STÖBER

POSIDYN® SDS 5000

Commissioning Instructions

Reinstallation

Function test

Replacement

V 5.6-S or later

08/2020 **en**

Table of contents

1 Introduction

1.1 About this manual

This manual describes:
- How to install a new inverter in a control cabinet.
- How to perform a function test after the reinstallation.
- How to replace an inverter.

Original version
The original language of this documentation is German.

1.2 Further documentation

Manual	Contents	ID
Projecting manual SDS 5000	Installation and connection	442277
Operating manual SDS 5000	Set up the inverter	442289

You can find the latest document versions at www.stoeber.de

The devices of the 5th generation of STOBER inverters can be optionally connected with different fieldbus systems. The connection is described in the following manuals:

Manuals	ID
PROFIBUS DP operating manual	441687
CANopen operating manual	441686
EtherCAT operating manual	441896
PROFINET operating manual	442340

You can find the latest document versions at www.stoeber.de.

1.3 Further support

If you have technical questions that are not answered by this document, please contact:
- Phone: +49 7231 582-3060
- E-mail: applications@stoeber.de

If you have questions about the documentation, please contact:
- E-mail: electronics@stoeber.de

If you have questions about training sessions, please contact:
- E-mail: training@stoeber.de

1.4 Trademarks

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The following names that are used in conjunction with the device, its optional equipment and its accessories are trademarks or registered trademarks of other companies:

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EnDat®	EnDat® and the EnDat® logo are registered trademarks of Dr. Johannes Heidenhain GmbH, Traunreut, Germany.
EtherCAT®, Safety over EtherCAT®, TwinCAT®	EtherCAT®, Safety over EtherCAT® and TwinCAT® are registered trademarks and patented technologies that are licensed by Beckhoff Automation GmbH, Verl, Germany.
PROFIBUS®, PROFINET®	The PROFIBUS®/PROFINET® logo is a registered trademark of PROFIBUS Nutzerorganisation e. V. Karlsruhe, Germany.

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Products that are registered as trademarks are not specially indicated in this documentation. Existing property rights (patents, trademarks, protection of utility models) are to be observed.

2 Notes on safety

The devices can represent a source of danger. Therefore observe
- the safety guidelines, technical rules and regulations given in the following sections and the
- Generally applicable technical rules and regulations.

Always read the corresponding documentation as well. STÖBER Antriebstechnik GmbH + Co. KG shall assume no liability for damage resulting from failure to comply with the instruction manual or relevant regulations. This documentation is purely a production description. It does not include any guaranteed features in terms of a warranty right. We reserve the right to make technical changes for the purpose of improving the devices.

2.1 Component part of the product

As this documentation includes important information for the safe and efficient handling of the product, always keep it in the immediate vicinity of the product until product disposal and ensure it can be accessed by qualified personnel at any time.

Also pass on this documentation if the product is handed over or sold to a third party.

2.2 Operation in accordance with its intended use

As defined by DIN EN 50178 (previously VDE 0160), the inverters are electrical equipment operating as power electronics to control the flow of energy in high voltage systems. They are designed exclusively for installation in the control cabinet with at least protection class IP54 and for supplying
- servo motors and
- asynchronous motors.

Designated use does not include connecting other electrical loads!

2.3 Risk assessment

Before the manufacturer may bring a machine onto the market, he must conduct a risk assessment according to Machine Directive 06/42/EC. As a result, the risks associated with the use of the machine are determined. The risk assessment is a multi-stage and iterative process. On no account can sufficient insight into the Machine Directive be given as part of this documentation. For this reason, seek detailed information about the norms and legal position. When installing the inverter in machines, commissioning is forbidden until it has been determined that the machine meets the requirements of EC Directive 06/42/EC.

2.4 Ambient conditions

The inverters are products subject to sales restrictions in accordance with IEC 61800-3. In a residential environment this product may cause high-frequency interference. If this occurs the user may be asked to take suitable measures to reduce it.

The inverters are not designed for use in a public low frequency network that supplies residential areas. High-frequency interference can be expected if the inverters are used in a network of this type. The inverters are designed exclusively for operation in TN networks. The inverters are only suitable for use in supply current networks that are able to provide a maximally symmetrical nominal short circuit current at maximally 480 volts according to the following table:

Size	Max. symmetrical nominal short-circuit current
0 and 1	5,000 A
2	5,000 A
3	10,000 A

Install the inverter in a control cabinet in which the admissible surrounding temperature will not be exceeded.

The following applications are prohibited:
- Use in areas subject to explosion hazard
- Use in environments with harmful substances as specified by EN 60721, for example oils, acids, gases, vapors, dust and radiation
- Use with mechanical vibration and impact loads exceeding the limits specified in the technical data in the projecting manuals

Implementation of the following applications is only permitted after approval is obtained from STOBER:
- Use in non-stationary applications

2.5 Qualified personnel

Since the devices may harbor residual risks, all configuration, transportation, installation and commissioning tasks including operation and disposal may only be performed by trained personnel who are aware of the possible risks.

Personnel must have the qualifications required for the job. The following table lists examples of occupational qualifications for the jobs:

Activity	Possible occupational qualifications
Transportation and storage	Worker skilled in storage logistics or comparable training
Configuration	- Graduate engineer (electro-technology or electrical power technology) - Technician (m/f) (electro-technology)
Installation and connection	Electronics technician (m/f)
Commissioning (of a standard application)	- Technician (m/f) (electro-technology) - Master electro technician (m/f)
Programming	Graduate engineer (electro-technology or electrical power technology)
Operation	- Technician (m/f) (electro-technology) - Master electro technician (m/f)
Disposal	Electronics technician (m/f)

In addition, the valid regulations, the legal requirements, the reference books, this technical documentation and, in particular, the safety information contained therein must be carefully

- read,
- understood and
- complied with.

2.6 Transportation and storage

Immediately upon receipt, examine the delivery for any transportation damages. Immediately inform the transportation company of any damages. If damages are found, do not commission the product. If the device is not to be installed immediately, store it in a dry, dust-free room. Please see the documentation for how to commission an inverter after it has been in storage for a year or longer.

2.7 Installation and connection

Installation and connection work are only permitted after the device has been isolated from the power!

The accessory installation instructions allow the following actions during the installation of accessories:
- The housing in the upper slot can be opened
- The housing in the bottom slot can be opened.

Opening the housing in another place or for other purposes is not permitted.

Use only copper conductors. For the line cross sections to be used, refer to DIN VDE 0298-4 or DIN EN 60204-1 Appendix D and Appendix G.

The permissible protection class is protective ground. Operation is not permitted unless the protective ground is connected in accordance with the regulations. Comply with the applicable instructions for installation and commissioning of motor and brakes.

Main equipment grounding markings: The main ground connections are marked "PE" or with the international ground symbol (IEC 60417, Symbol 5019 ⏚).

The motor must have an integrated temperature monitor with basic isolation in acc. with EN 61800-5-1 or external motor overload protection must be used.

Protect the device from falling parts (pieces of wire, leads, metal parts, and so on) during installation or other tasks in the switching cabinet. Parts with conductive properties inside the inverter can cause short circuits or device failure.

For information regarding use under UL conditions (UL – Underwriters Laboratories) please pay close attention to section 2 in the projecting manual (see section 1.2 Further documentation).

2.8 Commissioning, operation and service

Remove the additional covers before commissioning so that the device will not overheat. Note the minimum open areas specified in the projecting manuals during installation to prevent the inverter and its accessories from overheating.

The inverter housing must be closed before you turn on the power supply voltage. When the power supply voltage is turned on, hazardous voltages may be present on the connection terminals and the cables and motor terminals connected to them. Note that the device is not reliably free of voltage simply because all the displays are blank.

The following actions are prohibited while the supply voltage is applied
- Opening the housing
- Connecting or disconnecting connection clamps and
- Installing/removing or attaching/detaching accessories.

Apply the 5 safety rules in the order stated before performing any work on the machine:
1. Disconnect.
   Also ensure that the auxiliary circuits are disconnected.
2. Protect against being turned on again.
3. Check that voltage is not present.
4. Ground and short circuit.
5. Cover adjacent live parts.

Information
Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

You can carry out work on the inverter later. Repairs may only be performed by STOBER.

Send faulty devices with a fault description to:
STÖBER Antriebstechnik GmbH + Co. KG
Department VS-EL
Kieselbronner Str.12
75177 Pforzheim
GERMANY

2.9 Disposal

Please observe the current national and regional regulations! Dispose of the individual parts separately depending on the quality and currently applicable regulations, e.g. as

- Electronic waste (circuit boards)
- Plastic
- Sheet metal
- Copper
- Aluminum
- Battery

2.10 Residual dangers

The connected motor can be damaged with certain settings of inverters:

- Longer operation against an applied motor halting brake
- Longer operation of self-cooled motors at slow speeds

Drives can reach dangerous excess speeds (e.g., setting of high output frequencies for motors and motor settings which are unsuitable for this). Secure the drive accordingly.

2.11 Presentation of notes on safety

NOTICE

Notice

means that property damage may occur

▶ if the stated precautionary measures are not taken.

⚠ CAUTION!

Caution

with warning triangle means that minor injury may occur

▶ if the stated precautionary measures are not taken.

⚠ WARNING!

Warning

means that there may be a serious danger of death

▶ if the stated precautionary measures are not taken.

⚠ DANGER!

Danger

means that serious danger of death exists

▶ if the stated precautionary measures are not taken.

Information
refers to important information about the product or serves to emphasize a section in the documentation to which the reader should pay special attention.

3 Install accessories

3.1 Installation of the terminal accessories

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

NOTICE

Material damage due for example to electrostatic discharge!

▶ Take suitable protective measures when handling open printed circuit boards, for example clothing appropriate for ESD and an environment free of dirt and grease.

▶ Do not touch the contact surfaces.

To be able to connect binary and analog signals to the inverter, you need one of the following accessory parts:
- SEA 5001, ID no. 49576
- REA 5001, ID no. 49854
- XEA 5001, ID no. 49015

The installation is the same for the accessory parts.

If you want to continue to use a terminal module when replacing an inverter, note the following compatibility information for inverters from hardware version 200:

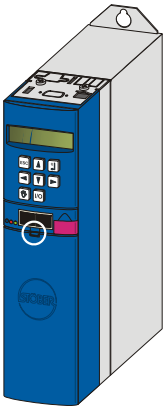
SEA 5000 / 5001	REA 5000	REA 5001	XEA 5000	XEA 5001
Yes	HW version 19 or higher for the accessories	Yes	No	HW version 11 or higher for the accessories

You need:

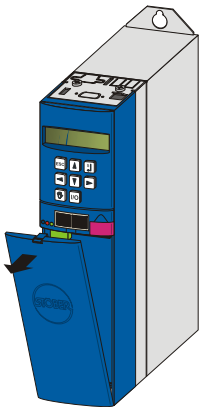
- A Phillips screwdriver.
- The screws pre-assembled on the accessories.

