
1SFC13105M0201

Softstarters Type PSTX210...370 and PSTX470...570

Service manual



Original instruction

This is the Service manual for Softstarter type PSTX210...370 and PSTX470...570.

Document number: 1SFC13105M0201

Revision: C

Issue date: 2021-07-28

Data subject to change without notice.

We reserve all rights to this document, even in the event that a patent is issued and a different commercial proprietary right is registered. Improper use, in particular reproduction and dissemination to third parties, is not permitted.

This document has been carefully checked. If the user nevertheless detects any errors, he is kindly asked to notify us as soon as possible.

The data contained in this manual is intended solely for the product description and is not to be deemed to be a statement of guaranteed properties. In the interests of our customers, we constantly seek to ensure that our products are developed to the latest technological standards.

As a result, there may be some differences between the Softstarter and the information in this manual.

Author's address:

ABB Electrification Sweden AB

Smart Power - Motor Starting & Safety

SE-721 61 Västerås, Sweden

<https://solutions.abb/softstarters>

© Copyright 2021. All rights reserved. Specification subject to changes without notice.

Safety

Warning and information

This chapter describes warning and information signs used in this manual, which the user should pay attention to.

- The service of the Softstarter shall be performed by authorized personnel only.
- This manual should always be accessible to authorized personnel working with service of Softstarters PSTX210...370 and PSTX470...570.
- The manual shall always be read through before performing any service tasks.

Usage of warnings and notes

There are two types of safety instructions throughout this manual: warnings and notes. Warnings caution you about conditions which can result in serious injury or death and/or damage to the equipment, and advise on how to avoid the danger. Notes draw attention to a particular condition or fact, or give information on a subject.

The warning symbols are used as follows:



WARNING. HAZARDOUS VOLTAGE

General warning symbol indicates the presence of a hazard which could result in personal injury and damage to equipment or property.



WARNING

Warning symbol indicates the presence of hazardous voltage which could result in personal injury.



Electrostatic sensitive devices warning

Electrostatic discharge is needed to not damage the equipment.



WARNING. HAZARDOUS VOLTAGE

Symbol indicates that only authorized and appropriately trained personnel are allowed to do the installation, operation and maintenance of the product. It should be done in accordance, with existing laws and regulations.



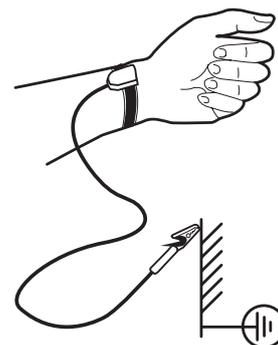
INFORMATION

Information sign tells the reader important facts and conditions.



Electrostatic sensitive devices warning

The printed circuit boards contain components sensitive to electrostatic discharge. Wear a grounding wrist band when handling the boards. Do not touch the boards unnecessarily.



Personal safety



WARNING. HAZARDOUS VOLTAGE

Service and repair shall be performed by authorized personnel only.

Service and repair shall be done in accordance with existing laws and regulations.

ABB personnel must under all circumstances, as a minimum, follow the ABB CISE 15.4 instruction.



WARNING

Use protective gloves when working with cover plates to prevent cutting injuries.

Softstarter type PSTX210...370 and PSTX470...570

Service manual

1 Introduction	1
2 Description	2
3 Service PSTX210...370	3
4 Service PSTX470...570	4
5 Wiring Diagrams	5
6 Revisions	6

1 Introduction

1.1 Service manual	
1.1.1 Intended audience	8
1.1.2 Revision notes and related documents	8
1.1.3 Acronyms and abbreviations	8
1.1.4 Chapters included	8

1.1 Service manual

This manual contains **step-by-step** instructions on how to perform service and maintenance on Softstarter range PSTX210...370 and PSTX470...570. Service and maintenance should be performed in accordance with this instruction to ensure product functionality, and to prevent that the lifetime of the product is shortened.

1.1.1 Intended audience

General

The service manual is intended for internal use and for the maintenance personnel responsible for service within ABB.

Reprint

Reprinting of this service manual is only promoted on approval. Reprint for internal use is permitted only for ABB service engineers.

1.1.2 Revision notes and related documents

For latest information on revisions and other documents related to the Softstarters, please check <https://solutions.abb/softstarters>

Table 1

Document	Document name
Spare parts catalogue	1SFC001013C0201

1.1.3 Acronyms and abbreviations

Acronyms and abbreviations used in this manual.

Table 2

Acronym/Abbreviation	Description
PCBA	Printed circuit board assembly
ESD	Electrostatic sensitive device
LED	Light Emitting Diode
LCD	Liquid Crystal Display
SCR	Silicon Controlled Rectifier (Thyristor)
HMI	Human-Machine Interface
FBP	Fieldbusplug
PCBA	Printed Circuit Board Assembly
CT	Current Transformer
R/L-key	Remote or Local
i-key	Information key

1.1.4 Chapters included

Table 3

Chapter	Description
1. Introduction	Introduces the reader to this manual.
2. Description	Describes the maintenance in general.
3. Service PSTX210...370	<p>This chapter describes how to perform service on the Softstarter step-by-step.</p> <p>The chapter contains:</p> <ul style="list-style-type: none"> • Earth the Softstarter • How to enter service profile • Update firmware • Set the ID • Reset to factory defaults • Remove the HMI • Place new HMI • Disconnect main power cables and control cables • Connect main power cables and control cables • Change the PCBA • Change the fans • Change the bypass contactor • Change the current transformers • Change the SCR • Test the SCR
4. Service PSTX470...570	<p>This chapter describes how to perform service on the Softstarter step-by-step.</p> <p>The chapter contains:</p> <ul style="list-style-type: none"> • Earth the Softstarter • How to enter service profile • Update firmware • Set the ID • Reset to factory defaults • Remove the HMI • Place new HMI • Disconnect main power cables and control cables • Connect main power cables and control cables • Change the PCBA • Change the fans • Change the bar holders • Change the current transformers • Assemble the Softstarter • Change the bypass contactor • Assemble the Softstarter • Change the SCR • Assemble the Softstarter • Test the SCR • Change the Stays
4. Revision	Shows revisions of this manual

2 Description

2.1 Description

2.1.1 Regular maintenance	10
2.1.2 Tools required	10
2.1.3 Service and repair	10
2.1.4 Weights	10
2.1.5 Dimension prints PSTX30...105, PSTX142...170	11
2.1.6 Dimension prints PSTX210...370, PSTX470...570	12
2.1.7 Markings and connections	14
2.1.8 Identification of Softstarter type	15

2.1 Description

This chapter outlines general information and procedures necessary for performing maintenance on Softstarters PSTX210...370 and PSTX470...570.



CAUTION

Do not open the Softstarter or touch any live parts when the main and supply voltage is connected.



WARNING

If using the Rated Operational Voltage U_e (Phase /N) as source for Control Supply Voltage U_s , make sure to not exceed U_s 250V AC, 50/60Hz.

2.1.1 Regular maintenance

Check screws

- Check that all mounting screws are fastened. Tighten if necessary.
- Check that all connections of main-, control- and supply circuits are fastened.
- Tighten the terminal screws and screws on the connection bars, if necessary.
- Check that the cooling airways are free from dirt and dust.
- Check that all the LED lamps are working.
- Check that the text in the HMI display is working.

Keep Softstarter clean from dirt

- Clean all dust and dirt from the products exterior using a vacuum cleaner. Any buildup of dirt or other contaminants that will not come off with vacuuming should be cleaned with lint free rags.
- All vents are to be cleaned of all dust and/or dirt. Ensure that ventilation openings are not obstructed. Dust and/or dirt in the Softstarter could lead to a short circuit.
- In environments where there is an extreme exposure to adverse conditions, the frequency of regular maintenance for Softstarters should be increased. If the Softstarter is installed in an electrical equipment room, the area should be kept cleaned of dirt and/or dust on a regular basis.
- The top of the Softstarter should be examined for evidence of water seepage. The source of the water should be immediately identified and corrective measures taken to permanently correct the condition.

Check the By-pass Contactor

- Inspect for loose, broken, or worn parts. Examine for excessive wear of moving parts. Observe that operating mechanisms function properly without binding, hanging, or without delayed action. Ensure mechanisms are clean, and all screws and screws are properly secured. Repair or replace if necessary.
- Check contacts on Softstarters for signs of wear and replace as required.

Service for By-pass Contactors

See the following operating instructions:

For PSTX470...570 1SFC 380023-en.

2.1.2 Tools required

- Slotted screwdriver
- Slotted screwdriver M3
- Long-nose plier
- Torx 15
- Torx 20
- Torx 25
- Torx 30
- Hexagon no. 4 Screwdriver
- Hexagon no. 8 Screwdriver
- Hexagon M10 socket wrench
- Abrasive cloth P600
- Ethanol
- Silicone oil
- Megger to set on 500V

2.1.3 Service and repair

In case the Softstarter has to be repaired, a spare parts list and necessary instructions are available at:

<https://solutions.abb/softstarters>

- Spare part list 1SFC001013C0201



Service and repair shall be performed by authorized personnel only. Note that unauthorized service and/or repair affects the safety and the warranty.

2.1.4 Weights



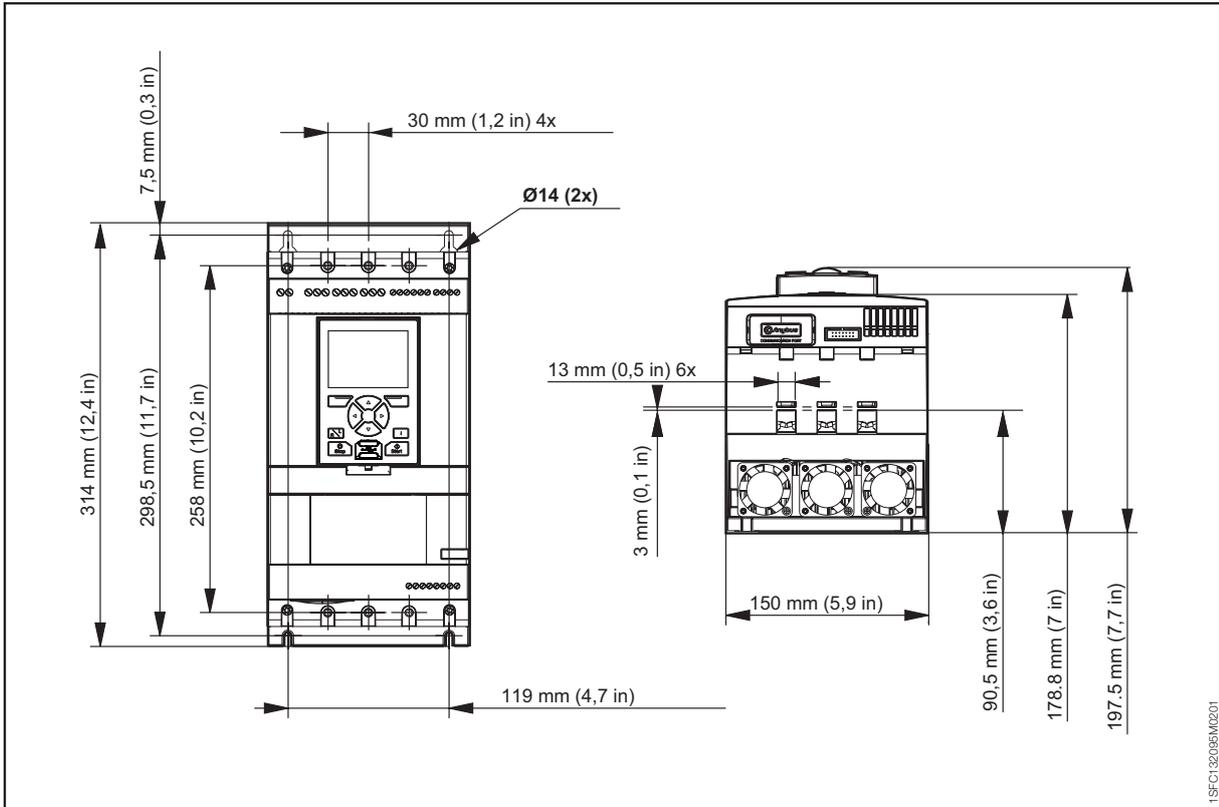
CAUTION

Pay attention to the weight when handling the Softstarter. Heavy lifting could result in personal injury.

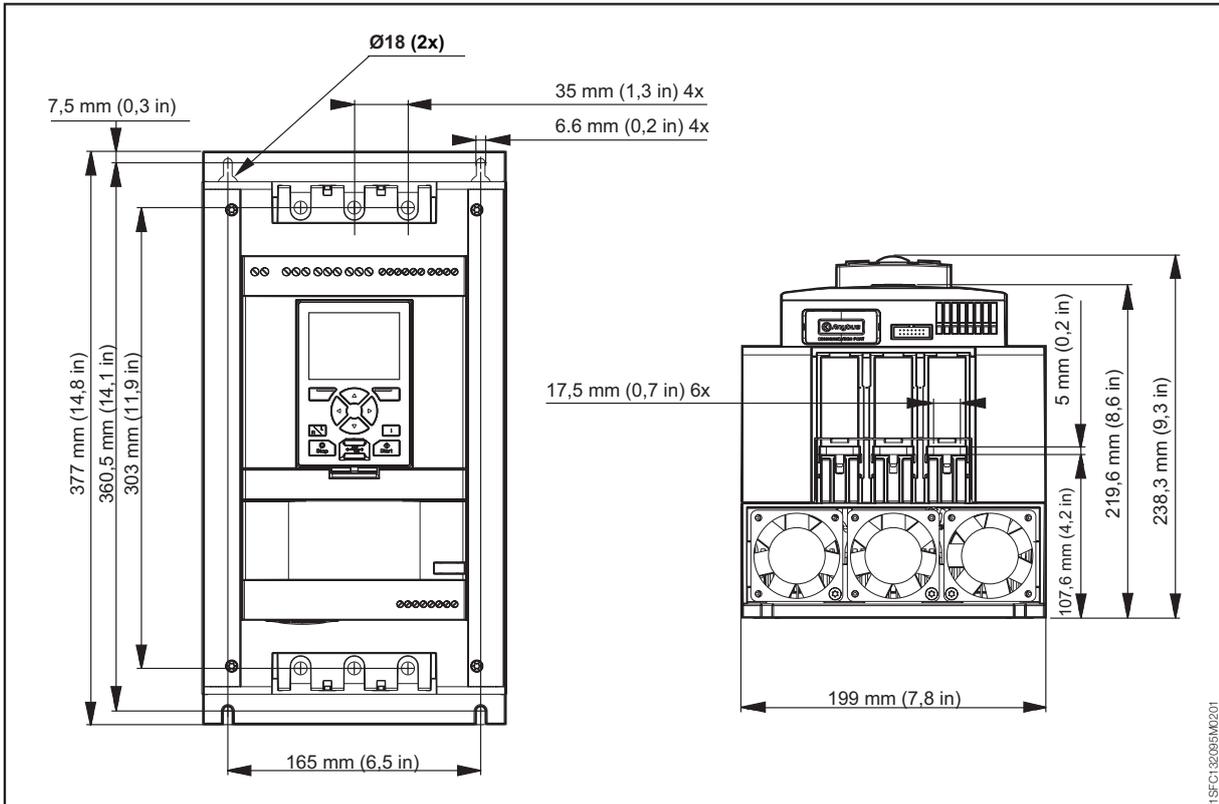
Table 4

Type	Weight in kg	Weight in lbs
PSTX 30...105	6,1	13,5
PSTX 142...170	9,6	21,2
PSTX 210...370	12,7	27,9
PSTX 470	25,5	56,2
PSTX 570	27,5	60,6

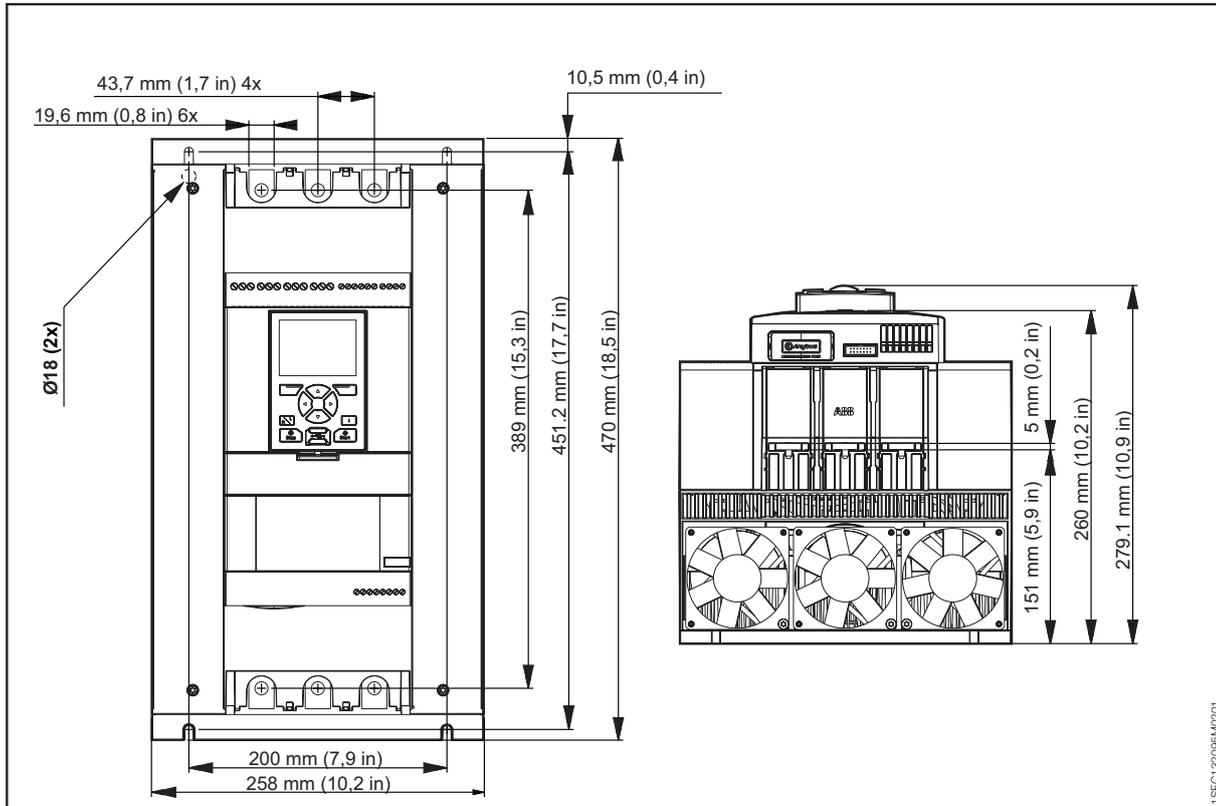
• PSTX30...105



• PSTX142...170

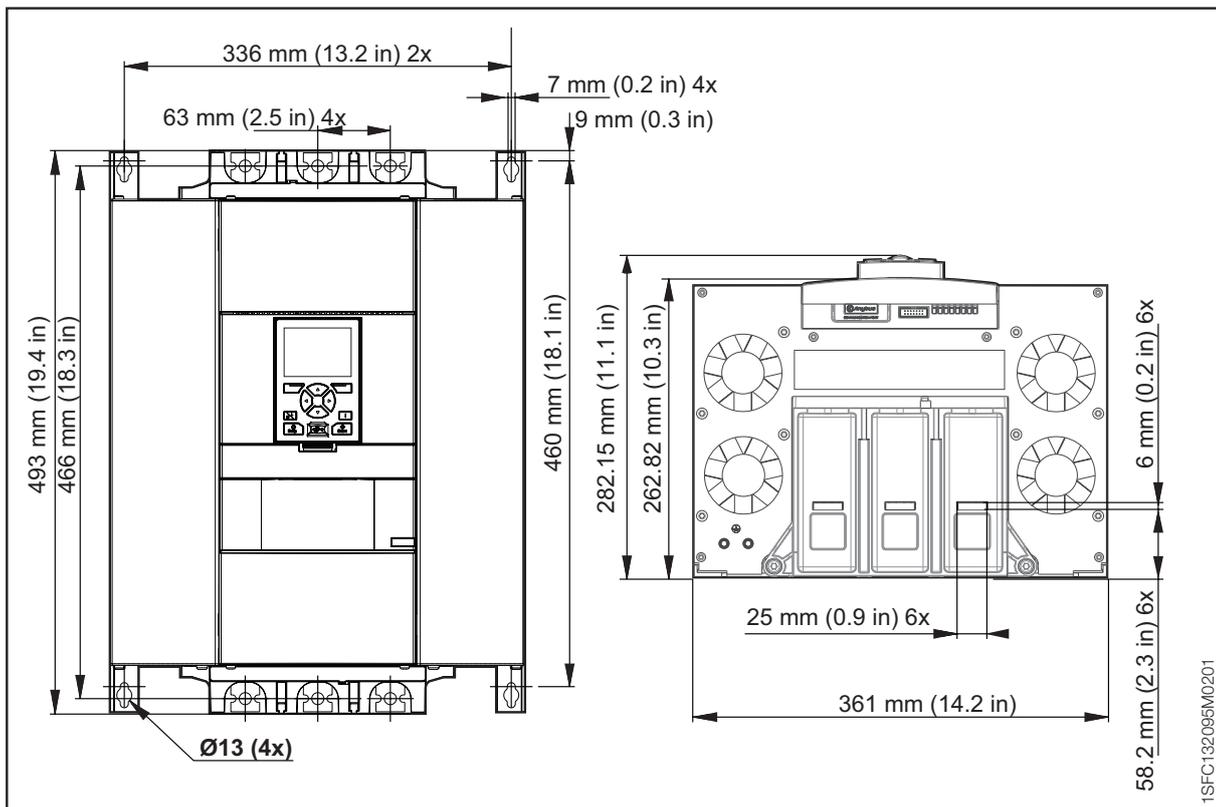


• PSTX210...370



1SFC132095M0201

• PSTX470...570



1SFC132095M0201

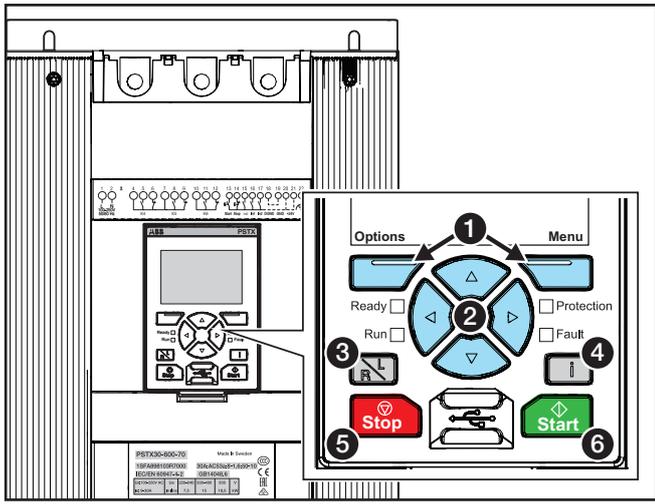
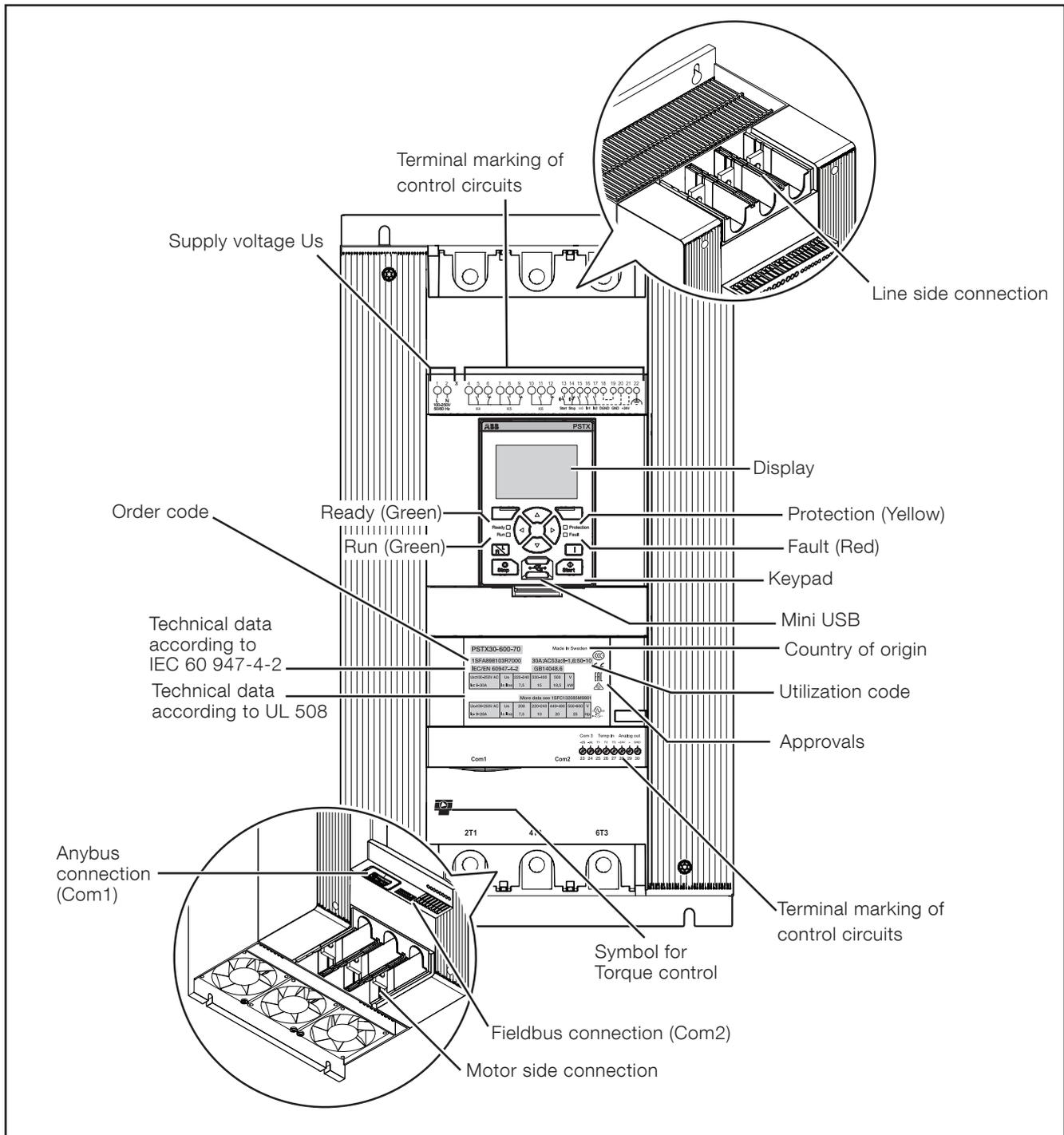
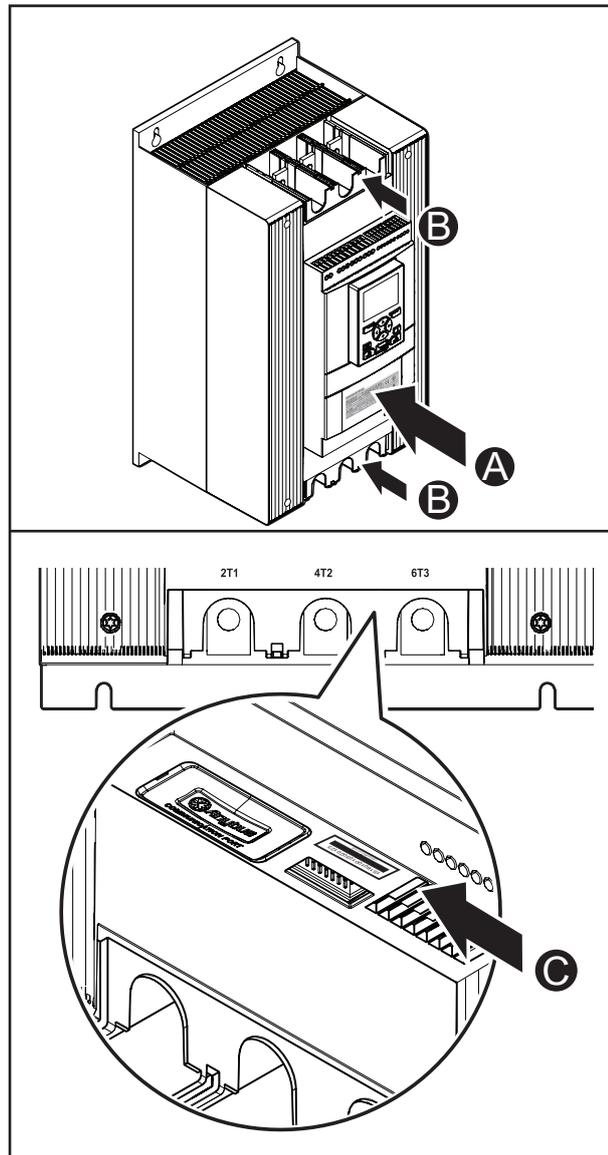


Table 4

Position	Key
1	Selection soft keys
2	Navigation keys
3	R/L-key = Remote or Local control
4	i-key = Information
5	Stop key
6	Start key



NOTE

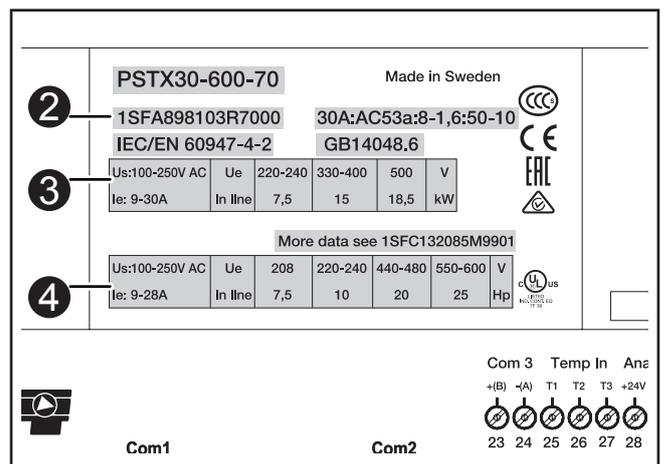
The service kits and spare parts varies depending on the type and serial number of the Softstarter. It is essential that the corresponding service kits and spare parts is used. Always refer to the spare parts catalogue when ordering service kits and spare parts. The spare parts catalogue, 1SFC001013C0201, is to be found on <https://solutions.abb/softstarters>

Identification

The Softstarter is identified by the front label **A**. Terminal marking of main circuit **B**.

