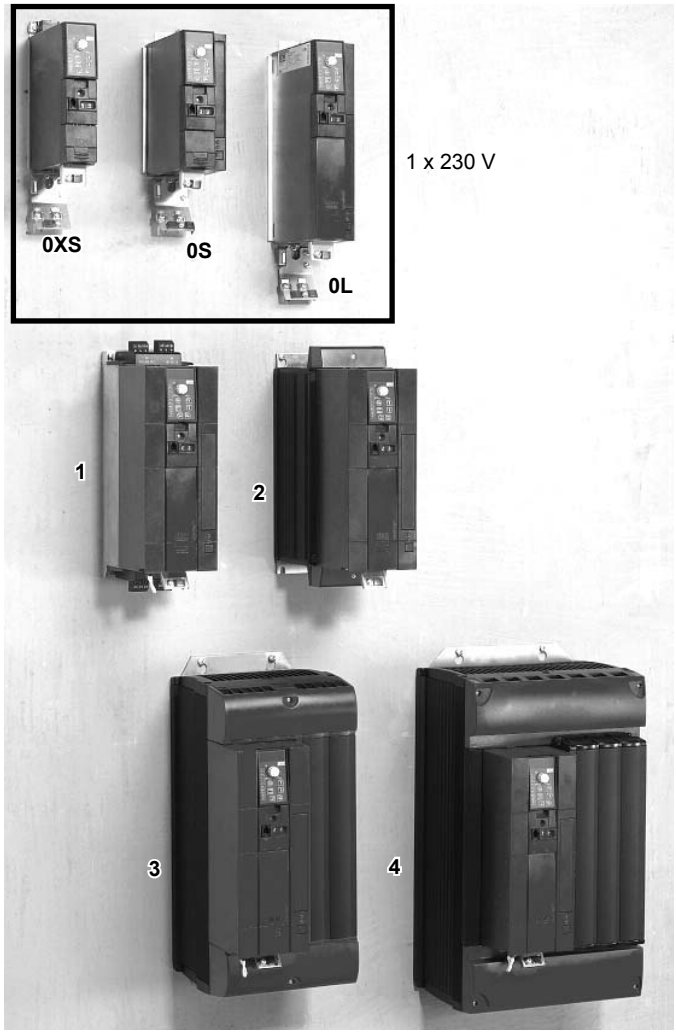
8.1.5 Technical data of MOVITRAC® B, 1 × AC 230 V

Overview of MOVITRAC® B

400 / 500 V

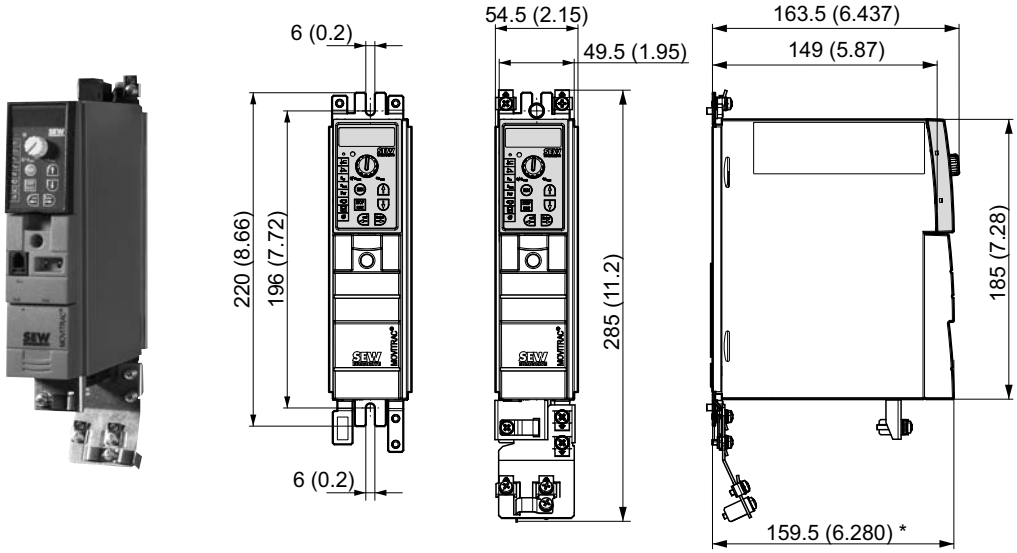


230 V



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

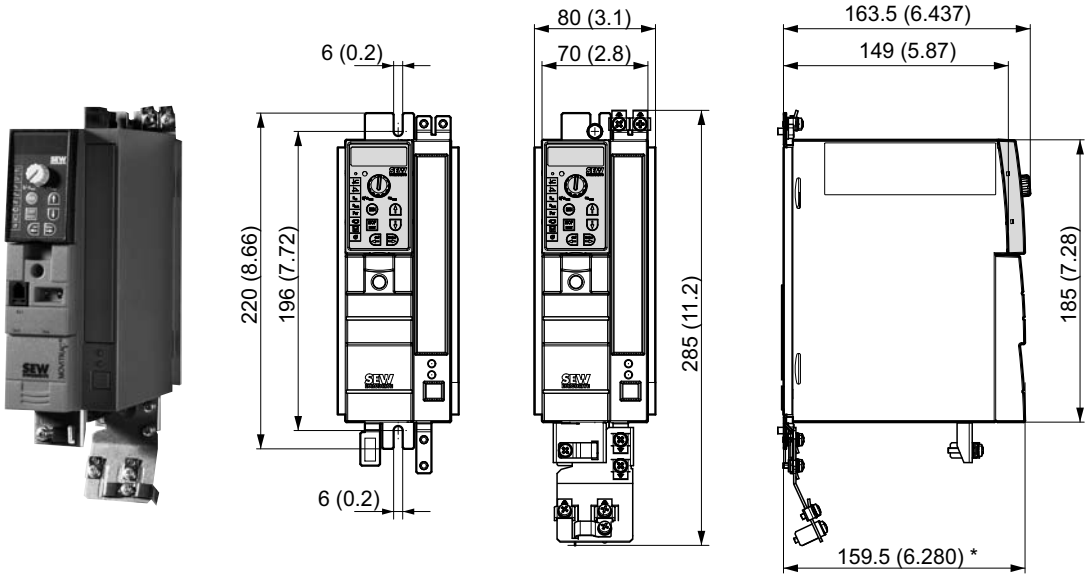
AC 230 V / 1-phase / size 0XS / 0.25 / 0.37 kW / 0.34 / 0.50 HP



* 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	

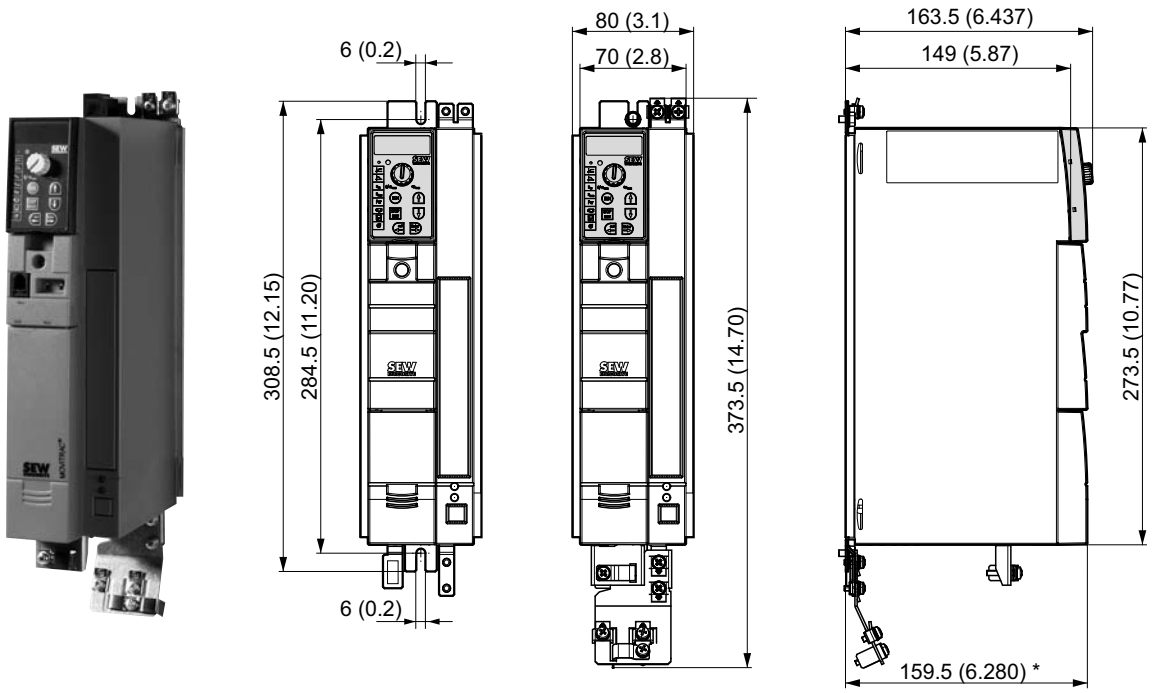
AC 230 V / 1-phase / size 0S / 0.55 / 0.75 kW / 0.74 / 1.0 HP



* 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		

8.1.6 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 169).			
Terminal response times	Digital input and output terminals are updated every 5 ms			
Max. cable cross-section	1.5 mm² (AWG15) without conductor end sleeves 1.0 mm² (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.

8.1.7 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) Two cores per terminal: 0.75 – 1.0 mm² (AWG21 – 17)				
Tightening torque	• Min. 0.22 Nm • Max. 0.25 Nm				
	Size	**Input capacitance**	**Min.**	**Type.**	**Max.**
Safety-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				

8.2 Technical data for accessories and options

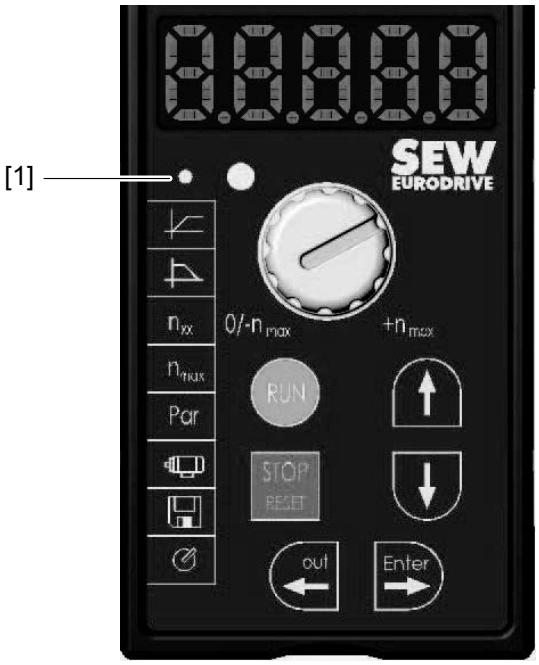
8.2.1 Keypads

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

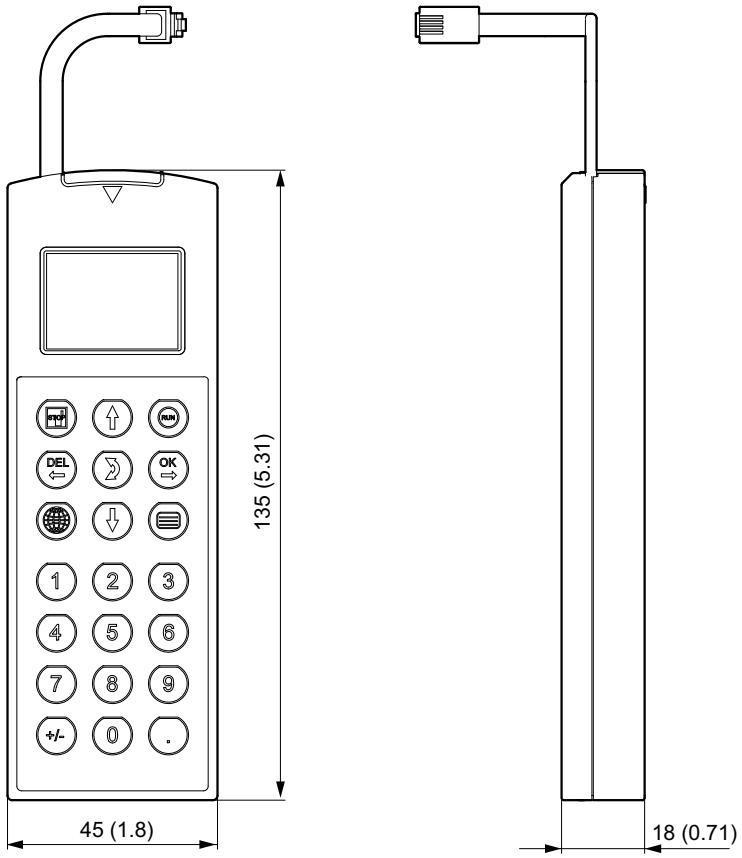
- Illuminated plain text display, choice of 7 languages
- Keypad with 21 keys
- Can be connected via extension cable DKG60B (5 m (20 ft))
- Degree of protection IP40 (EN 60529)