Installing SEA 5001, REA 5001 or XEA 5001 in a SDS 5000

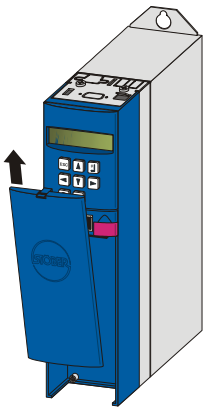
1. Unlock the spring lock of the inverter cover:



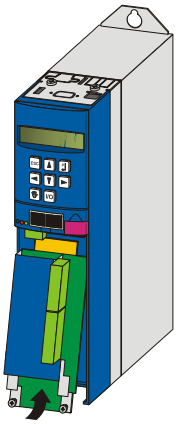
2. Lift the upper end of the cover off the inverter:



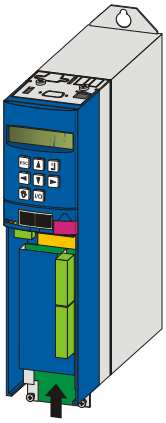
3. Remove the cover upwards from the inverter:



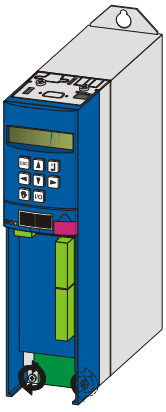
4. Insert the accessory part at an oblique angle with the gold contacts forwards. The gold contacts must lie in front of the black terminal block.



5. Push the gold contacts in the black terminal block.



6. Fasten the accessory part on the inverter with the fastening screws:



⇨ You have now installed the accessory.

3.2 Installing communication accessories

Communication accessories include option boards for CANopen, PROFIBUS, EtherCAT and PROFINET.

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

NOTICE

Material damage due for example to electrostatic discharge!

▶ Take suitable protective measures when handling open printed circuit boards, for example clothing appropriate for ESD and an environment free of dirt and grease.

▶ Do not touch the contact surfaces.

3.2.1 Install CAN 5000 or DP 5000

You will need the following accessories for the connection of CANopen or PROFIBUS. The accessory part is installed above the inverter's display.

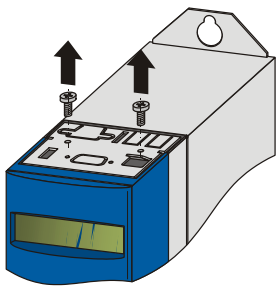
- CANopen: CAN 5000
- PROFIBUS: DP 5000

You will need the following for installation of CAN 5000 or DP 5000.

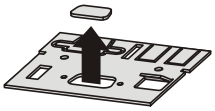
- A TX10 Torx screwdriver.
- A pair of pliers.
- A hexagon socket wrench, 4.5 mm.

Installation of a CAN 5000 or DP 5000 in an inverter

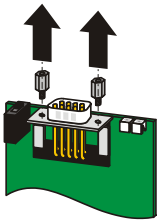
1. Remove the mounting screws and take off the cover plate:



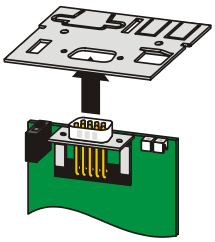
2. Remove the metal plate punch-out with a pair of pliers:



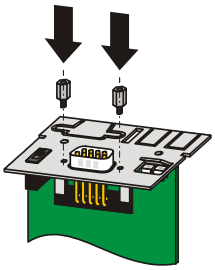
3. Remove the screws from the option board:



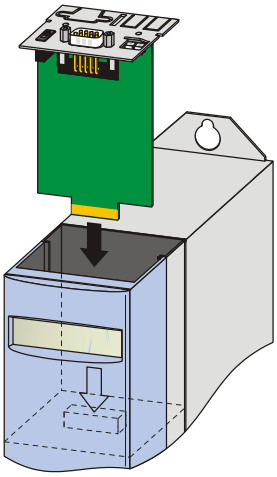
4. From below, thread the sub D plug connector of the PCB through the metal plate:



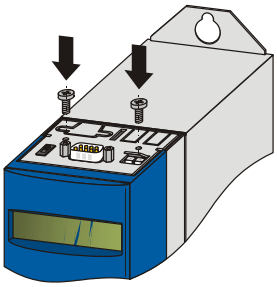
5. Secure the PCB to the metal plate with the screws which you removed in step 3:



6. Guide the option board into the inverter so that the gold contacts slide into the black connector:



7. Secure the metal plate to the inverter with the mounting screws:



⇨ You have now installed the accessory.

3.2.2 Install ECS 5000 or PN 5000

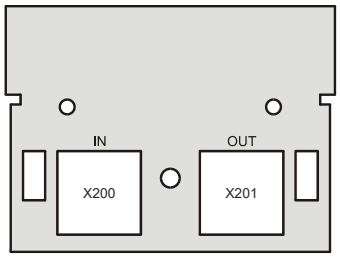
To connect EtherCAT or PROFINET, you need the following accessory. The accessory is installed above the inverter display:

- EtherCAT: ECS 5000
- PROFINET: PN 5000

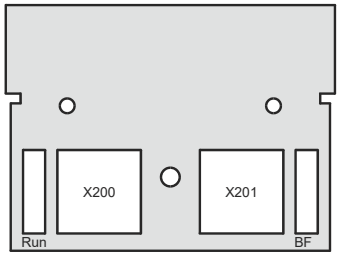
For installation you need:

- A Torx screwdriver TX10.
- A Phillips screwdriver.

- To install ECS 5000, the following metal plate that comes with the accessory:



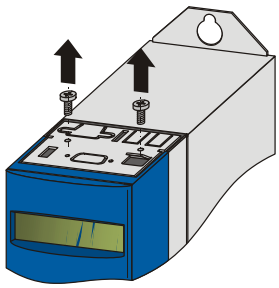
- To install PN 5000, the following metal plate that comes with the accessory:



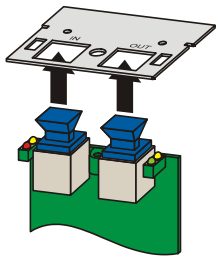
- The screw with the detent edge disk that is included with the accessory.

Installing ECS 5000 or PN 5000 in an inverter

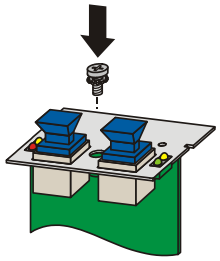
1. Undo the fastening screws and take off the cover plate:



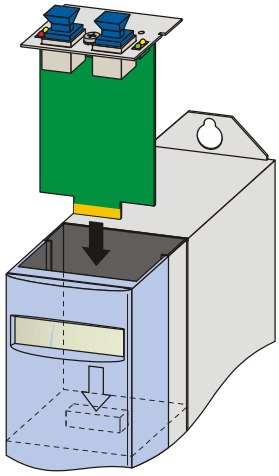
2. Guide the RJ45 connector of the circuit board from below through the plate that is included with the accessory:



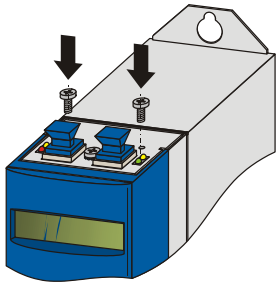
3. Fasten the plate on the circuit board with the screw with the detent edge disk that is included:



4. Guide the option board in the inverter so that the gold contacts are pushed in the black terminal block:



5. Fasten the plate to the inverter with the fastening screws:

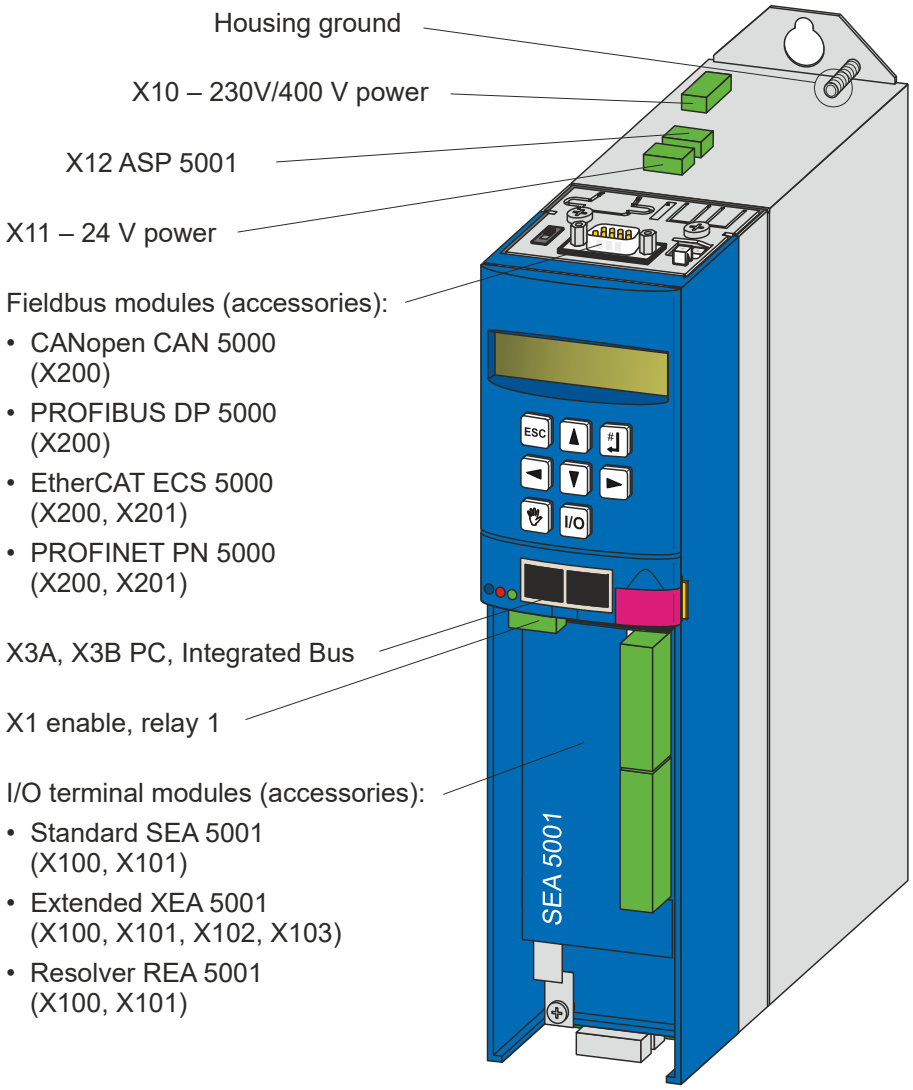


⇨ You have now installed the accessory.