A Front label

Order code **2**.
 Technical data according to IEC 60947-4-2 **3**.
 Technical data according to UL 508 **4**.
 The label shows the Softstarter and the serial number.



C Serial number information

The ABB Serial number within business unit Control Products has the following structure:

Table 5

Prefix	Register Id	Individual identity number part			
1S	160	PPPP	YY	WW	NNNN

Prefix = Defined in ABB Corporate Standard 9AAK100359

Register Id = Defined in BAATLV Instruction 1SFD2000-8

Individual identity number part

PPPP = Identification for product type / part of product

YY = Manufacturing year. Two digits.

(e.g. 02 for year 2002)

WW = Manufacturing Week. Two digits.

NNNN = Running number with week. Minimum four digits, starting with 1000 each week.

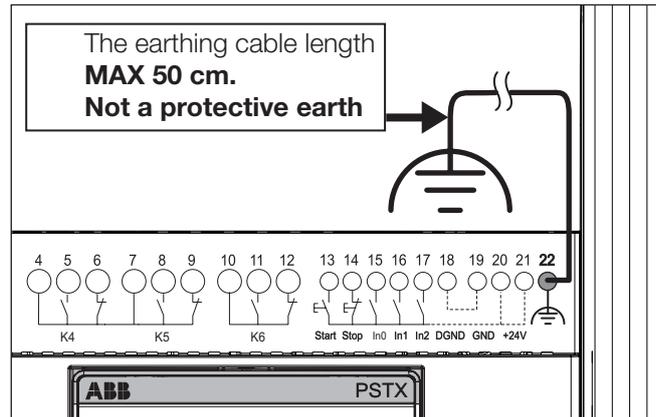
3.1 Introduction	
3.1.1 Earth the Softstarter	18
3.1.2 How to access service parameters	18
3.2 Configuring the HMI	
3.2.1 Update Firmware	19
3.2.2 Set the ID	19
Reset to factory defaults	20
3.3 Change the HMI, Disconnect/Connect the main power cables and the control cables	
3.3.1 Change the HMI	22
3.3.2 Place the new HMI	22
3.3.3 Disconnect the main power cables and the control cables	23
3.3.4 Connect the main power cables and the control cables	24
3.4 Service of the PCBA	
3.4.1 Change the PCBA	26
3.5 Change the Fans, Bypass contactor and Current transformers	
3.5.1 Change the fans	30
3.5.2 Change the Bypass contactor	31
3.5.3 Change the Current transformers	33
3.6 Change the SCR	
3.6.1 Change the SCR	36
3.7 Instructions for testing the SCR	
3.7.1 Test the SCR	41

3.1 Introduction

This service instruction contains **step-by-step** service of the PSTX210...370 Softstarter.

3.1.1 Earth the Softstarter

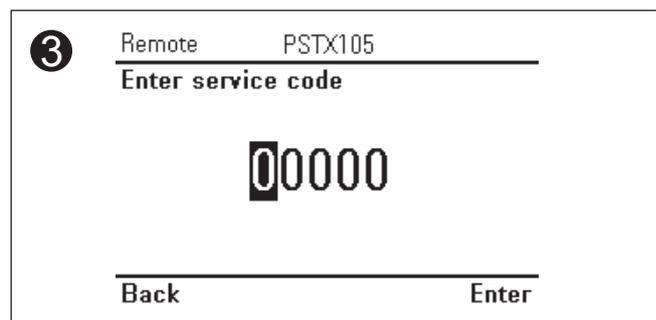
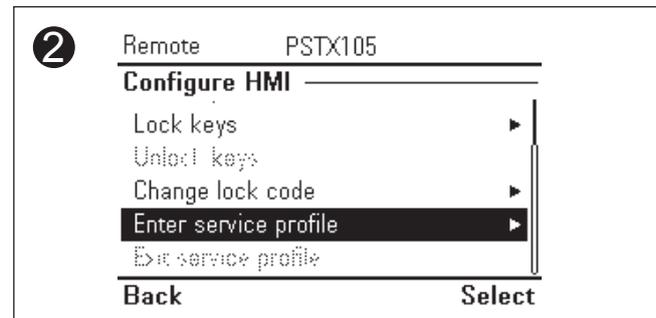
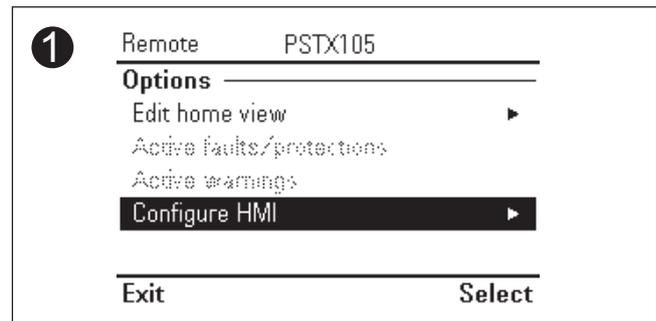
- Maximum cable length of the earthing**
The Softstarter should be earthed from **terminal 22**. The earthing cable length must not be longer than **50 cm**. Note that the earthing is not a protective earth.



3.1.2 How to access service parameters

Follow this instruction in order to make the service parameters available on the Softstarter:

- Switch on the power supply (terminal 1 and 2).
- 1** Push "Options" to reach Options menu. Use or to navigate to **Configure HMI** and then push "Select".
- 2** Use or to navigate to **Enter service profile** and then push "Select".
- 3** Use , , and , to enter the **service code**. Enter the following code: **73758**, and then push "Enter".
- When the message **Service profile OK** appears, the code is set.



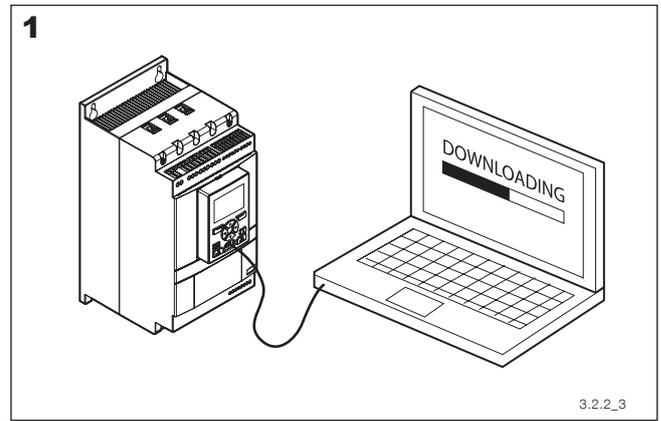
3.2 Configuring the HMI

This chapter describes how update firmware, set the ID and how to reset the Softstarter to default.

3.2.1 Update Firmware

Firmware needs to be updated when changing the HMI. Please contact your ABB sales office for information.

See Figure 1.



3.2.2_3

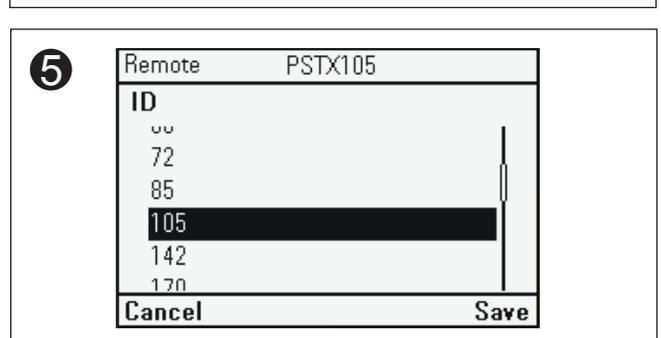
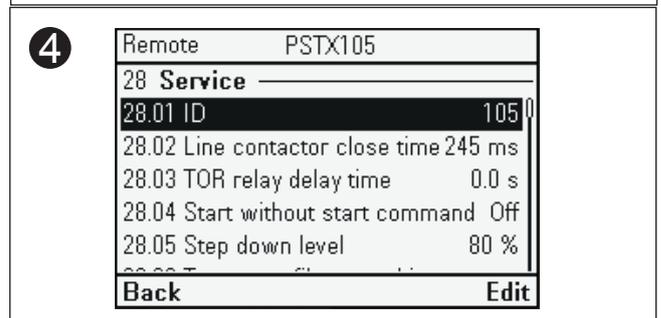
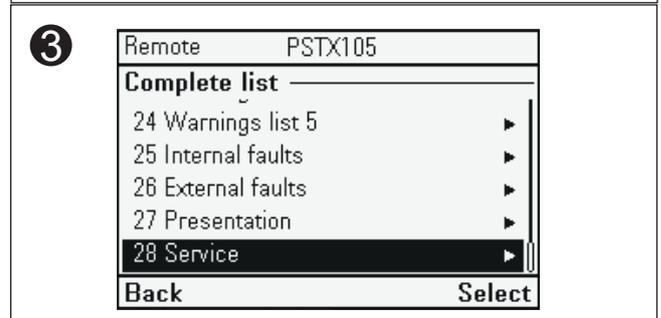
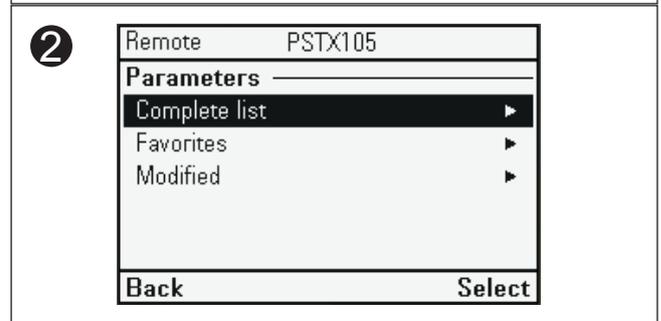
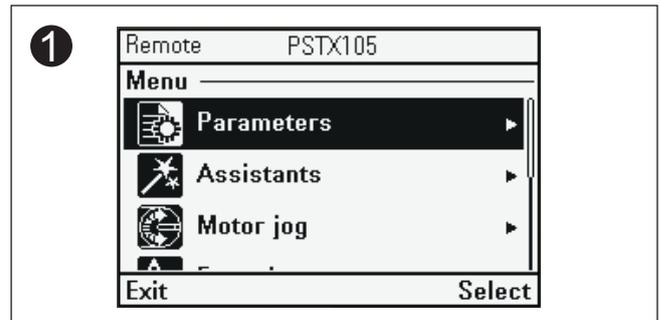
3.2.2 Set the ID

The ID of the Softstarter has to be changed when the PCBA has been changed and after updating firmware. Choose between 210...370 due to type of Softstarter.

1. Switch on the power supply (terminal 1 and 2).
2. **1** Push "Menu" to reach Menu. Use or to navigate to **Parameters** and then push "Select".
3. **2** Use or to navigate to **Complete list** and then push "Select".
4. **3** Use or to navigate to **28 Service** and then push "Select".
5. **4** Use or to navigate to **28.01 ID** and then push "Edit".
6. **5** Use , to set **28.01 ID** to **105** and then push "Save".



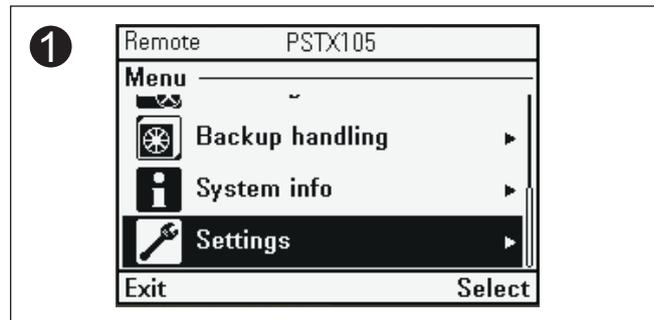
Changing the ID parameter will result in all the parameters being set to their default value followed by a restart of the device.



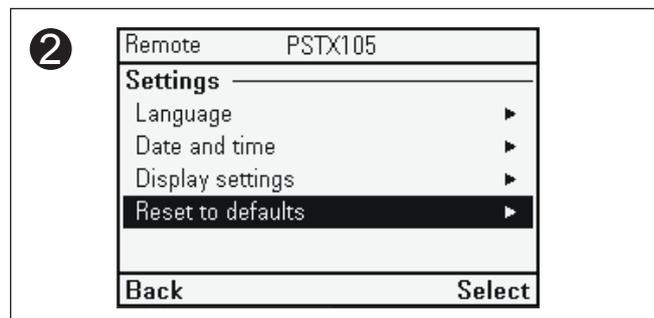
Reset to factory defaults

1. Switch on the power supply (terminal 1 and 2).

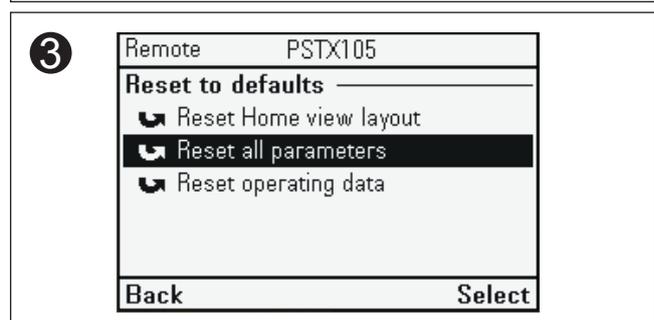
2. ① Push  "Menu" to reach Menu.
Use  or  to navigate to **Settings** and then push  "Select".



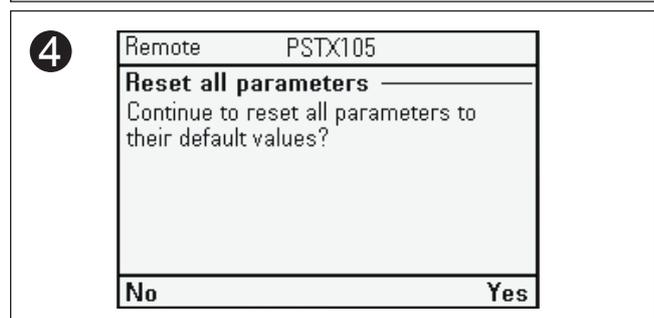
3. ② Use  or  to navigate to **Reset to defaults** and then push  "Select".



4. ③ Use  or  to navigate to **Reset all parameters** and then push  "Select".



5. ④ Following message will appear on the display:
Continue to reset all parameters to their default values?
Push  "Yes" to reset all parameters
or  "No" if you wish to cancel the operation.



3.3 Change the HMI, Disconnect/ Connect the main power cables and the control cables

This chapter describes how to change the HMI, disconnect or connect the main power cables and the control cables prior to performing service on the softstarter.



WARNING. HAZARDOUS VOLTAGE

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools required:

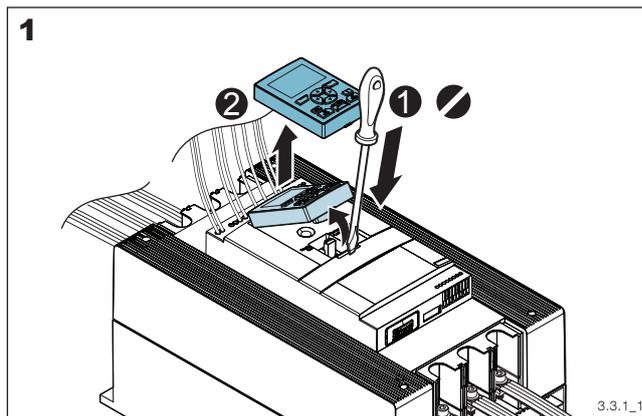
- Slotted screwdriver for removing the HMI
- Slotted screwdriver M3 for removing the control cables
- Hexagon screwdriver no. 8 for removing the main power cables

3.3.1 Change the HMI



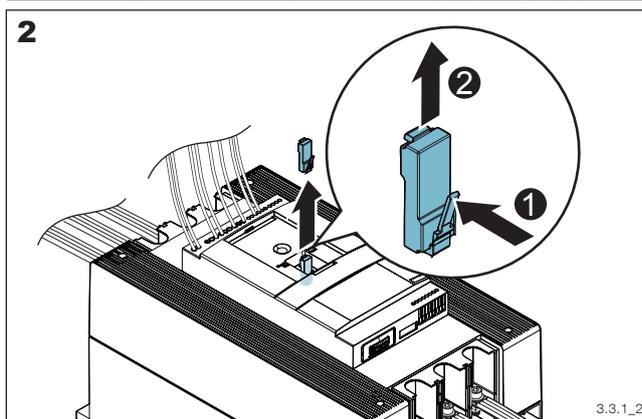
1. Remove the HMI module

- 1 Push back the locking bar preferably using a slotted screwdriver.
- 2 Remove the HMI module from the unit.



2. Disconnect the RJ45 plug

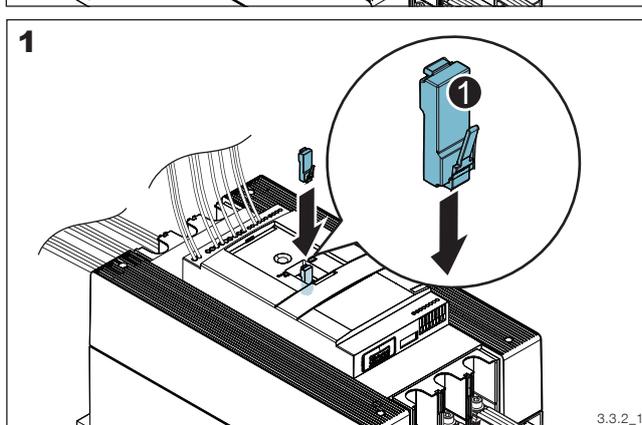
- 1 Press down the locking clip.
- 2 Remove the RJ45 plug (while locking clip held down) by pulling it upwards from unit. Be careful not to damage the locking clip.



3.3.2 Place the new HMI

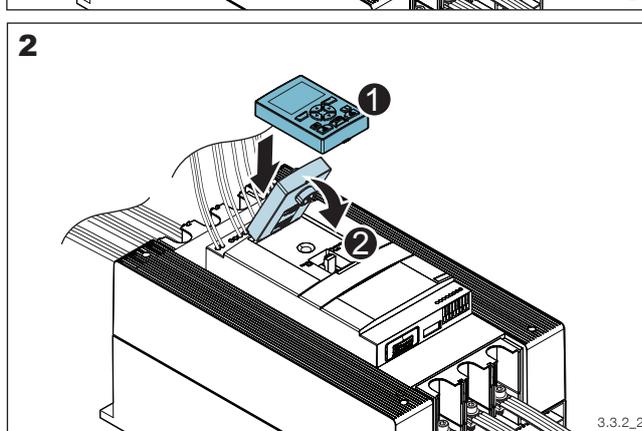
1. Connect the RJ45 plug

- 1 Connect the RJ45 plug to its socket. Make sure the plug gets properly connected; listen for a “clicking sound” from the locking clip when mounting the plug.



2. Place the new HMI module

- 1 Place the new HMI module on top of the unit with the front end facing downwards and the rear end facing upwards.
- 2 Dock the HMI module by pushing the rear end downwards and carefully snap the module into position.



Procedures after HMI replacement

Firmware needs to be updated when changing the HMI. Please contact your ABB sales office for information.

3.3.3 Disconnect the main power cables and the control cables



WARNING. HAZARDOUS VOLTAGE

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



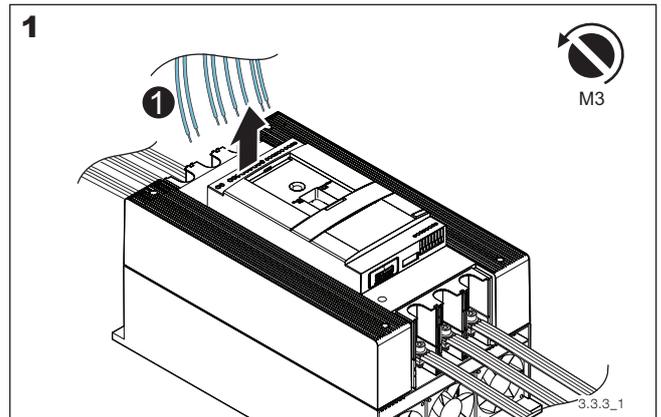
WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.

1. Disconnect the control cables

Mark the control cables prior to disconnecting them to enable proper re-connection.

① Loosen the **M3** screws using a slotted screwdriver and disconnect the control cables from the terminals.

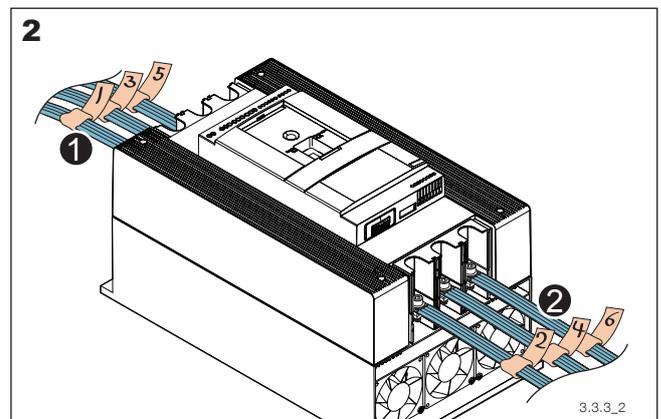


2. Mark the main power cables

Mark the power cables prior to disconnecting them.

① Mark the main power cables on the top terminals 1L1, 3L2 and 5L3 with 1, 3 and 5.

② Mark the main power cables on the bottom terminals 2T1, 4T2 and 6T3 with 2, 4 and 6.

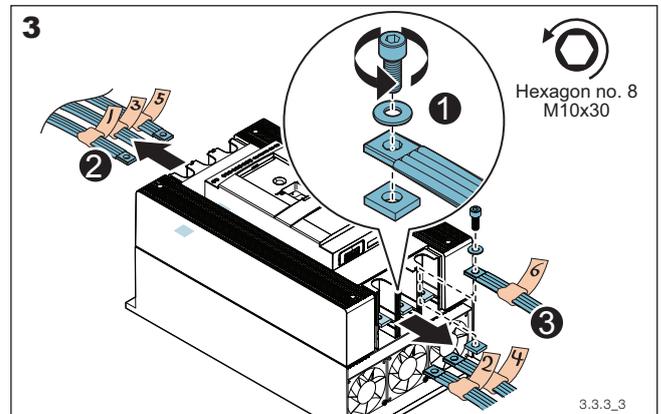


3. Disconnect the main power cables

① Loosen (6x) **Hexagon no. 8 M10x30** (including washers and square nuts).

② Disconnect the main power cables from the top terminals 1L1, 3L2 and 5L3.

③ Disconnect the main power cables from the bottom terminals 2T1, 4T2 and 6T3.



3.3.4 Connect the main power cables and the control cables



WARNING. HAZARDOUS VOLTAGE

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

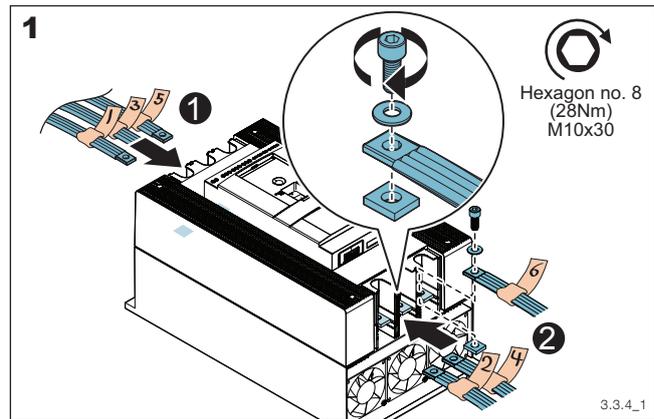
When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.

3

1. Connect main power cables

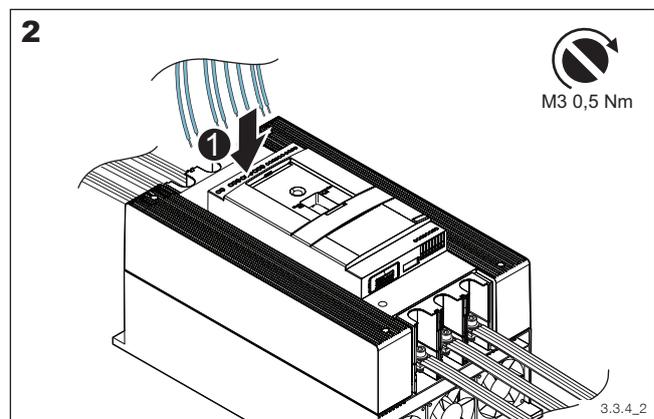
① Fasten the main power cables, according to previously made markings (1, 3 or 5), to top terminals 1L1, 3L2 and 5L3. **Hexagon no. 8 M10x30 (28Nm)**. Washers and square nuts to be used.

② Fasten the main power cables, according to previously made markings (2, 4 or 6), to bottom terminals 2T1, 4T2 and 6T3. **Hexagon no. 8 M10x30 (28Nm)**. Washers and square nuts to be used.

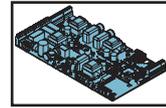


2. Connect control cables

① Connect the control cables (according to previously made markings) to the terminal block and fasten the **M3** screws (**0,5Nm**) using a slotted screwdriver.



3.4 Service of the PCBA



This chapter describes changing of the PCBA.



WARNING. HAZARDOUS VOLTAGE

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

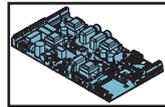
The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools required:

- Torx 15 for removing the front cover
- Torx 20 for removing the front cover
- Long-nose plier for removing the cables from the PCBA

3.4.1 Change the PCBA



WARNING. HAZARDOUS VOLTAGE

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.

3



DISMANTLE THE SOFTSTARTER

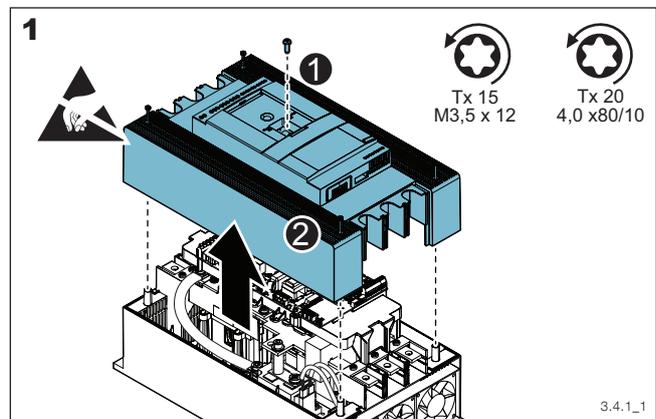
Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 3.3.3, step 1-3.**

1. Remove the front cover

① Loosen (1x) **Torx 15 M3,5x12** on the HMI bracket.

① Loosen (4x) **Torx 20 4,0 x80/10**. Remove the front cover by lifting it upwards from unit.