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

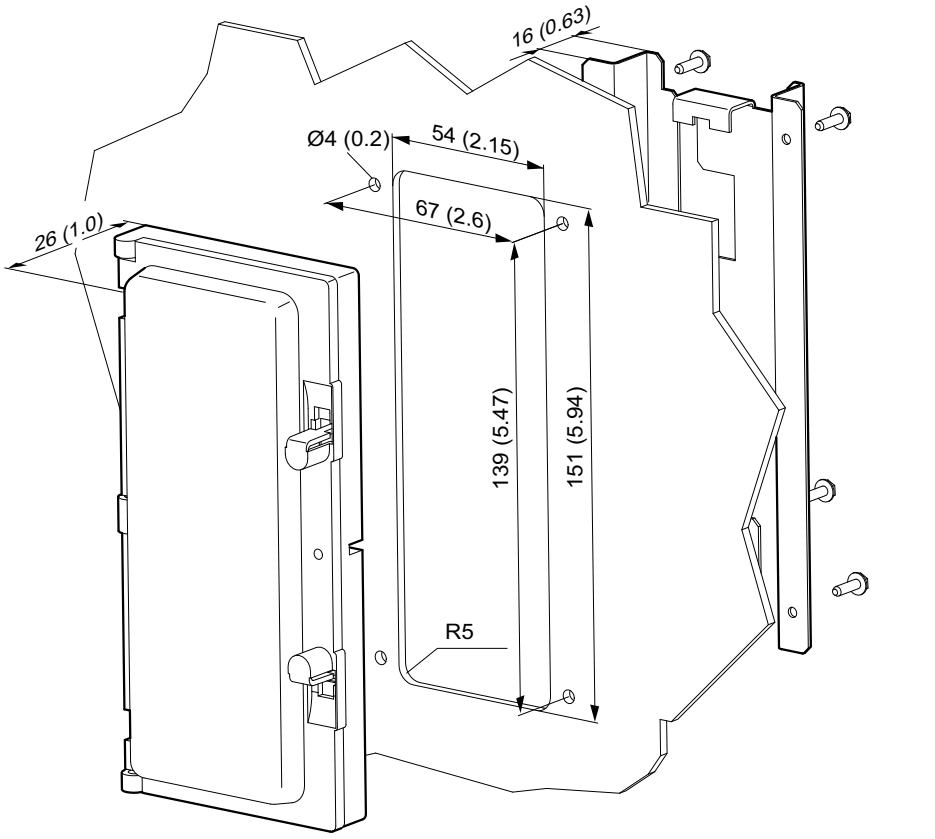
The DBM60B option can be used to mount the keypad close to the inverter (e.g. in the control cabinet door). The DBM60B option consists of a housing in degree of protection IP65 and a 5 m (20 ft) long DKG60B extension cable.

Part numbers

- DBM60B 08248532
- DKG60B 08175837

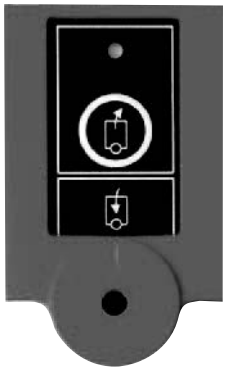
Dimension drawing DBM60B/DKG60B

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



All dimensions in mm (in)

UBP11A parameter module



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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

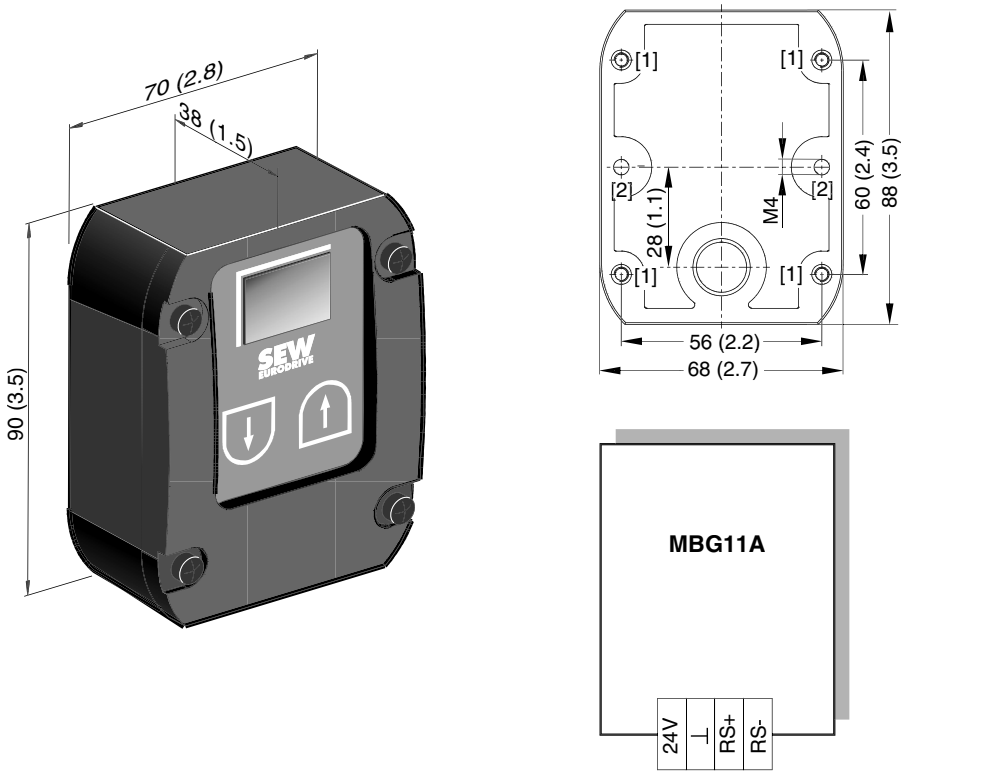
Part number 822 547 8

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).



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[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

8.2.2 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).

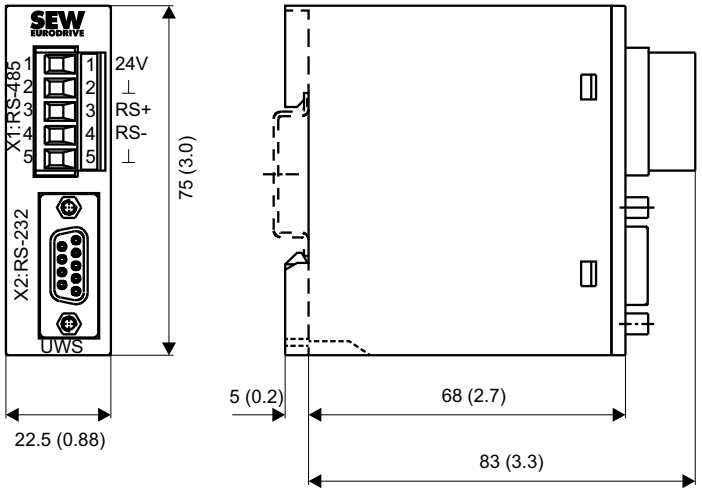
RS232 interface The connection between UWS11A and PC is made using a commercially available serial interface cable (shielded!).

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 mm² (AWG 24 - 12)

2 cores per terminal 0.20 – 1 mm² (AWG 24 – 17)

Dimension drawing of UWS11A



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All dimensions in mm (in)

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

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.

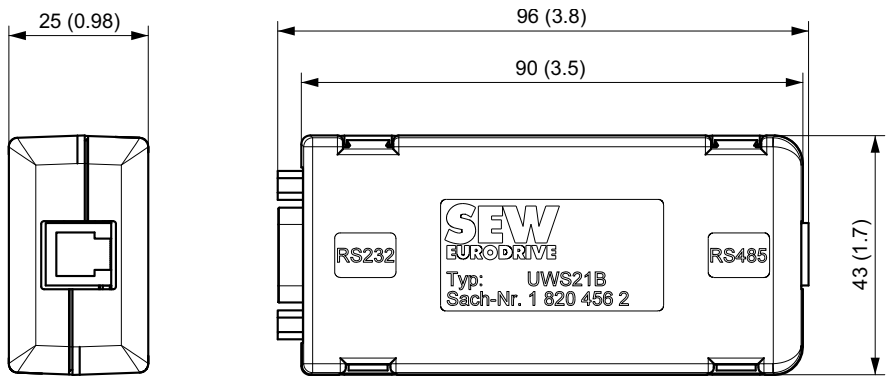
RS232 interface The connection of UWS21B with PC is made using a standard serial interface cable (shielded).

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 for UWS21B



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

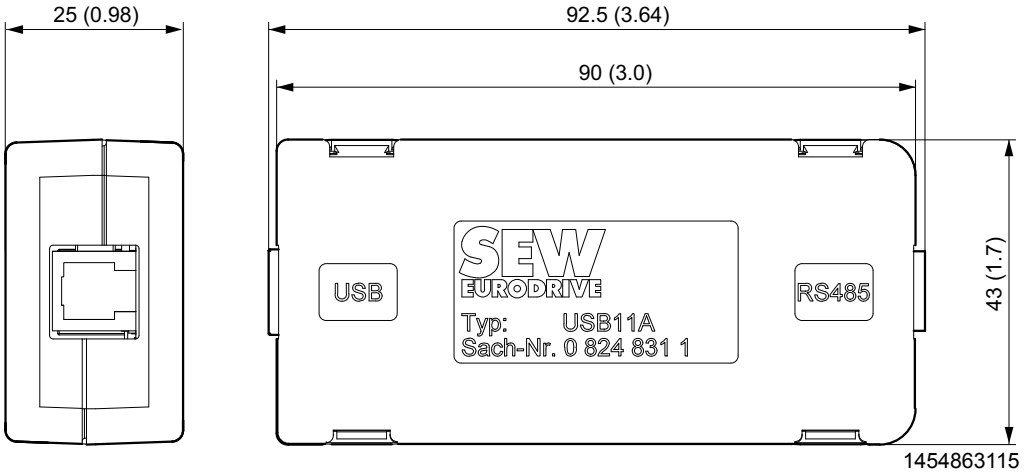
MOVITRAC® B and USB11A are connected using a serial interface cable with RJ10 connectors.