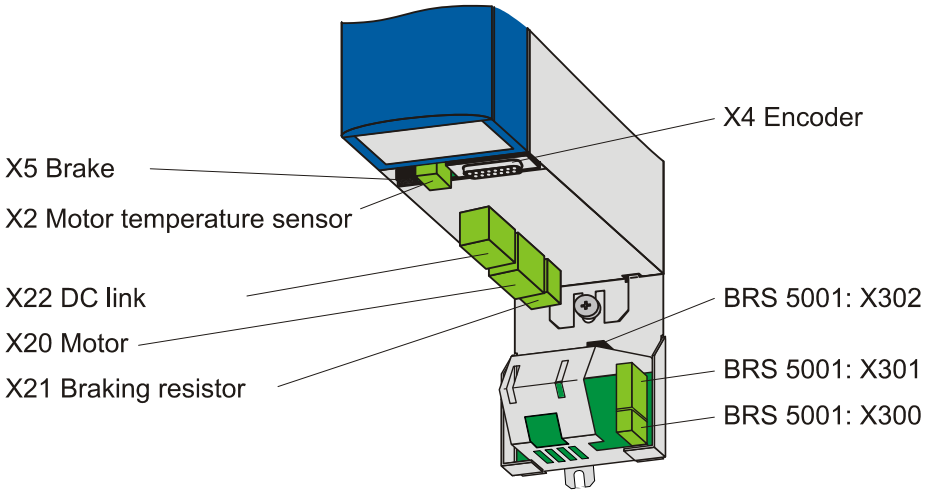
4 Device information

4.1 Overview of terminals

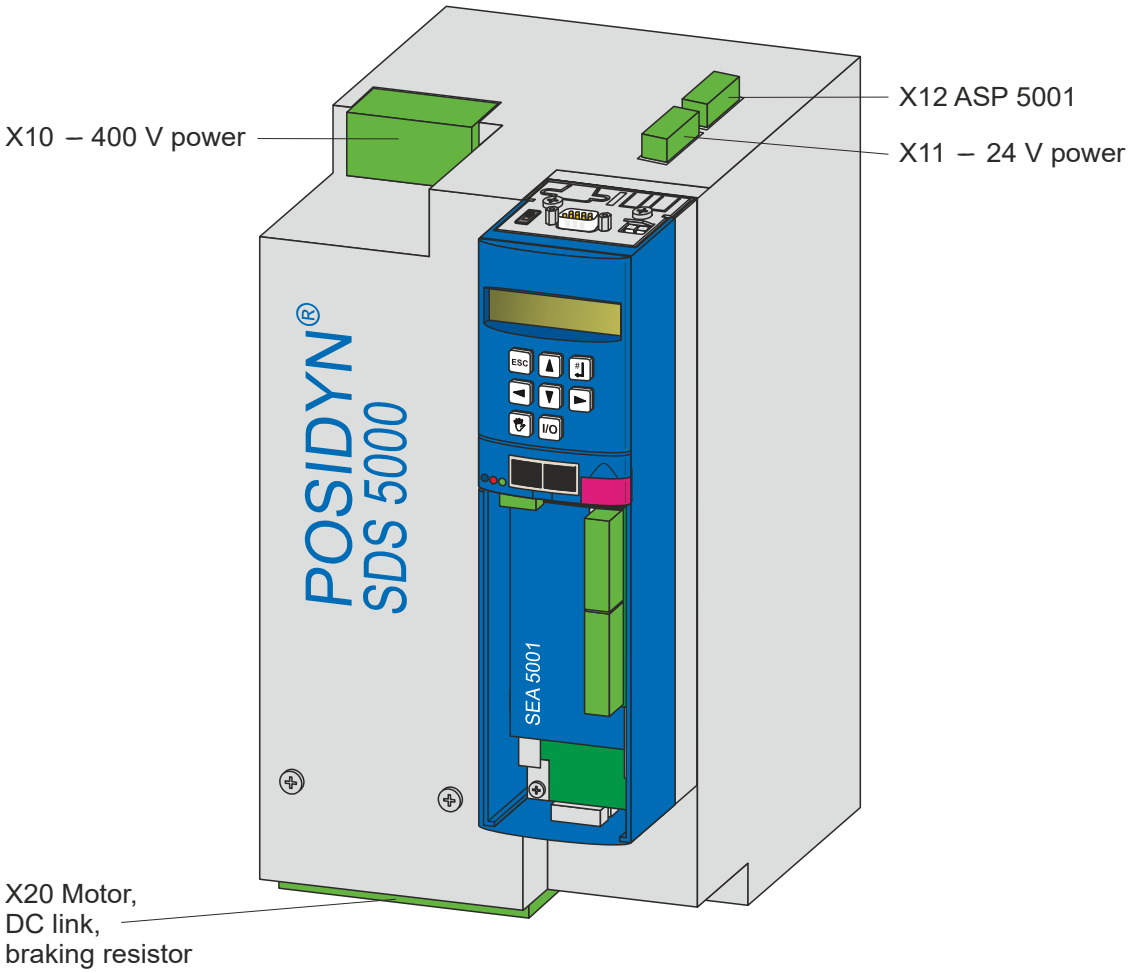
Front and top of device
(in the example with fieldbus accessory CAN 5000 and I/O terminal module SEA 5001)



Bottom of the device
(in the example with brake module BRM 5001)



Size 3 – Front and top of device
(in the example with fieldbus module CAN 5000 and I/O terminal module SEA 5001)



Minimum tightening torque M_{min} – screw-type terminals

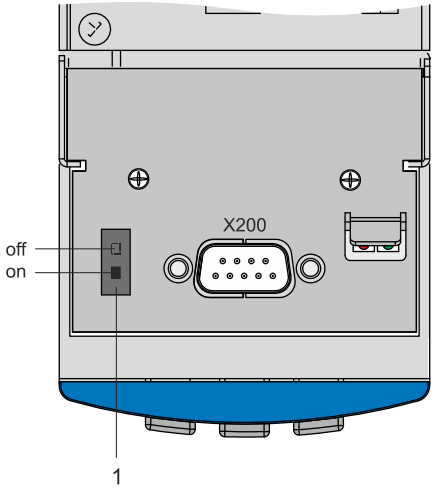
Size	0		1		2		3	
Unit	[Nm]	[lb-in]	[Nm]	[lb-in]	[Nm]	[lb-in]	[Nm]	[lb-in]
M_{min}	0.5	4.4	0.5	4.4	1.2	11	2.5	22

Maximum conductor cross-section of power terminals

Size	Size 0	Size 1	Size 2	Size 3
Maximum cross-section for conductor with ferrule [mm^2]	2.5	4	6	35

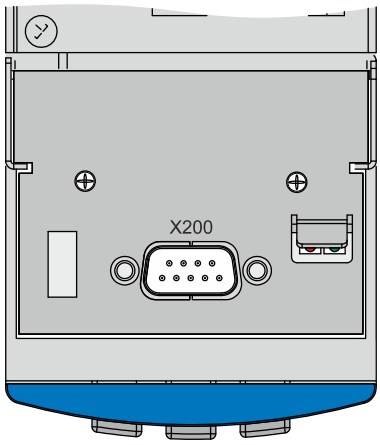
4.1.1 Fieldbus modules

Top of device with fieldbus module CANopen CAN 5000

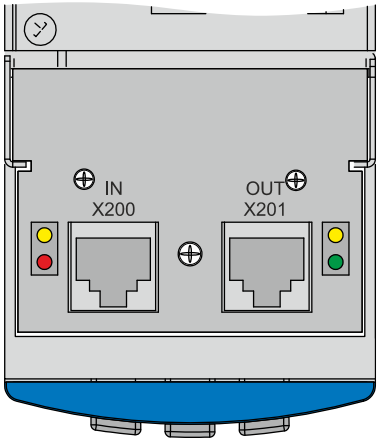


1 Internal terminating resistor 120 Ω switchable

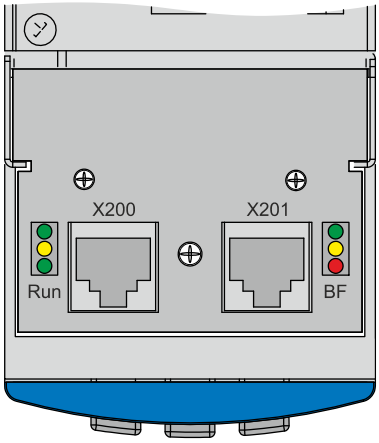
Top of device with fieldbus module PROFIBUS DP 5000