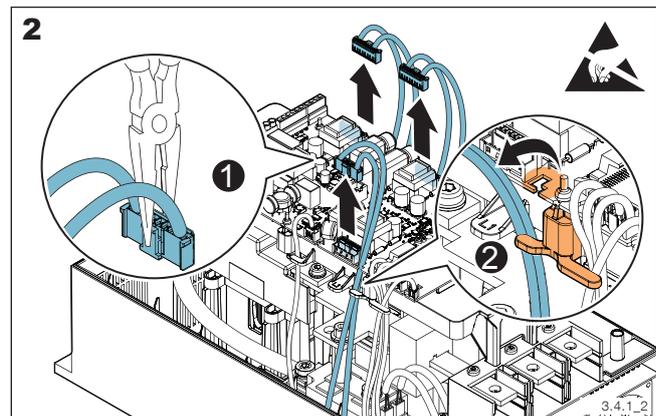


2. Disconnect SCR cables from PCBA

Mark the SCR cables with 1, 2, 3 prior to disconnecting them. This enables proper re-connection.

① Disconnect the three SCR cables from their terminals on the PCBA using a long-nose plier.

② Slide out the cables from the cable holders located on bracket.



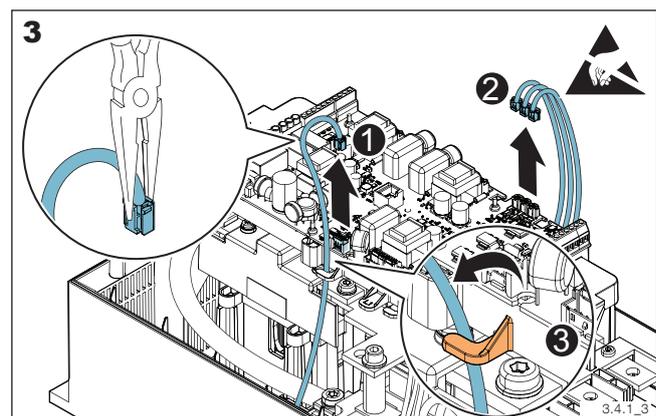
3. Disconnect bypass contactor cable and CT cables from the PCBA

Mark the CT cables with 1, 2, 3 prior to disconnecting them. This enables proper re-connection.

① Disconnect the bypass contactor cable from its terminal on the PCBA using a long-nose plier.

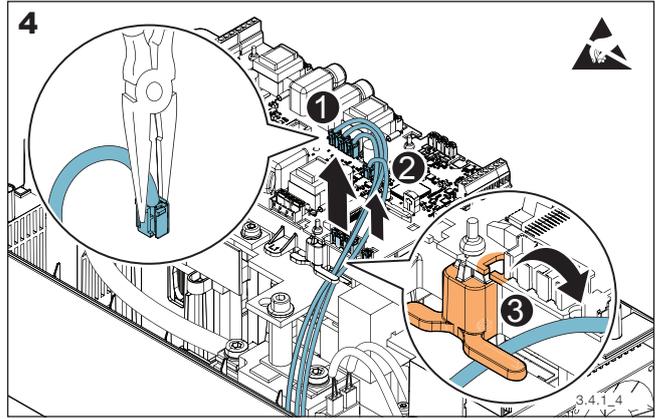
② Disconnect the three CT cables from their terminals on the PCBA using a long-nose plier.

③ Slide out the cables from the cable holders located on bracket.



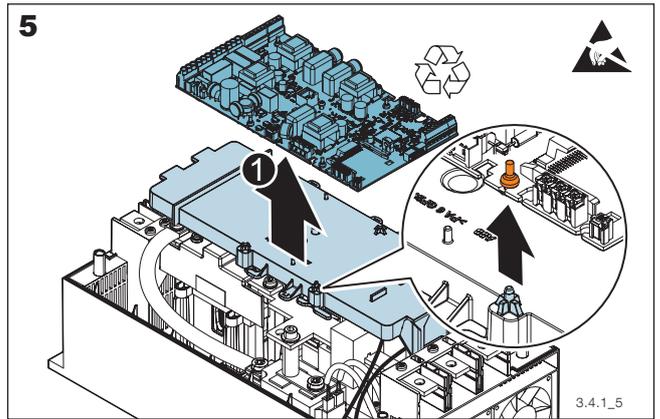
4. Disconnect the thermal sensor cable and fan cables from the PCBA

- ❶ Disconnect the three fan cables from their terminals on the PCBA using a long-nose plier.
- ❷ Disconnect the thermal sensor cable from its terminal on the PCBA using a long-nose plier.
- ❸ Slide out the cables from the cable holders located on bracket.



5. Remove the PCBA

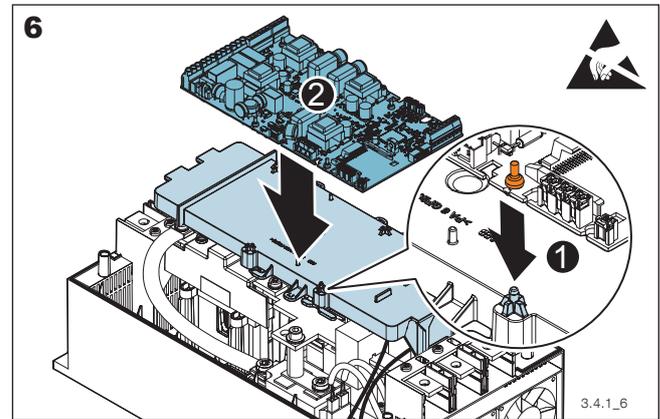
- ❶ Gently loosen the PCBA from the bracket pegs and lift it upwards from unit. Make sure the rubber bushings stays mounted on the PCBA when removed. Dispose of expended PCBA.



6. Place new PCBA

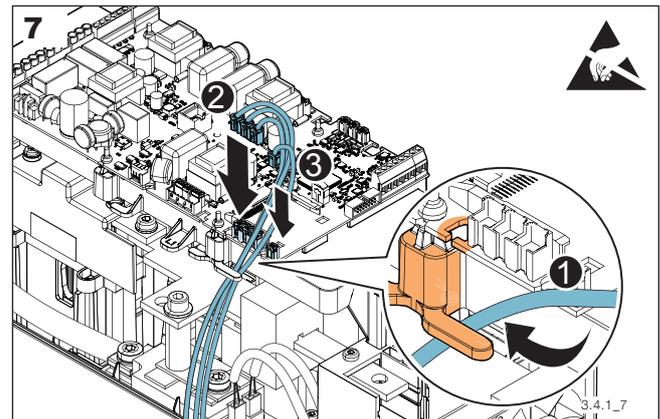
Note that rubber bushings shall be mounted on the PCBA prior to assembly.

- ❶ Align the new PCBA to bracket pegs.
- ❷ Gently press the PCBA onto the bracket pegs until it is firmly fitted.



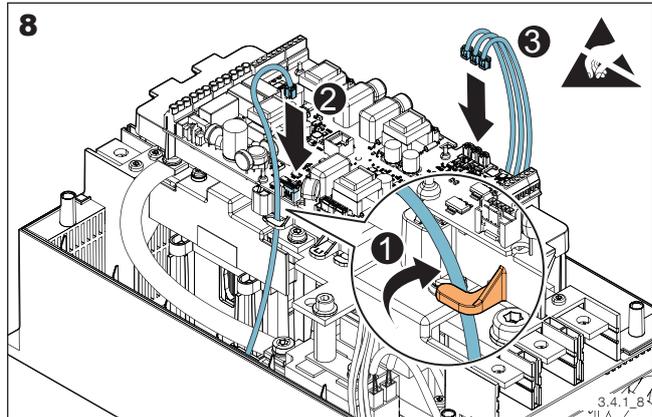
7. Connect thermal sensor cable and fan cables to PCBA

- ❶ Place the cables in the cable holders located on bracket.
- ❷ Connect the three fan cables to their terminals on the PCBA.
- ❸ Connect the thermal sensor cable to its terminal on the PCBA.



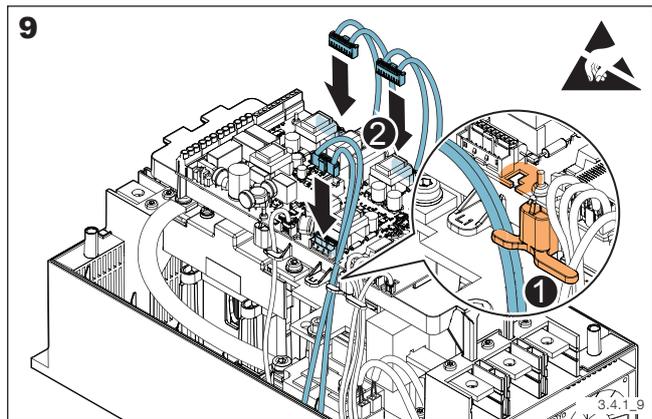
8. Connect bypass contactor cable and CT cables to PCBA

- ❶ Place the cables in the cable holders located on bracket.
- ❷ Connect the bypass contactor cable to its terminal on the PCBA.
- ❸ Connect the three CT cables, according to previously made markings (1, 2 or 3), to their terminals on the PCBA.



9. Connect SCR cables to PCBA

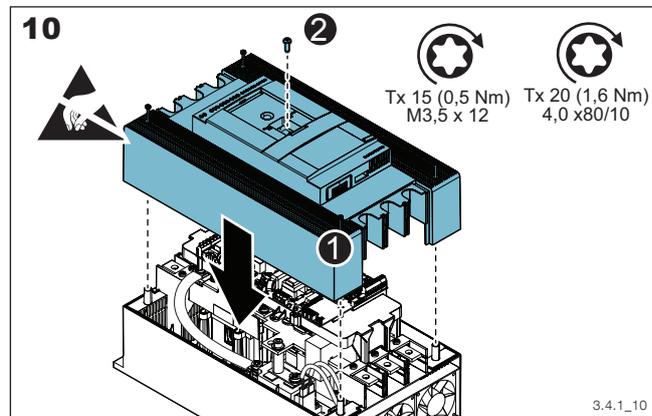
- ❶ Place the cables in the cable holders located on bracket.
- ❷ Connect the three SCR cables, according to previously made markings (1, 2 or 3), to their terminals on the PCBA.



10. Place front cover

Place the front cover on the unit and align it to the plastic screw sleeves located on lower housing.

- ❶ Fasten the front cover with (4x) **Torx 20 4,0 x80/10 (1,6Nm)**.
- ❷ Fasten (1x) **Torx 15 M3,5x12 (0,5 Nm)** on the HMI bracket.



REASSEMBLE THE SOFTSTARTER

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 3.3.4, step 1-2**.

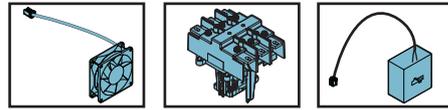


Procedures after PCBA replacement

Set the ID of the Softstarter after changing the PCBA, as described in **chapter 3.2.2, step 1-6**.

Firmware needs to be updated when changing the HMI. Please contact your ABB sales office for information.

3.5 Change the Fans, Bypass contactor and Current transformers



This chapter describes changing of the Fans, Bypass contactor and Current transformers.



WARNING. HAZARDOUS VOLTAGE

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools required:

- Torx 25 for removing the fans
- Torx 30 for removing flexible bars
- Torx 25 for removing the bypass contactor
- Torx 30 for removing the bypass contactor
- Hexagon no. 8 for removing phase bar
- Torx 25 for removing phase bars

3.5.1 Change the fans



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 3.3.3, step 1-3**.

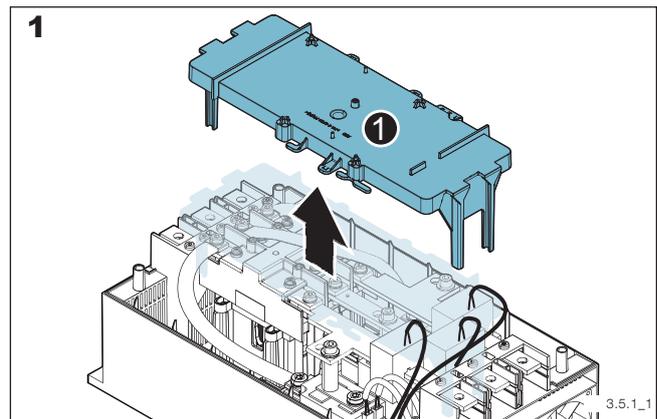
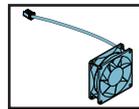
Remove cover and PCBA

Dismantle the front cover, all cables and the PCBA as described in **chapter 3.4.1, step 1-5**.

3

1. Remove PCBA bracket

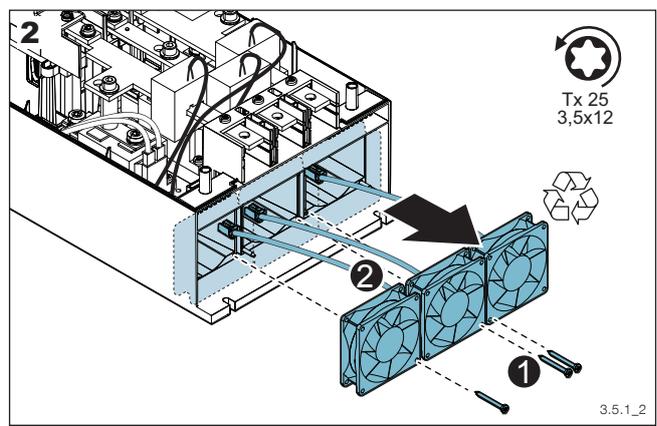
① Remove the PCBA bracket by lifting it upwards from unit.



2. Remove fans

① Loosen (3x) Torx 25 3,5x12 and remove the fans without damaging the plastic support pegs.

② Carefully pull out the three already disconnected fan cables. Dispose of expended fans.

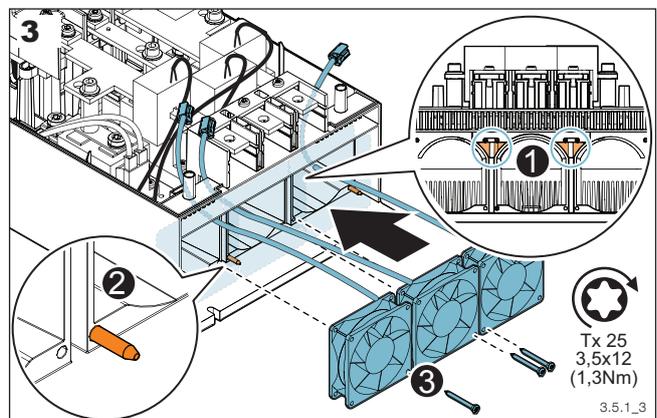


3. Place fans

① Thread the fan cables through the cable inlets.

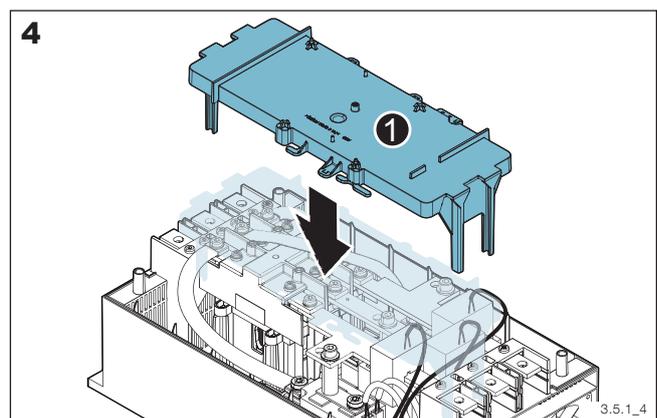
② Align the fans to the support pegs and attach them into position on fixture.

③ Fasten fans with (3x) Torx 25 3,5x12 (1,3Nm).



4. Place PCBA bracket

① Align the bracket rails to their fixing point to unit and place the PCBA bracket into position.



REASSEMBLE THE SOFTSTARTER

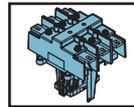
Place PCBA, cables and front cover

Place the PCBA, connect all cables and install the front cover as described in **chapter 3.4.1, step 6-10**.

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 3.3.4, step 1-2**.

3.5.2 Change the Bypass contactor



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

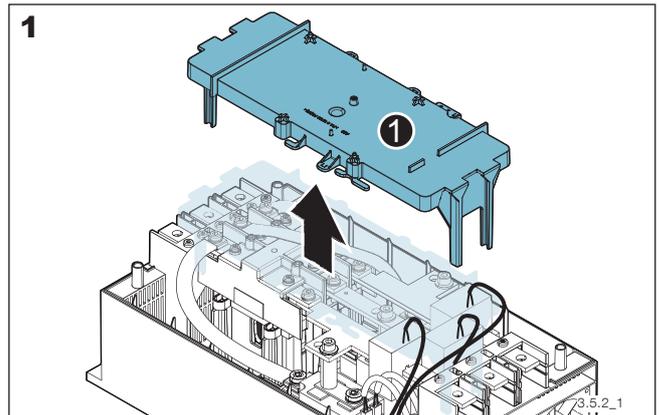
Disconnect the main power cables and the control cables as described in **chapter 3.3.3, step 1-3**.

Remove cover and PCBA

Dismantle the front cover, all cables and the PCBA as described in **chapter 3.4.1, step 1-5**.

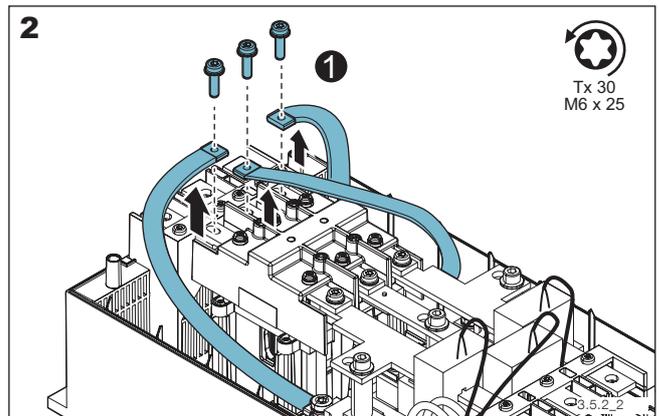
1. Remove PCBA bracket

➊ Remove the PCBA bracket by lifting it upwards from unit.



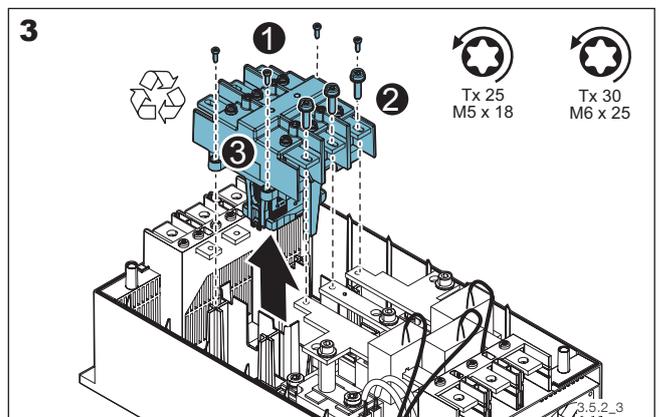
2. Disconnect flexible bars

➋ Loosen (3x)  Torx 30 M6x25 (one screw per phase) to disconnect the flexible bars.



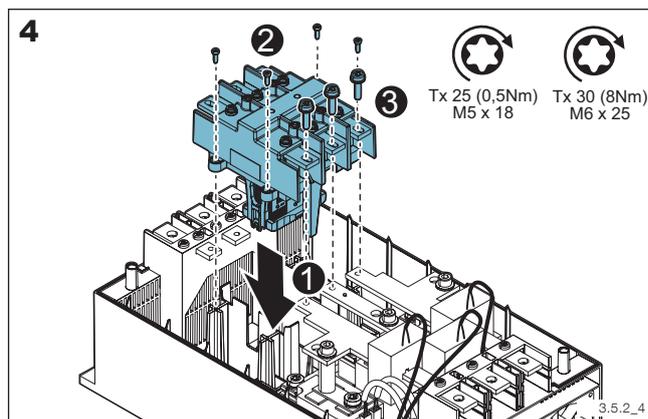
3. Remove bypass contactor

➌ Loosen (4x)  Torx 25 M3x8 from the bypass contactor.
➍ Loosen (3x)  Torx 30 M6x25 from the bypass contactor.
➎ Remove the bypass contactor (including cable) by lifting it upwards from unit. Dispose of expended bypass contactor.



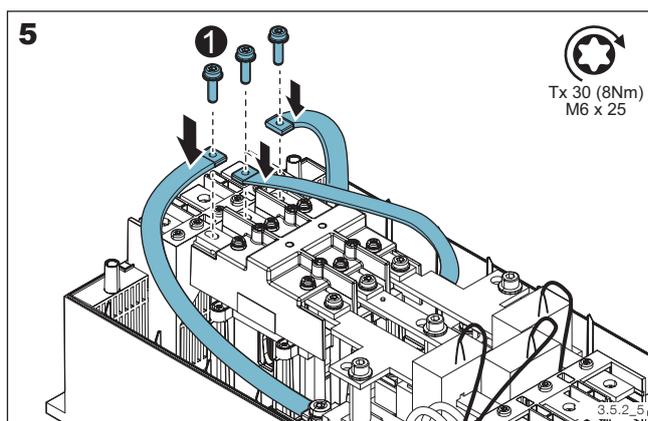
4. Place new bypass contactor

- ① Place the new bypass contactor in the unit and align it to screw mounting points.
- ② Fasten bypass contactor with (4x)  **Torx 25 M3x8 (0,5Nm)**.
- ③ Fasten bypass contactor additionally with (3x)  **Torx 30 M6x25 (8Nm)**.



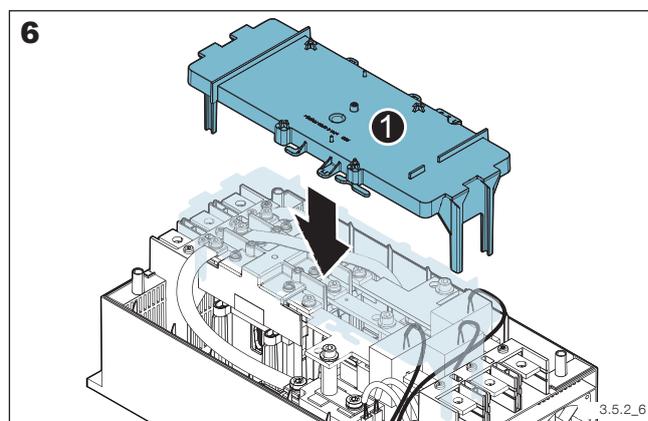
5. Connect flexible bars

- ① Connect and fasten the flexible bars with (3x)  **Torx 30 M6x25 (8Nm)**.



6. Place PCBA bracket

- ① Align the bracket rails to their fixing point to unit and place the PCBA bracket into position.



REASSEMBLE THE SOFTSTARTER

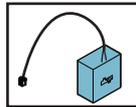
Place PCBA, cables and front cover

Place the PCBA, connect all cables and install the front cover as described in **chapter 3.4.1, step 6-10**.

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 4.3.4, step 1-2**.

3.5.3 Change the Current transformers



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

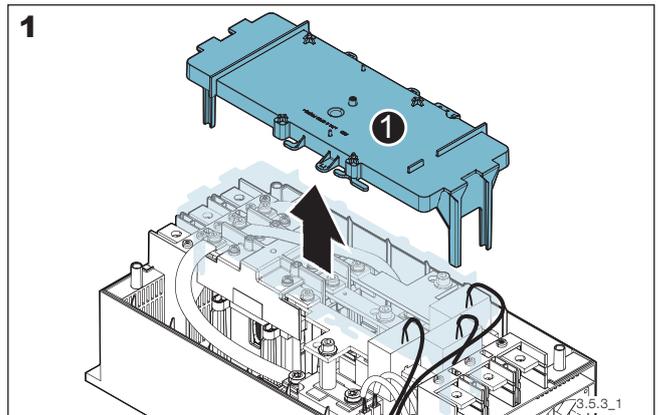
Disconnect the main power cables and the control cables as described in **chapter 3.3.3, step 1-3**.

Remove cover and PCBA

Dismantle the front cover, all cables and the PCBA as described in **chapter 3.4.1, step 1-5**.

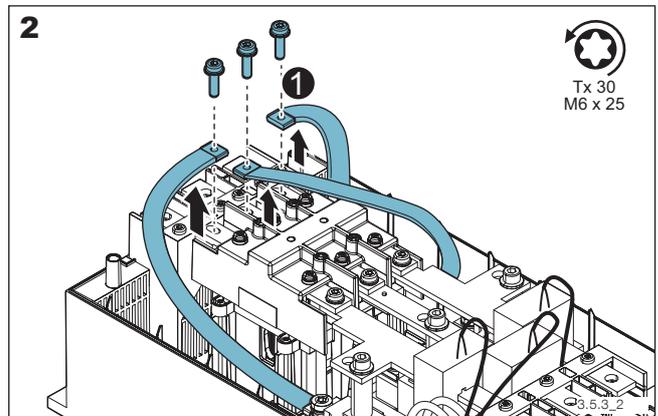
1. Remove PCBA bracket

① Remove the PCBA bracket by lifting it upwards from unit.



2. Disconnect flexible bars

① Loosen (3x)  Torx 30 M6x25 (one screw per phase) to disconnect the flexible bars.

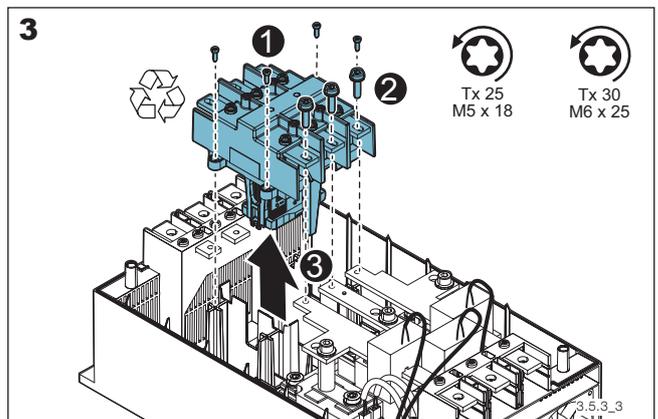


3. Remove bypass contactor

① Loosen (4x)  Torx 25 M3x8 from the bypass contactor.

② Loosen (3x)  Torx 30 M6x25 from the bypass contactor.

③ Remove the bypass contactor (including cable) by lifting it upwards from unit.

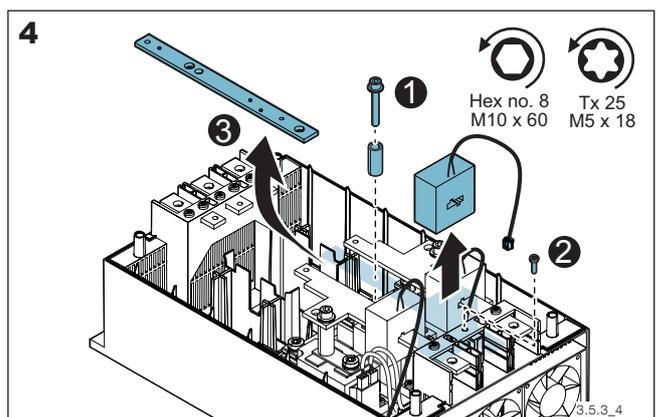


4. Remove phase bar and current transformer

① Loosen (1x)  Hexagon no. 8 M10x60 from the phase bar. Also remove sleeve and washer.

② Loosen (1x)  Torx 25 M5x18 from the phase bar.

③ Slide the phase bar outwards from current transformer until unattached; remove phase bar and current transformer from unit. Dispose of expended current transformer.



5. Place new current transformer

Make sure that the ratio value of the new current transformer correspond to previously installed current transformer. Verify the ratio according to **Table 6** below.

Make sure cables of new current transformer gets connected in accordance to previously made markings.

- ❶ Place the new current transformer into the unit with cable side facing toward fans.
- ❷ Mount the phase bar through the current transformer and fasten phase bar with **(1x)**  **Hexagon no. 8 M10x60 (12Nm)**. Sleeve and washer are to be used.
- ❸ Fasten phase bar additionally with **(1x)**  **Torx 25 M5x18 (3Nm)**.