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)

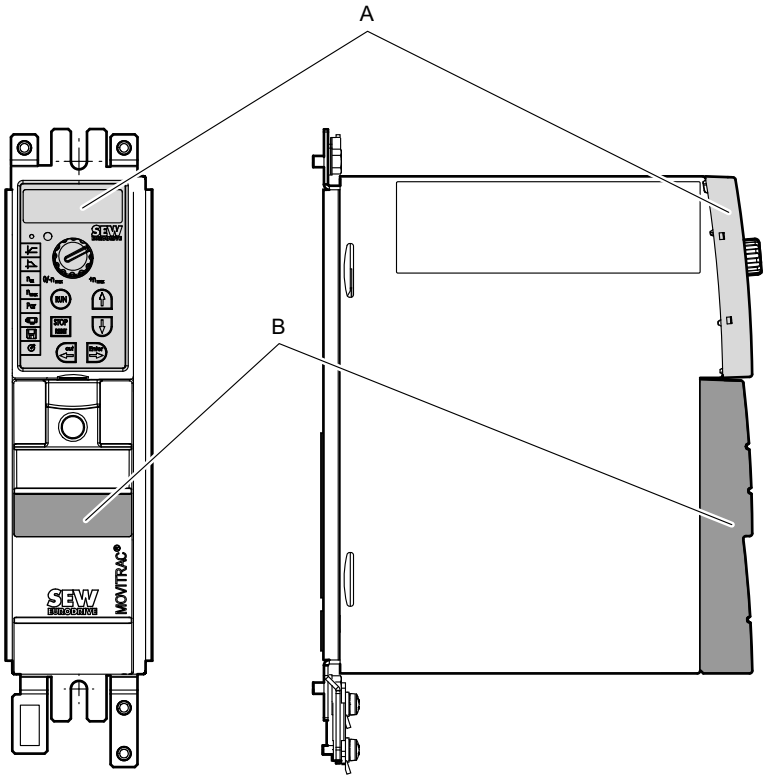
8.2.3 Front modules

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

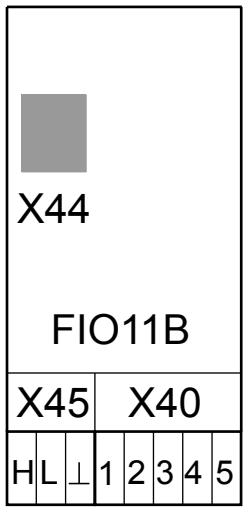
FIO11B analog module

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

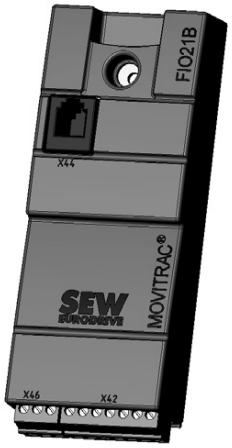
FIO21B digital module

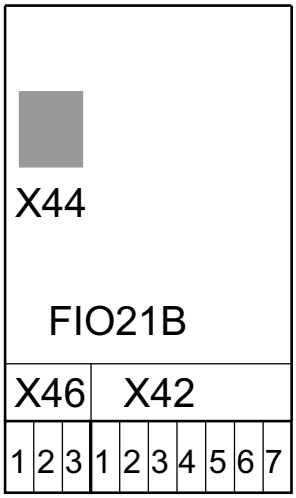
Part number 1822 541 1

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

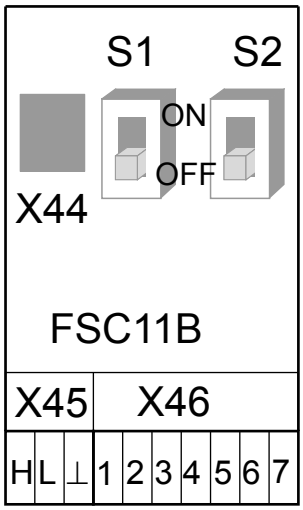
FSC11B communication module

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

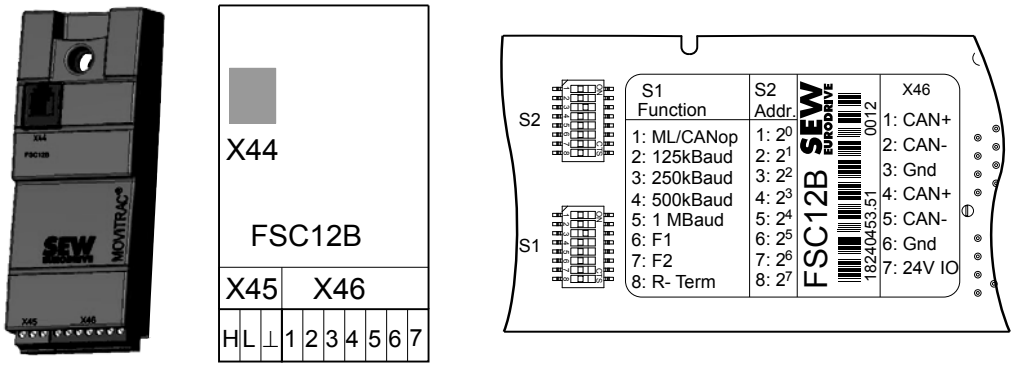
Function	Terminal	Designation	Data
System bus (SBus)	X46:1 X46:2 X46:3 X46:4 X46:5 X46:6 X46:7	SC11: SBus high SC12: SBus low GND: Reference potential SC21: SBus high SC22: SBus low GND: Reference potential 24VIO: Auxiliary voltage / External voltage supply	CAN bus according to CAN specification 2.0, 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



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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.

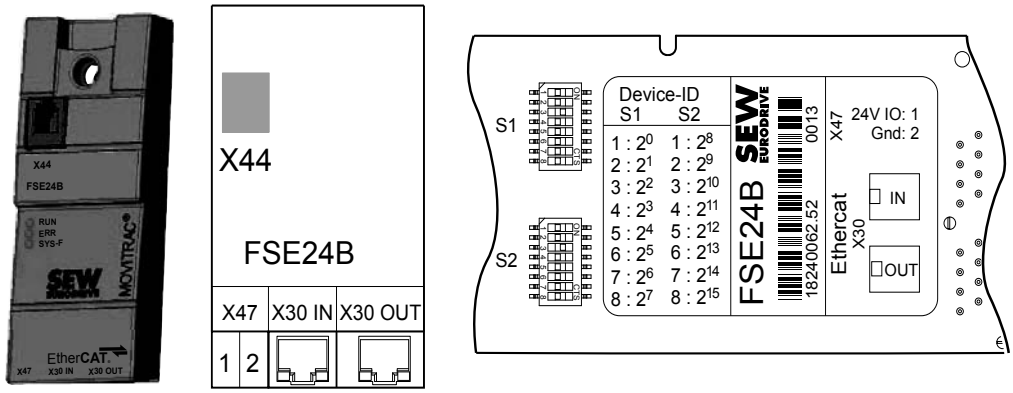
EtherCAT® module FSE24B

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.

8.2.4 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

- **⚠ NOTICE**

  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 187). 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

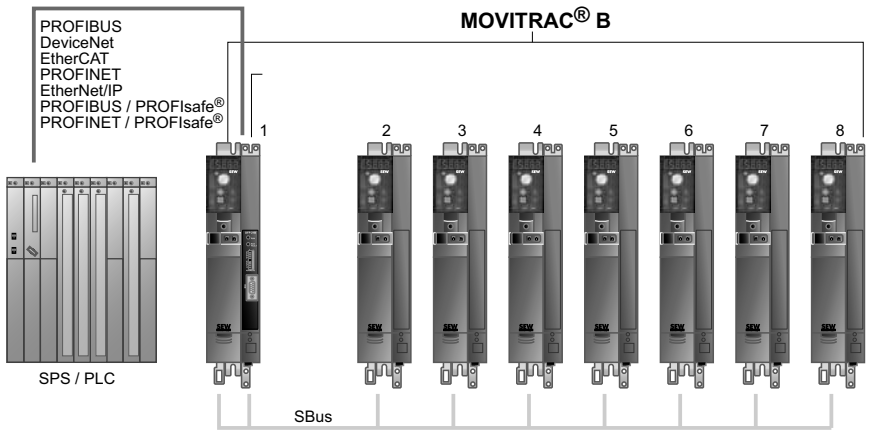
Fieldbus gateways convert standard fieldbuses into the SEW SBus. This means that up to 8 inverters can be triggered using one gateway.

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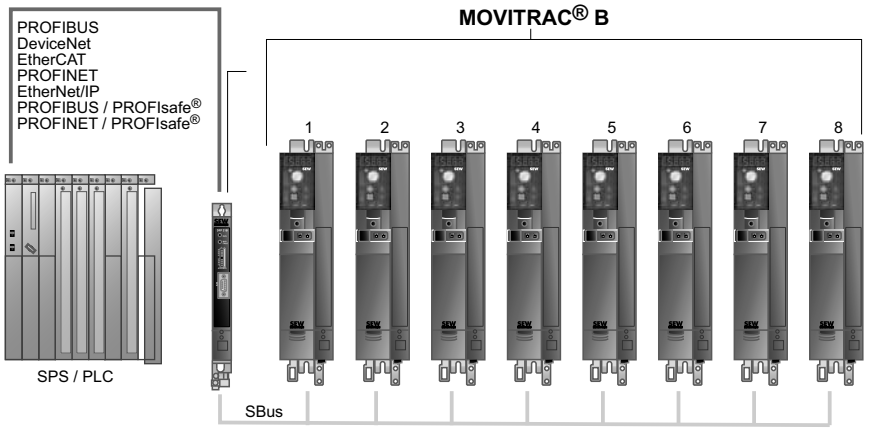
- In separate housing: The DF..B fieldbus interface is mounted in an UOH11B housing.



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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.

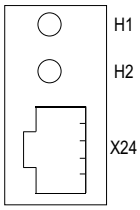
2) As an alternative, you can connect each MOVITRAC® B unit to an EtherCAT® network via FSE24B front module.

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.