Top of device with fieldbus module EtherCAT ECS 5000

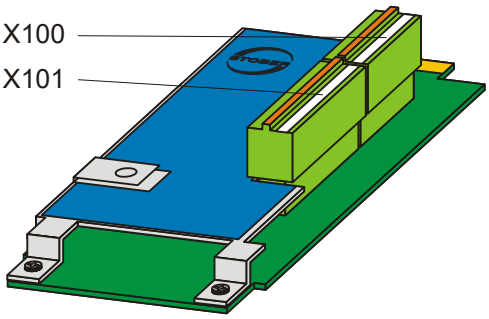


Top of device with fieldbus module PROFINET PN 5000

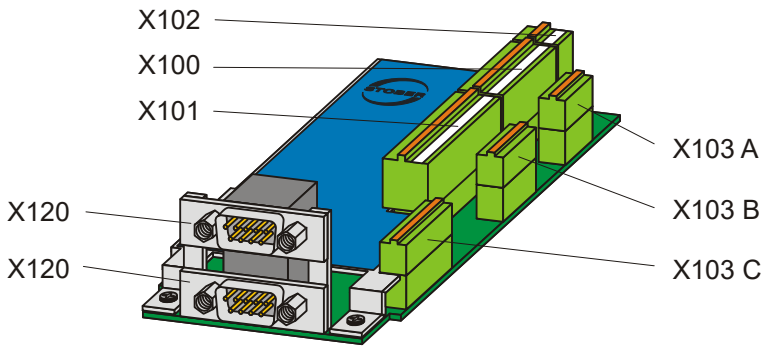


4.1.2 I/O terminal modules

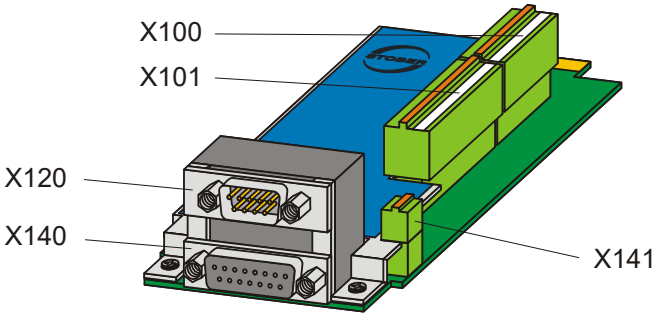
Standard SEA 5001



Extended XEA 5001

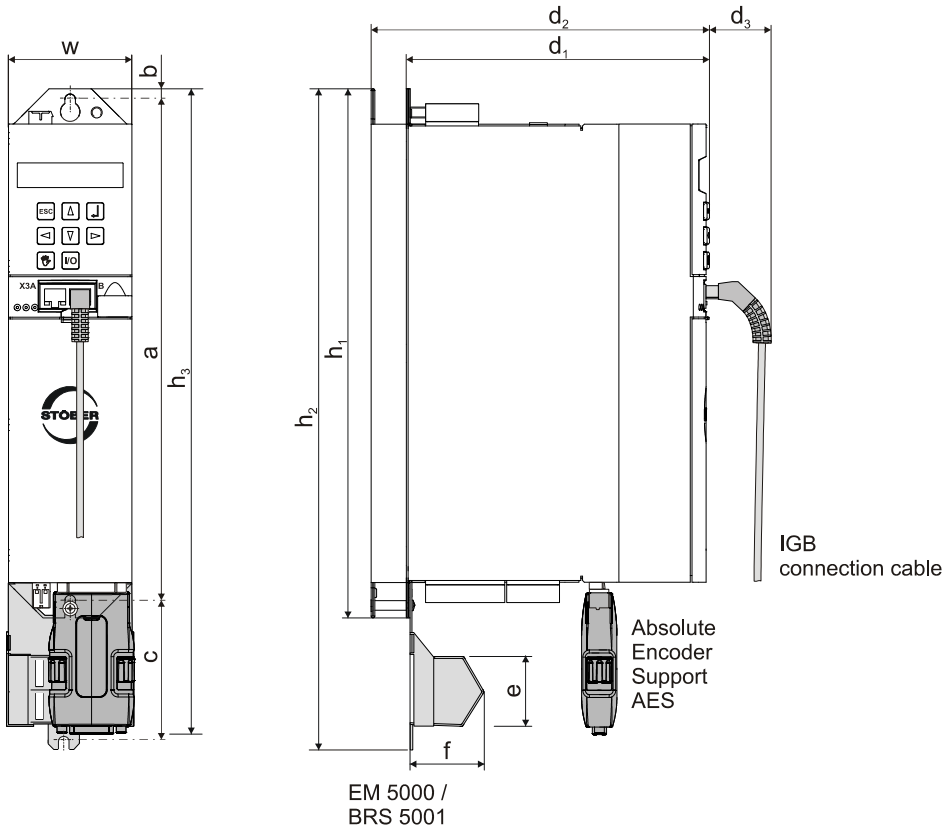


Resolver REA 5001



4.2 Dimensions

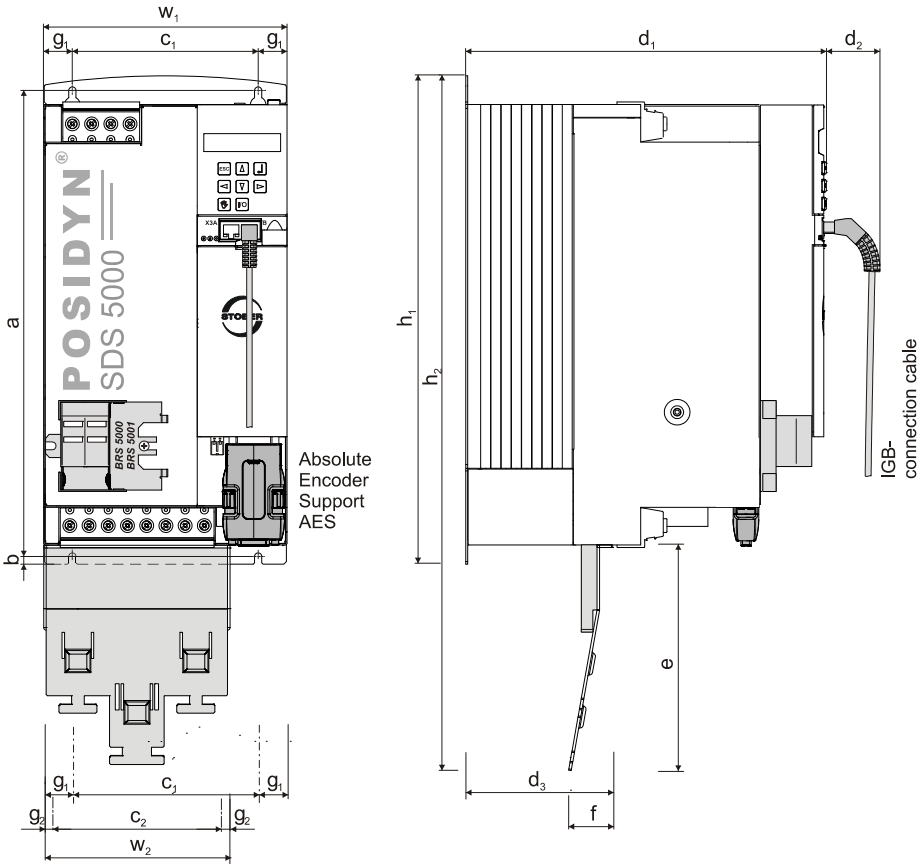
4.2.1 Size 0 to 2



Dimensions [mm]			Size 0	Size 1	Size 2
Inverter	Height	h_1	300		
		h_2	360[a] / 373[b]		
		h_3 [c]	365		
	Width	w	70		105
	Depth	d_1	175	260	260
		d_2 [d]	193	278	278
		d_3	40		
EMC shroud	Height	e	37.5[e] / 44[f]		
	Depth	f	40		
Fastening holes	Vertical distance to upper edge	b	6		
	Vertical distance	a	283+2		
	Vertical distance	c[g]	79		

a) h_2 = Height incl. EMC shroud EM 5000
b) h_2 = Height incl. brake module BRS 5001
c) h_3 = Height incl. AES
d) d_2 = Depth incl. brake resistor RB 5000
e) e = Height of the EMC shroud EM 5000
f) e = Height of the brake module BRS 5001
g) c = Vertical distance at brake module BRS 5001

4.2.2 Size 3

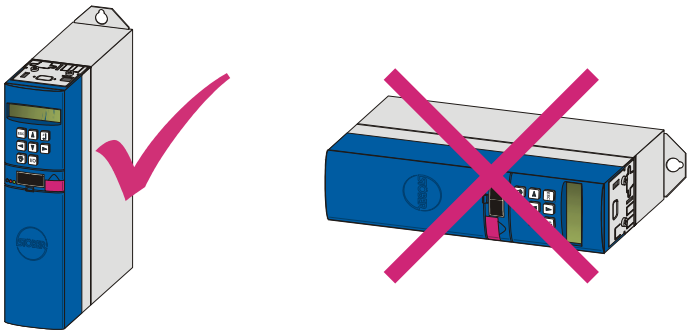


Dimensions [mm]			Size 3
Inverter	Height	h_1	382.5
		h_2 a)	540
	Width	w_1	194
	Depth	d_1	276
		d_2	40
EMC shroud	Height	e	174
	Width	w_2	147
	Depth	f	34
	Depth	d_3	113
Fastening holes	Vertical distance	a	365+2
	Vertical distance to bottom edge	b	6
	Horizontal distance	c_1 b)	150+0.2/-0.2
	Horizontal distance from the side edge	g_1 c)	20
	Horizontal distance	c_2 d)	132
	Horizontal distance from the side edge	g_2 e)	7.5

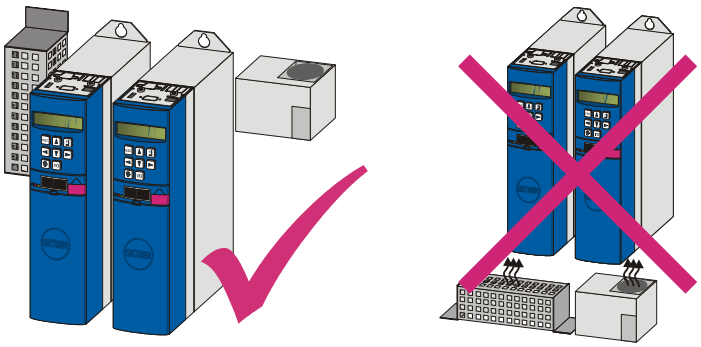
a) h_2 = height incl. EMC shroud EM6A3
b) c_1 = horizontal distance from the fastening holes of the inverter
c) g_1 = horizontal distance from the side edge of the inverter
d) c_2 = horizontal distance from the fastening holes of the EMC shroud EM6A3
e) g_2 = horizontal distance from the side edge of the EMC shroud EM6A3

4.3 Installation of the inverter in the switching cabinet

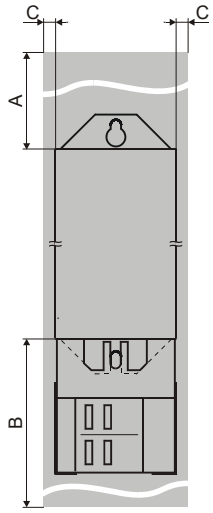
- The inverters must be installed in a control cabinet with at least protection class IP54.
- The installation location must be free of dust, corrosive vapors and all fluids (in accordance with pollution degree 2 as per EN 60204/EN 50178).
- The installation location must be free of atmospheric moisture.
- Prevent condensation, for example with anti-condensation heating elements.
- For reasons related to EMC, use mounting plates with a conductive surface (unpainted, etc.).
- Fasten the inverters onto the mounting plate with M5 screws.
- The inverters must be installed vertically:



- Avoid installation above or in the immediate vicinity of heat-generating devices, e.g. output chokes or braking resistors:



- To ensure there is sufficient air circulation in the control cabinet, observe the minimum clearances.



Min. clearance [dimensions in mm]	A Above	B Below	C On the side
Size 0 – size 2	100	100	5
... With EMC shroud or brake module	100	120	5
Size 3	100	100	5
... With EMC shroud	100	220	5

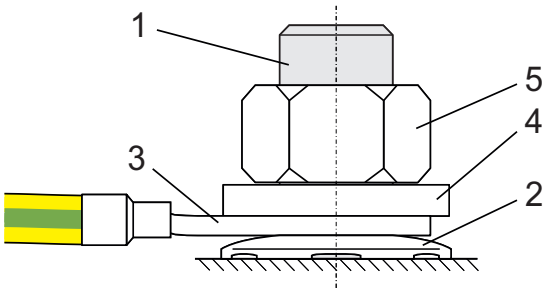
4.4 Housing ground

4.4.1 Size 0 to 2

Note the following information on the connection of the protective earth to ground the housing correctly:

- Note the assembly sequence on the M6 earth bolts (1):
  - 2 Contact disc
  - 3 Cable socket
  - 4 Washer
  - 5 Nut

  Contact disk, washer, and nuts are supplied with the inverter.



- Torque: 4 Nm
- Stray currents > 10 mA can arise in normal operation. To fulfill DIN EN 61800-5-1 and EN 60204-1, connect the earth bolts with a copper conductor according to the following table:

Cross-section A Feeder	Minimum cross-section A_P Earth conductor at earth bolts
A ≤ 2.5 mm^2	2.5 mm^2
2.5 < A ≤ 16 mm^2	A
16 – 35 mm^2	≥ 16 mm^2
> 35 mm^2	A/2

4.4.2 Size 3

Design the housing earth at interface X10 in at least mm^2 copper or 16 mm^2 aluminum.

4.5 Forming

NOTICE

Material damage!

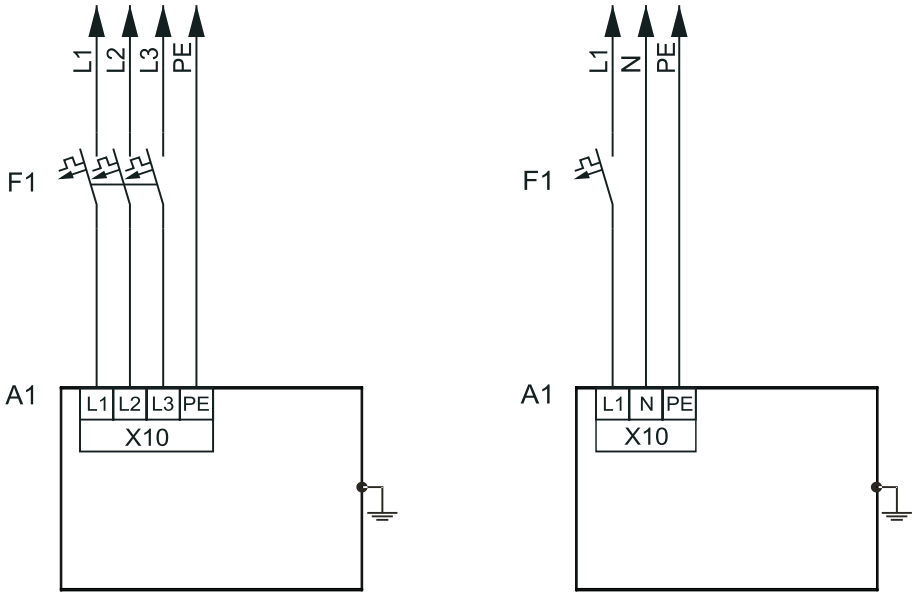
The DC link capacitors in devices of sizes 0, 1 and 2 can lose their electrical strength through long storage times. Considerable material damage can arise from a reduced electrical strength of the DC link capacitors when switching on.

▶ Use devices in storage annually or before startup.

Perform forming for stored devices.

Information
STOBER recommends connecting stored devices to the supply voltage according to the wiring shown for one hour every year. Please note that the inverters are designed exclusively for operation in TN networks.