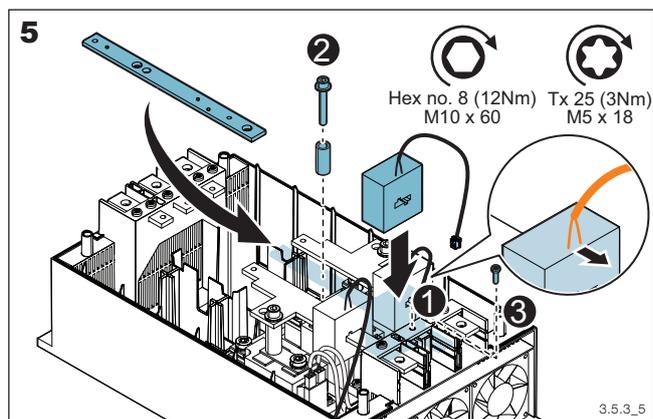
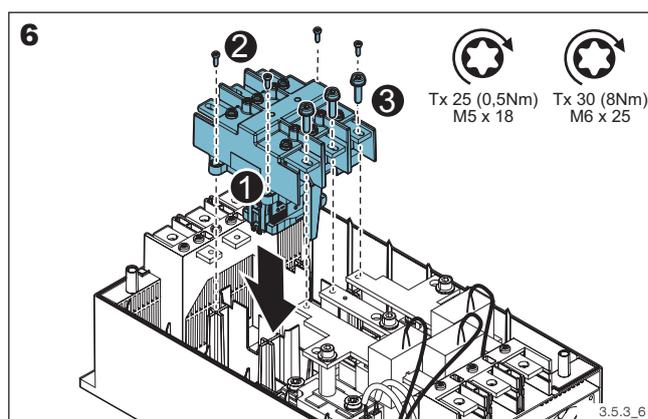


Table 6

Softstarter size	Ratio	Order code	Type
PSTX30...105	105/0,025	1SFA899302R1105	PSCT-400
PSTX142...170	175/0,025	1SFA899302R1175	PSCT-500
PSTX210...370	370/0,2	1SFA899302R1370	PSCT-600

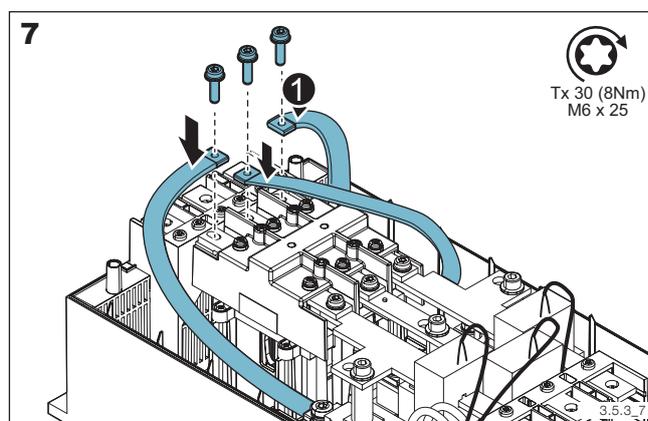
6. Place bypass contactor

- ❶ Place the bypass contactor into the unit and align it to screw mounting points.
- ❷ Fasten bypass contactor with **(4x)**  **Torx 25 M3x8 (0,5Nm)**.
- ❸ Fasten bypass contactor additionally with **(3x)**  **Torx 30 M6x25 (8Nm)**.



7. Connect flexible bars

- ❶ Connect and fasten the flexible bars with **(3x)**  **Torx 30 M6x25 (8Nm)**.



REASSEMBLE THE SOFTSTARTER

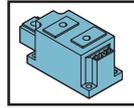
Place PCBA, cables and front cover

Place the PCBA, connect all cables and install the front cover as described in **chapter 3.4.1, step 6-10**.

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 3.3.4, step 1-2**.

3.6 Change the SCR



This chapter describes changing of the SCR.



WARNING. HAZARDOUS VOLTAGE

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

- SCR and heatsinks must be handled carefully to avoid scratches and other marks.
- Do not touch the contact surfaces.
- Do not lift the SCR by the SCR wires.
- Make sure that there is no damage to the welding flange or to the contact surface.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product..



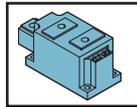
The following instruction shows service on Softstarter model PSTX210...370.

Depending on model small changes in the service procedure may differ but the principle of the service is the same.

Tools required:

- Torx 30 for removing flexible bars
- Torx 25 for removing the bypass contactor
- Torx 30 for removing the bypass contactor
- Hexagon no. 8 for removing phase bars
- Torx 25 for removing phase bars
- Torx 25 for removing the SCR
- Hexagon no. 8 for removing the SCR
- Abrasive cloth P600 to polish the SCR
- Ethanol to clean the SCR
- Silicone oil to prepare new SCR

3.6.1 Change the SCR



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 3.3.3, step 1-3**.

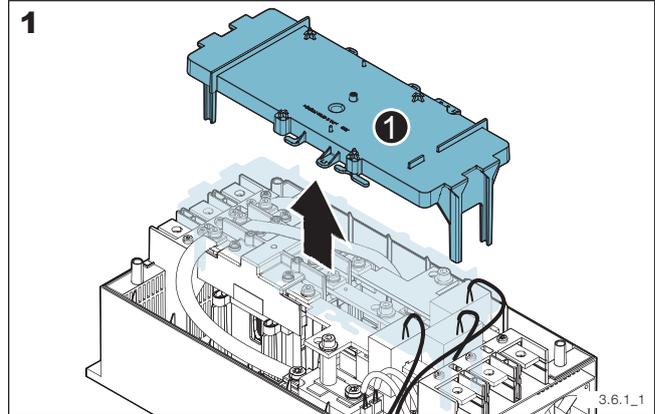
Remove cover and PCBA

Dismantle the front cover, all cables and the PCBA as described in **chapter 3.4.1, step 1-5**.

3

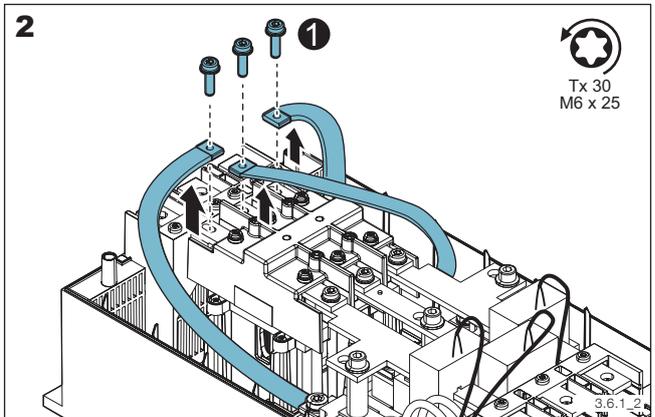
1. Remove PCBA bracket

① Remove the PCBA bracket by lifting it upwards from unit.



2. Remove flexible bars

① Loosen (3x)  **Torx 30 M6x25** (one screw per phase) to disconnect the flexible bars.

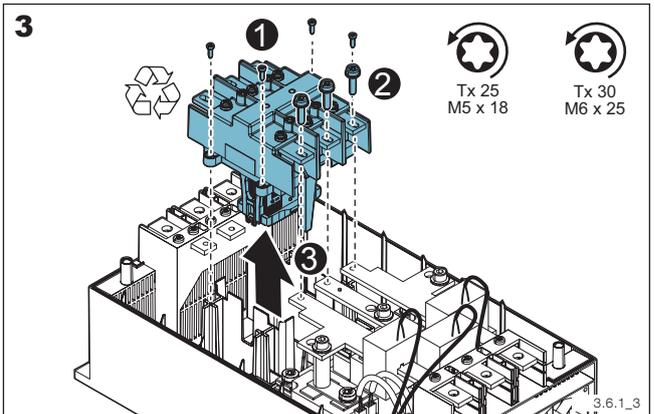


3. Remove bypass contactor

① Loosen (4x)  **Torx 25 M3x8** from the bypass contactor.

② Loosen (3x)  **Torx 30 M6x25** from the bypass contactor.

③ Remove the bypass contactor (including cable) by lifting it upwards from unit.

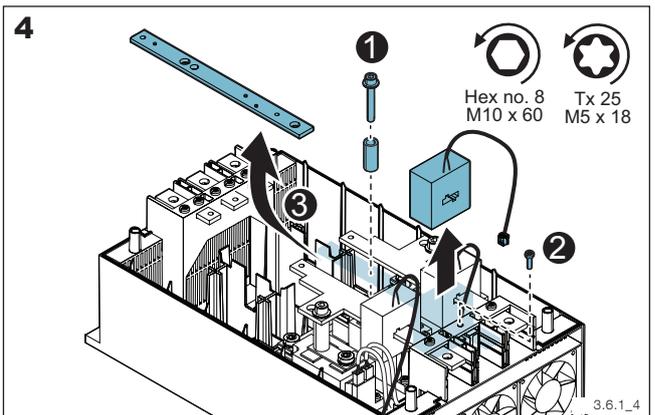


4. Remove middle phase bar and current transformer

① Loosen (1x)  **Hexagon no. 8 M10x60** from the middle phase bar. Also remove sleeve and washer.

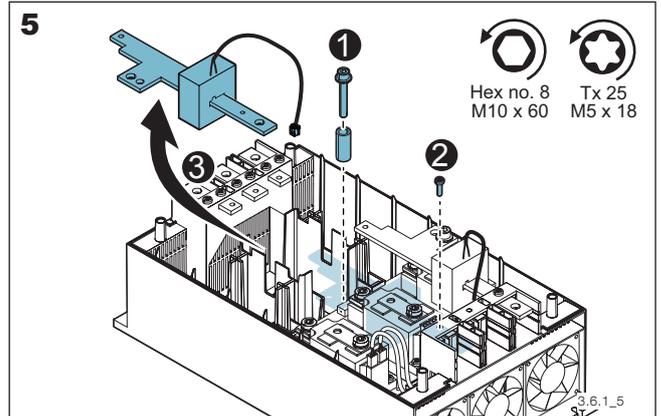
② Loosen (1x)  **Torx 25 M5x18** from the middle phase bar.

③ Slide the middle phase bar outwards from current transformer until unattached; remove phase bar and current transformer from unit.



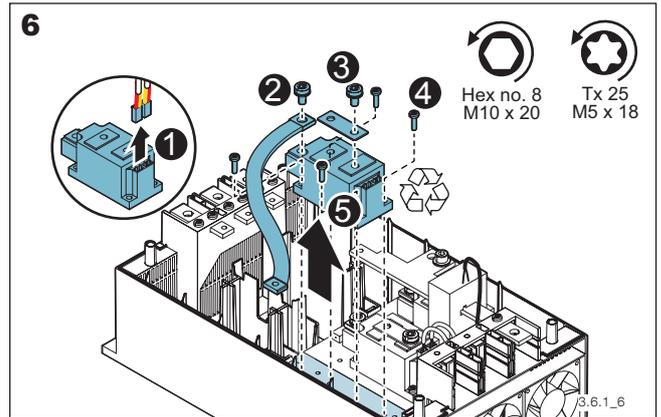
5. Remove left phase bar and current transformer

- ① Loosen (1x) **Hexagon no. 8 M10x60** from the left phase bar. Also remove sleeve and washer.
- ② Loosen (1x) **Torx 25 M5x18** from the left phase bar.
- ③ Slide the left phase bar outwards from current transformer until unattached; remove phase bar and current transformer from unit.



6. Remove SCR

- ① Disconnect the SCR cable from module.
- ② Loosen (1x) **Hexagon no. 8 M10x20** (including square washer) to disconnect the flexible bar from the SCR.
- ③ Loosen (1x) **Hexagon no. 8 M10x20** (including rectangular washer) from the SCR.
- ④ Loosen (4x) **Torx 25 M5x18** from the SCR.
- ⑤ Remove the SCR by lifting it upwards from unit. Dispose of expended SCR.

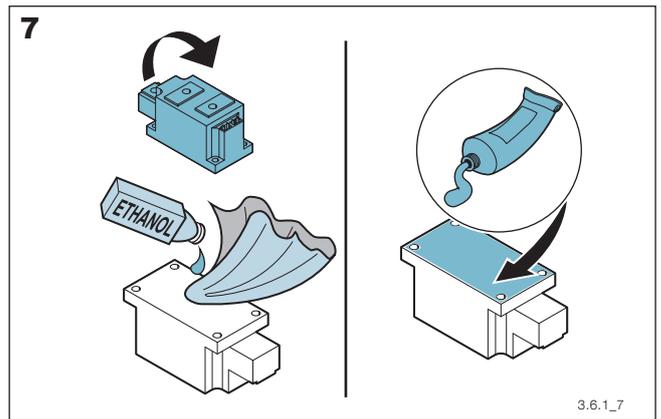


WARNING

- SCR and heatsinks must be handled carefully to avoid scratches and other marks.
- Do not scratch the contact surfaces with the guide pins.
- Do not touch the contact surfaces.
- Do not lift the SCR by the wire.
- Make sure that there is no damage to the welding flange or to the contact surface.

7. Preparation of heatsink and SCR

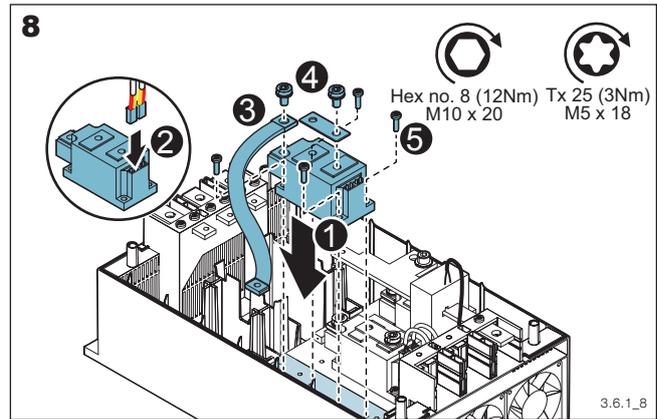
- Clean all polished contact surfaces carefully with Ethanol.
- Use well moistened lint-free paper.
- Avoid contact with surface.
- Lubricate directly after polishing/cleaning, within 5 minutes. The contact surfaces must be dry before lubrication.
- Apply a couple of drops of silicone oil on the cleaned contact surfaces, avoid getting oil in the guide hole. Smooth the oil lightly over the whole surface using lint-free paper. Then wipe off the surface in order to get a very thin layer of oil.
- Avoid contact with the surfaces after lubrication.



Use the service kit in the spare part catalog 1SFC001013C0201.

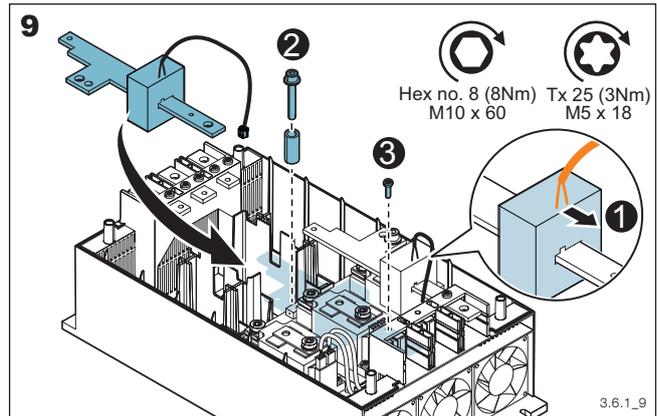
8. Place new SCR

- ① Place the new SCR into the unit and align it to screw mounting points.
- ② Connect the SCR cable to module.
- ③ Fasten (1x)  **Torx 25 M5x18** (including square washer) to connect the flexible bar to the SCR.
- ④ Fasten (1x)  **Torx 25 M5x18** (including rectangular washer) to the SCR.
- ⑤ Fasten (4x)  **Hexagon no. 8 M10x20** to the SCR.



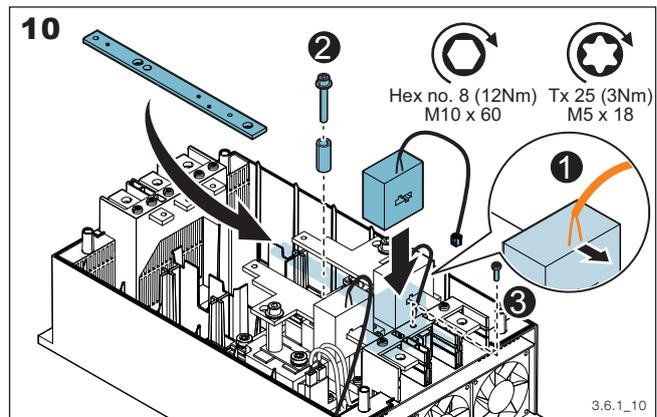
9. Place left phase bar and current transformer

- ① Place the left current transformer into the unit with cable side facing toward fans.
- ② Mount the left phase bar through the current transformer and fasten phase bar with (1x)  **Hexagon no. 8 M10x60 (12Nm)**. Sleeve and washer are to be used.
- ③ Fasten left phase bar additionally with (1x)  **Torx 25 M5x18 (3Nm)**.



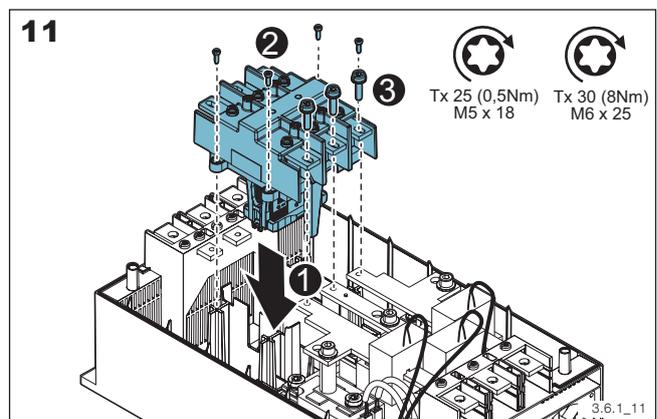
10. Place middle phase bar and current transformer

- ① Place the middle current transformer into the unit with cable side facing toward fans.
- ② Mount the middle phase bar through the current transformer and fasten phase bar with (1x)  **Hexagon no. 8 M10x60 (12Nm)**. Sleeve and washer are to be used.
- ③ Fasten middle phase bar additionally with (1x)  **Torx 25 M5x18 (3Nm)**.



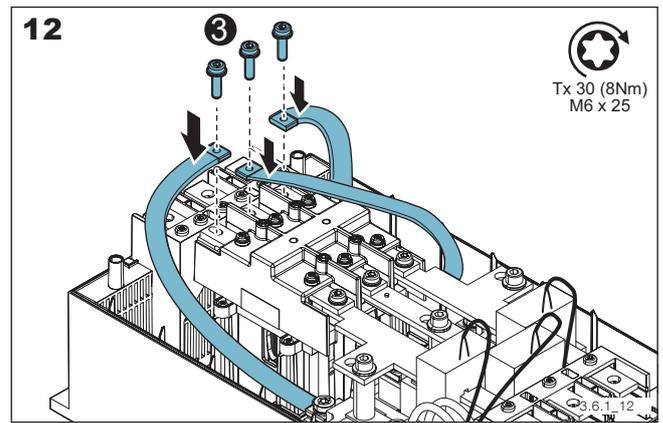
11. Place new bypass contactor

- ① Place the new bypass contactor into the unit and align it to screw mounting points.
- ② Fasten bypass contactor with (4x)  **Torx 25 M3x8 (0,5Nm)**.
- ③ Fasten bypass contactor additionally with (3x)  **Torx 30 M6x25 (8Nm)**.



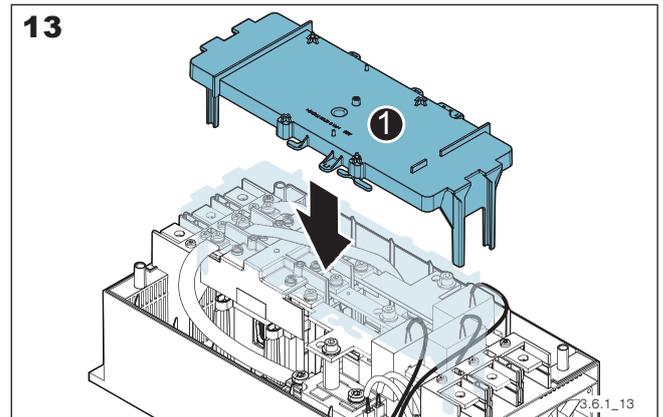
12. Connect flexible bars

- ① Connect and fasten the flexible bars with (3x)
- 🔩 Torx 30 M6x25 (8Nm).



13. Place PCBA bracket

- ① Align the bracket rails to their fixing point to unit and place the PCBA bracket into position.



REASSEMBLE THE SOFTSTARTER

Place PCBA, cables and front cover

Place the PCBA, connect all cables and install the front cover as described in **chapter 3.4.1, step 6-10**.

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 3.3.4, step 1-2**.

3.7 Instructions for testing the SCR



IMPORTANT NOTE

Only perform the SCR-test if the Softstarter displays one of the following faults: “Short circuit thyristor fault” or “Open circuit thyristor fault”

Replace SCR if the result of the test shows under 1 Mohm.



WARNING. HAZARDOUS VOLTAGE

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools:

- Torx 15 for removing the front cover
- Torx 20 for removing the front cover
- Long-nose plier for removing the cables from the PCBA
- Megger to set on 500V

3.7.1 Test the SCR



IMPORTANT NOTE

Only perform the SCR-test if the Softstarter displays one of the following faults: "Short circuit thyristor fault" or "Open circuit thyristor fault"

Replace SCR if the result of the test shows under 1 Mohm.



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 3.3.1, step 1-3.**

1. Remove the front cover

① Loosen (1x) Torx 15 M3,5x12 on the HMI bracket.

① Loosen (4x) Torx 20 4,0 x80/10. Remove the front cover by lifting it upwards from unit.

2. Disconnect SCR cables from PCBA

Mark the SCR cables with 1, 2, 3 prior to disconnecting them. This enables proper re-connection.

① Disconnect the three SCR cables from their terminals on the PCBA using a long-nose plier.

② Slide out the cables from the cable holders located on bracket.

3. Connect the Megger to the Softstarter

① Connect the black megger contact to the main terminal 1L1 on the Softstarter.

② Connect the red megger contact to the main terminal 2T1 on the Softstarter.

③ Set the megger on 500V. Press and hold the Test button. Note the result.



Also use 500V for 690V softstarters.

4. Switch the Megger cables

Switch the connection according to figure 6:

① Connect the red megger contact to the main terminal 1L1 on the Softstarter.

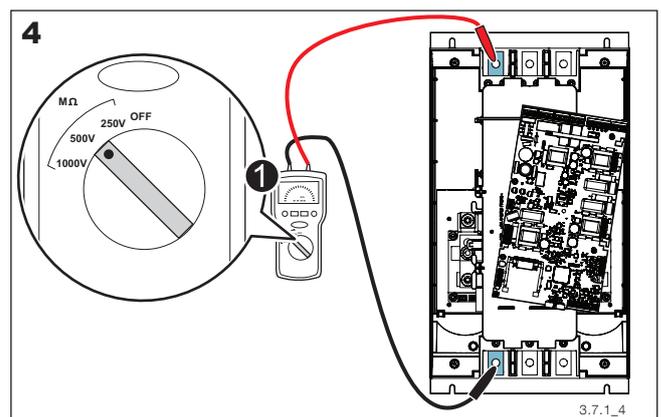
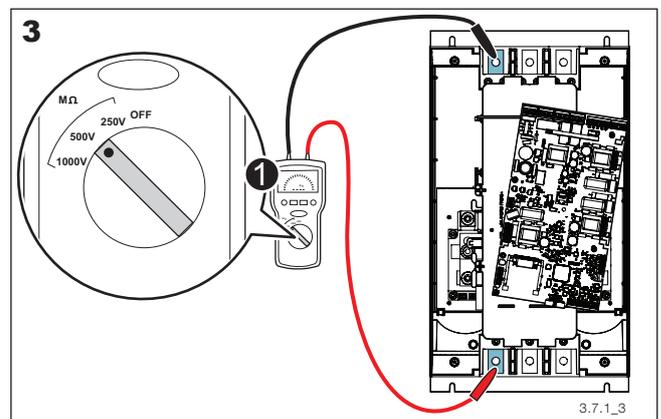
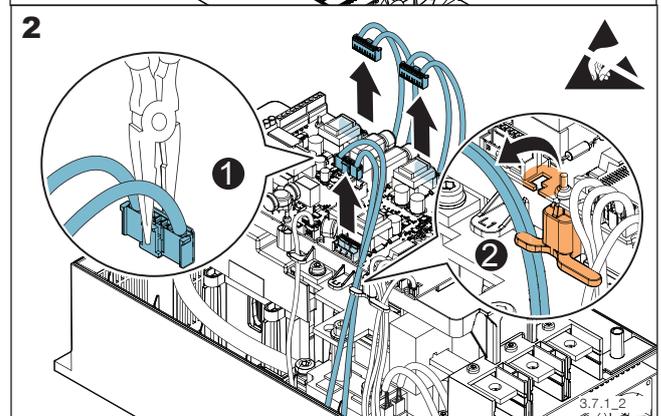
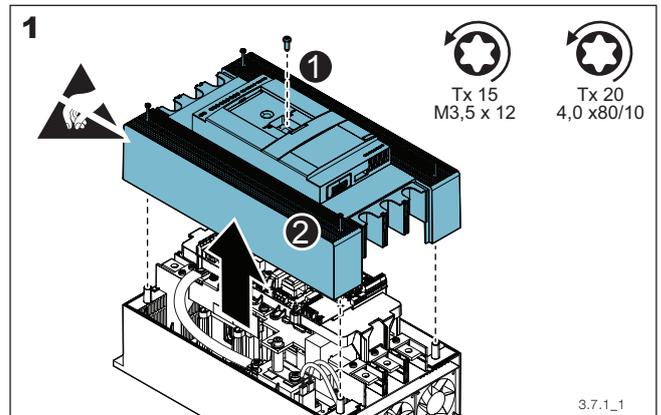
② Connect the black megger contact to the main terminal 2T1 on the Softstarter.

③ Set the megger on 500V. Press and hold the Test button. Note the result.

Repeat step

5. Connect the Megger to the Softstarter
and

6. Switch the Megger cables
on the two remaining phases between
3L2 - 4T2 and 5L3 - 6T3.

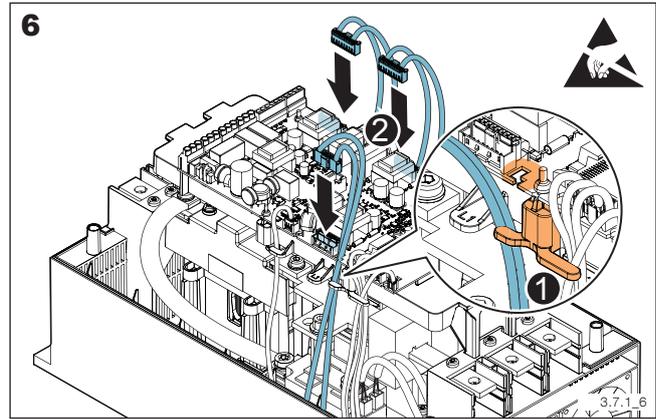


5. Detect a shorted SCR

The three different phases will give six values. If any of the values shows lower than 1 Mohm there is probably a shortage. Proceed with changing the SCR, see chapter **3.6.1 Change the SCR**.

6. Connect SCR cables to PCBA

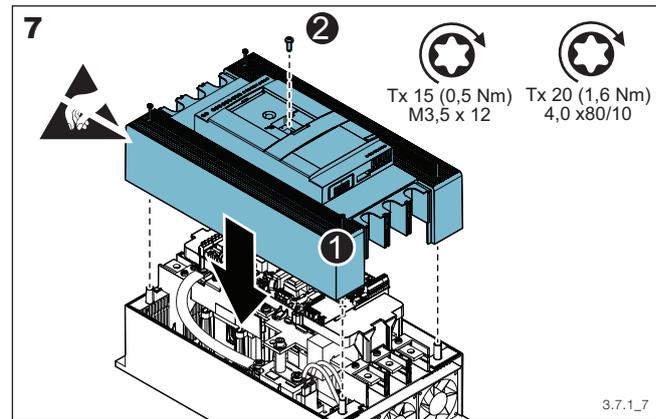
- ① Place the cables in the cable holders located on bracket.
- ② Connect the three SCR cables, according to previously made markings (1, 2 or 3), to their terminals on the PCBA.



7. Place front cover

Place the front cover on the unit and align it to the plastic screw sleeves located on lower housing.

- ① Fasten the front cover with (4x) **Torx 20 4,0 x80/10 (1,6Nm)**.
- ② Fasten (1x) **Torx 15 M3,5x12 (0,5 Nm)** on the HMI bracket.



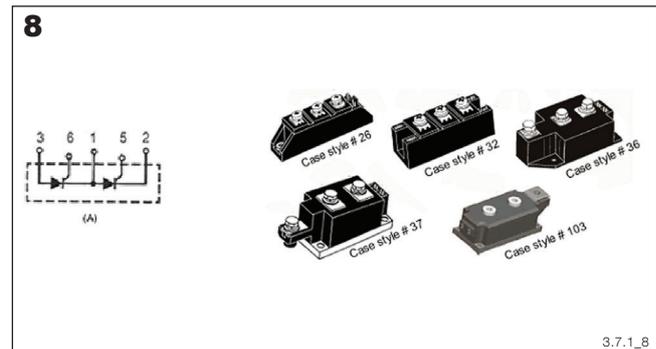
REASSEMBLE THE SOFTSTARTER

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 3.3.2, step 1-2**.