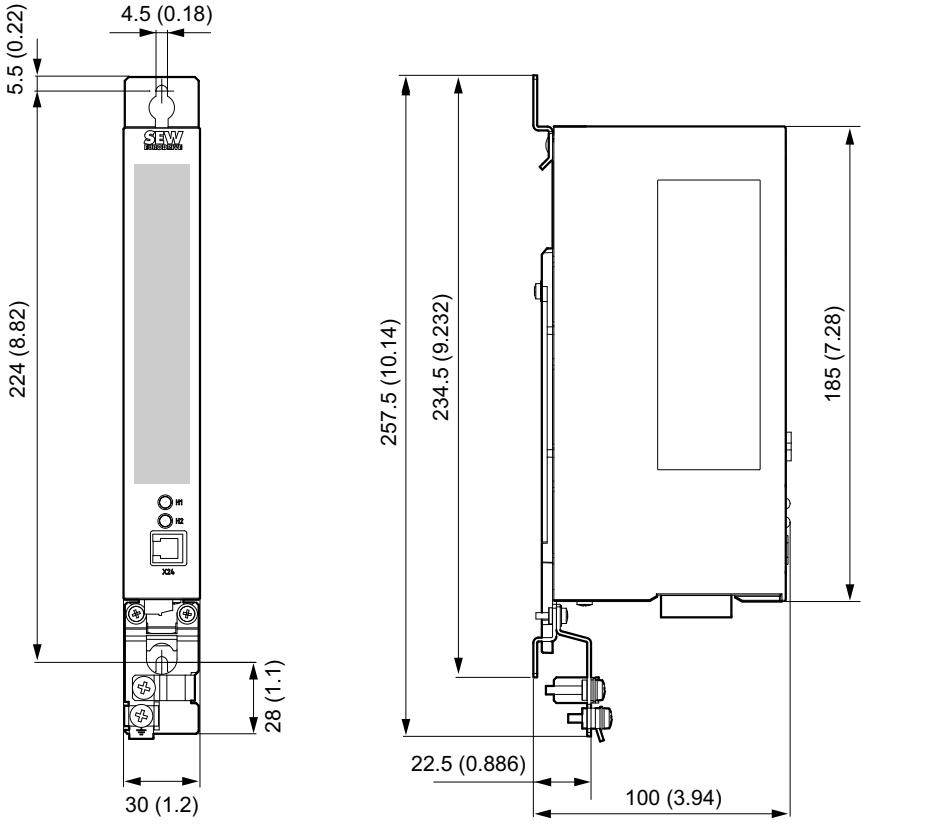
Functional principle

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 for UOH

All dimensions are specified in mm (in).



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8.2.5 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:

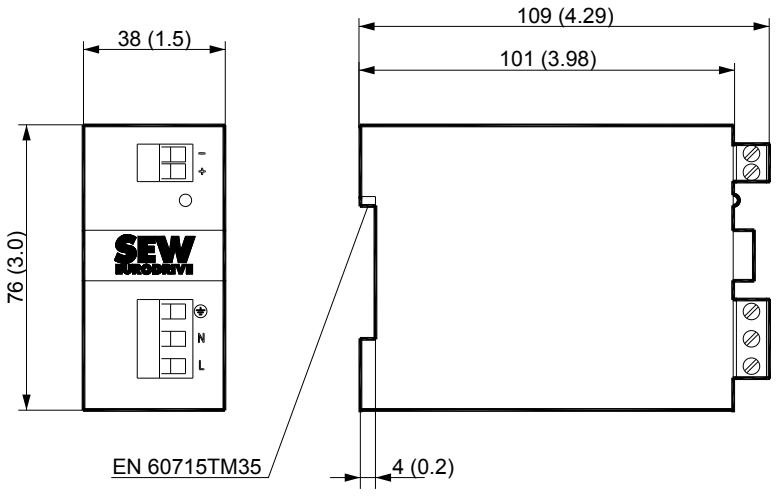
- "Controller DHE21B / DHF21B / DHR21B (standard), DHE41B / DHF41B / DHR41B (advanced)" manual
- "MOVI-PLC® basic DHP11B Controller" manual

8.2.6 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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8.2.7 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/61B Regenerative Power Supply Unit and MDX62B Motor Inverter" system manual. This manual can be ordered from SEW-EURODRIVE.

MOVIDRIVE® MDR60A supplies the DC link of the connected MOVIDRIVE® inverters 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

MOVIDRIVE® MDR60A	0150-503-00 (size 2) 0370-503-00 (size 3) 0750-503-00 (size 4)
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 $R_i \approx 3.0\ k\Omega$, $I_E \approx 10$ 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

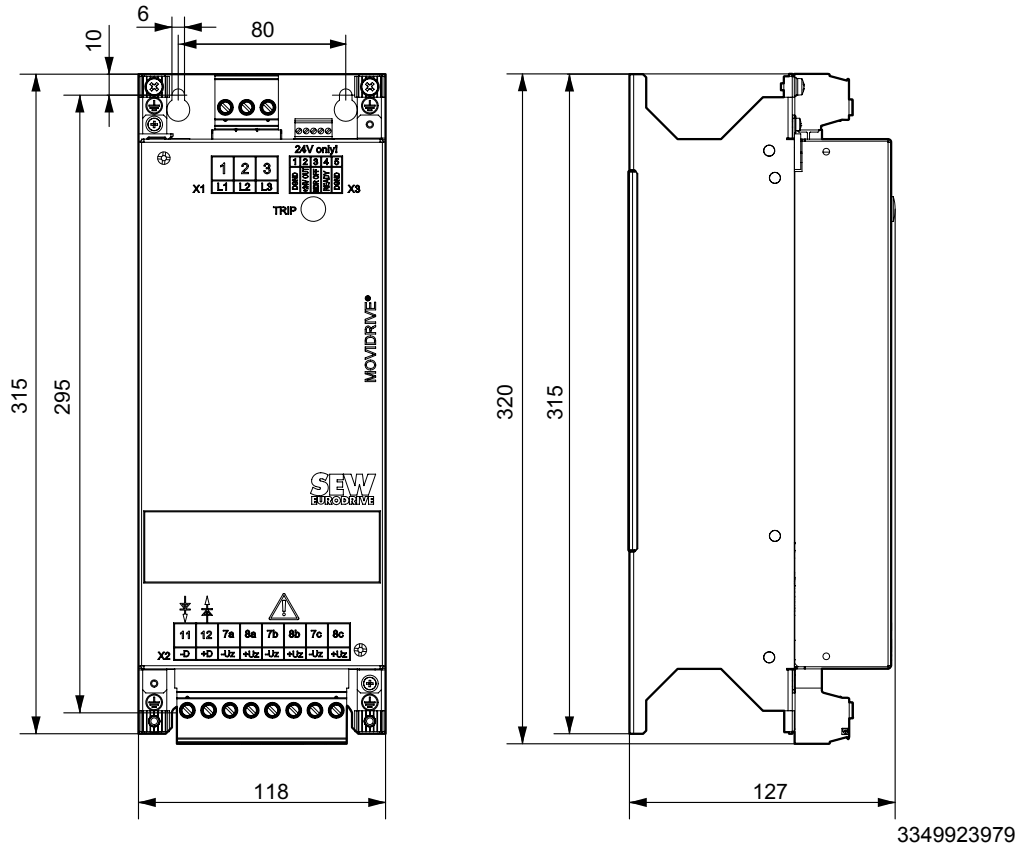
MOVIDRIVE® MDR60A **Standard variant** **Variant with coated printed circuit boards**		**Size 4** **0750-503-00** **0750-503-00/L**
Part number		826 556 9 829 673 1
INPUT		
Nominal line voltage (according to EN 50160)	V_{line}	3 × AC 380 V - 500 V
Line frequency	f_{line}	50 Hz - 60 Hz ±5%
Nominal connected 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

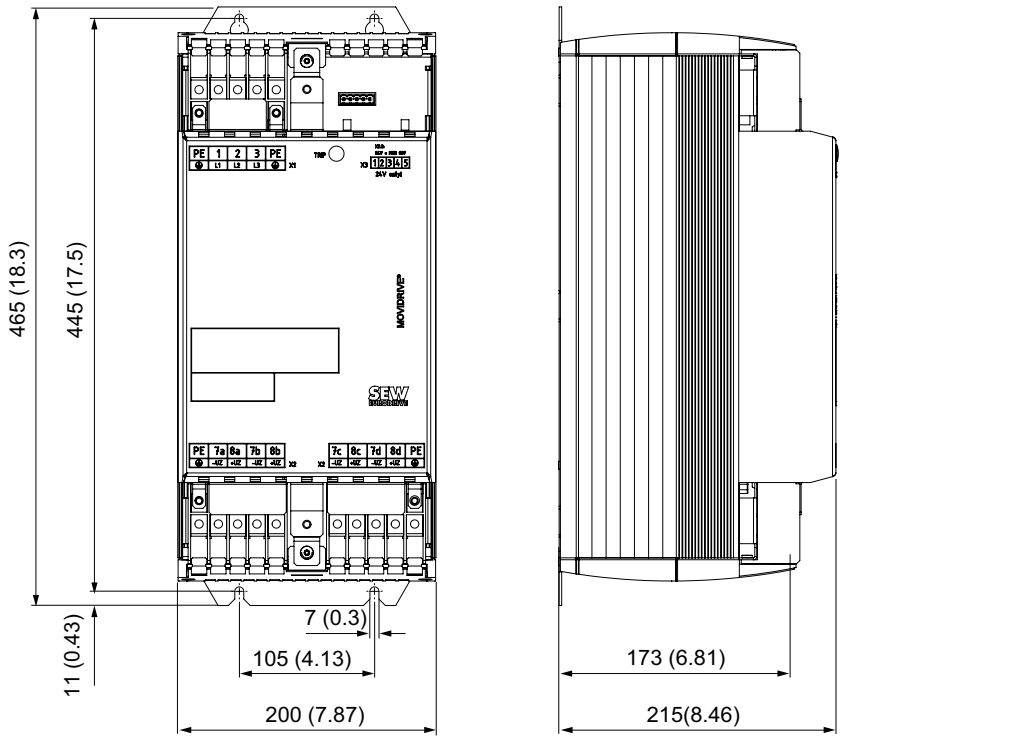


All dimensions in mm (in)

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

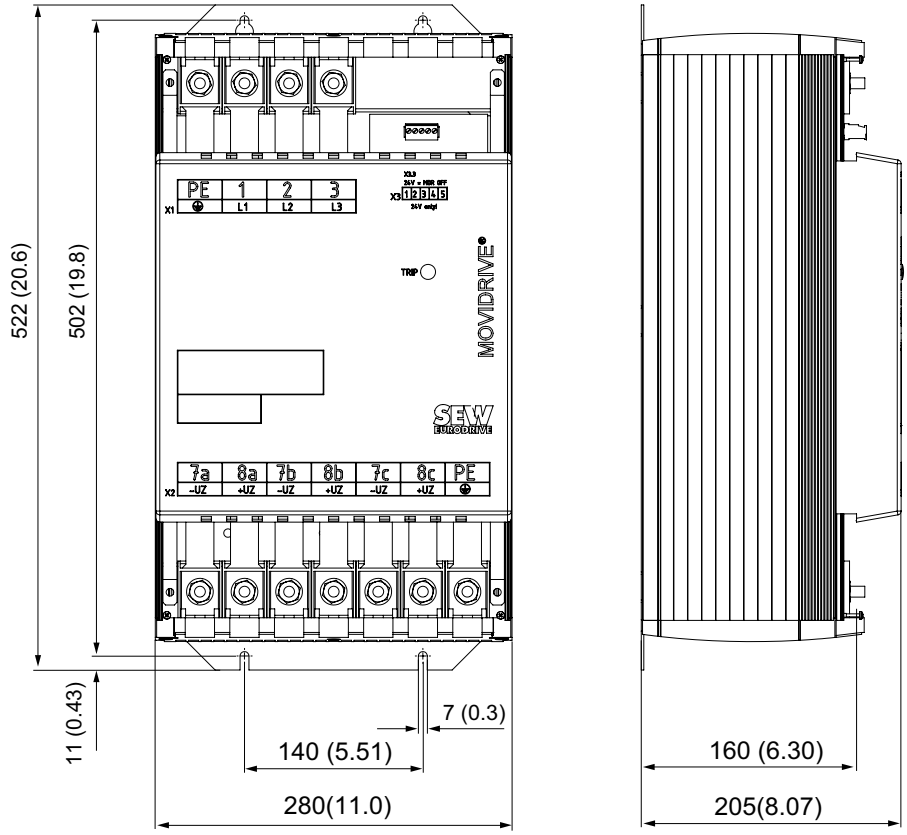


All dimensions in mm (in)