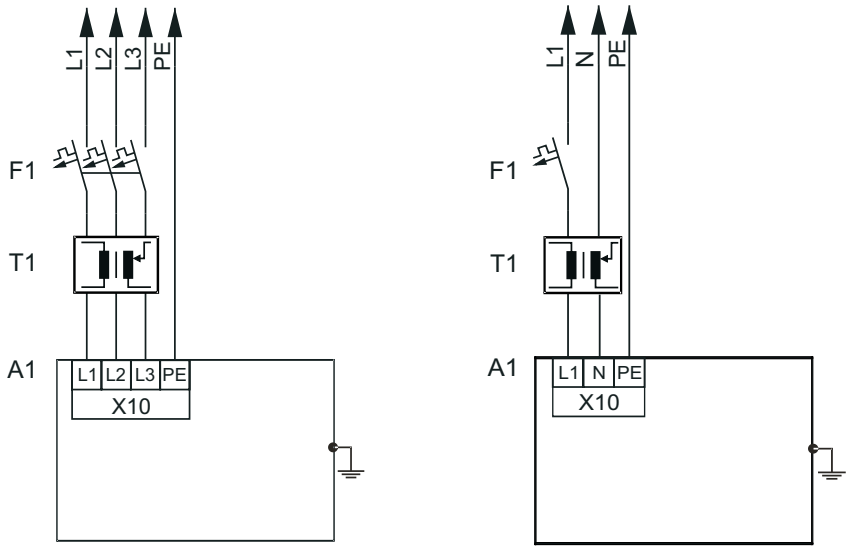
The graphics below show the principle network connection for 3-phase and 1-phase devices.



Legend

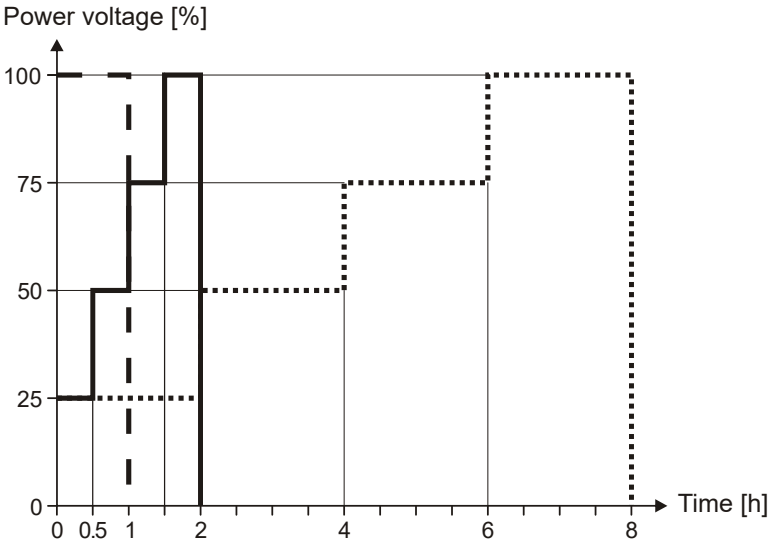
L1–L3 = lines 1 to 3
N = neutral conductor
PE = protective ground
F1 = fuse
A1 = inverter

If annual forming is not possible, form the stored devices before commissioning according to the wiring and voltage levels shown below.



Legend

L1–L3 = lines 1 to 3
N = neutral conductor
PE = protective ground
F1 = fuse
T1 = variable transformer
A1 = inverter



– –	Storage time 1 - 2 years:	Before enabling, apply voltage for one hour.
———	Storage time 2 - 3 years:	Before enabling, form as per curve.
·····	Storage time ≥3 years:	Before enabling, form as per curve.
	Storage time under 1 year:	No action required.

5 Reinstallation

5.1 Reinstall inverter

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

The following requirements apply:
- A contact plan of the system in which the connection of the inverter is described must be present.

You need:
- A tool to drill the drill holes in the control cabinet
- A tool to tighten the fastening screws

Reinstall inverter

1. Drill the drill holes in the mounting plate according to the included drill plan.
2. Remove all terminals from the inverter.
3. Install the accessory cards (see section 3 Install accessories).
4. Attach the inverter to the mounting plate in the control cabinet with the upper fastening screw.
5. Attach the inverter with the lower fastening screw.
6. For sizes 0 to 2: Connect the housing earth (see section 4.4 Housing ground).
7. Attach all terminals.
8. Connect the inverter and accessories according to the contact plan.

⇨ You have installed the inverter. Check whether you can perform a function test (see section 6 Function test).

5.2 Reinstall inverter with bottom brake resistor

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

The following requirements apply:

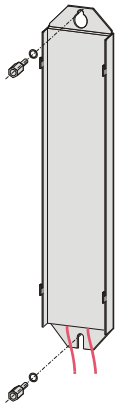
- A contact plan of the system in which the connection of the inverter is described must be present.

You need:

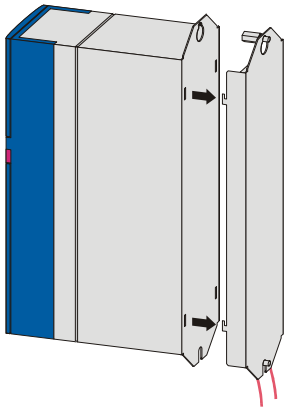
- The M5 threaded bolts included with the bottom brake resistor
- Tool for drilling holes
- a tool to tighten the fastening screws

Reinstallation of inverter size 0, 1 or 2

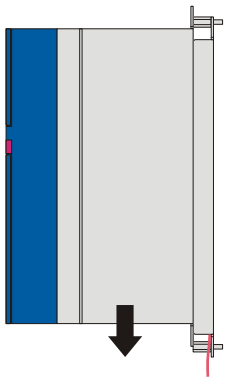
1. Drill the drill holes in the mounting plate according to the included drill plan.
2. Remove all terminals on the inverter.
3. Install the accessory cards (see section 3 Install accessories).
4. Attach the bottom brake resistor to the mounting plate in the control cabinet with the threaded bolts:



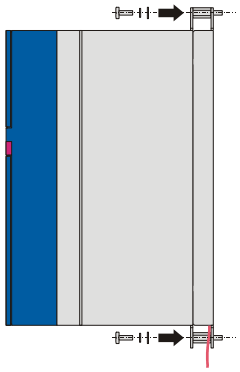
5. Place the inverter on the guides:



6. Press the inverter down on the guides:



7. Attach the inverter to the studs with the screws and washers:



8. Connect the housing ground (see section 4.4 Housing ground).
9. Attach all terminals.
10. Connect the inverter and accessories according to the contact plan.

⇨ You have installed the inverter. Check whether you can perform a function test (see section 6 Function test).

5.3 Reinstall inverter with EMC/brake module

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

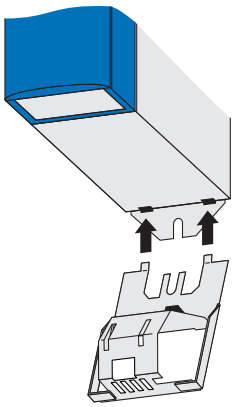
▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

The following requirements apply:
- A contact plan of the system in which the connection of the inverter is described must be present.

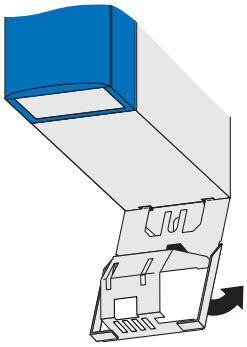
You need:
- Tool for drilling holes
- a tool to tighten the fastening screws

Reinstall inverter size 0, 1 or 2 with EMC shroud

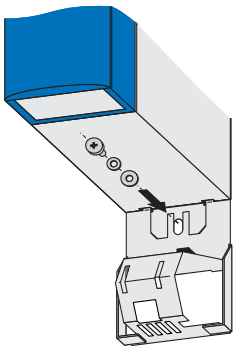
1. Drill the drill holes in the mounting plate according to the included drill plan.
2. Remove all terminals from the inverter.
3. Install the accessory cards (see section 3 Install accessories).
4. Attach the inverter on the mounting plate in the control cabinet with the upper fastening screw.
5. Insert the shroud into the openings at a slight angle:



6. Press the rear of the shroud onto the mounting plate:



7. Attach the shroud to the inverter and mounting plate with the fastening screw and washers:



8. Connect the housing ground (see section 4.4 Housing ground).
9. Attach all terminals.
10. Connect the inverter according to the contact plan.

⇨ You have installed the inverter. Check whether you can perform a function test (see section 6 Function test).

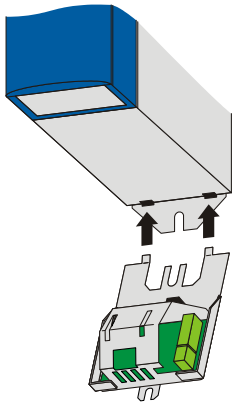
The following requirements apply:
- A contact plan of the system in which the connection of the inverter is described must be present.

You need:
- Tool for drilling holes
- a tool to tighten the fastening screws

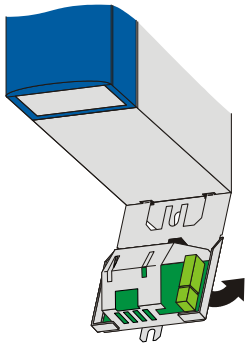
Reinstall inverter size 0, 1 or 2 with brake module

1. Drill the drill holes in the mounting plate according to the included drill plan.
2. Remove all terminals from the inverter.
3. Install the accessory cards (see section 3 Install accessories).
4. Attach the inverter on the mounting plate in the control cabinet with the upper fastening screw.

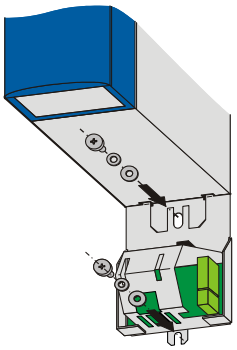
5. Insert the module into the openings at a slight angle:



6. Press the rear of the module onto the mounting plate:



7. Attach the module to the inverter and mounting plate with the fastening screw and washers. You can optionally secure the module below in addition with another fastening screw on the mounting plate:

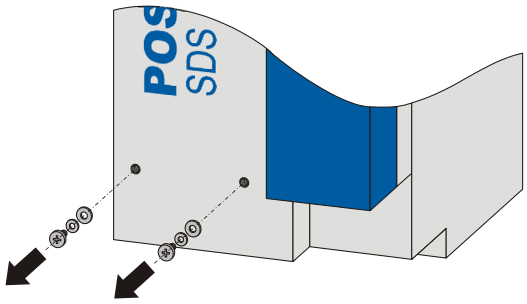


8. Connect the housing ground (see section 4.4 Housing ground).
9. Attach all terminals.
10. Connect the inverter and accessory according to the contact plan.

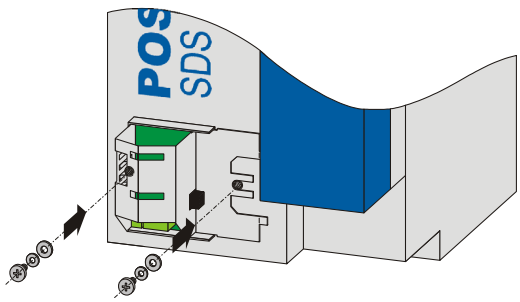
⇨ You have installed the inverter. Check whether you can perform a function test (see section 6 Function test).