8. Examples of SCR for PSTX

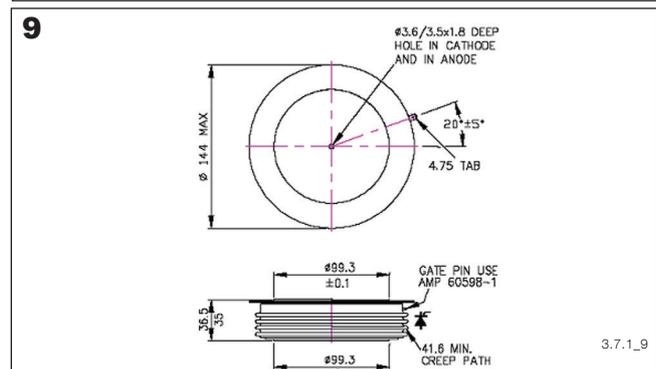
Figure 8 shows typical types of SCR blocks used in PSTX210...370. The manufacturing type can be both IXYS (black housing) and Semikron (white housing).



9. Examples of SCR for PSTX

For Softstarters type PSTX470...570 we are using SCR of capsule types. **See figure 9**.

Please note that this type of SCR has to be correctly mounted when tested to get the correct result.



4.1 Introduction	
4.1.1 Earth the Softstarter	46
4.1.2 How to access service parameters	46
4.2 Configuring the HMI	
4.2.1 Update Firmware	47
4.2.2 Set the ID	47
4.2.3 Reset to defaults	48
4.3 Change the HMI, Disconnect/Connect the main power cables and the control cables	
4.3.1 Change the HMI	50
4.3.2 Place new HMI	50
4.3.3 Disconnect the main power cables and the control cables	51
4.3.4 Connect the main power cables and the control cables	52
4.4 Service of the PCBA	
4.4.1 Change the PCBA	54
4.5 Change the Fans, Bar holders and Current transformers	
4.5.1 Change the Fans	58
4.5.2 Change the Bar holders	59
4.5.3 Change the Current transformers	61
4.5.4 Assemble the Softstarter	62
4.6 Change the Bypass contactor	
4.6.1 Change the Bypass contactor	65
4.6.2 Assemble the Softstarter	68
4.7 Change the SCR	
4.7.1 Change the SCR	71
4.7.2 Assemble the Softstarter	73
4.8 Instructions for testing the SCR	
4.8.1 Test the SCR	76
4.9 Change the Stays	
(For type PSTX470...570)	
4.9.1 Change the Stays	79

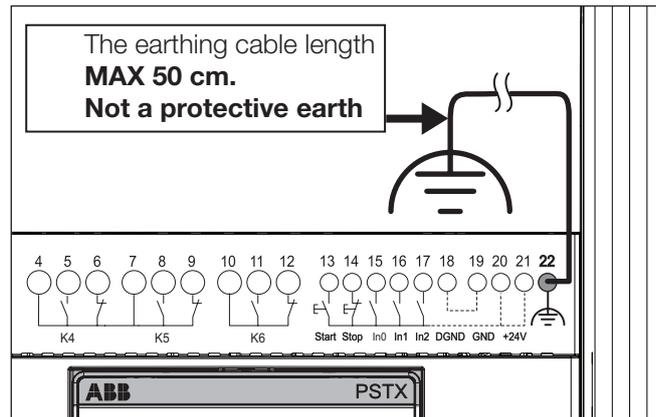
4.1 Introduction

This service instruction contains **step-by-step** service of the PSTX470...570 Softstarter.

4.1.1 Earth the Softstarter

1. Maximum cable length of the earthing

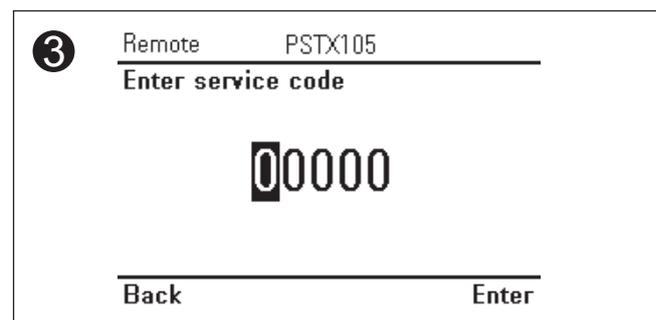
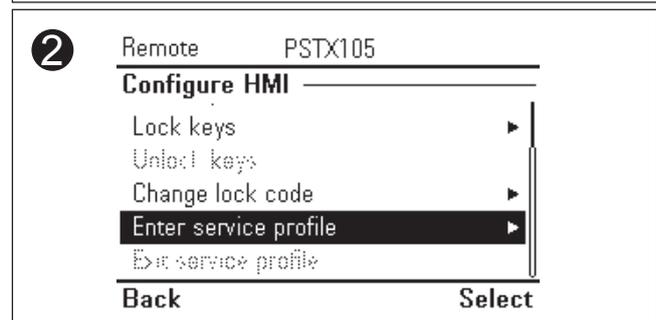
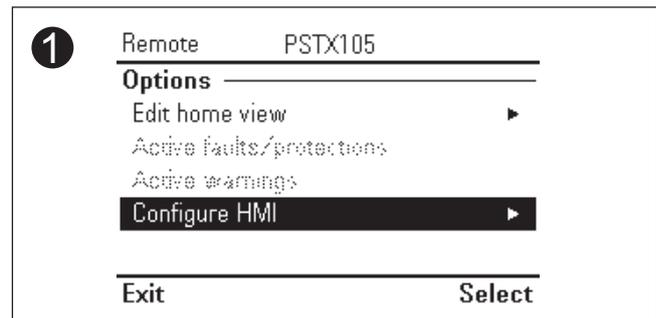
The Softstarter should be earthed from **terminal 22**. The earthing cable length must not be longer than **50 cm**. Note that the earthing is not a protective earth.



4.1.2 How to access service parameters

Follow this instruction in order to make the service parameters available on the Softstarter:

- Switch on the power supply (terminal 1 and 2).
- 1** Push "Options" to reach Options menu. Use or to navigate to **Configure HMI** and then push .
- 2** Use or to navigate to **Enter service profile** and then push .
- 3** Use , and , to enter the **service code**. Enter the following code: **73758**, and then push .
- When the message **Service profile OK** appears, the code is set.



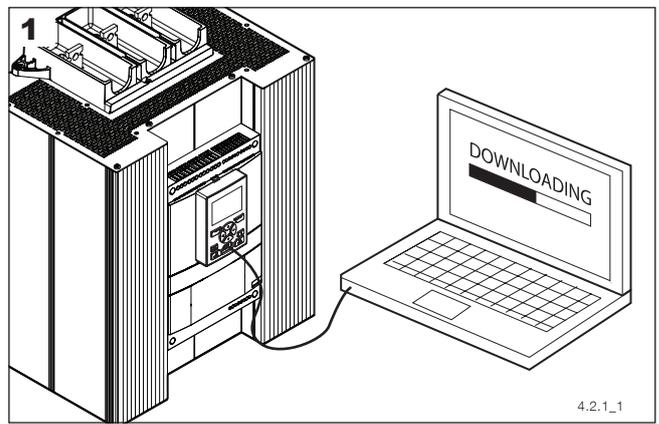
4.2 Configuring the HMI

This chapter describes how update firmware, set the ID and how to reset the Softstarter to default.

4.2.1 Update Firmware

Firmware needs to be updated when changing the HMI. Please contact your ABB sales office for information.

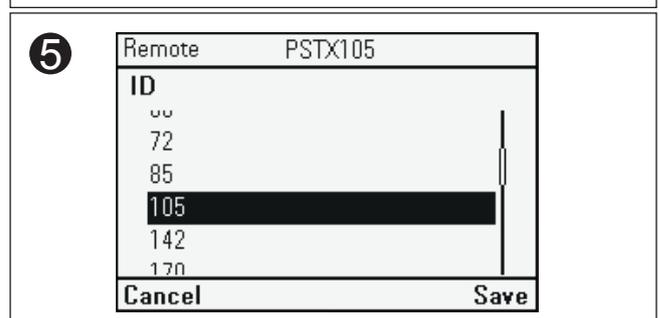
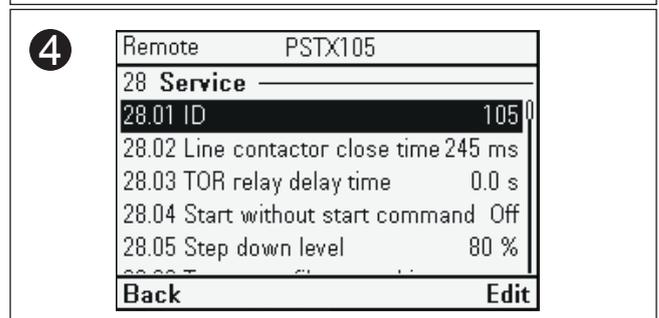
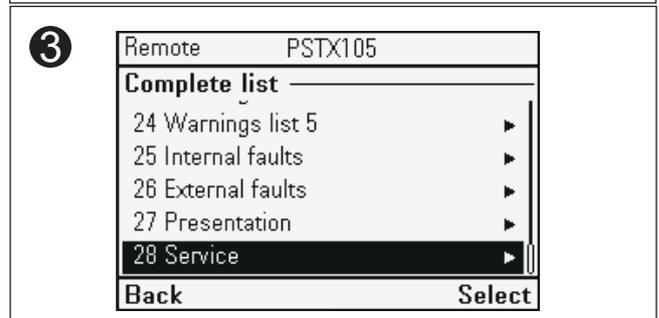
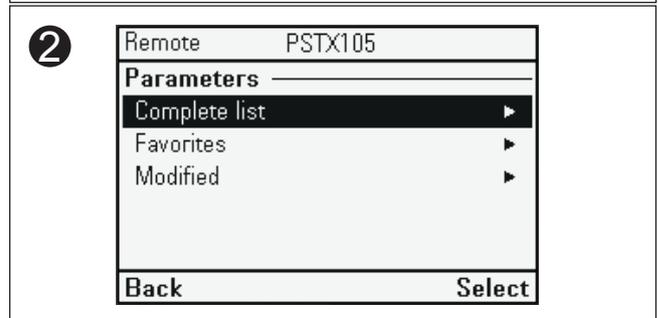
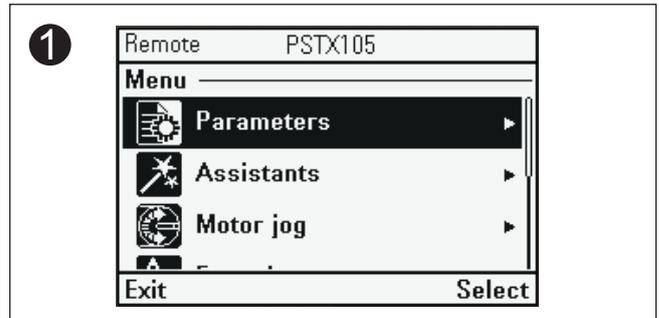
See Figure 1.



4.2.2 Set the ID

The ID of the Softstarter has to be changed when the PCBA has been changed and after updating firmware. Choose between 470...570 due to type of Softstarter.

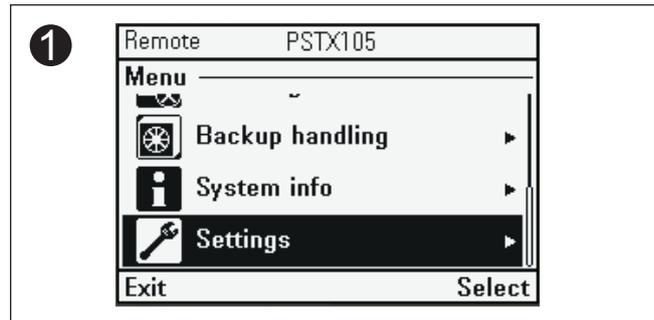
1. Switch on the power supply (terminal 1 and 2).
2. **1** Push "Menu" to reach Menu. Use or to navigate to **Parameters** and then push "Select".
3. **2** Use or to navigate to **Complete list** and then push "Select".
4. **3** Use or to navigate to **28 Service** and then push "Select".
5. **4** Use or to navigate to **28.01 ID** and then push "Edit".
6. **5** Use , to set **28.01 ID** to **105** and then push "Save".



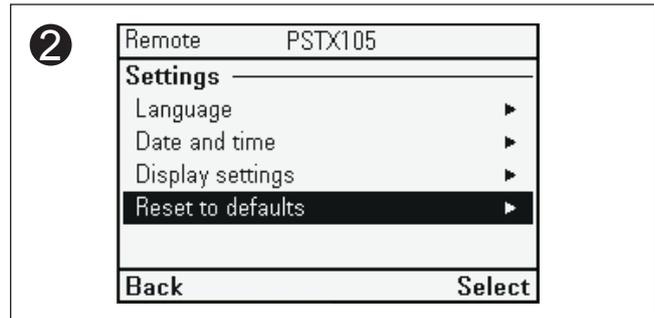
4.2.3 Reset to defaults

1. Switch on the power supply (terminal 1 and 2).

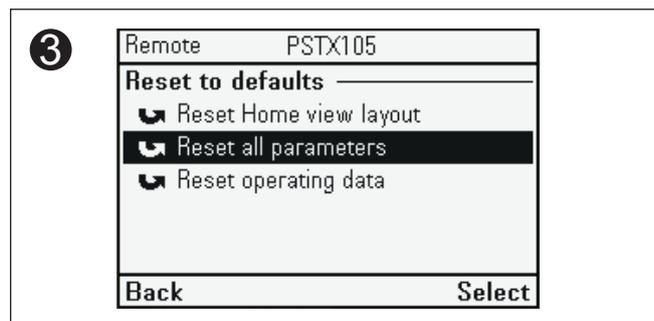
2. ① Push  "Menu" to reach Menu.
Use  or  to navigate to **Settings** and then push  "Select".



3. ② Use  or  to navigate to **Reset to defaults** and then push  "Select".

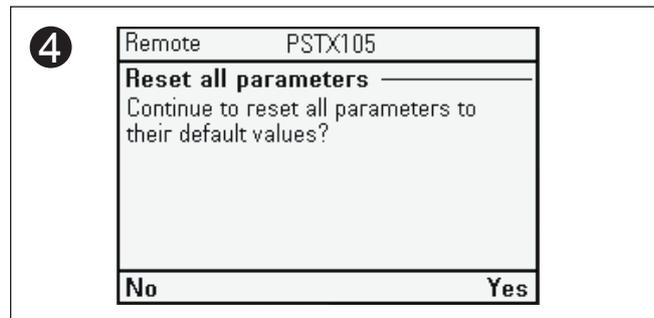


4. ③ Use  or  to navigate to **Reset all parameters** and then push  "Select".



5. ④ Following message will appear on the display:
Continue to reset all parameters to their default values?

Push  "Yes" to reset all parameters
or  "No" if you wish to cancel the operation.



4.3 Change the HMI, Disconnect/Connect the main power cables and the control cables

This chapter describes how to change the HMI, disconnect or connect the main power cables and the control cables prior to performing service on the softstarter.



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools required:

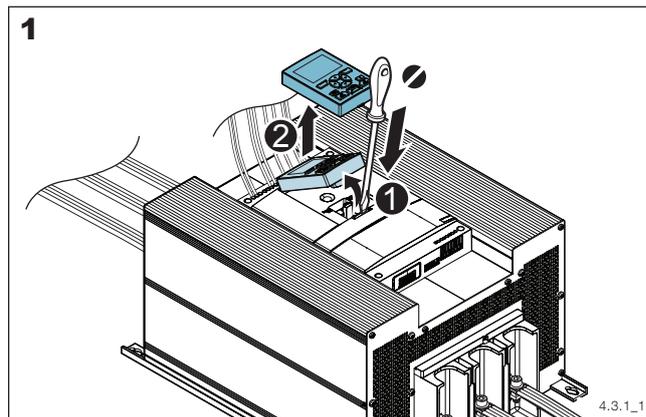
- Slotted screwdriver for removing the HMI
- Slotted screwdriver M3 for removing the control cables
- Hexagon no. 8 for removing the main power cables

4.3.1 Change the HMI



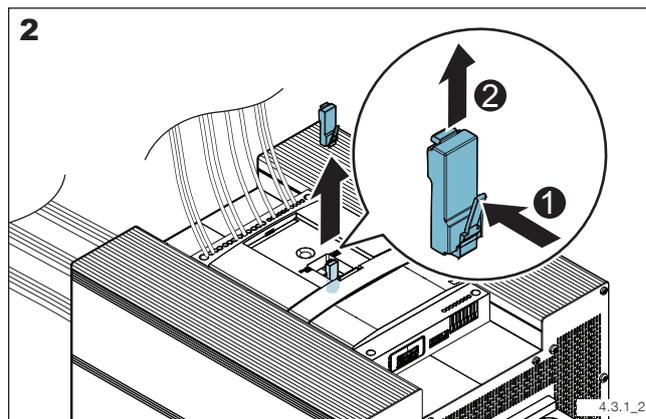
1. Remove HMI

- 1 Push back the locking bar preferably using a slotted screwdriver.
- 2 Remove the HMI module from the unit.



2. Remove RJ45 plug

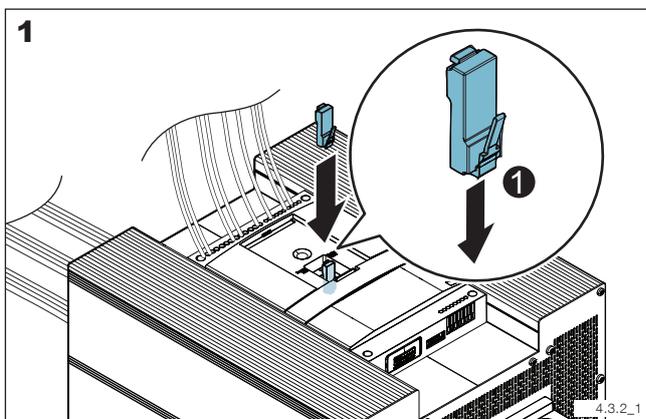
- 1 Press down the locking clip.
- 2 Remove the RJ45 plug (while locking clip held down) by pulling it upwards from unit. Be careful not to damage the locking clip.



4.3.2 Place new HMI

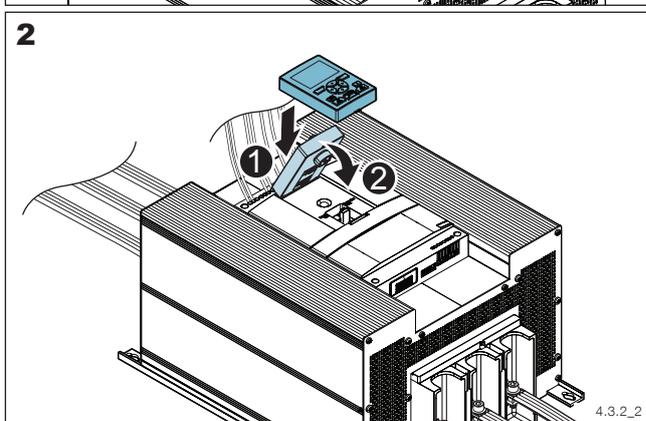
1. Place RJ45 plug

- 1 Connect the RJ45 plug to its socket. Make sure the plug gets properly connected; listen for a "clicking sound" from the locking clip when mounting the plug.



2. Place new HMI

- 1 Place the new HMI module on top of the unit with the front end facing downwards and the rear end facing upwards.
- 2 Dock the HMI module by pushing the rear end downwards and carefully snap the module into position.



Procedures after HMI replacement

Firmware needs to be updated when changing the HMI. Please contact your ABB sales office for information.

4.3.3 Disconnect the main power cables and the control cables



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



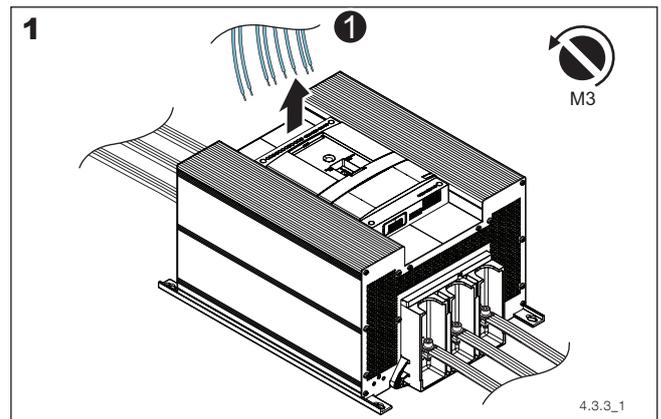
WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.

1. Remove control cables

Mark the control cables prior to disconnecting them to ensure proper re-connection.

① Loosen the **M3** screws using a slotted screwdriver and disconnect the control cables from the terminal block.

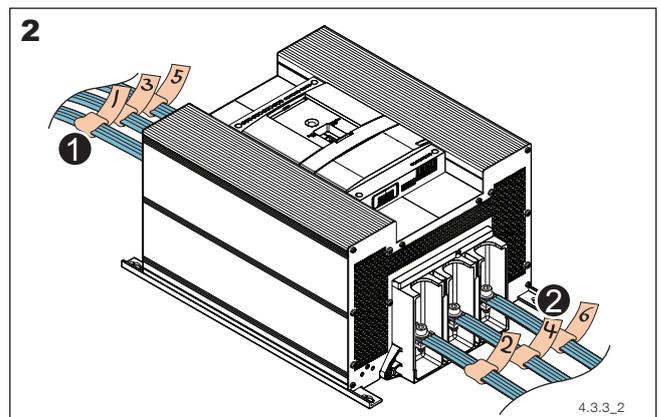


2. Mark main power cables

Mark the power cables prior to disconnecting them.

① Mark the main power cables on the top terminals 1L1, 3L2 and 5L3 with 1, 3 and 5.

② Mark the main power cables on the bottom terminals 2T1, 4T2 and 6T3 with 2, 4 and 6.

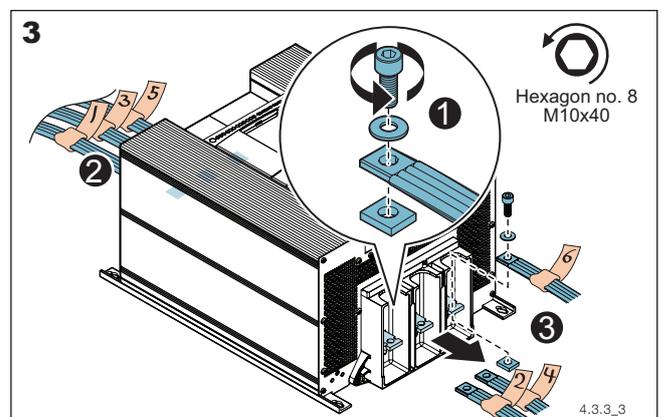


3. Disconnect main power cables

① Loosen (6x)  **Hexagon no. 8 M10x40** (including washers and square nuts).

② Disconnect the main power cables from the top terminals 1L1, 3L2 and 5L3.

③ Disconnect the main power cables from the bottom terminals 2T1, 4T2 and 6T3.



4.3.4 Connect the main power cables and the control cables



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



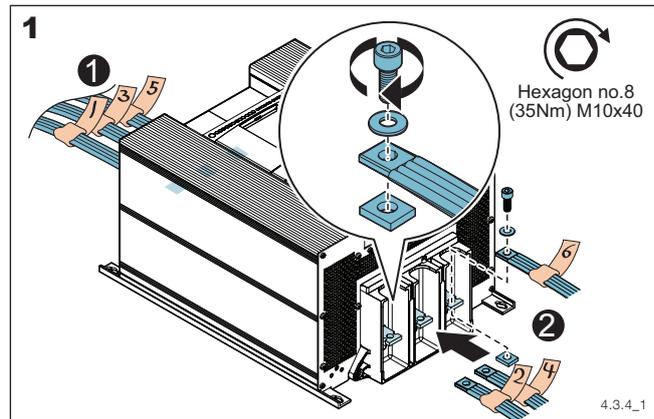
WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.

4

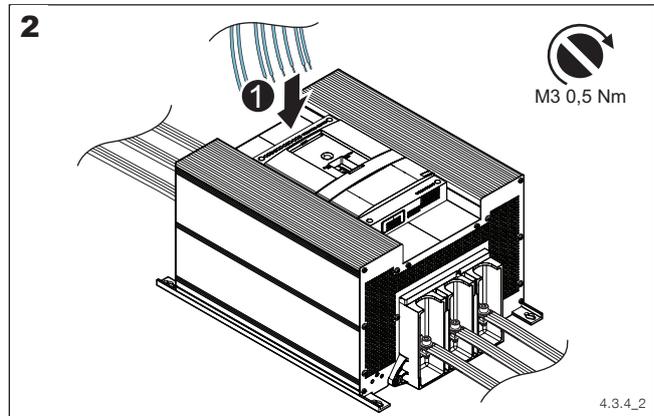
1. Connect main power cables

- 1 Fasten the main power cables, according to previously made markings (1, 3 or 5), to top terminals 1L1, 3L2 and 5L3. **Hexagon no. 8 M10x40 (35Nm)**. Washers and square nuts to be used.
- 2 Fasten the main power cables, according to previously made markings (2, 4 or 6), to bottom terminals 2T1, 4T2 and 6T3. **Hexagon no. 8 M10x40 (35Nm)**. Washers and square nuts to be used.

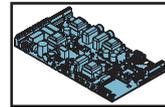


2. Connect control cables

- 1 Connect the control cables (according to previously made markings) to the terminal block and fasten the **M3** screws (**0,5Nm**) using a slotted screwdriver.



4.4 Service of the PCBA



This chapter describes changing of the PCBA.



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

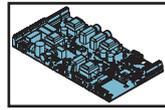
The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools required:

- Torx 15 for removing the front cover
- Torx 20 for removing the front cover
- Long-nose plier for removing the cables from the PCBA

4.4.1 Change the PCBA



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



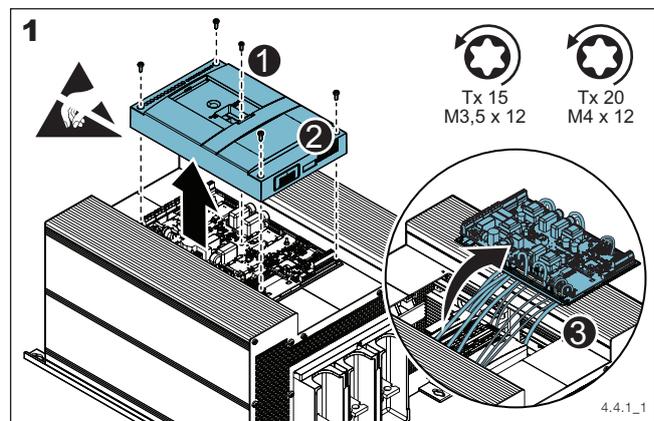
DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 4.3.3, step 1-3**.

1. Remove front cover

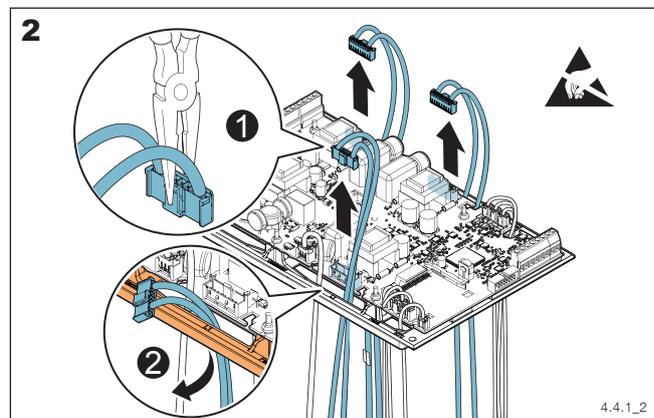
- Loosen (1x) **Torx 15 M3,5x12** on the HMI bracket.
- Loosen (4x) **Torx 20 M4x12**. Remove the front cover by lifting it upwards from unit. Ensure that screws do not come loose and fall down on the PCBA upon removal.
- Lift out the PCBA from unit (at this point still mounted on bracket) to facilitate continued service.



2. Disconnect SCR cables from PCBA

Mark the SCR cables with 1, 2, 3 prior to disconnecting them to ensure proper re-connection. Note that markings are to be made in accordance with existing data available on the PCBA bracket.