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 cabless 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

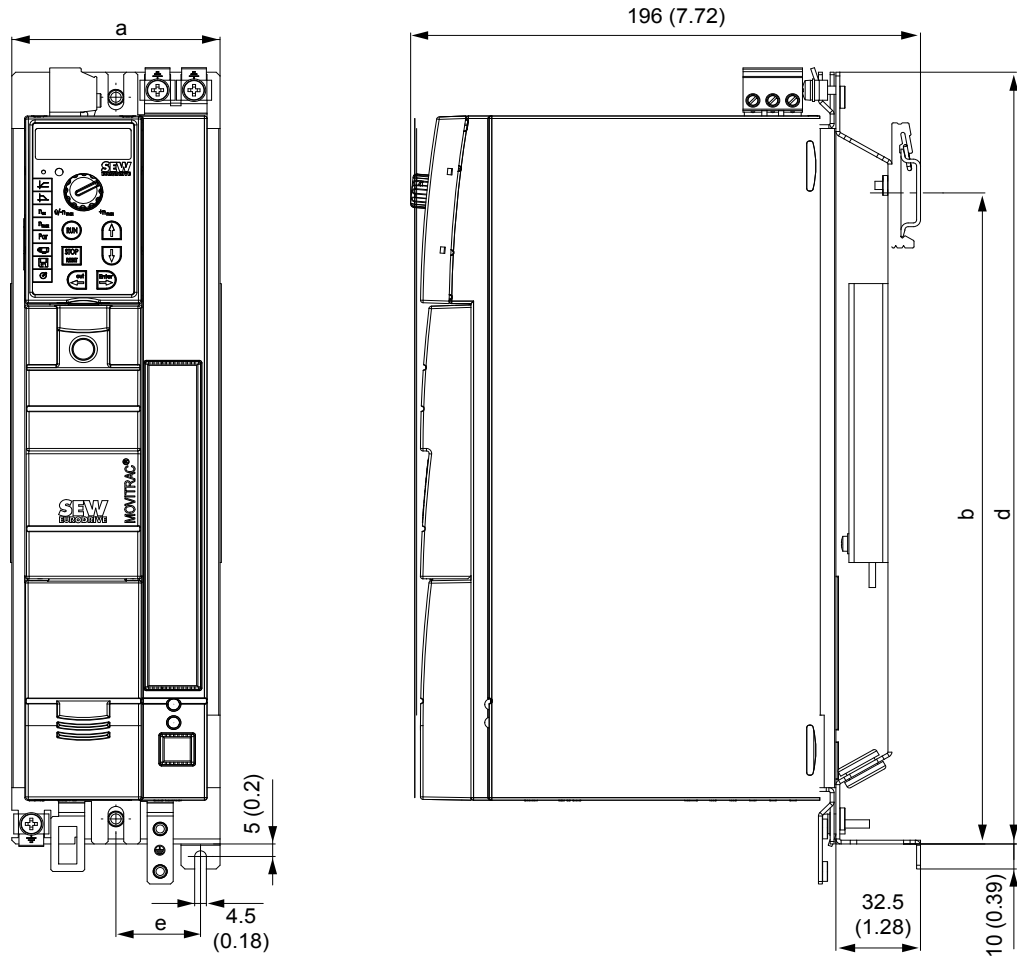
Refer to the "MOVIDRIVE® MDR60A Regenerative Power Supply Unit" system manual for information on the DC link connection. This system manual can be ordered from SEW-EURODRIVE.

8.2.8 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)

8.3 Technical data for braking resistors, chokes and filters

8.3.1 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 therefore mounted on the control cabinet roof.

Plan for a load derating of 4 % per 10 K from an ambient temperature of 45 °C (113 °F). Do not exceed the maximum ambient temperature of 80 °C (176 °F). Note the maximum permissible temperature of other components (e.g. MOVITRAC® B) when installing braking resistors in the control cabinet.

UL and cUL approval

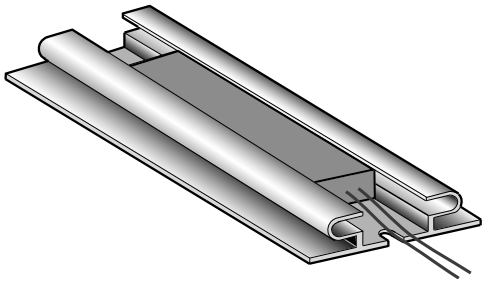
Type BW.. braking resistors are UL and cUL approved in conjunction with MOVITRAC® B frequency inverters. SEW-EURODRIVE will provide certification on request. The BW..-T and BW..-P braking resistors have cRUus approval independent of the MOVITRAC® B inverter.

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*).



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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

The 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 the 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 the wire and grid resistors is higher than in the flat-type braking resistors (→ chapter "Braking resistor selection")
- A temperature switch is integrated in the BW..-T braking resistor
- A thermal over-current relay is integrated in the BW..-P braking resistor

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

Do not use electronic or electromagnetic fuses because these can be triggered even in case of short-term excess currents that are still within the tolerance range.

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

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

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

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 50 % 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		

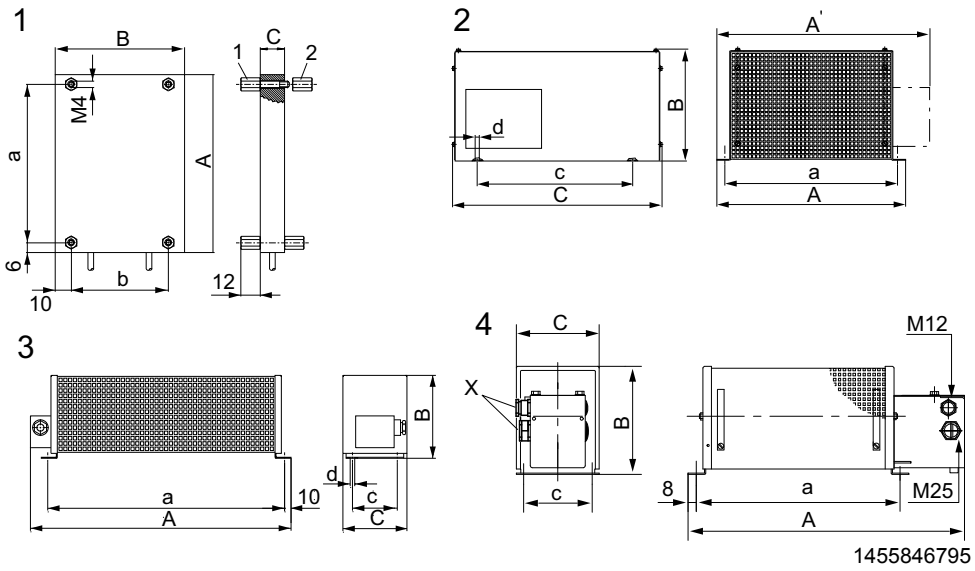
1) Physical power limit due to DC link voltage and resistance value

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

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



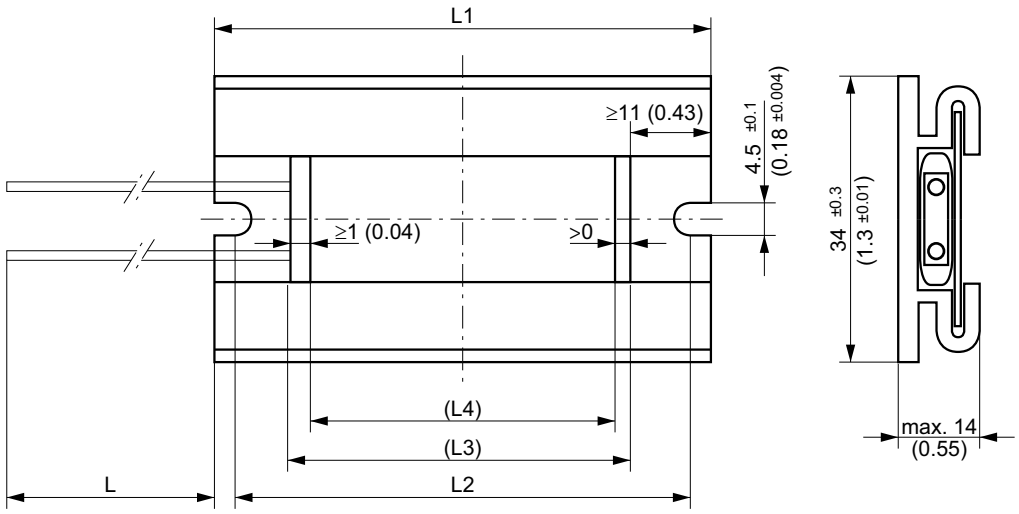
BW... :

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

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	Mass 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)
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)

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

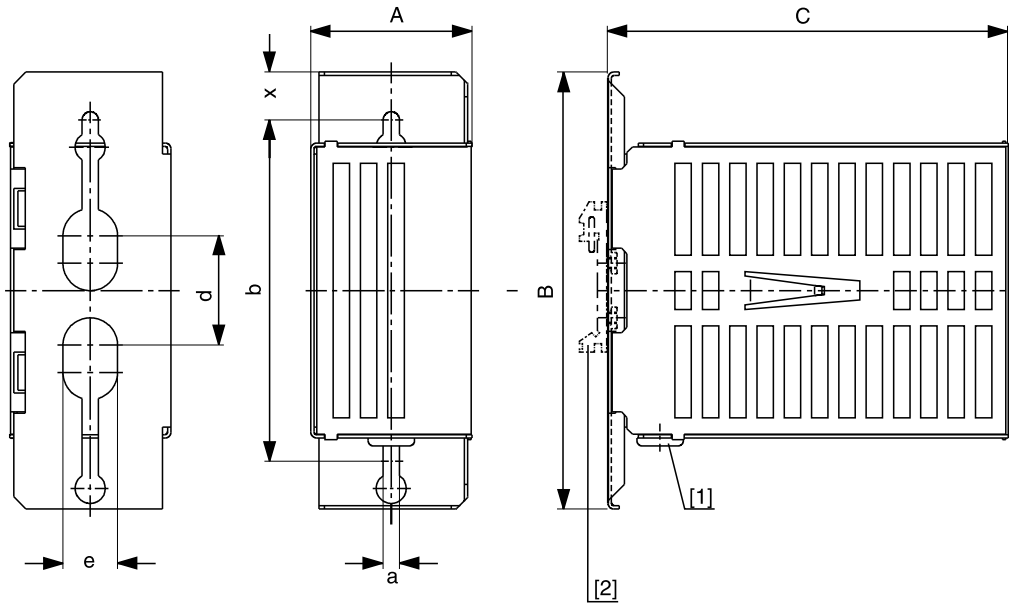
BS... touch guard

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)