Reinstall inverter size 3 with brake module and shroud

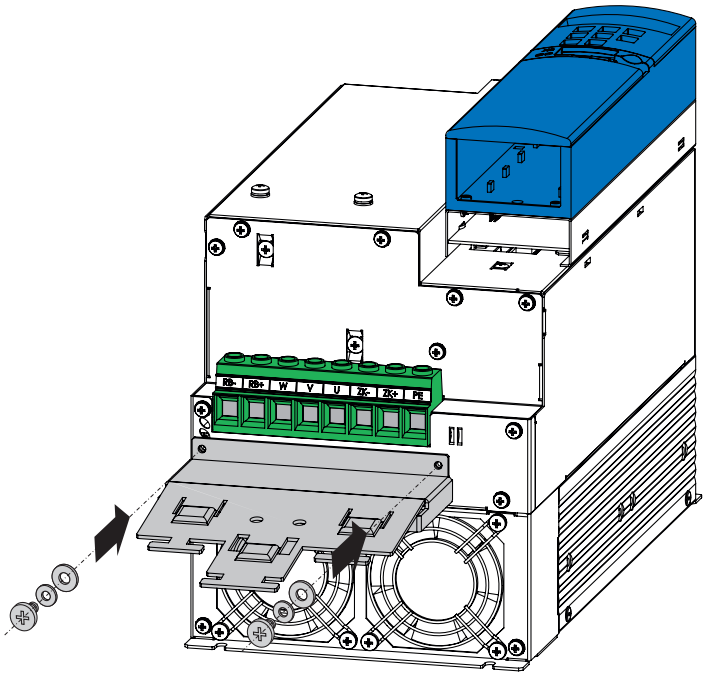
1. Drill the drill holes in the mounting plate according to the included drill plan.
2. Remove all terminals from the inverter.
3. Install the accessory cards (see section 3.1 Installation of the terminal accessories).
4. Remove the fastening screws and washers on the front of the inverter to attach the brake module:



5. Place the module on the device and fasten it in place with the fastening screws and washers:



6. Then fasten the EMC shroud EM6A3 onto the bottom of the inverter in the threaded holes provided for this purpose with the two included fastening screws (combination screws with toothed lock washer, M4x8; max. tightening torque: 2.4 Nm).



7. Attach the inverter on the mounting plate in the control cabinet with the fastening screws.
8. Attach all terminals.
9. Connect the inverter and accessories according to the contact plan.

⇨ You have installed the inverter. Check whether you can perform a function test (see section 6 Function test).

5.4 Reinstall the inverter with the bottom brake resistor and EMC/brake module

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

The following requirements apply

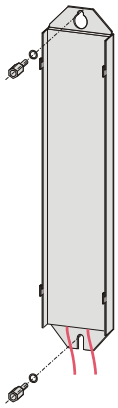
- A contact plan of the system in which the connection of the inverter is described must be present.

You need

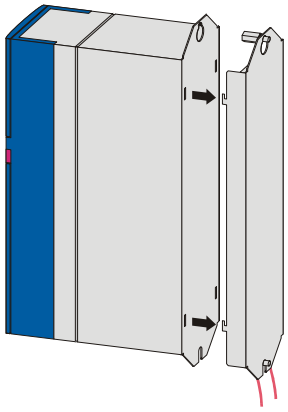
- The M5 threaded bolts included with the bottom brake resistor
- Tool for drilling holes
- a tool to tighten the fastening screws

Reinstall inverter size 0, 1 or 2 with substructure and EMC shroud

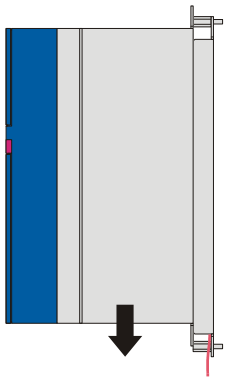
1. Drill the drill holes in the mounting plate according to the included drill plan.
2. Remove all terminals from the inverter.
3. Install the accessory cards (see section 3 Install accessories).
4. Attach the bottom brake resistor to the mounting plate in the control cabinet with the threaded bolts:



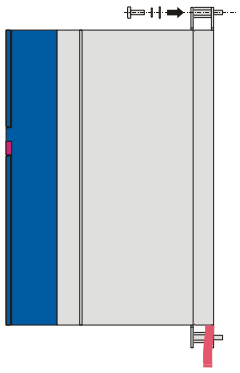
5. Place the inverter on the guides:



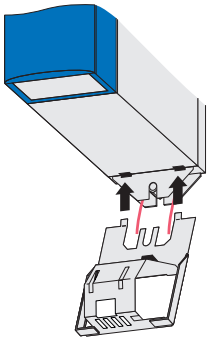
6. Press the inverter down on the guides:



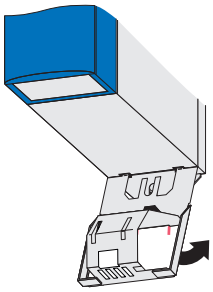
7. Attach the inverter to the upper stud with the screws and washers:



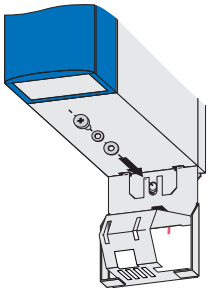
8. Insert the shroud into the openings at a slight angle:



9. Press the rear of the shroud onto the threaded bolt of the substructure:



10. Attach the shroud to the inverter and threaded bolt with the fastening screw and washers:



11. Connect the housing ground (see section 4.4 Housing ground).
12. Attach all terminals.
13. Connect the inverter according to the contact plan.

⇨ You have installed the inverter. Check whether you can perform a function test (see section 6 Function test).

The following requirements apply

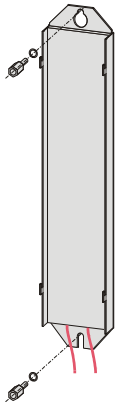
- A contact plan of the system in which the connection of the inverter is described must be present.

You need

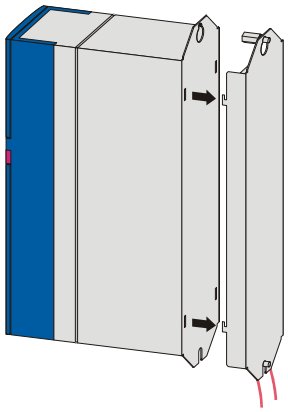
- The M5 threaded bolts included with the bottom brake resistor
- Tool for drilling holes
- a tool to tighten the fastening screws

Reinstall inverter size 0, 1 or 2 with substructure and brake module

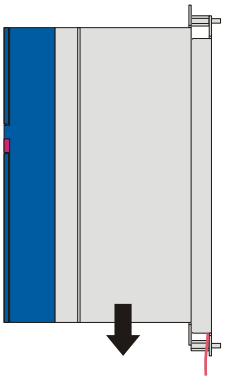
1. Drill the drill holes in the mounting plate according to the included drill plan.
2. Remove all terminals from the inverter.
3. Install the accessory cards (see section 3 Install accessories).
4. Attach the bottom brake resistor to the mounting plate in the control cabinet with the threaded bolts:



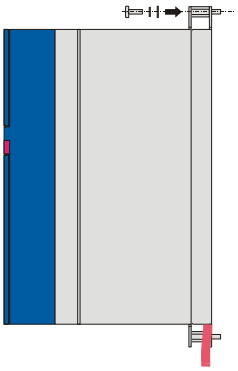
5. Place the inverter on the guides:



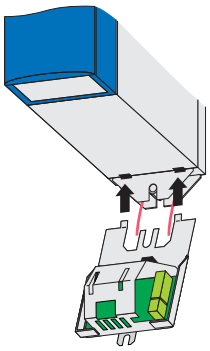
6. Press the inverter down on the guides:



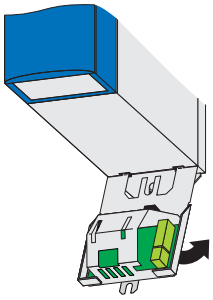
7. Attach the inverter to the upper stud with the screws and washers:



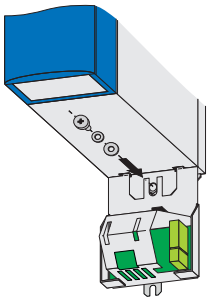
8. Insert the module into the openings at a slight angle:



9. Press the rear of the module onto the threaded bolt of the substructure:



10. Attach the module to the inverter and threaded bolt with the fastening screw and washers:



11. Connect the housing ground (see section 4.4 Housing ground).
12. Attach all terminals.
13. Connect the inverter and accessories according to the contact plan.

⇨ You have installed the inverter. Check whether you can perform a function test (see section 6 Function test).

6 Function test

⚠ WARNING!

Danger due to moving parts!

The motor shaft rotates during the function test!

- ▶ Clear the danger zone before the function test.
- ▶ Do not connect any mechanical systems to the motor or gear unit until the function test is completed.
- ▶ Make certain the components fastened to the motor are sufficiently secured against centrifugal forces (by feather keys, coupling elements, etc).

You can perform the function test if you connect a STOBER servo motor with an absolute value encoder to the inverter after reinstallation. In this case, the required data is read from the electronic nameplate.

Note also that the inverter must be in the standard condition as supplied to the customer. In this case, the *fast reference value* application is saved.

Use the function test to check the connection of
- the motor,
- any existing encoders,
- any existing ASP 5001 units that may be used,
- any existing brakes,
- the power supply and
- the 24 V supplies.

The description of the function test is divided into three sections for clarity:
- Preparing the function test
- Performing the function test
- Resetting the function test

6.1 Preparing the function test

Information
In any case perform the actions described in the following one after the other.

Preparing the function test

1. Switch on the 24 V supply of the accessory.
2. Switch on the 24 V supply of the inverter.
3. Switch on the power supply.
4. If available: Deselect the ASP 5001.
   ⇨ The inverter display shows *2: readySwtchOn*.

⇨ You have prepared the function test.

If the described results are not achieved, check the following cases.

- The inverter display shows the malfunction *55:OptionBoard* alternating to *10:24Vfailure*:
  – Check the 24 V supply of the accessories.
  – Perform the function test again and switch on the 24 V supply of the accessories before or at the same time as the 24 V supply of the inverter.

- The inverter display does not show *2: readySwtchOn*.
  – Check the power supply and the 24 V supply of the inverter.
  – Check whether the ASP 5001 is activated. Note that an installed ASP 5001 must be activated even if it is not used. You can find information on this in the projecting manual of the inverter.
  – Ensure that the enable is switched off.

- The inverted display shows a malfunction.
  – Determine the causes using the operating manual of the inverter.

6.2 Performing the function test

Performing the function test

1. Press the manual button on the front of the inverter.
   ⇨ The inverter changes to normal operation. The inverter display shows the symbol L.
2. Press the I/O button on the front of the inverter.
   ⇨ The inverter is enabled in normal operation.
3. Press the < or > arrow button on the front of the inverter.
   ⇨ The axle turns and the inverter does not detect any malfunctions. You have now checked the connections.

⇨ You have performed the function test.

If the described results are not achieved, check the following cases.

- The axle does not turn.
  – Check whether there is a blockage in the machine.
  – Check whether any existing brakes are released.
  – Check the motor connection.

- The inverted display shows a malfunction.
  – Determine the causes using the operating manual of the inverter.

6.3 Complete the function test

Complete the function test

1. Press the I/O button on the front of the inverter.
   ⇨ The inverter is no longer enabled.
2. Press the manual button on the front of the inverter.
   ⇨ The inverter changes to normal operation. The inverter display shows *2: readySwtchOn*.

⇨ You have completed the function test.

If the described results are not achieved, check the following cases.

- The inverted display shows a malfunction.
  – Determine the causes using the operating manual of the inverter.

7 Replacement

Information
Note that this section does not describe the replacement of an inverter from a DC link connection. Observe the projecting manual of the inverter for this.

The following requirements apply for each replacement:
- Inverters of the same series (MDS, SDS, FDS) and same power (5008, 5075 etc.) are replaced.
- The version of the hardware and firmware of the inverter is the same or more recent than the inverter to be disassembled.
- The circuit diagram of the machine is present.
- The Paramodule of the inverter to be disassembled is present. The original project is saved on the Paramodule.