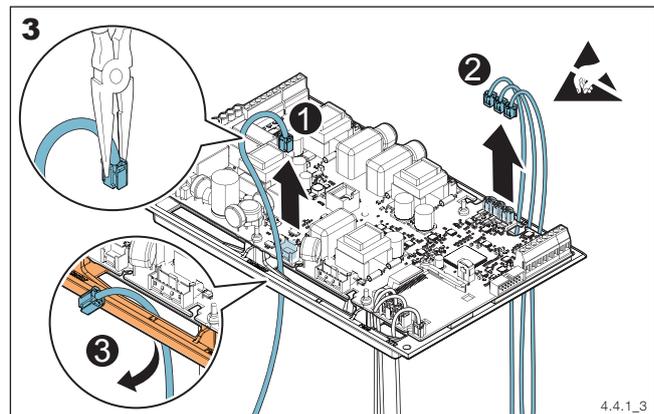
- Disconnect the three SCR cables from their terminals on the PCBA using a long-nose plier.
- Pull out the three SCR cables from the cable inlets on the PCBA bracket.



3. Disconnect bypass contactor cable and CT cables from PCBA

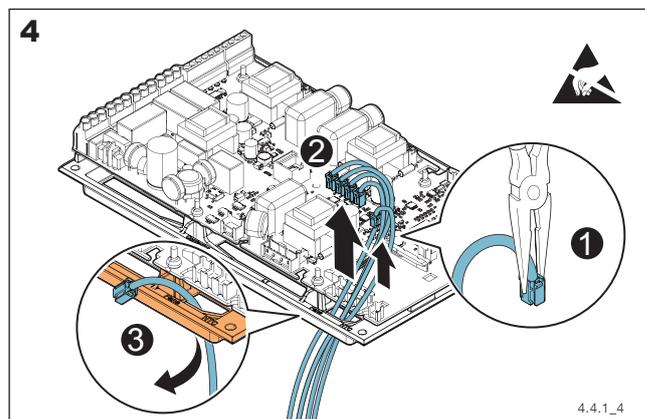
Mark the CT cables with 1, 2, 3 prior to disconnecting them to ensure proper re-connection. Note that markings are to be made in accordance with existing data available on the PCBA bracket.

- Disconnect the bypass contactor cable from its terminal on the PCBA using a long-nose plier.
- Disconnect the three CT cables from their terminals on the PCBA using a long-nose plier.
- Pull out the bypass contactor cable, and the three CT cables, from the cable inlets on the PCBA bracket.



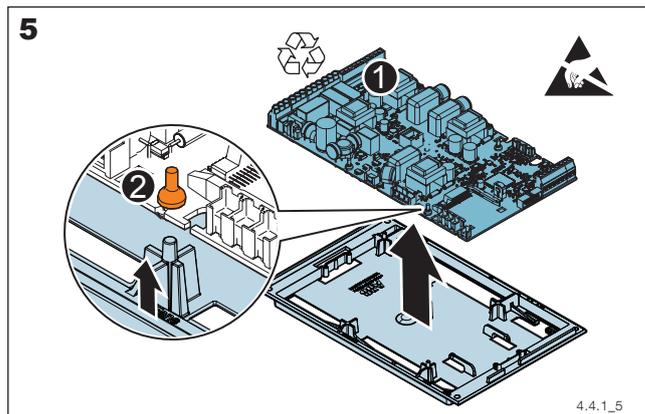
4. Remove thermal sensor cable and fan cables from PCBA

- 1 Disconnect the thermal sensor cable from its terminals on the PCBA using a long-nose plier.
- 2 Disconnect the four fan cables from their terminals on the PCBA using a long-nose plier.
- 3 Pull out the thermal sensor cable, and the four fan cables, from the cable inlets on the PCBA bracket.



5. Remove PCBA from PCBA bracket

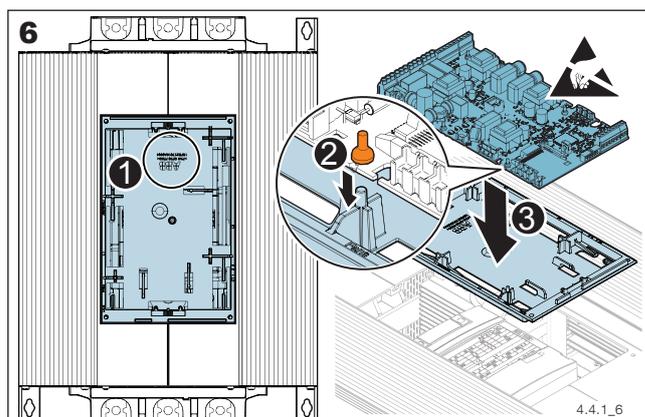
- 1 Gently loosen the PCBA from the bracket peg in the upper right corner.
- 2 Gently pull the PCBA out of the bracket to the right direction until loosened from the bracket peg in the lower left corner. Dispose of expended PCBA.



6. Place new PCBA on PCBA bracket

Note that rubber bushings shall be mounted on the PCBA prior to assembly.

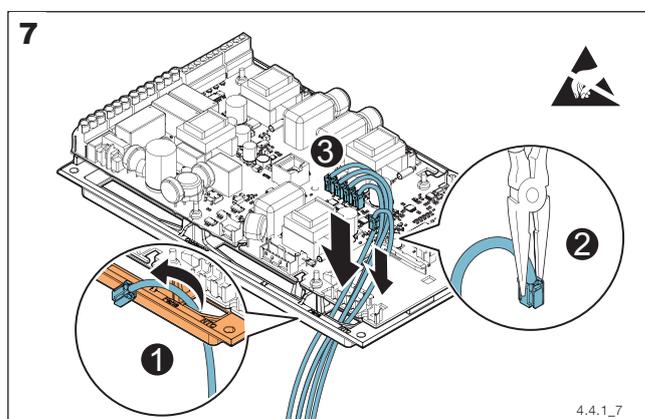
- 1 Position the bracket so that ABB's logotype appears upside down on the upper end.
- 2 Place the new PCBA on the bracket by sliding it onto bracket from the right direction until attached to the peg in the lower left corner.
- 3 Gently press the PCBA onto the bracket peg in the upper right corner until firmly fitted.



7. Connect thermal sensor cable and fan cables to PCBA

When reconnecting cables; read markings on the PCBA bracket.

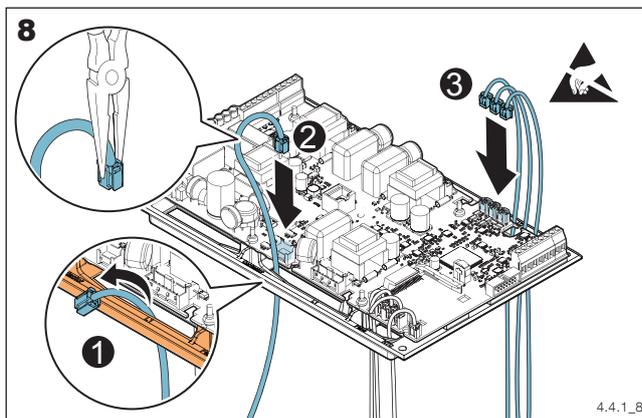
- 1 Thread the thermal sensor cable, and the four fan cables, through the cable inlets on the PCBA bracket.
- 2 Connect the thermal sensor cable to its terminal on the PCBA.
- 3 Connect the four fan cables to their terminals on the PCBA.



8. Connect bypass contactor cable and CT cables to PCBA

When reconnecting cables; read markings on the PCBA bracket.

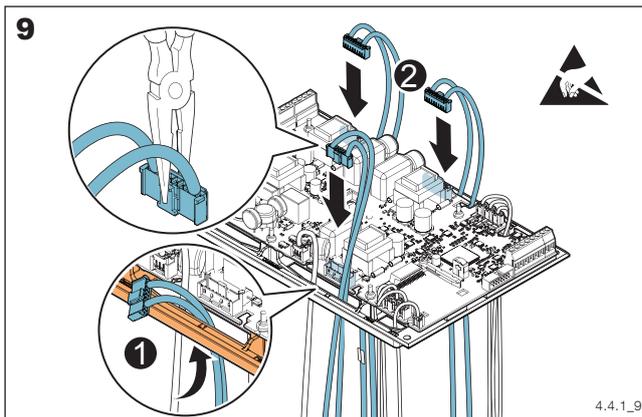
- ① Thread the bypass contactor cable, and the three CT cables, through the cable inlets on the PCBA bracket.
- ② Connect the bypass contactor cable to its terminal on the PCBA.
- ③ Connect the three CT cables, according to previously made markings (1, 2 or 3), to their terminals on the PCBA.



9. Connect SCR cables to PCBA

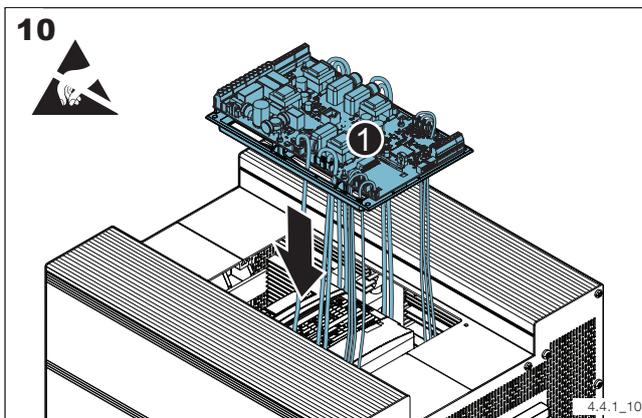
When reconnecting cables; read markings on the PCBA bracket.

- ① Thread all three SCR cables through the cable inlets on the PCBA bracket.
- ② Connect the three SCR cables, according to previously made markings (1, 2 or 3), to their terminals on the PCBA.



10. Place new PCBA and PCBA bracket

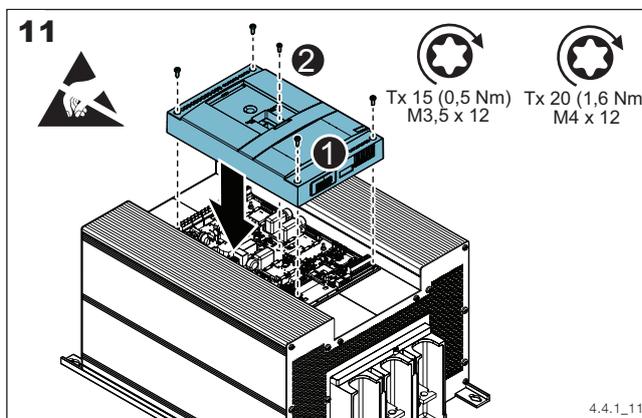
- ① Place the new PCBA (mounted to bracket) on the unit. Make sure cables do not get stuck in between the bracket frame and Softstarter when mounted.



11. Place front cover

Place the front cover on the unit and align it to the plastic screw sleeves located on lower housing.

- ① Fasten the front cover with (4x) **Torx 20 4,0 x80/10 (1,6Nm)**.
- ② Fasten (1x) **Torx 15 M3,5x12 (0,5 Nm)** on the HMI bracket.



REASSEMBLE THE SOFTSTARTER

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 4.3.4, step 1-2**.

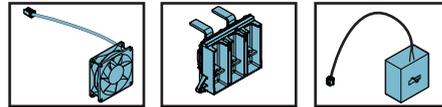


Procedures after PCBA replacement

Set the ID of the Softstarter after changing the PCBA, as described in **chapter 4.2.2, step 1-6**.

Firmware needs to be updated when changing the HMI. Please contact your ABB sales office for information.

4.5 Change the Fans, Bar holders and Current transformers



This chapter describes changing of the Fans, Current transformers and Bar holders.



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools required:

- Torx 20 for removing the fan cover
- Torx 20 for removing the fans
- Torx 20 for removing top cover
- Torx 30 for removing angle brackets
- Torx 30 for removing internal phase bars
- Torx 30 for removing phase bars
- Hexagon no. 8 for removing bar holders

4.5.1 Change the Fans



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

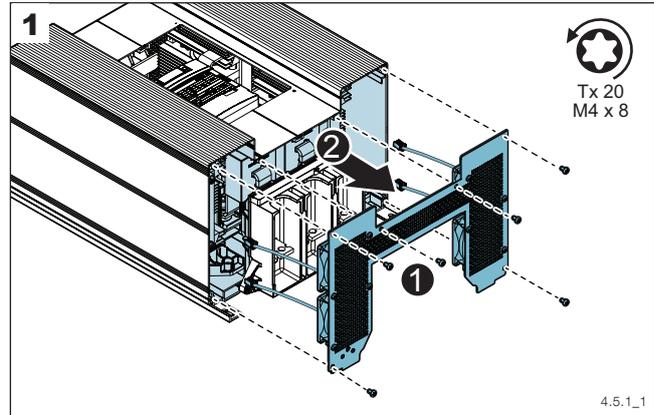
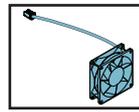
Disconnect the main power cables and the control cables as described in **chapter 4.3.3, step 1-3**.

Remove cover and PCBA

Dismantle the front cover, all cables and the PCBA as described in **chapter 4.4.1, step 1-5**.

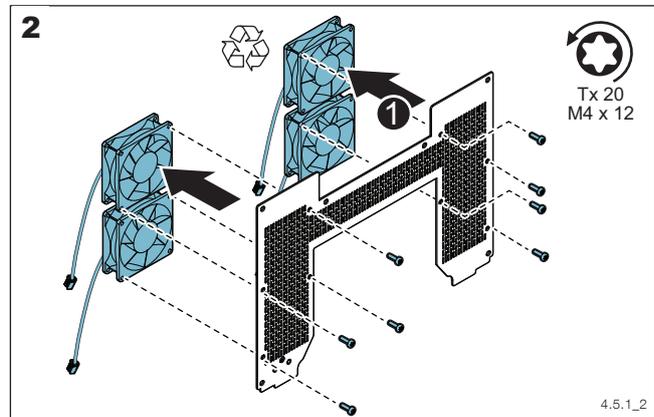
1. Remove fan cover

- 1 Loosen **(6x) Torx 20 M4x8** from the fan cover. Screws are located in each corner, and on the center bracket, of the fan cover.
- 2 Pull the fan cover outwards from unit with the fans still mounted on fan cover.



2. Remove fans from fan cover

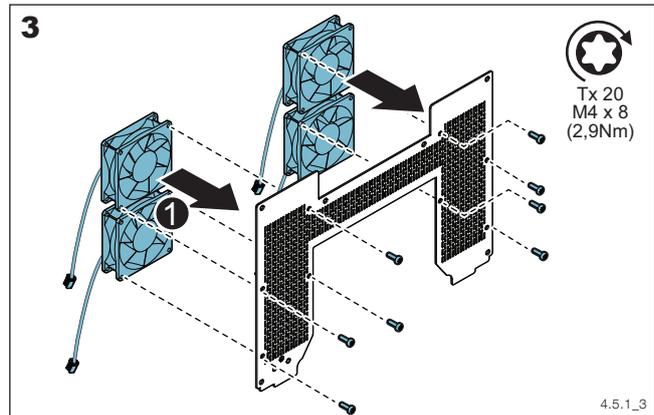
- 1 Loosen **(8x) Torx 20 M4x12** to separate the four fans from the fan cover. Screws are placed diagonally with two screws per fan. Dispose of expended fans.



3. Fasten fans to fan cover

Note that fans are to be mounted with regards to air-flow directions.

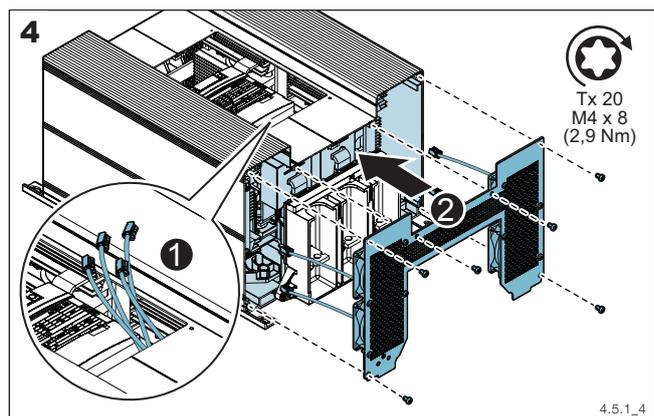
- 1 Fasten **(8x) Torx 20 M4x12 (1,3Nm)** to attach the four fans on the fan cover. Screws are to be mounted diagonally with two screws per fan.



4. Place fan cover

- 1 Thread the fan cables through the cable inlets.
- 2 Fasten the fan cover to the unit with **(6x) Torx 20 M4x8 (2,9Nm)**. Screws are to be mounted in each corner, and on the center bracket, of the fan cover.

For full reassembly of Softstarter; See chapter **4.5.4 Assemble the Softstarter**



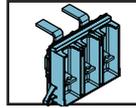
REASSEMBLE THE SOFTSTARTER

Place PCBA, cables and front cover

Place the PCBA, connect all cables and install the front cover as described in **chapter 4.3.1, step 6-10**.

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 4.3.4, step 1-2**.



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 4.3.3, step 1-3**.

Remove cover and PCBA

Dismantle the front cover, all cables and the PCBA as described in **chapter 4.3.1, step 1-5**.

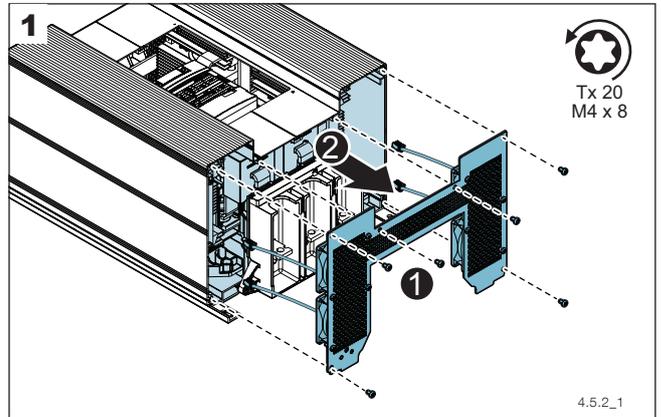


CAUTION

Use protective gloves when working with cover plates to prevent cutting injuries.

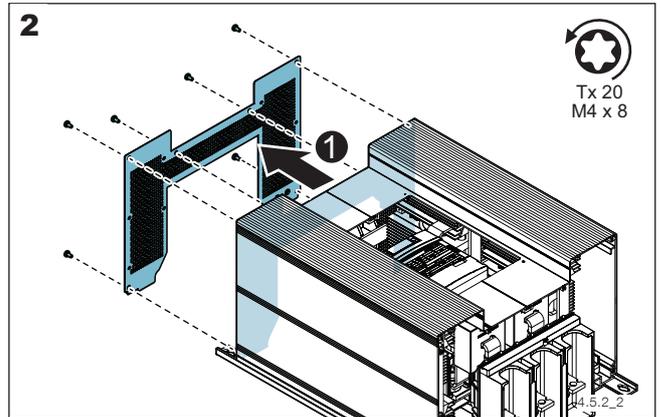
1. Remove fan cover

- ① Loosen (6x) Torx 20 M4x8 from the fan cover. Screws are located in each corner, and on the center bracket, of the fan cover.
- ② Pull the fan cover outwards from unit with the fans still mounted to fan cover.



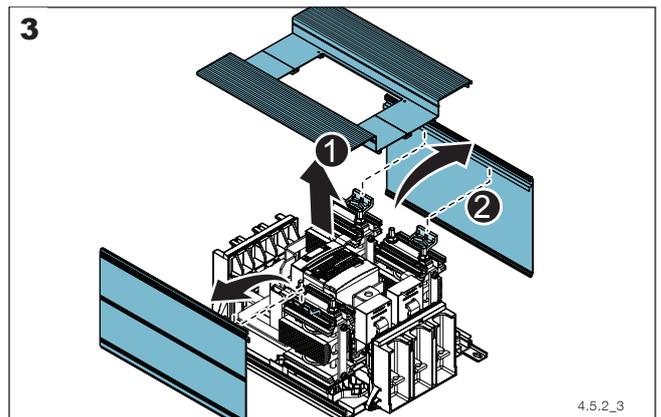
2. Remove top cover

- ① Loosen (6x) Torx 20 M4x8 and pull the top cover outwards from unit. Screws are located in each corner, and on the center bracket, of the top cover.



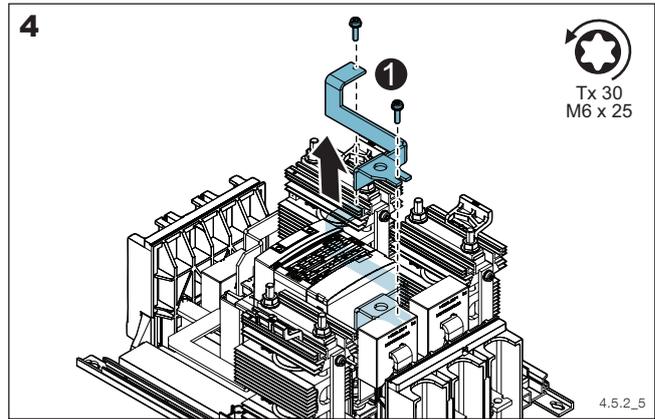
3. Remove front- and side covers

- ① Remove the front cover by lifting it upwards from unit.
- ② Remove the side covers by tilting them outwards from unit until disengaged from rails.



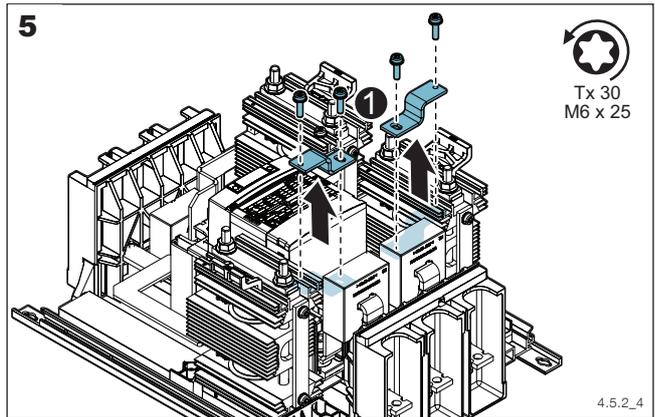
4. Remove first internal phase bar

① Loosen (2x)  **Torx 30 M6x25** and remove the first internal phase bar. Note that one screw is mounted on cooling tower.



5. Remove angle brackets

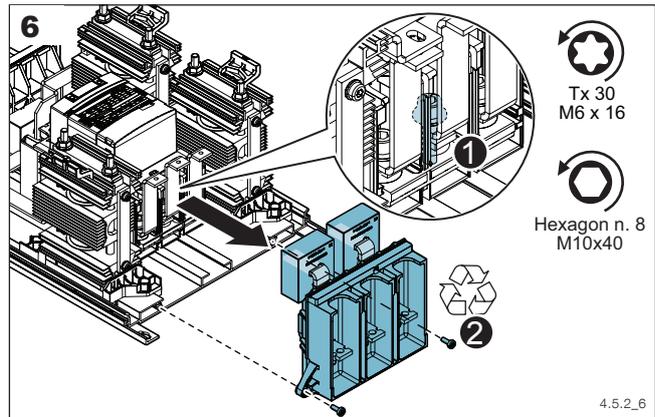
① Loosen (4x)  **Torx 30 M6x25** and remove the two angle brackets. Note that outer screws of each bracket are mounted to cooling towers.



6. Remove bar holder

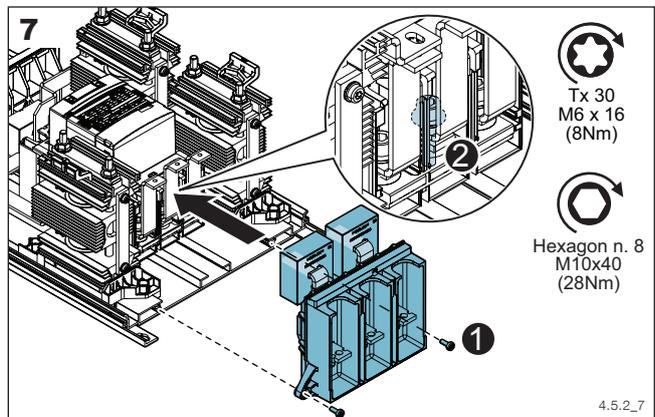
① Slightly untighten screw from the middle phase  **Hexagon no. 8 M10x40**.
 ② Loosen (2x)  **Torx 30 M6x16** and pull the bar holder outwards from unit.

Dismantle/assemble current transformers from/to bar holders as described in **chapter 4.4.4**.



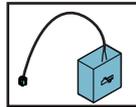
7. Place new bar holder

① Place the new bar holder to the unit and align it correctly to phases and screw holes. Fasten with (2x)  **Torx 30 M6x16 (8Nm)**.
 ② Fasten the middle phase bar screw  **Hexagon no. 8 M10x40 (28Nm)**.



 **REASSEMBLE THE SOFTSTARTER**
 Reassemble the Softstarter as described in chapter 4.5.4, 1-6.

4.5.3 Change the Current transformers



1. Remove current transformers from bottom bar holder

① Slide the current transformers outwards from phase bars until unattached. Dispose of expended current transformers.

2. Place new current transformers on bottom side bar holder

Make sure that the ratio value of the new current transformer correspond to previously installed current transformer. Verify the ratio according to **table 7** below.

Make sure cables of new current transformer gets connected in accordance to previously made markings.

① Position the current transformers with cables facing downwards. ABB logotypes shall appear upside down facing the bar holders.

② Mount the current transformers on the phase bars.

3. Remove current transformer from top bar holder

① Loosen (2x)  **Torx 30 M6x16** from the middle phase bar in order to pull out the phase bar and remove the current transformer. Dispose of expended current transformer.

4. Place new current transformer on top bar holder

Make sure that the ratio value of the new current transformer correspond to previously installed current transformer. Verify the ratio according to **Table 7** below.

Make sure cable of new current transformer gets connected in accordance to previously made markings.

① Position the current transformer with the cable facing upwards and the ABB logotype facing outwards from bar holder.

② Place the current transformer on the bar holder and mount the phase bar through the current transformer. Fasten the phase bar to the bar holder with (2x)  **Torx 30 M6x16 (8Nm)**.

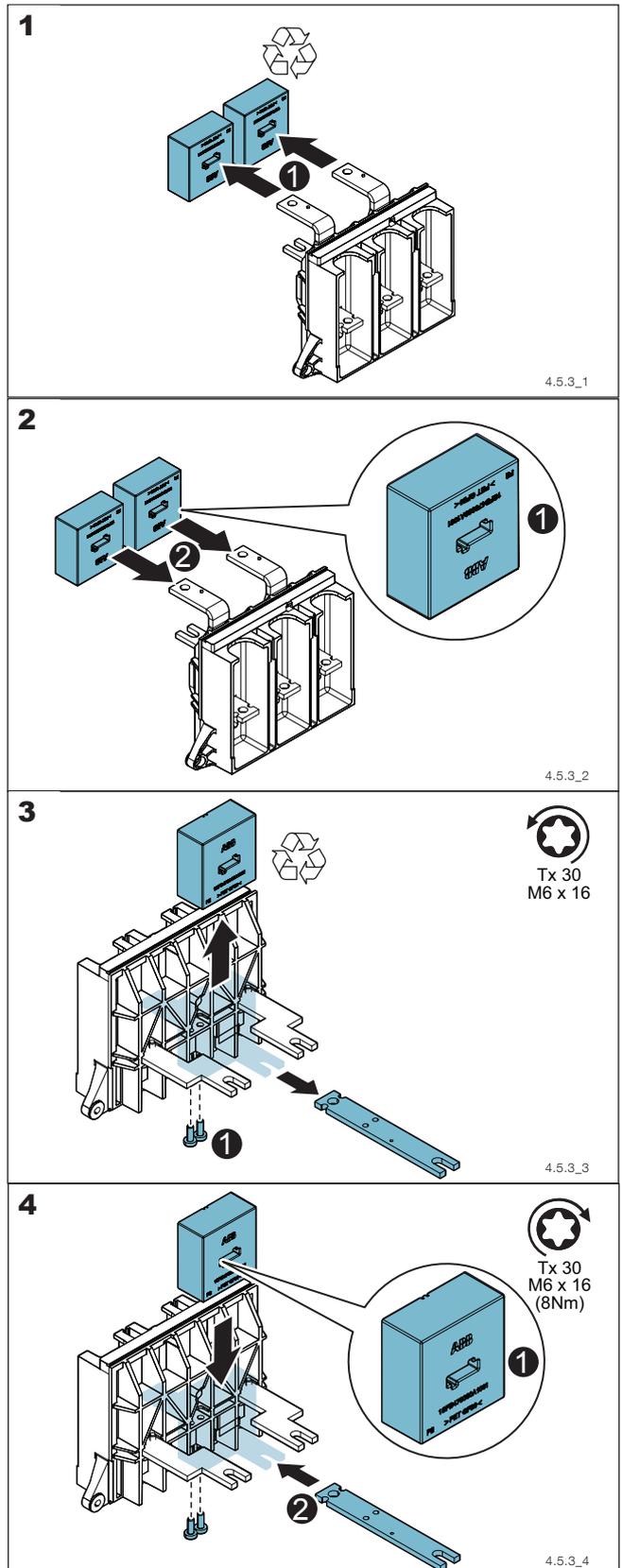


Table 7

Softstarter size	Ratio	Order code	Type
PSTX470...570	570/0,2	1SFA899302R1570	PSCT-570
PSTX720...840	840/0,2	1SFA899302R1840	PSCT-840
PSTX1050...1250	1250/0,2	1SFA899302R2250	PSCT-1250

4.5.4 Assemble the Softstarter

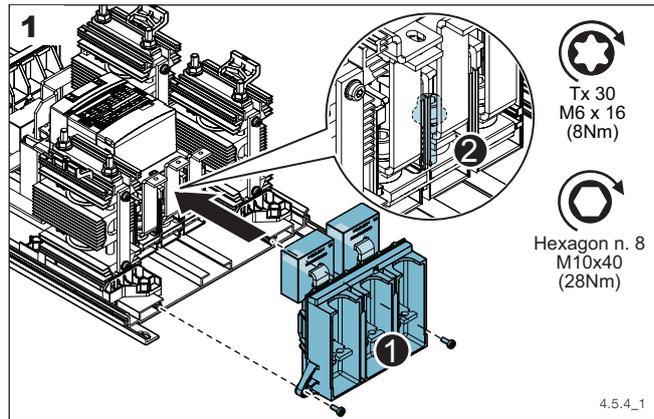


CAUTION

Use protective gloves when working with cover plates to prevent cutting injuries.