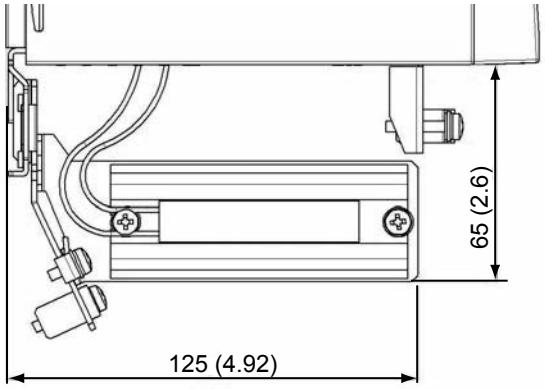
Mounting rail installation

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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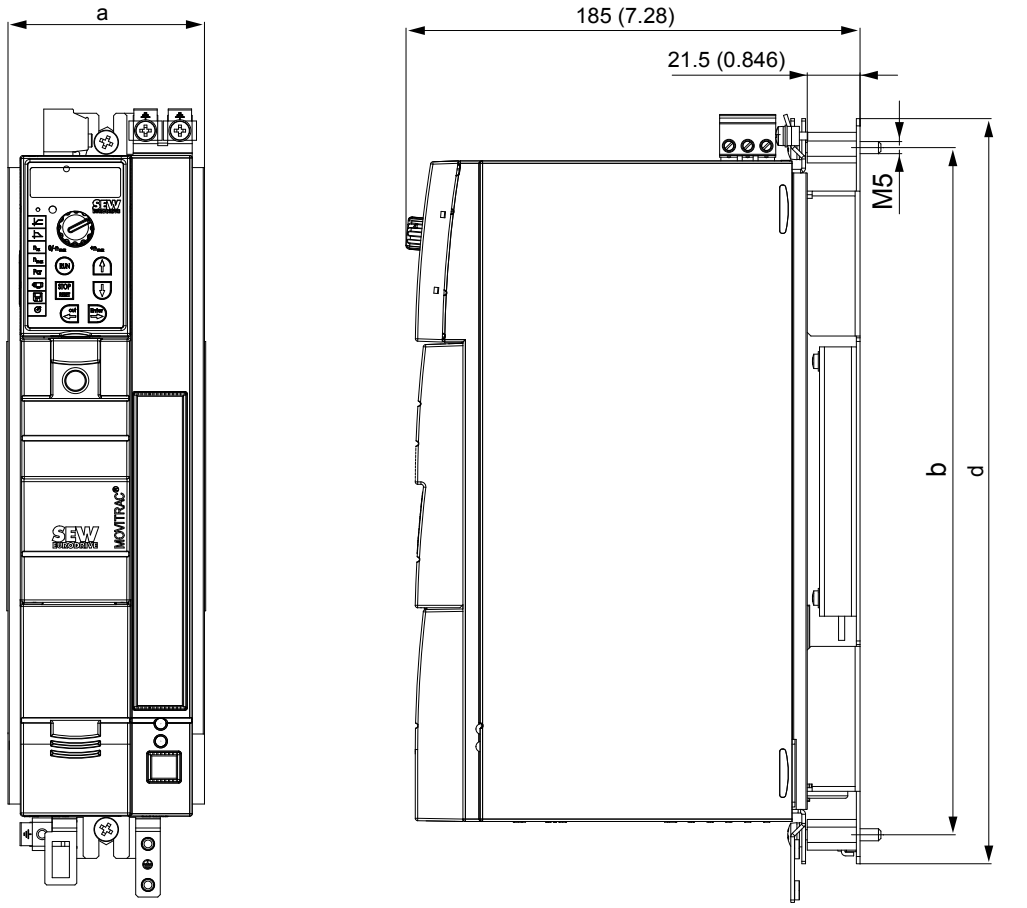
FKB11/12/13B for submounting braking resistors

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		

Dimension drawing



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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)

8.3.2 Line chokes ND

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

Line choke type	ND 010-301	ND 020-151
Part number	826 972 6	826 973 4
Nominal voltage V_N	1 × AC 230 V ±10%	
Ambient temperature °C	– 25 °C to +45 °C	
Degree of protection	IP00 (EN 60529)	
Nominal current I_N	AC 10 A	AC 20 A
Power loss at I_N P_V	6 W	10 W
Inductance L_N	3 mH	1.5 mH
Terminal strip	4 mm^2 (AWG10)	10 mm^2 (AWG8)
Tightening torque	0.6 Nm / 5 lb in	1.5 Nm / 13 lb in
Suitable for MOVITRAC® B		
1-phase 230 V	0003 – 0008	0011 – 0022

Line choke type		ND 020-013	ND045-013	ND085-013	ND150-013
Part number		826 012 5	826 013 3	826 014 1	825 548 2
Nominal voltage V_N		3 × AC 200 – 500 V ±10 %			
Ambient temperature °C		– 25 °C to +45 °C			
Degree of protection		IP00 (EN 60529)			
Nominal current I_N		AC 20 A	AC 45 A	AC 85 A	AC 150 A
Power loss at I_N P_V		10 W	15 W	25 W	65 W
Inductance L_N		0.1 mH			
Terminal strip		4 mm^2 (AWG10)	10 mm^2 (AWG8)	35 mm^2 (AWG2)	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 one three-phase line choke

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

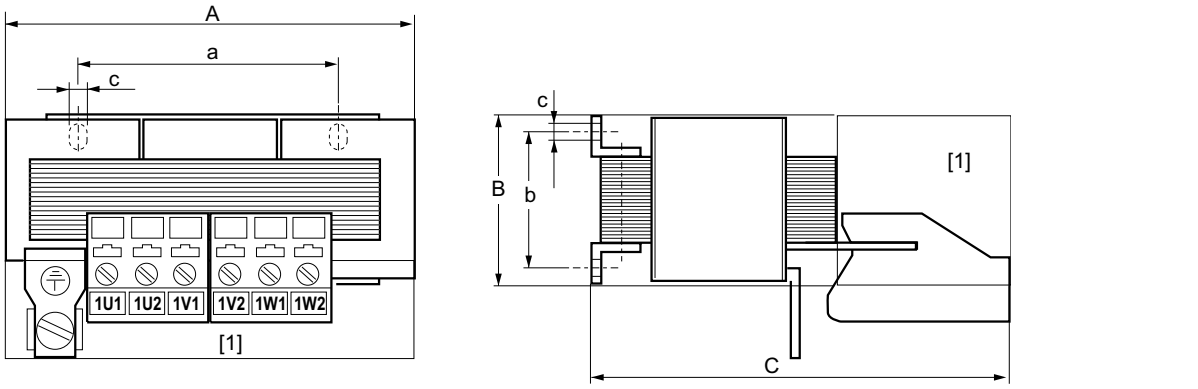
- The line contactor must be designed for the total current.
- The fuse must correspond to the nominal current of the line choke.
- The symmetric connection of the MOVITRAC® B to line choke.

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..

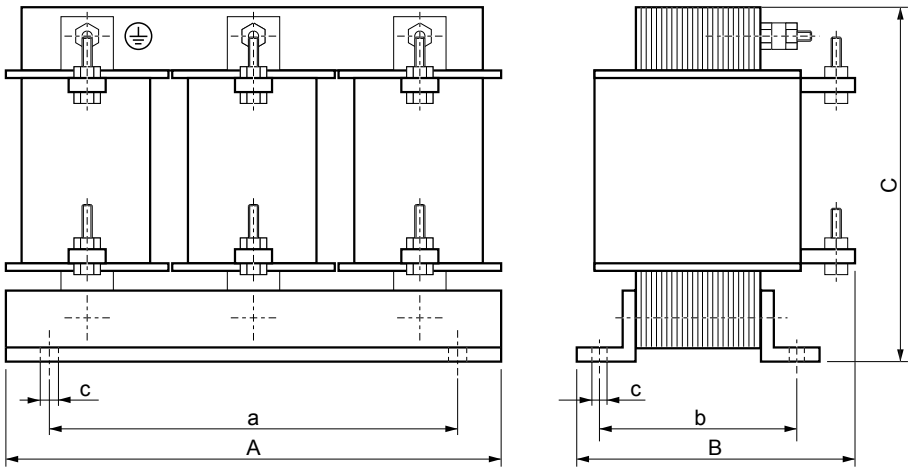


[1] Space for installation terminals
Any mounting position

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..



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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)

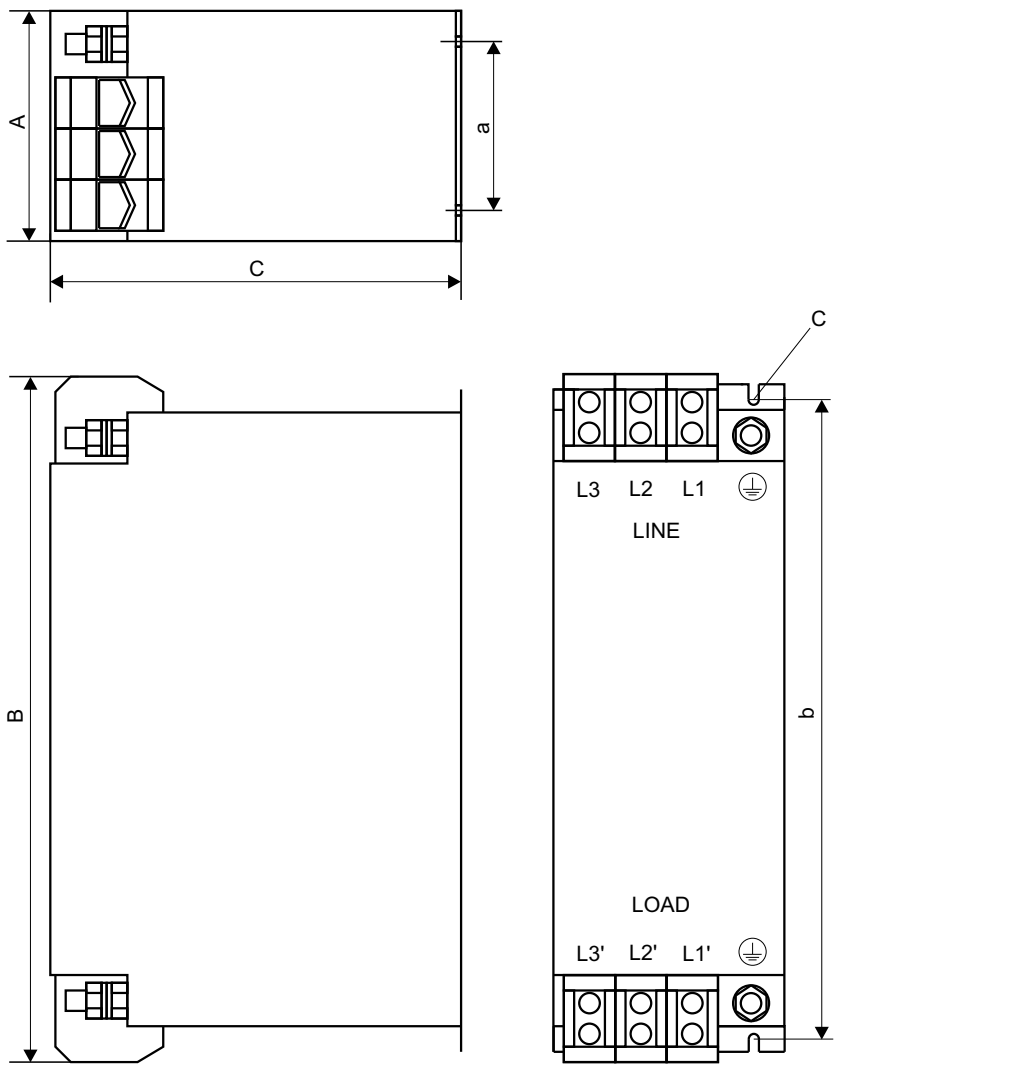
8.3.3 NF line filter

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

Type		NF009-503	NF014-503	NF018-503	NF035-503	NF048-503
Part number		827 412 6	827 116 X	827 413 4	827 128 3	827 117 8
Nominal voltage		3 × AC 200 – 500 V ±10 %				
Ambient temperature		– 25 °C to +45 °C				
Degree of protection		IP20 (EN 60529)				
Nominal current		AC 9 A	AC 14 A	AC 18 A_{AC}	AC 35 A	AC 48 A
Power loss		6 W	9 W	12 W	15 W	22 W
Leakage current		≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 40 mA
Connections PE screw		4 mm² (AWG10) M5			10 mm² (AWG8) M5/M6	
Tightening torque		0.6 – 0.8 Nm / 5 – 7 lb in			1.8 Nm / 16 lb in	
Suitable for MOVITRAC® B						
3 × 400 / 500 V	100% I_N	0003 – 0040	0055 / 0075	–	0110 / 0150	0220
	125% I_N	0003 – 0030	0040 / 0055	0075	0110	0150
3 × 230 V	100% I_N	0015 / 0022	0037	–	0055 / 0075	0110
	125% I_N	0015	0022	0037	0055 / 0075	–

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

Dimension drawing of line filter NF009-503 – NF150-503



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)

8.3.4 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.