7.1 Replacing the inverter

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

NOTICE

Loss of absolute position!

If the encoder cable is disconnected from the AES, the absolute position in the encoder is deleted.

▶ Never disconnect the encoder cable from the AES. Disconnect the AES from the inverter.

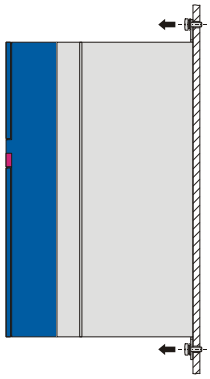
▶ Note the operating instructions for the Absolute Encoder Support AES.

You need:
- A tool to undo and tighten the fastening screws

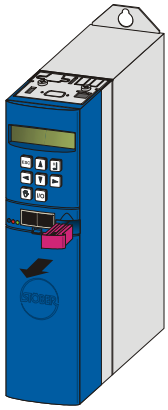
Replacing the inverter

1. If the AES is available, do **not** disconnect the encoder cable from the AES! Disconnect the AES from the inverter!
2. Remove all terminals from the inverter that is being removed.
3. Undo the housing ground for devices of size 0, 1 or 2.

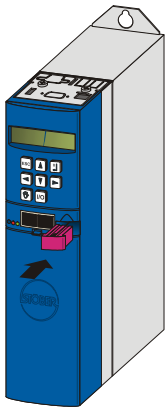
4. Undo the fastening screws and take the inverter out of the control cabinet.



5. Remove the Paramodule from the disassembled inverter.

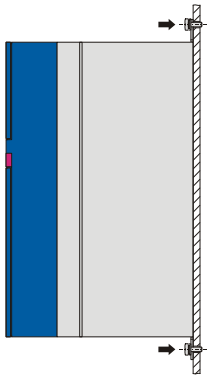


6. Place the Paramodule on the inverter to be installed.



7. If no accessories were supplied with the new inverter, disassemble the I/O circuit boards and fieldbus circuit boards of the disassembled inverter.
8. Install the accessories in the new inverter (see section 3 Install accessories).

9. Install the new inverter in the control cabinet.



10. Connect the housing ground correctly for devices of size 0, 1 or 2 (see section 4.4 Housing ground).
11. Reattach all terminals.
12. If an AES is available, plug it onto the inverter using the connected encoder cable. Tighten the knurled screws so that the AES is securely connected with the inverter.

⇨ You have replaced the inverter.

7.2 Replace the inverter with the bottom brake resistor

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

NOTICE

Loss of absolute position!

If the encoder cable is disconnected from the AES, the absolute position in the encoder is deleted.

▶ Never disconnect the encoder cable from the AES. Disconnect the AES from the inverter.

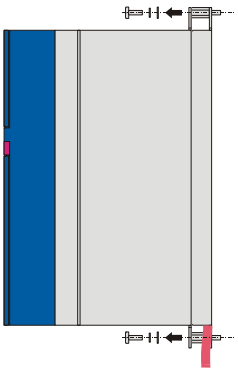
▶ Note the operating instructions for the Absolute Encoder Support AES.

You need:

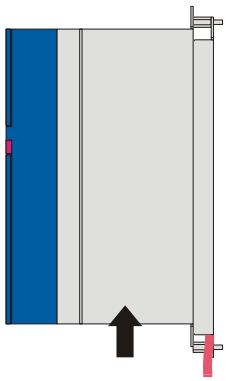
- A tool to undo and tighten the fastening screws

Replacing inverters size 0, 1 or 2

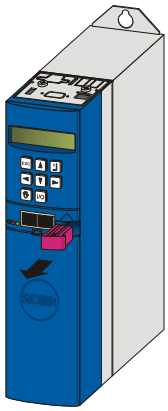
1. If the AES is available, do **not** disconnect the encoder cable from the AES! Disconnect the AES from the inverter!
2. Remove all terminals from the inverter that is being removed.
3. Undo the housing earth.
4. Undo the fastening screws.



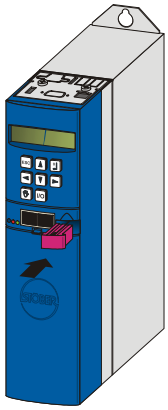
5. Press the inverter up on the guides of the bottom brake resistor and take the inverter out of the control cabinet.



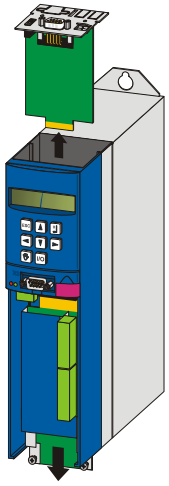
6. Remove the Paramodule from the disassembled inverter.



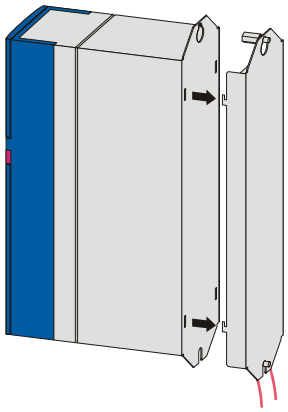
7. Place the Paramodule on the inverter to be installed.



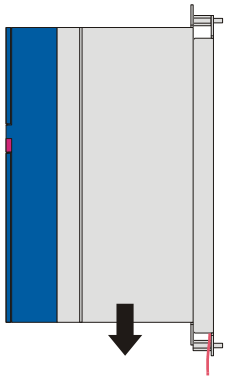
8. If no accessories were supplied with the new inverter, disassemble the I/O circuit boards and fieldbus circuit boards of the disassembled inverter.



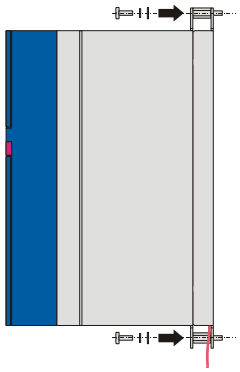
9. Install the accessories in the new inverter (see section 3 Install accessories).
10. Place the inverter on the guides:



11. Press the inverter down on the guides:



12. Attach the inverter to the studs with the screws and washers:



13. Connect the housing earth correctly (see section 4.4 Housing ground).
14. Reattach all terminals.
15. If an AES is available, plug it onto the inverter using the connected encoder cable. Tighten the knurled screws so that the AES is securely connected with the inverter.

⇨ You have replaced the inverter.

7.3 Replace the inverter with EMC/brake module

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

NOTICE

Loss of absolute position!

If the encoder cable is disconnected from the AES, the absolute position in the encoder is deleted.

▶ Never disconnect the encoder cable from the AES. Disconnect the AES from the inverter.

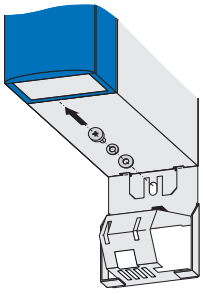
▶ Note the operating instructions for the Absolute Encoder Support AES.

You need:

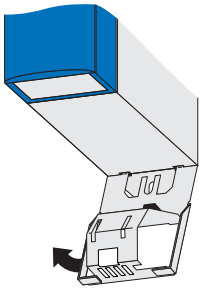
- A tool to undo and tighten the fastening screws

Replace inverter size 0, 1 or 2 with EMC shroud

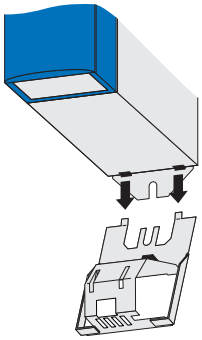
1. If the AES is available, do **not** disconnect the encoder cable from the AES! Disconnect the AES from the inverter!
2. Remove all terminals from the inverter that is being removed.
3. Undo the housing earth.
4. Undo the lower fastening screw.



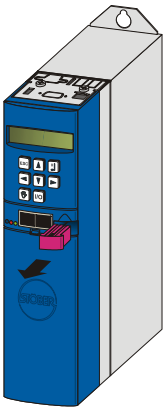
5. Slightly push the lower edge of the shroud away from the control cabinet wall:



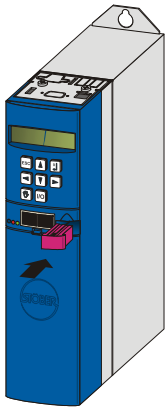
6. Remove the shroud by pushing slightly down at an angle:



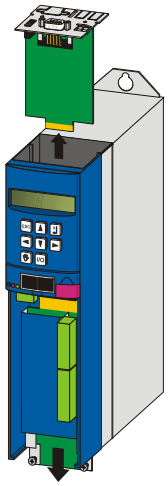
7. Undo the upper fastening screw and take the inverter out of the control cabinet.
8. Remove the Paramodule from the disassembled inverter.



9. Place the Paramodule on the inverter to be installed.



10. If no accessories were supplied with the new inverter, disassemble the I/O circuit boards and fieldbus circuit boards of the disassembled inverter.



11. Install the accessories in the new inverter (see section 3 Install accessories).
12. Attach the inverter to the top of the control cabinet with the screw and washers.
13. Attach the EMC shroud to the new inverter (see section 5.3 Reinstall inverter with EMC/brake module, steps 5 to 7 for size 0, 1 or 2).
14. Connect the housing earth correctly (see section 4.4 Housing ground).
15. Reattach all terminals.
16. If an AES is available, plug it onto the inverter using the connected encoder cable. Tighten the knurled screws so that the AES is securely connected with the inverter.

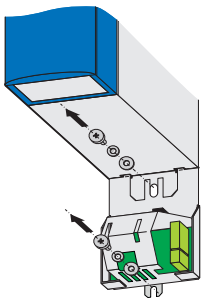
⇨ You have replaced the inverter.

Information
When changing from BRS 5000 to BRS 5001, note that brake module BRS 5001 requires firmware V 5.6-N at least.

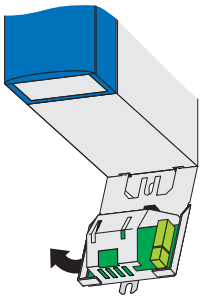
You need:
- A tool to undo and tighten the fastening screws

Replace inverter size 0, 1 or 2 with brake module

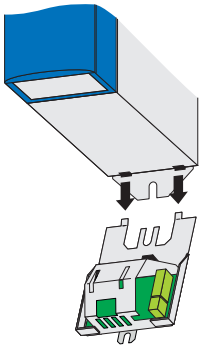
1. If the AES is available, do **not** disconnect the encoder cable from the AES! Disconnect the AES from the inverter!
2. Remove all terminals from the inverter that is being removed.
3. Undo the housing earth.
4. Undo the lower fastening screw.



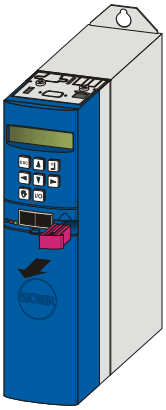
5. Slightly push the lower edge of the module away from the control cabinet wall:



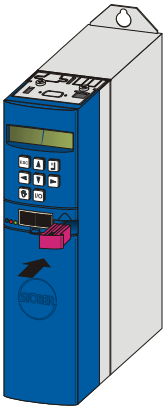
6. Remove the module by pushing slightly up at an angle:



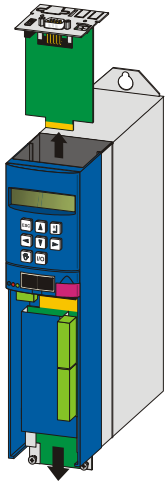
7. Undo the upper fastening screw and take the inverter out of the control cabinet.
8. Remove the Paramodule from the disassembled inverter.



9. Place the Paramodule on the inverter to be installed.



10. If no accessories were supplied with the new inverter, disassemble the I/O circuit boards and fieldbus circuit boards of the disassembled inverter.