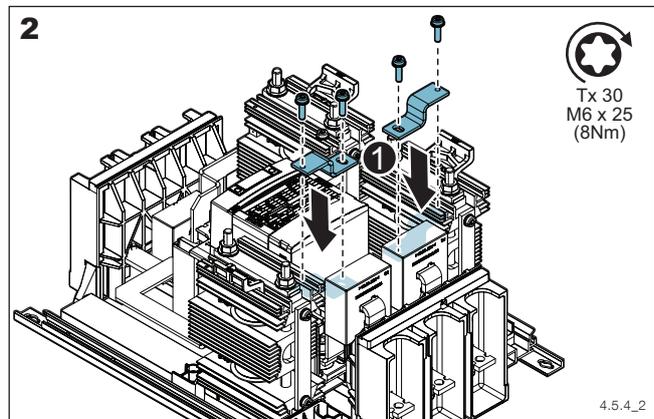
1. Place bottom bar holder

- 1 Place the bar holder to the unit and align it correctly to phases and screw holes. Fasten with (2x) **Torx 30 M6x16 (8Nm)**.
- 2 Fasten the middle phase bar screw **Hexagon n. 8 M10x40 (28Nm)**.



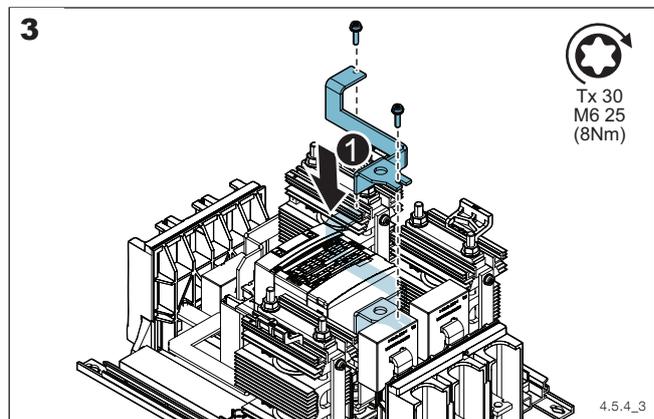
2. Place angle brackets

- 1 Fasten the two angle brackets to unit with (4x) **Torx 30 M6x25 (8Nm)**. Note that outer screws of each bracket are mounted to cooling towers.



3. Place first internal phase bar

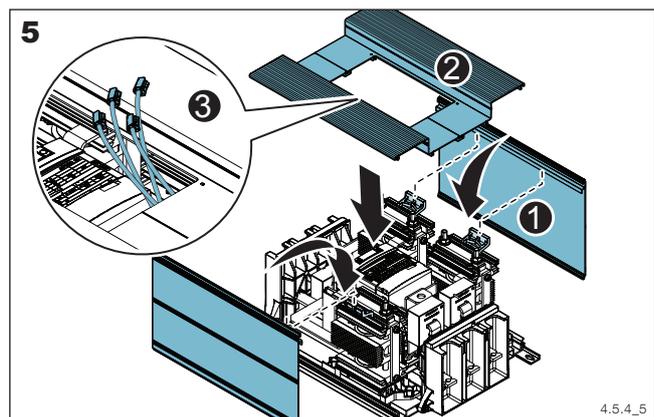
- 1 Fasten phase bar to unit with (2x) **Torx 30 M6x25 (8Nm)**. Note that one screw is mounted on cooling tower.



4. Place side- and front covers

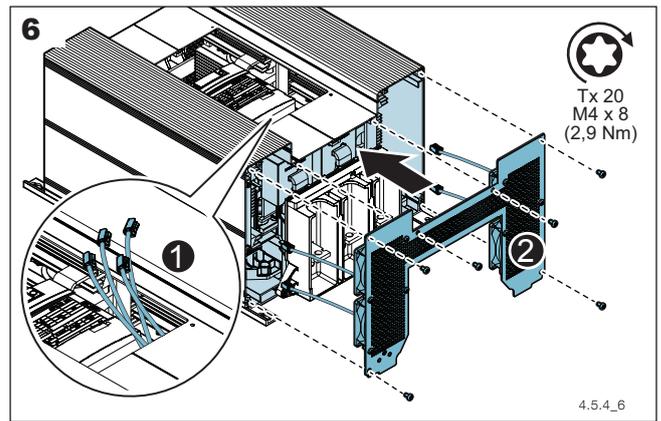
Make sure to position side covers with dual locking rails facing upwards prior to assembly.

- 1 Interlock the side covers to rails and attach them to support brackets mounted on cooling towers.
- 2 Place the front cover on the unit and interlock to rails.
- 3 Thread the cables through the cable inlets opening in the front cover.



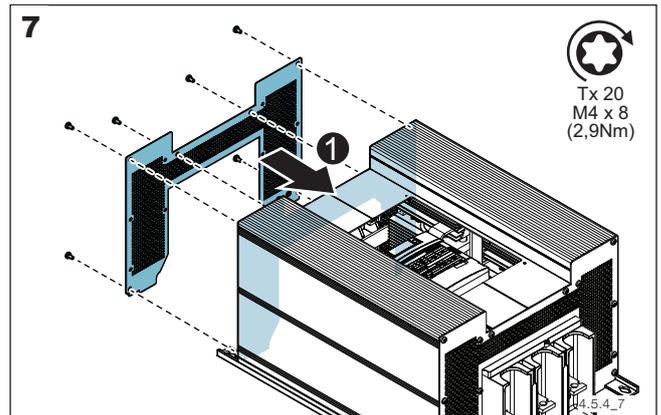
5. **Place fan cover**

- 1 Thread the fan cables through the cable inlets.
- 2 Fasten fan cover to the unit with **(6x) Torx 20 M4x8 (2,9Nm)**. Screws are to be mounted in each corner, and on the center bracket, of the fan cover.



6. **Place top cover**

- 1 Fasten top cover to the unit with **(6x) Torx 20 M4x8 (2,9Nm)**. Screws are to be mounted in each corner, and on the center bracket, of the top cover.



REASSEMBLE THE SOFTSTARTER

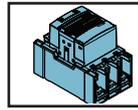
Place PCBA, cables and front cover

Place the PCBA, connect all cables and install the front cover as described in **chapter 4.4.1, step 6-10**.

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 4.3.4, step 1-2**.

4.6 Change the Bypass contactor



This chapter describes how to change of the By-pass Contactor.



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



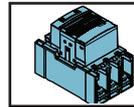
WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools:

- Torx 20 for removing the fan cover
- Torx 20 for removing the top cover
- Torx 30 for removing angle brackets
- Torx 30 for removing internal phase bars
- Hexagon no. 8 for removing the bar holders
- Hexagon no. 4 for removing the bypass contactor
- Hexagon no. 8 for removing the bypass contactor



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 4.3.3, step 1-3**.

Remove cover and PCBA

Dismantle the front cover, all cables and the PCBA as described in **chapter 4.4.1, step 1-5**.

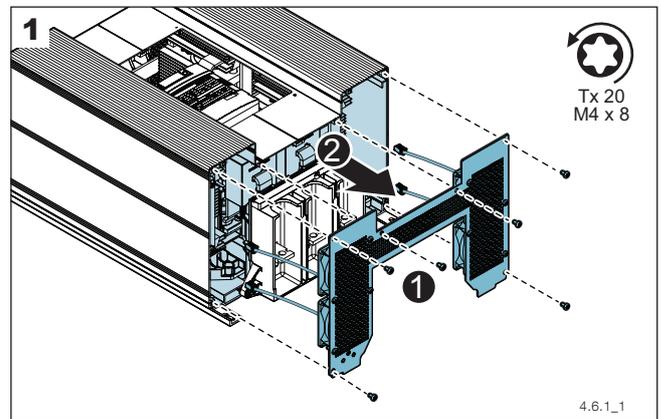


CAUTION

Use protective gloves when working with cover plates to prevent cutting injuries.

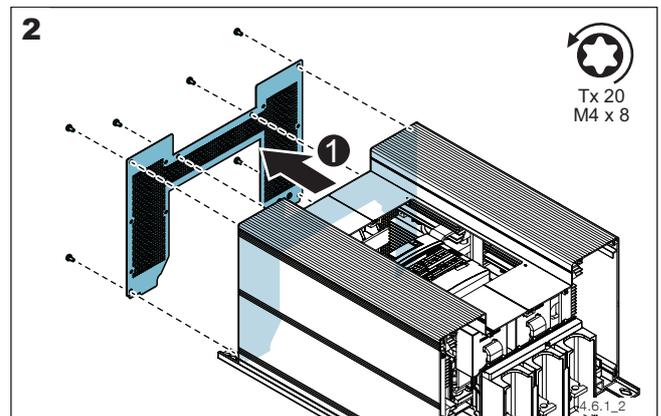
1. Remove fan cover

- ① Loosen (6x) Torx 20 M4x8 from the fan cover. Screws are located in each corner, and on the center bracket, of the fan cover.
- ② Pull the fan cover outwards from unit with the fans still mounted to fan cover.



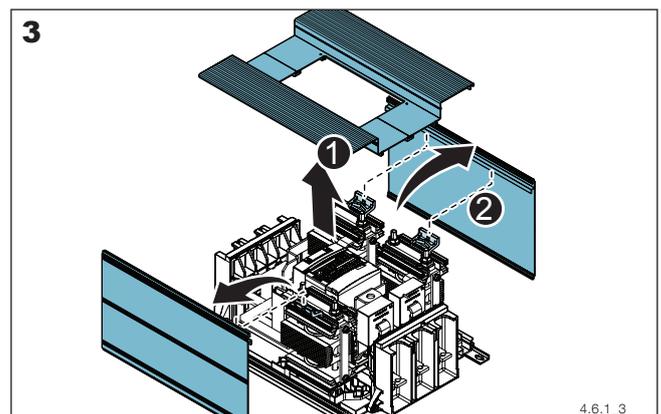
2. Remove top cover

- ① Loosen (6x) Torx 20 M4x8 and pull the top cover outwards from unit. Screws are located in each corner, and on the center bracket, of the top cover.



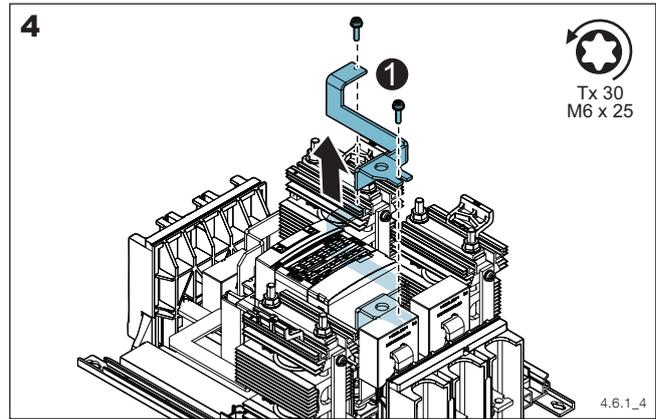
3. Remove front- and side cover

- ① Remove the front cover by lifting it upwards from unit.
- ② Remove the side covers by tilting them outwards from unit until disengaged from rails.



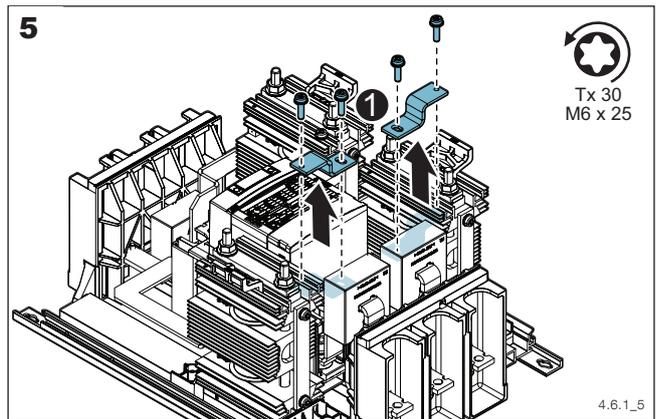
4. **Remove first internal phase bar**

① Loosen (2x)  **Torx 30 M6x25** and remove the first internal phase bar. Note that one screw is mounted on cooling tower.



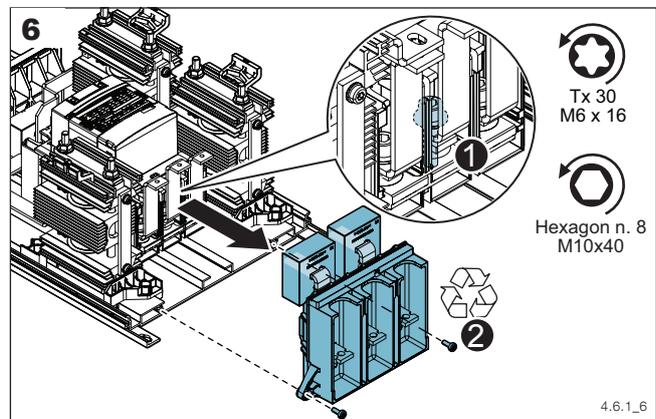
5. **Remove angle brackets**

① Loosen (4x)  **Torx 30 M6x25** and remove the two angle brackets. Note that outer screws of each bracket are mounted to cooling towers.



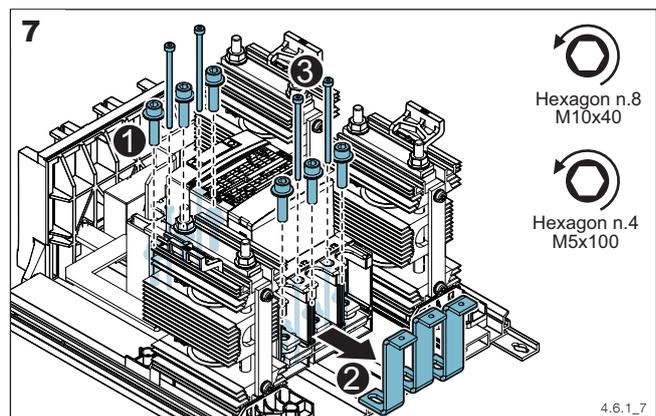
6. **Remove bottom bar holder**

① Slightly untighten screw from the middle phase
 **Hexagon n. 8 M10x40**.
② Loosen (2x)  **Torx 30 M6x16** and pull the bar holder outwards from unit.



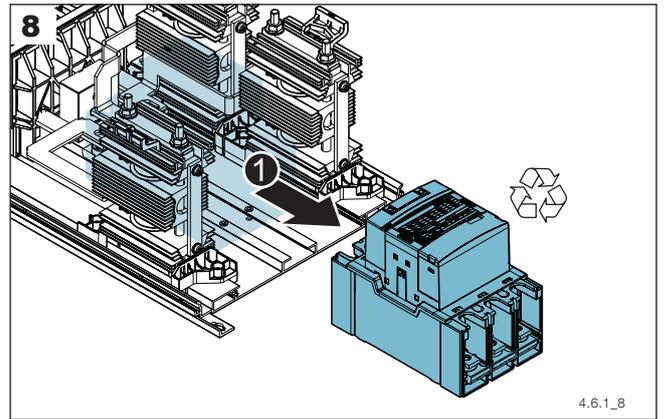
7. **Loosen screws from bypass contactor**

① Loosen (6x)  **Hexagon n. 8 M10x40** from the phases on the bypass contactor.
② Remove phase rails by pulling them outwards from bypass contactor.
③ Loosen (4x)  **Hexagon n. 4 M5x100** from the bypass contactor.



8. Remove bypass contactor

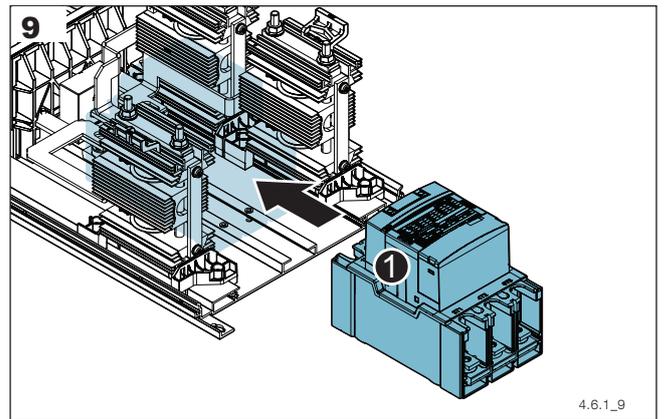
① Remove the bypass contactor by lifting it outwards from unit. Dispose of expended bypass contactor.



4.6.1_8

9. Place new bypass contactor

① Place the new bypass contactor in the unit with terminals 1L1, 3L2 and 5L3 facing inwards. Align to phase rails.



4.6.1_9

4.6.2 Assemble the Softstarter



Please don't forget to vacuum clean the Softstarter from dirt and dust when reassembling.

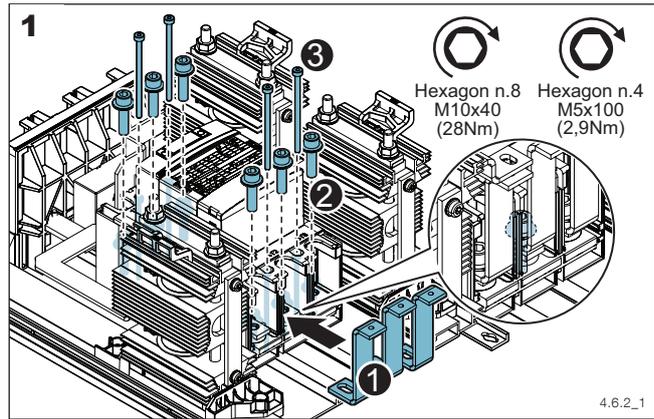


CAUTION

Use protective gloves when working with cover plates to prevent cutting injuries.

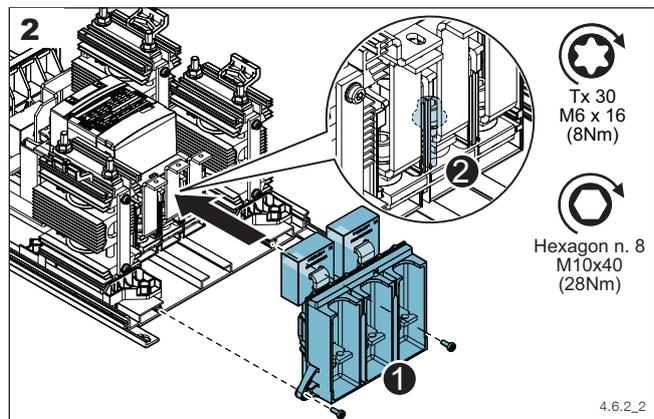
1. Place phase rails and fasten screws

- ① Mount the phase rails to the bypass contactor (terminals 2T1, 4T2 and 6T3).
- ② Fasten (6x) **Hexagon no. 8 M10x40 (28Nm)** to the phases on the bypass contactor. In order to mount the bar holder; do not fully tighten the screw for the middle phase (4T2).
- ③ Fasten bypass contactor to unit with (4x) **Hexagon no. 4 M5x100 (2,9Nm)**.



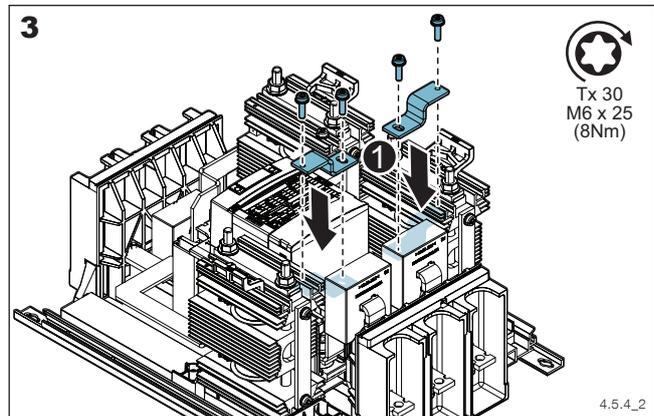
2. Place bottom bar holder

- ① Place the bar holder to the unit and align it correctly to phases and screw holes. Fasten with (2x) **Torx 30 M6x16 (8Nm)**.
- ② Fasten the middle phase bar screw **Hexagon no. 8 M10x40 (28Nm)**.



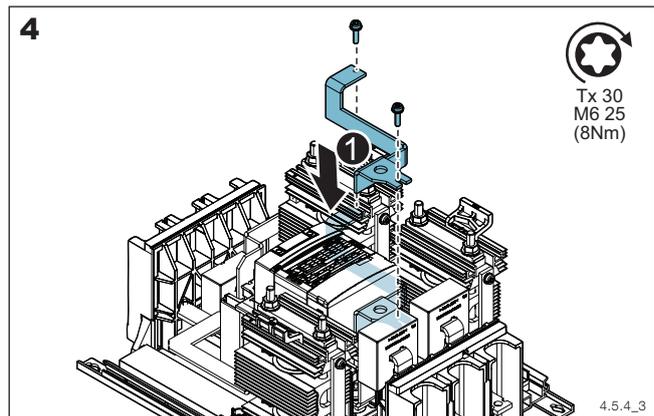
3. Place angle brackets

- ① Fasten the two angle brackets to unit with (4x) **Torx 30 M6x25 (8Nm)**. Note that outer screws of each bracket are mounted to cooling towers.



4. Place first internal phase bar

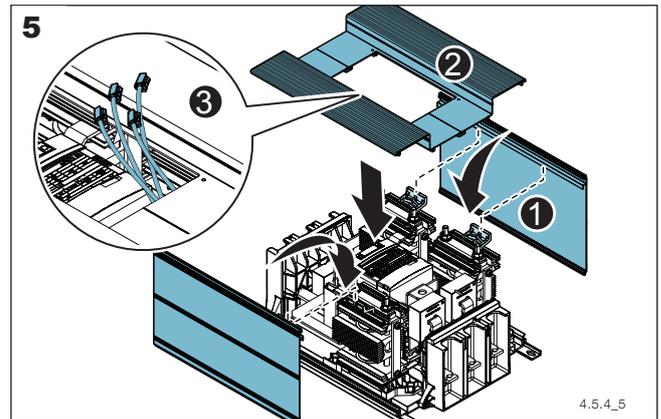
- ① Fasten phase bar to unit with (2x) **Torx 30 M6x25 (8Nm)**. Note that one screw is mounted on cooling tower.



5. Place side- and front covers

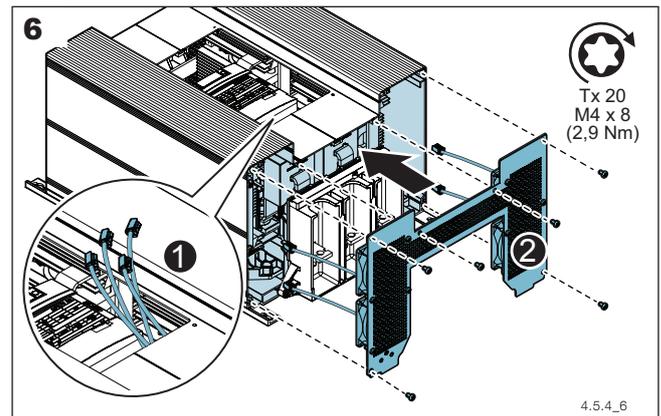
Make sure to position side covers with dual locking rails facing upwards prior to assembly.

- 1 Interlock the side covers to rails and attach them to support brackets mounted on cooling towers.
- 2 Place the front cover on the unit and interlock to rails.
- 3 Thread the cables through the cable inlets opening in the front cover.



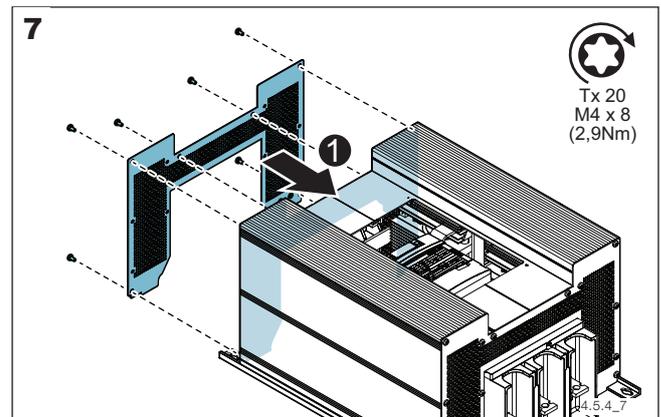
6. Place fan cover

- 1 Thread the fan cables through the cable inlets.
- 2 Fasten fan cover to the unit with (6x) **Torx 20 M4x8 (2,9Nm)**. Screws are to be mounted in each corner, and on the center bracket, of the fan cover.



7. Place top cover

- 1 Fasten top cover to the unit with (6x) **Torx 20 M4x8 (2,9Nm)**. Screws are to be mounted in each corner, and on the center bracket, of the top cover.



REASSEMBLE THE SOFTSTARTER

Place PCBA, cables and front cover

Place the PCBA, connect all cables and install the front cover as described in **chapter 4.4.1, step 6-10**.

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 4.3.4, step 1-2**.

4.7 Change the SCR



This chapter describes how to change the SCR.



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

- SCR and heatsinks must be handled carefully to avoid scratches and other marks.
- Do not touch the contact surfaces.
- Do not lift the SCR by the SCR wires.
- Make sure that there is no damage to the welding flange or to the contact surface.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product..



The following instruction shows service on Softstarter model PSTX470...570. Depending on model small changes in the service procedure may differ but the principle of the service is the same.

Tools required:

- Torx 20 for removing the fan cover
- Torx 20 for removing the top cover
- Torx 30 for removing angle brackets
- Torx 30 for removing phase rails
- Torx 30 for removing bolted bars
- Hexagon socket wrench for removing M10 screw-nut
- Abrasive cloth P600 to polish the SCR
- Ethanol to clean the SCR
- Silicone oil to prepare new SCR



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 4.3.3, step 1-3**.

Remove cover and PCBA

Dismantle the front cover, all cables and the PCBA as described in **chapter 4.4.1, step 1-5**.

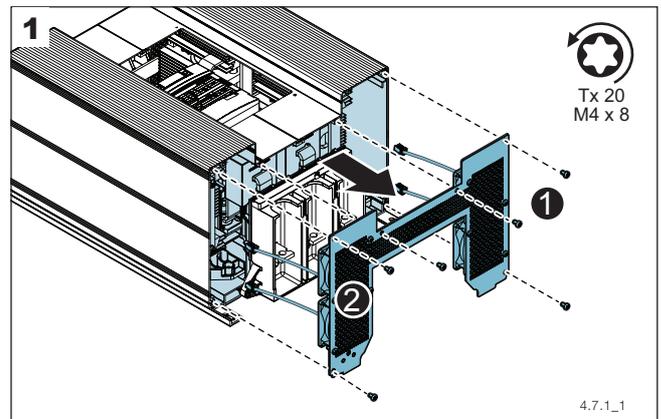


CAUTION

Use protective gloves when working with cover plates to prevent cutting injuries.

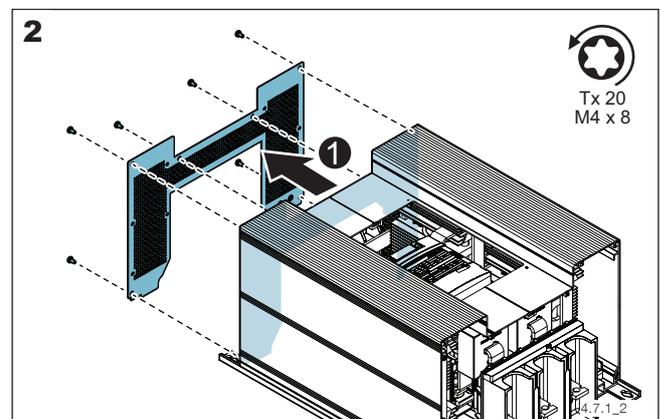
1. Remove fan cover

- ① Loosen (6x) Torx 20 M4x8 from the fan cover. Screws are located in each corner, and on the center bracket, of the fan cover.
- ② Pull the fan cover outwards from unit with the fans still mounted to fan cover.