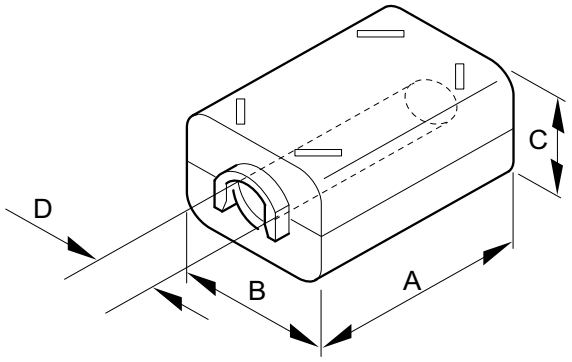
The delivery scope contains 3 folding ferrites. Install them according to the installation instructions.

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).



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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)

8.3.5 HD output chokes

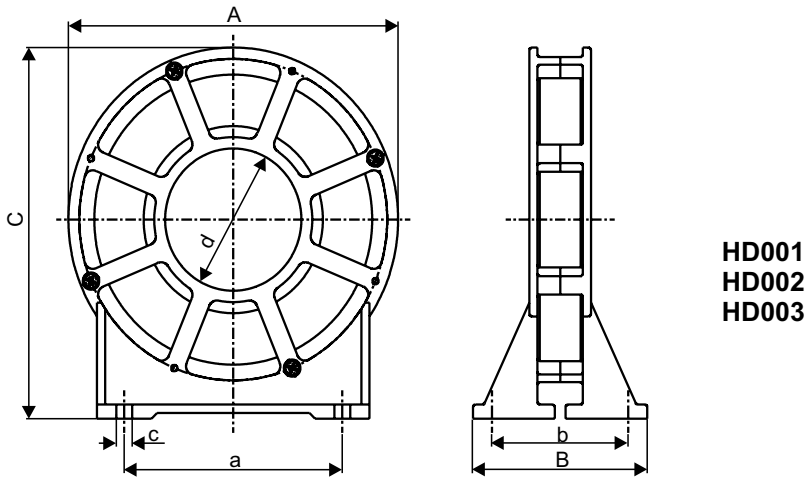
You can reduce the radiated interference of the unshielded motor cable by using an output choke.

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

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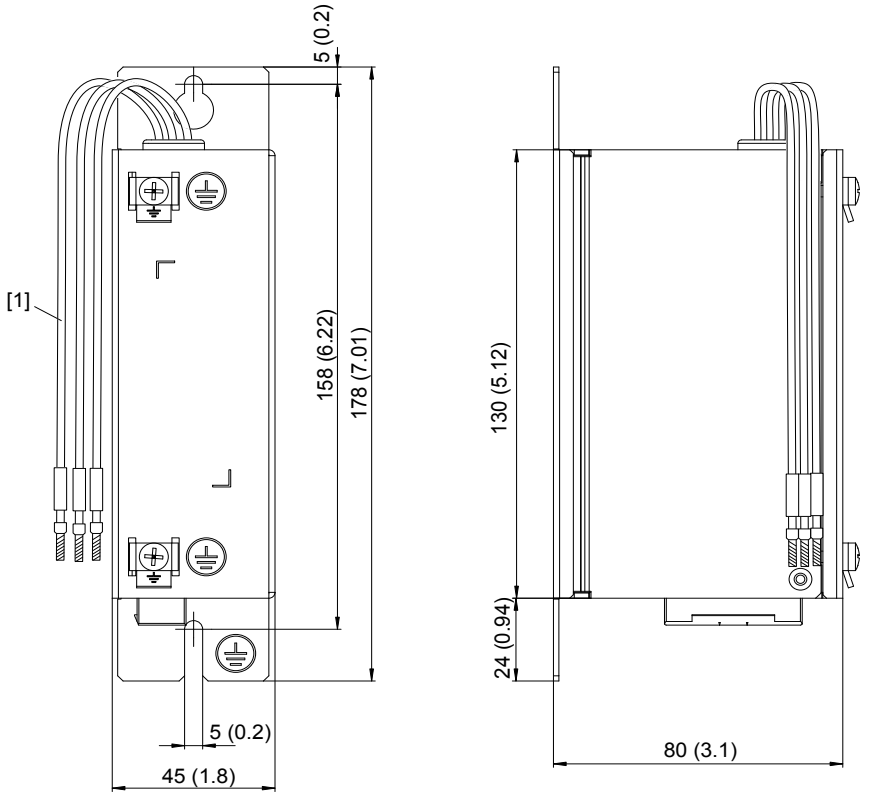
Output choke type	Main dimensions mm (in)			Mounting dimensions mm (in)		Inner Ø mm (in)	Hole dimension mm (in)	Mass
	A	B	C	a	b	d	c	kg (lb)
HD001	121 (4.76)	64 (2.5)	131 (5.16)	80 (3.1)	50 (2.0)	50 (2.0)	5.8 (0.23)	0.5 (1)
HD002	66 (2.6)	49 (1.9)	73 (2.9)	44 (1.7)	38 (1.5)	23 (0.91)		0.2 (0.4)
HD003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

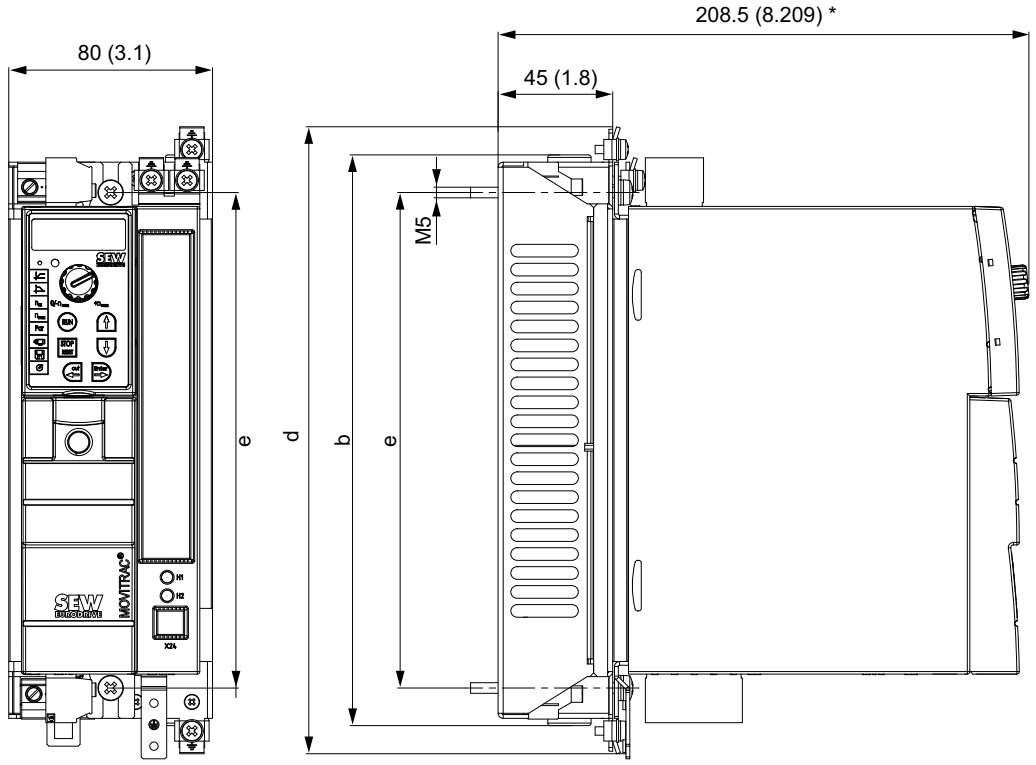
The following figure shows the mechanical dimensions in mm (in):



[1] Length = 100 mm (3.94 in)

Dimension drawing HD100/HD101

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



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* 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)

8.3.6 HF... output filter

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

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

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

Observe the following notes:

INFORMATION

- Output filters can 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 studs 1.6 Nm ±20 %					
Mass	3.1 kg (6.8 lb)	4.4 kg (9.7 lbs)			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® 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 V_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)
Mass	10.8 kg (23.8 lb)	15.9 kg (35.1 lb)	16.5 kg (36.4 lb)	23 kg (51 lb)	32 kg (71 lb)	85.3 kg (188 lb)
Assignment 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® 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.

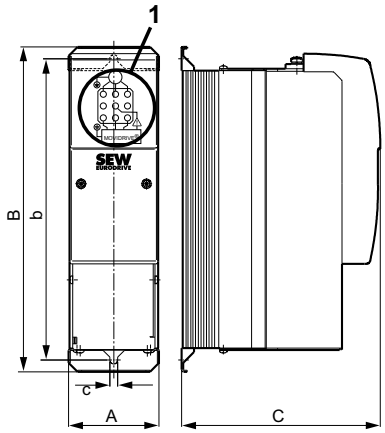
3) Observe the chapter on EMC-compliant installation according to EN 61800-3 in the SEW documentation

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

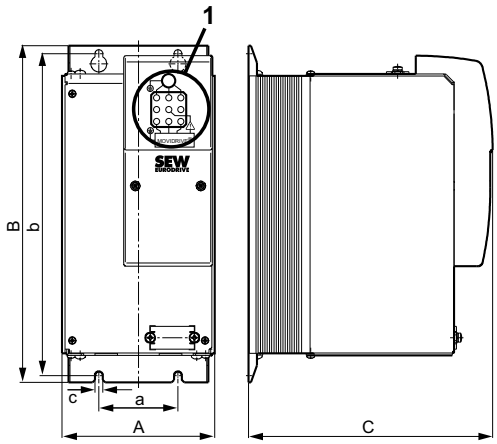
Dimension drawings of HF...-503 output filters

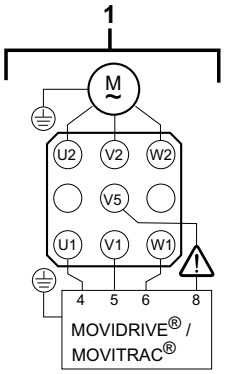
The following figures show the mechanical dimensions in mm (in):