11. Install the accessories in the new inverter (see section 3 Install accessories).
12. Attach the inverter to the top of the control cabinet with the screw and washers.
13. Attach the brake module to the new inverter (see section 5.3 Reinstall inverter with EMC/brake module, steps 5 to 7 for size 0, 1 or 2).
14. Connect the housing earth correctly (see section 4.4 Housing ground).
15. Reattach all terminals.
16. If an AES is available, plug it onto the inverter using the connected encoder cable. Tighten the knurled screws so that the AES is securely connected with the inverter.

⇨ You have replaced the inverter.

You need:

- A tool to undo and tighten the fastening screws

Replacing size 3 inverters

1. If the AES is available, do **not** disconnect the encoder cable from the AES! Disconnect the AES from the inverter!
2. Remove all terminals from the inverter that is being removed.
3. Undo the fastening screws and take the inverter out of the control cabinet.
4. Remove the Paramodule from the disassembled inverter.
5. Place the Paramodule on the inverter to be installed.
6. If no accessories were supplied with the new inverter: Disassemble the I/O circuit boards and fieldbus circuit boards, the brake module and the EMC shroud of the disassembled inverter.
7. Install the accessory cards in the new inverter (see section 3 Install accessories).
8. Attach the brake module and EMC shroud to the new inverter (see section 5.3 Reinstall inverter with EMC/brake module, steps 4 to 7 for size 3).
9. Attach the inverter to the control cabinet with the screws and washers.
10. Reattach all terminals.
11. If an AES is available, plug it onto the inverter using the connected encoder cable. Tighten the knurled screws so that the AES is securely connected with the inverter.

⇨ You have replaced the inverter.

7.4 Replace the inverter with bottom brake resistor and EMC/brake module

⚠ WARNING!

Danger of personal injury and material damage due to electric shock!

▶ Always switch off all power supply voltage before working on the inverter! Note that the discharge time of the DC link capacitors is up to 6 minutes. You can only determine the absence of voltage after this time period.

NOTICE

Loss of absolute position!

If the encoder cable is disconnected from the AES, the absolute position in the encoder is deleted.

▶ Never disconnect the encoder cable from the AES. Disconnect the AES from the inverter.

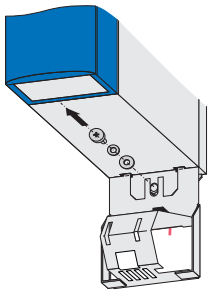
▶ Note the operating instructions for the Absolute Encoder Support AES.

You need:

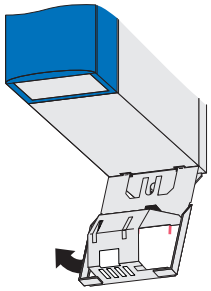
- A tool to undo and tighten the fastening screws

Replace inverter size 0, 1 or 2 with substructure and EMC shroud

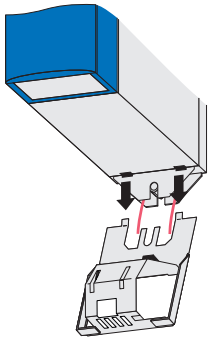
1. If the AES is available, do **not** disconnect the encoder cable from the AES! Disconnect the AES from the inverter!
2. Remove all terminals from the inverter that is being removed.
3. Undo the housing earth.
4. Undo the lower fastening screws.



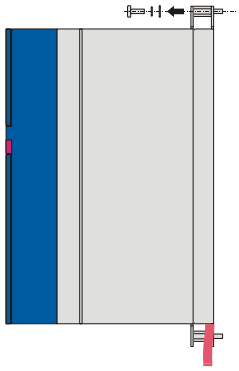
5. Slightly push the lower edge of the shroud away from the control cabinet wall:



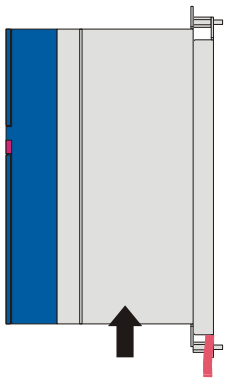
6. Remove the shroud by pushing slightly down at an angle:



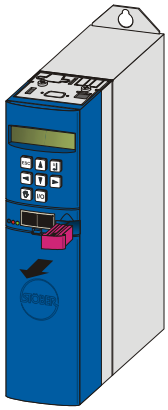
7. Undo the upper fastening screw.



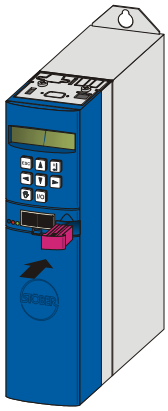
8. Press the inverter up on the guides of the bottom brake resistor and take the inverter out of the control cabinet.



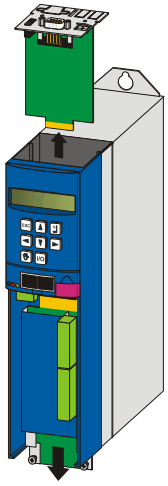
9. Remove the Paramodule from the disassembled inverter.



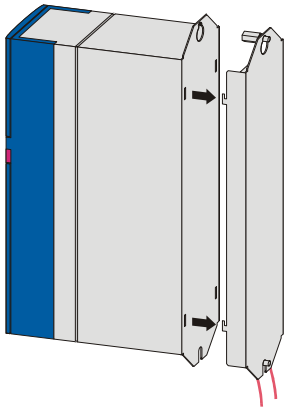
10. Place the Paramodule on the inverter to be installed.



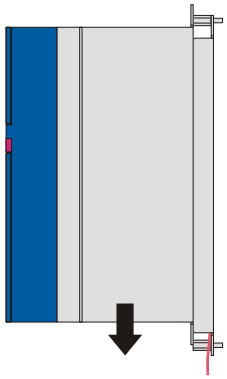
11. If no accessories were supplied with the new inverter, disassemble the I/O circuit boards and fieldbus circuit boards of the disassembled inverter.



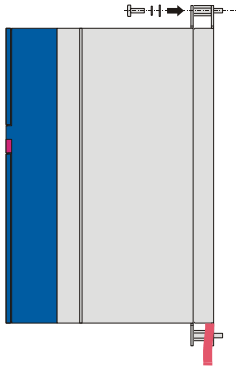
12. Install the accessories in the new inverter (see section 3 Install accessories).
13. Place the inverter on the guides:



14. Press the inverter down on the guides:



15. Attach the inverter to the upper stud with the screws and washers:



16. Attach the EMC shroud to the new inverter (see section 5.4 Reinstall the inverter with the bottom brake resistor and EMC/brake module, steps 8 to 10 for size 0, 1 or 2).
17. Connect the housing earth correctly (see section 4.4 Housing ground).
18. Reattach all terminals.
19. If an AES is available, plug it onto the inverter using the connected encoder cable. Tighten the knurled screws so that the AES is securely connected with the inverter.

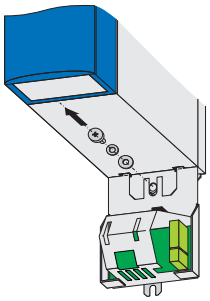
⇨ You have replaced the inverter.

Information
When changing from BRS 5000 to BRS 5001, note that brake module BRS 5001 requires firmware V 5.6-N at least.

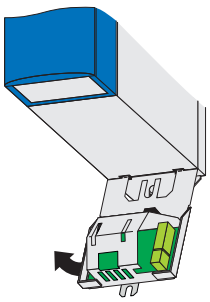
You need:
- A tool to undo and tighten the fastening screws

Replace inverter size 0, 1 or 2 with substructure and brake module

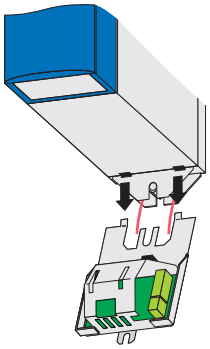
1. If the AES is available, do **not** disconnect the encoder cable from the AES! Disconnect the AES from the inverter!
2. Remove all terminals from the inverter that is being removed.
3. Undo the housing earth.
4. Undo the lower fastening screw.



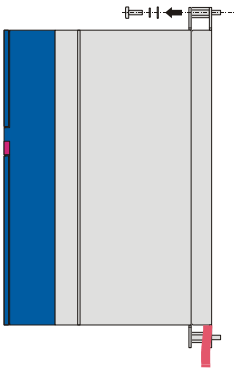
5. Slightly push the lower edge of the module away from the control cabinet wall:



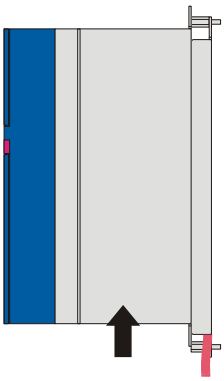
6. Remove the module by pushing slightly up at an angle:



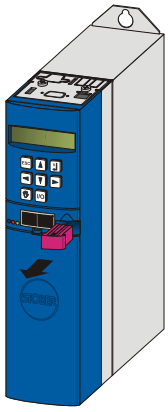
7. Undo the upper fastening screw.



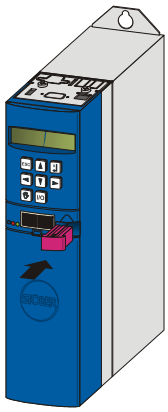
8. Press the inverter up on the guides of the bottom brake resistor and take the inverter out of the control cabinet.



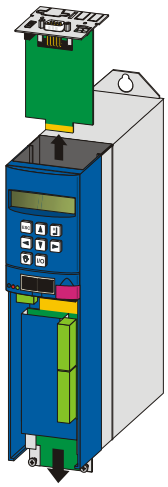
9. Remove the Paramodule from the disassembled inverter.



10. Place the Paramodule on the inverter to be installed.

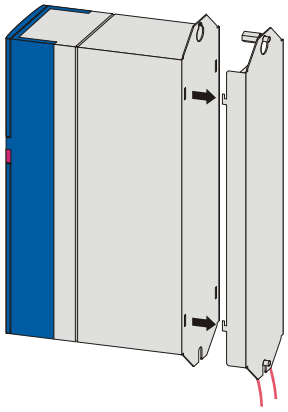


11. If no accessories were supplied with the new inverter, disassemble the I/O circuit boards and fieldbus circuit boards of the disassembled inverter.

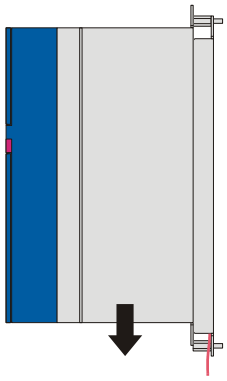


12. Install the accessories in the new inverter (see section 3 Install accessories).

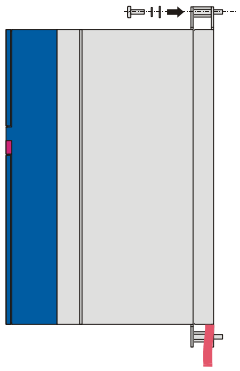
13. Place the inverter on the guides:



14. Press the inverter down on the guides:



15. Attach the inverter to the upper stud with the screws and washers:



16. Attach the brake module to the new inverter (see section 5.4 Reinstall the inverter with the bottom brake resistor and EMC/brake module, steps 8 to 10 for size 0, 1 or 2).
17. Connect the housing earth correctly (see section 4.4 Housing ground).
18. Reattach all terminals.
19. If an AES is available, plug it onto the inverter using the connected encoder cable. Tighten the knurled screws so that the AES is securely connected with the inverter.

⇨ You have replaced the inverter.

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