HF008 / 015 / 022 / 030-503



HF040/055/075-503





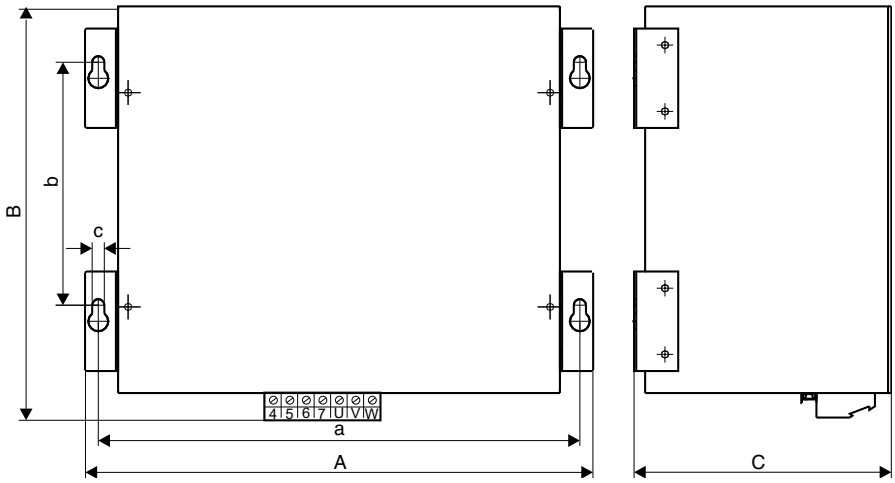
1472824587

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



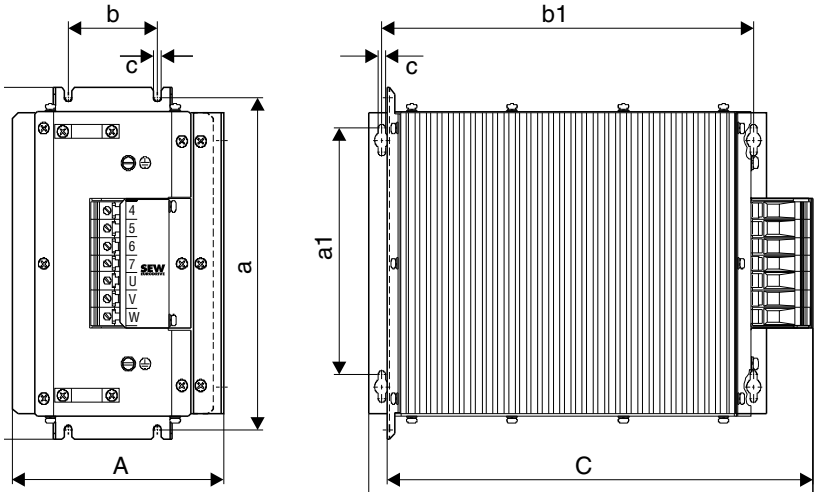
1472827659

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)

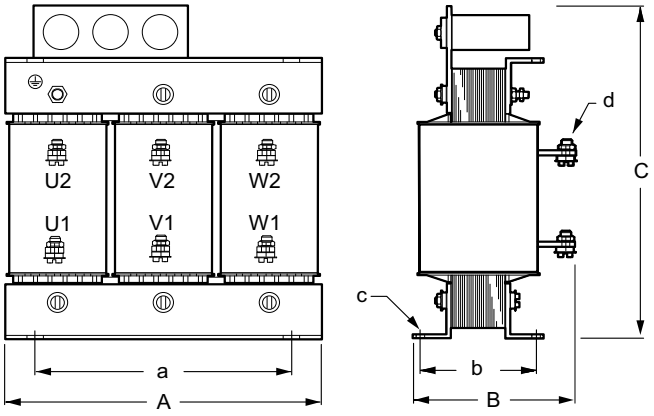
Dimension drawings of HF...-403 output filters

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)

8.3.7 EMC module FKE12B / FKE13B

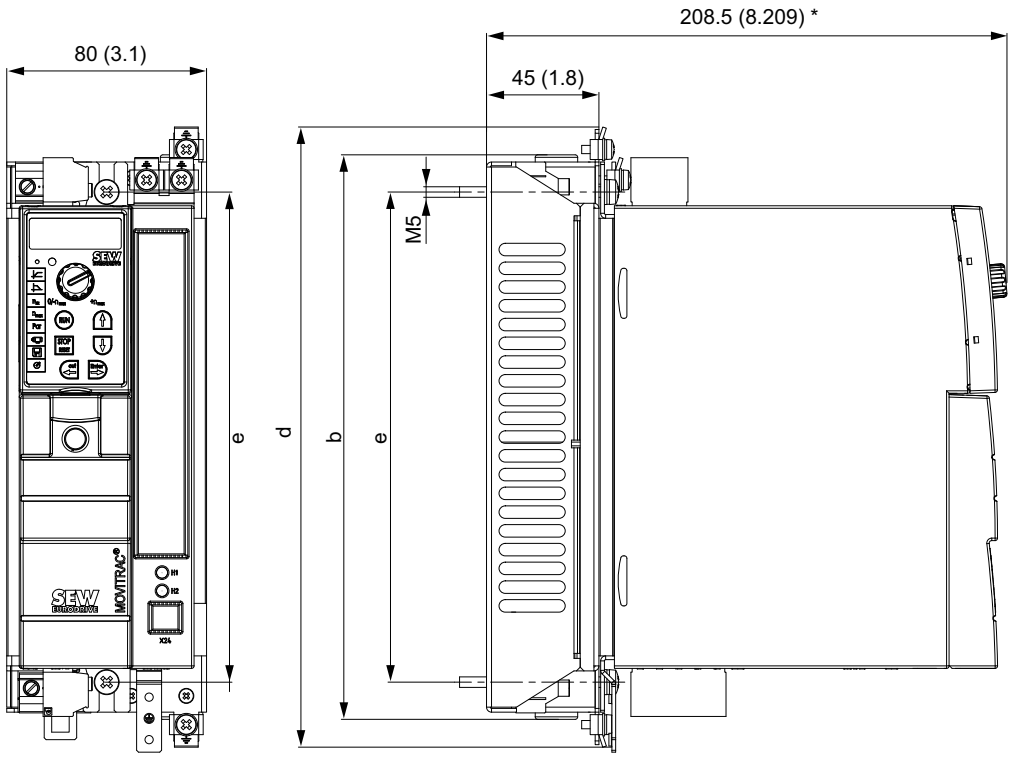
Using the EMC module, you can reach limit class C1 (B) on the input and output sides. The EMC module is designed for 100 % operation and 125 % operation.

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).



9007199616643467

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

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

9 Declaration of conformity

9.1 MOVITRAC®

EC Declaration of Conformity

SEW EURODRIVE

900850010

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the following products

frequency inverters of the series	**MOVITRAC® B**	
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
Low Voltage Directive	**2006/95/EC**	
EMC Directive	**2004/108/EC**	**4)**
Applied harmonized standards	**EN 13849-1:2008** **EN 61800-5-1:2007** **EN 61800-3:2007**	**5)**

1) The products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.

5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

Bruchsal	14.06.10	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

10 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			
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Australia			
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	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			
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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			
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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			
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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			
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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			
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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			
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Egypt			
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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			
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Great Britain			
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	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			
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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			
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Israel			
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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

Mongolia			
Sales	**Ulan Bator**	SEW-EURODRIVE Representative Office Mongolia Olympic street 8, 2nd floor Juulchin corp bldg., Sukhbaatar district, Ulaanbaatar 14253	Tel. +976-70009997 Fax +976-70009997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn

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

Paraguay			
Sales	**Fernando de la Mora**	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sew-py@sew-eurodrive.com.py

Peru			
Assembly **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

Poland			
	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
	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

Tanzania			
Sales	**Dar es Salaam**	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 uroos@sew.co.tz

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**	**Kocaeli-Gebze**	SEW-EURODRİVE Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	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

USA			
	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

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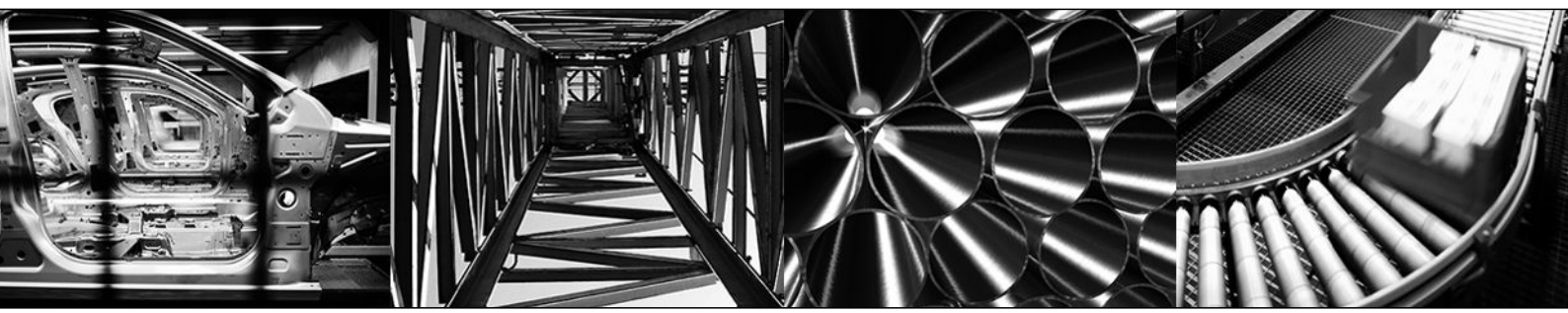

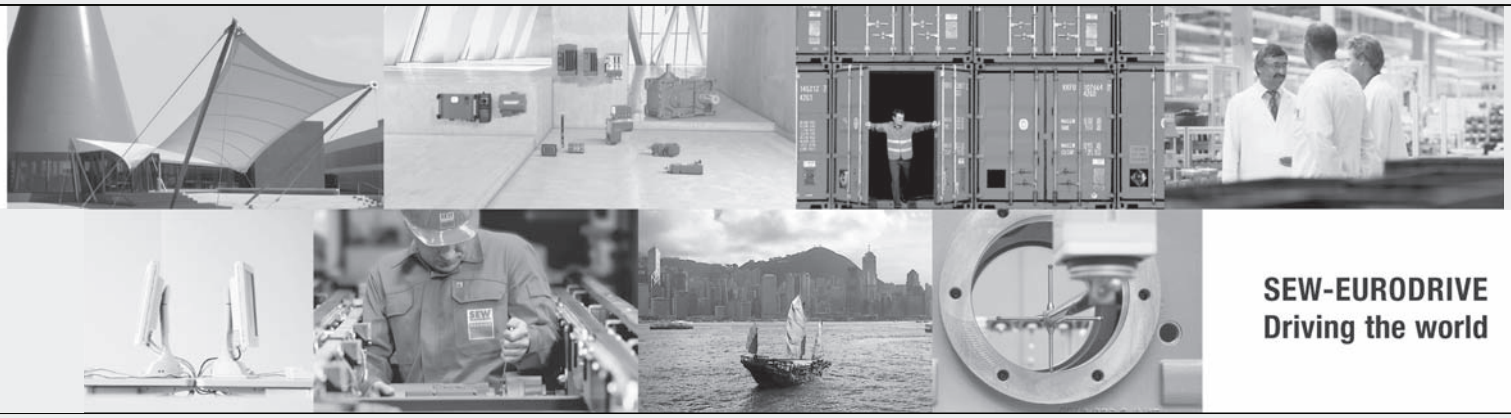

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