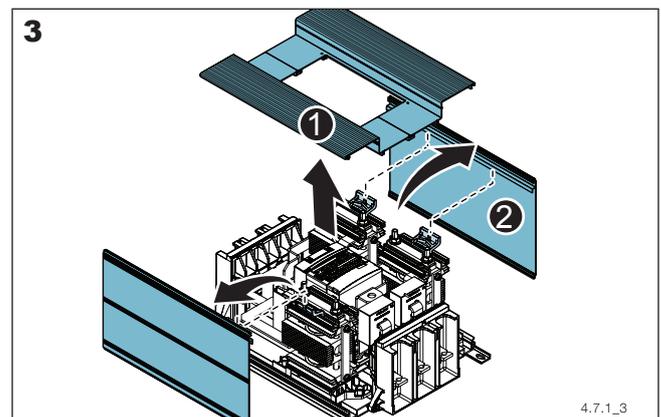
2. Remove top cover

- ① Loosen (6x) Torx 20 M4x8 and pull the top cover outwards from unit. Screws are located in each corner, and on the center bracket, of the top cover.



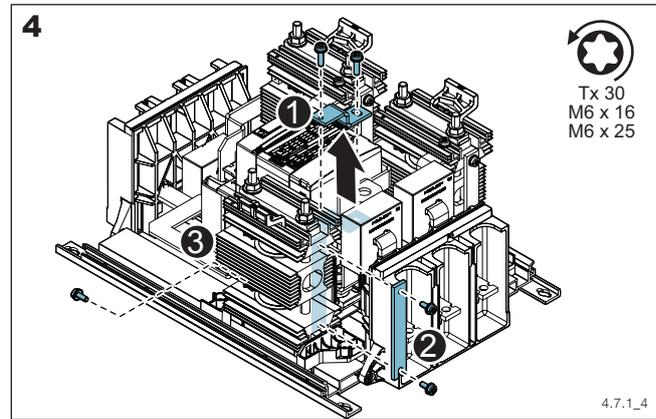
3. Remove front- and side cover

- ① Remove the front cover by lifting it upwards from unit.
- ② Remove the side covers by tilting them outwards from unit until disengaged from rails.



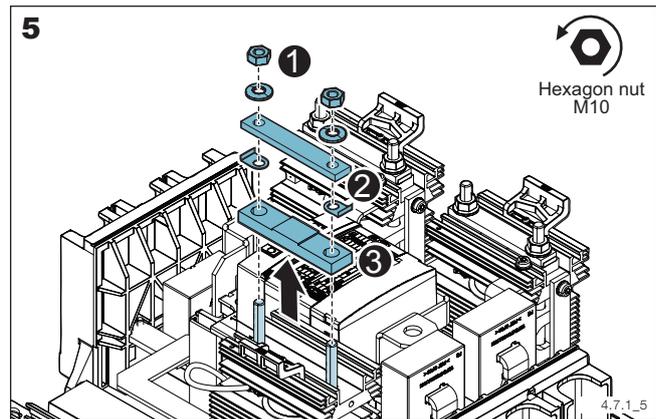
4. Remove brackets

- ① Loosen (2x)  **Torx 30 M6x25** and remove the angle bracket from cooling tower.
- ② Loosen (2x)  **Torx 30 M6x16** and remove the bolted bar from cooling tower.
- ③ Loosen screw that attach phase rail to cooling tower (1x)  **Torx 30 M6x16**.



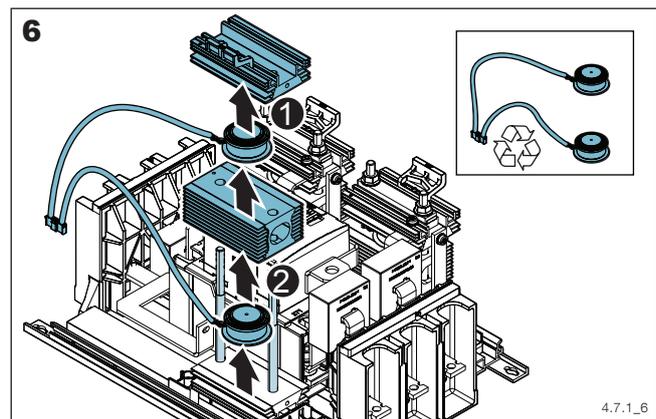
5. Remove screw-nuts and tension bars from cooling tower

- ① Loosen and remove (2x)  **Hexagon M10 Screw-nut** and the two spring washers from cooling tower.
- ② Remove the tension bar and the two torque washers from cooling tower.
- ③ Remove the distance bar from cooling tower.



6. Remove heatsinks and SCR from cooling tower

- ① Remove the upper heatsink and upper SCR unit by lifting them upwards from mounting screws.
- ② Remove the middle heatsink and lower SCR unit by lifting them upwards from mounting screws. Do not remove the isolation plastic pipes from mounting screws. Dispose of expended SCR.

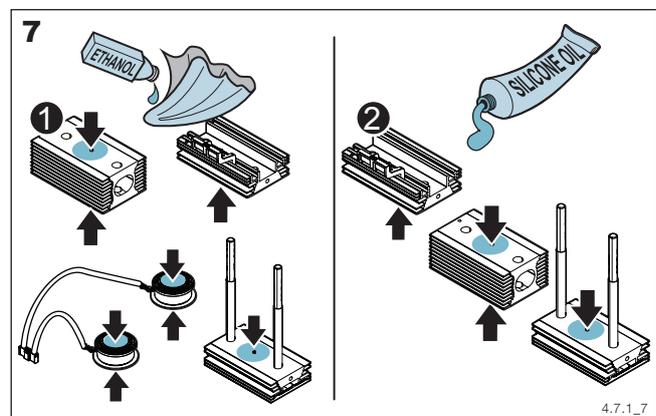


WARNING

- SCR:s and heatsinks must be handled with care to avoid scratches and other marks.
- Do not scratch the contact surfaces with the guide pins.
- Do not touch the contact surfaces.
- Do not lift the SCR by the wire.
- Ensure there is no damage to the welding flange or to the contact surface.

7. Preparation of heatsink and SCR

- Clean all polished contact surfaces carefully with Ethanol.
- Use well moistened lint-free paper.
- Avoid contact with surface.
- Lubricate directly after polishing/cleaning, within 5 minutes. The contact surfaces must be dry before lubrication.
- Apply a couple of drops of silicone oil on the cleaned contact surfaces, avoid getting oil in the guide hole. Smooth the oil lightly over the whole surface using lint-free paper. Then wipe off the surface in order to get a very thin layer of oil.
- Avoid contact with the surfaces after lubrication.



Use the service kit in the spare part catalog 1SFC001013C0201.

4.7.2 Assemble the Softstarter



Please don't forget to vacuum clean the Softstarter from dirt and dust when reassembling.



CAUTION

Use protective gloves when working with cover plates to prevent cutting injuries.

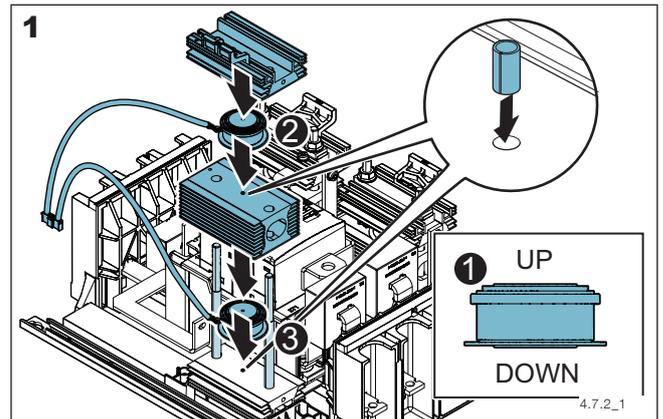
1. Place new SCR

Make sure that the symbol and type specification of the new SCR corresponds to previously installed SCR prior to assembly. Do not scratch the contact surfaces with the guide pins. Turn the component so that the SCR wires point in the direction towards the bypass contactor.

① Make sure to place the SCR units in the right direction, according to illustration.

② Place the lower SCR unit and middle heatsink onto mounting screws on cooling tower. Align to guide pin.

③ Place the upper SCR unit and upper heatsink onto mounting screws on cooling tower. Align to guide pin.

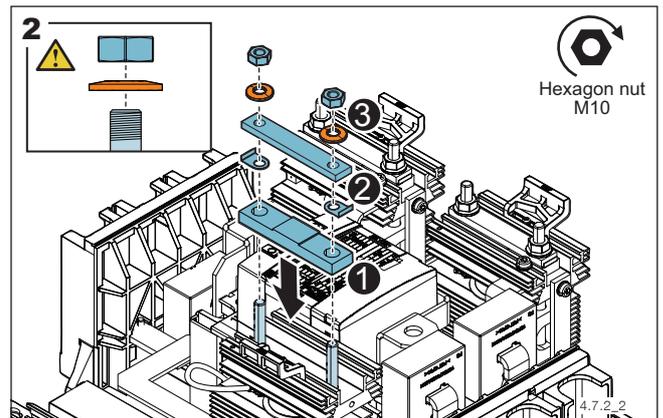


2. Place screw-nuts and tension bars to cooling tower

① Place the distance bar onto mounting screws on cooling tower.

② Place the two torque washers and tension bar onto mounting screws on cooling tower.

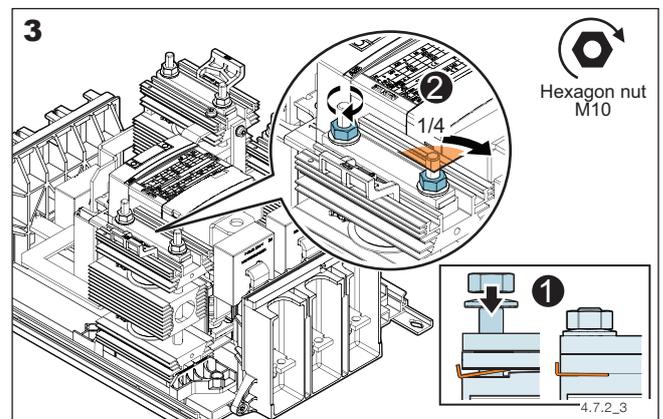
③ Place (2x) **Hexagon M10 Screw-nut** and the two spring washers onto mounting screws on cooling tower (do not yet fasten). Spring washers are to be placed with the concave side facing downwards.



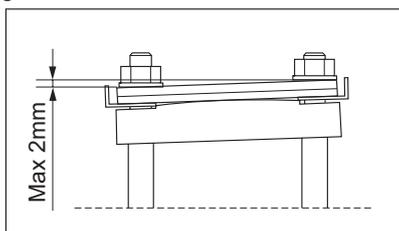
3. Fasten tension bars to cooling tower

① Fasten (2x) **Hexagon M10 Screw-nut** by hand until clamps are tightened.

② Fasten each nut additionally by half a turn alternately until the spring gap indicators are just trapped, then tighten 1/4 turn.

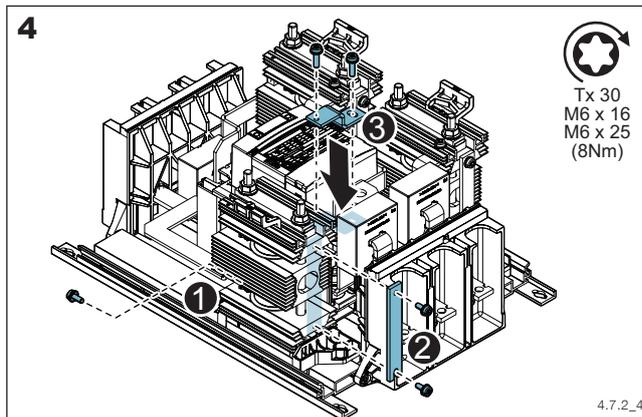


The slope may not be more than 2 mm. See figure below:



4. Fasten brackets

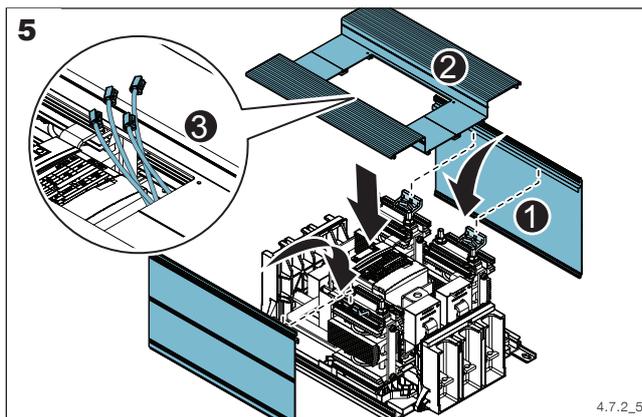
- ① Fasten screw that attach phase rail to cooling tower (1x) **Torx 30 M6x16 (8Nm)**.
- ② Place the bolted bar on the cooling tower and fasten with (2x) **Torx 30 M6x16 (8Nm)**.
- ③ Place the angle bracket on the cooling tower and fasten with (2x) **Torx 30 M6x25 (8Nm)**.



5. Place side- and front covers

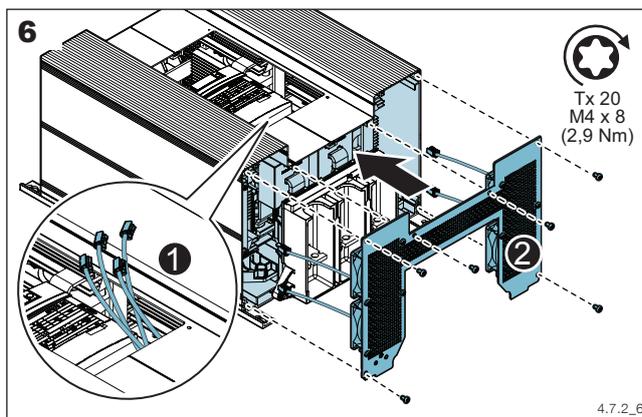
Make sure to position side covers with dual locking rails facing upwards prior to assembly.

- ① Interlock the side covers to rails and attach them to support brackets mounted on cooling towers.
- ② Place the front cover on the unit and interlock to rails.
- ③ Thread the cables through the cable inlets opening in the front cover.



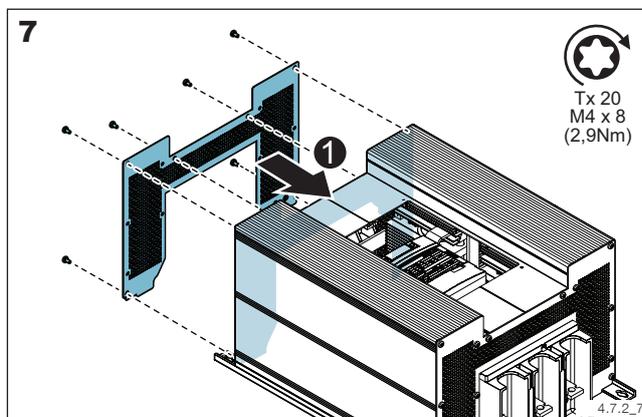
6. Place fan cover

- ① Thread the fan cables through the cable inlets.
- ② Fasten fan cover to the unit with (6x) **Torx 20 M4x8 (2,9Nm)**. Screws are to be mounted in each corner, and on the center bracket, of the fan cover.



7. Place top cover

- ① Fasten top cover to the unit with (6x) **Torx 20 M4x8 (2,9Nm)**. Screws are to be mounted in each corner, and on the center bracket, of the top cover.



i REASSEMBLE THE SOFTSTARTER

Place PCBA, cables and front cover

Place the PCBA, connect all cables and install the front cover as described in **chapter 4.4.1, step 6-10**.

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 4.3.4, step 1-2**.

4.8 Instructions for testing the SCR



IMPORTANT NOTE

Only perform the SCR-test if the Softstarter displays one of the following commandos: “Short circuit fault” or “Open circuit thyristor fault”.

Replace SCR if the result of the test shows under 1 Mohm.



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools:

- Torx 15 for removing the front cover
- Torx 20 for removing the front cover
- Long-nose plier for removing the cables from the PCBA
- Megger to set on 500V



IMPORTANT NOTE

Only perform the SCR-test if the Softstarter displays one of the following commandos: “Short circuit fault” or “Open circuit thyristor fault”.

Replace SCR if the result of the test shows under 1 Mohm.



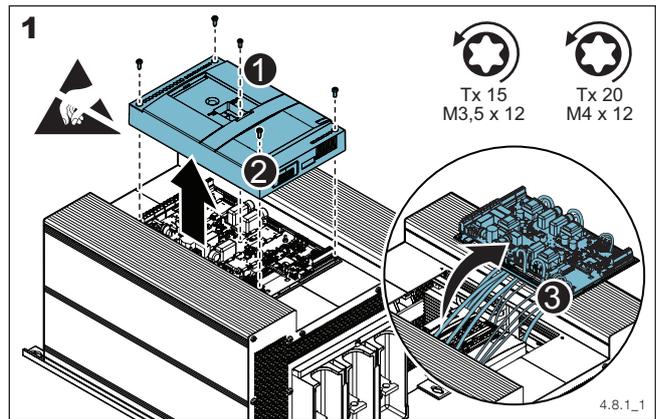
DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 4.3.3, step 1-3.**

1. Remove front cover

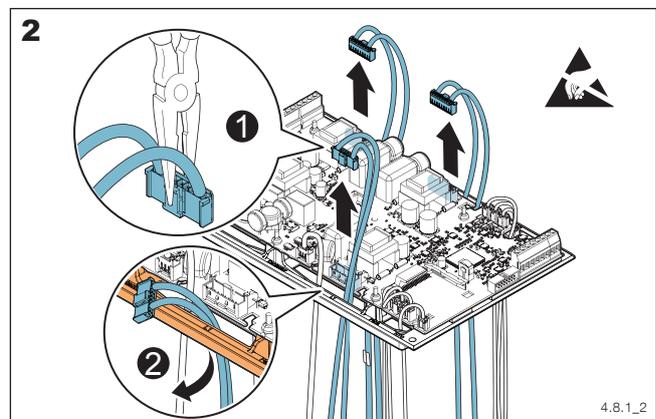
- ① Loosen (1x) Torx 15 M3,5x12 on the HMI bracket.
- ② Loosen (4x) Torx 20 M4x12. Remove the front cover by lifting it upwards from unit. Ensure that screws do not come loose and fall down on the PCBA upon removal.
- ③ Lift out the PCBA from unit (at this point still mounted on bracket) to facilitate continued service.



2. Disconnect SCR cables from PCBA

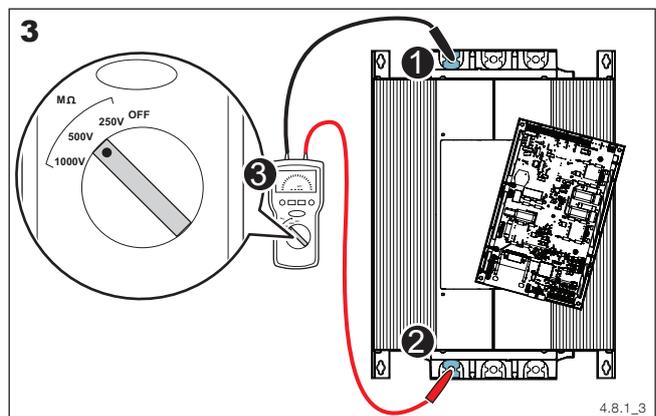
Mark the SCR cables with 1, 2, 3 prior to disconnecting them to ensure proper re-connection. Note that markings are to be made in accordance with existing data available on the PCBA bracket.

- ① Disconnect the three SCR cables from their terminals on the PCBA using a long-nose plier.
- ② Pull out the three SCR cables from the cable inlets on the PCBA bracket.



3. Connect the Megger to the Softstarter

- ① Connect the black megger contact to the main terminal 1L1 on the Softstarter.
- ② Connect the red megger contact to the main terminal 2T1 on the Softstarter.
- ③ Set the megger on 500V. Press and hold the Test button. Note the result.



Also use 500V for 690V softstarters.

4. Switch the Megger cables

Switch the connection according to figure 6:

- ❶ Connect the red megger contact to the main terminal 1L1 on the Softstarter.
- ❷ Connect the black megger contact to the main terminal 2T1 on the Softstarter.
- ❸ Set the megger on 500V. Press and hold the Test button. Note the result.

Repeat step

5. Connect the Megger to the Softstarter and

6. Switch the Megger cables

on the two remaining phases between 3L2 - 4T2 and 5L3 - 6T3.

5. Detect a shorted SCR

The three different phases will give six values. If any of the values shows lower than 1 Mohm there is probably a shortage. Proceed with changing the SCR, see chapter 4.7.1 Change the SCR.

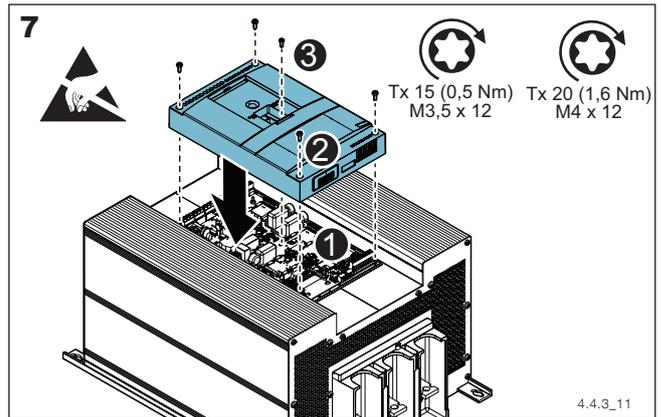
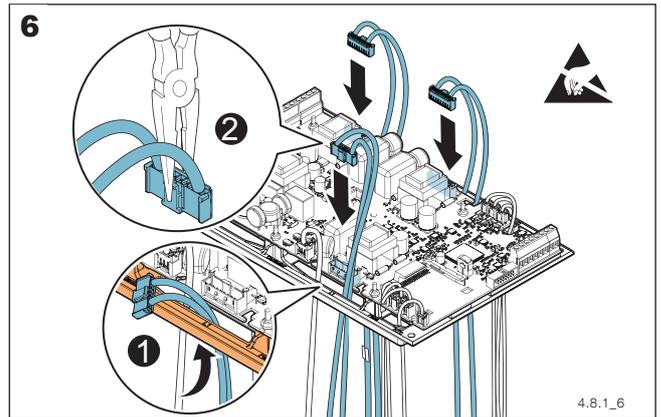
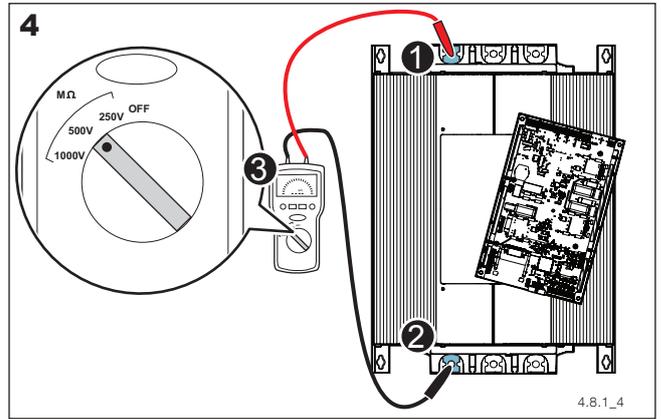
6. Connect SCR cables to PCBA

When reconnecting cables; read markings on the PCBA bracket.

- ❶ Thread all three SCR cables through the cable inlets on the PCBA bracket.
- ❷ Connect the three SCR cables, according to previously made markings (1, 2 or 3), to their terminals on the PCBA.

7. Place front cover

- ❶ Place back the PCBA and the bracket on the Softstarter.
Place the front cover on the unit and align it to the plastic screw sleeves located on lower housing.
- ❷ Fasten the front cover with (4x)  **Torx 20 4,0 x80/10 (1,6Nm).**
- ❸ Fasten (1x)  **Torx 15 M3,5x12 (0,5 Nm)** on the HMI bracket.



REASSEMBLE THE SOFTSTARTER

Connect main power cables and control cables

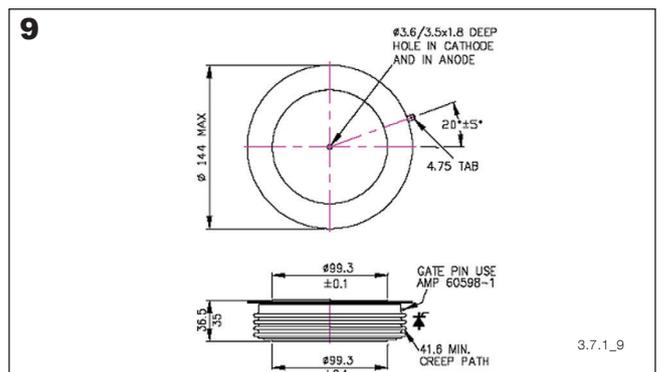
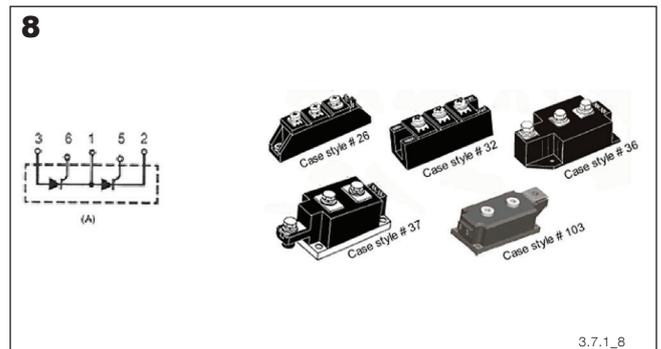
Connect the main power cables and the control cables as described in **chapter 4.3.4, step 1-2.**

8. Examples of SCR for PSTX

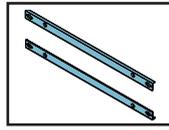
Figure 8 shows typical types of SCR blocks used in PSTX210...370. The manufacturing type can be both IXYS (black housing) and Semikron (white housing).

9. Examples of SCR for PSTX

For Softstarters type PSTX470...570 we are using SCR of capsule types. **See figure 9.** Depending on type and size, these can show different values when checking them up. Please not that this type of SCR has to be correctly mounted when tested to get the correct result.



4.9 Change the Stays (For type PSTX470...570)



This chapter describes how to change the Stays.



CAUTION

Always make sure that the power supply is switched off before doing maintenance on the Softstarter.



WARNING

When performing maintenance on the Softstarter, an antistatic strap must be used. The antistatic strap should be worn on the wrist, and be connected to an electrical ground, to prevent electrostatic discharge (ESD) damage to the Softstarter.



WARNING

The life span of electronics can be affected by damage caused by electrostatic discharge. This can happen if a charged tool or person touches a component. Therefore it is very important that all tools and personnel are discharged by touching an earthed point before the PCBA or any of the components are touched. It is equally important to discharge the package with the new component before opening it.

A person walking on a carpet can be charged with up to fifteen thousand volt (15000V). Compare this with the fact that some sensitive components can be destroyed when discharged on a much lower level (about 100V). We kindly ask you to pay notice to this, as this is a vital point in order to ensure the life span and function of the product.

Tools:

- Torx 30 for removing the stays

4.9.1 Change the Stays



DISMANTLE THE SOFTSTARTER

Remove main power cables and control cables

Disconnect the main power cables and the control cables as described in **chapter 4.3.3, step 1-3**.

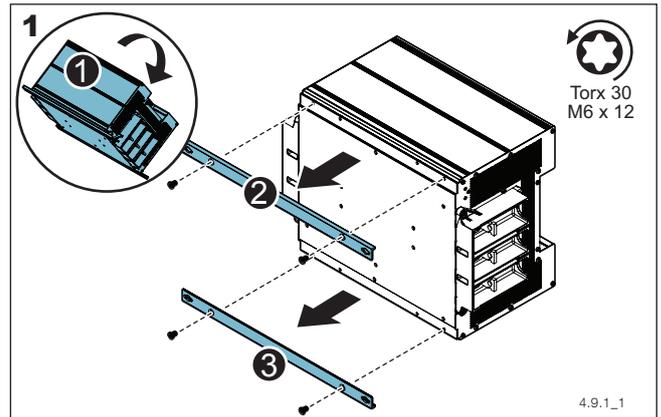


CAUTION

Use protective gloves when working with stays to prevent cutting injuries.

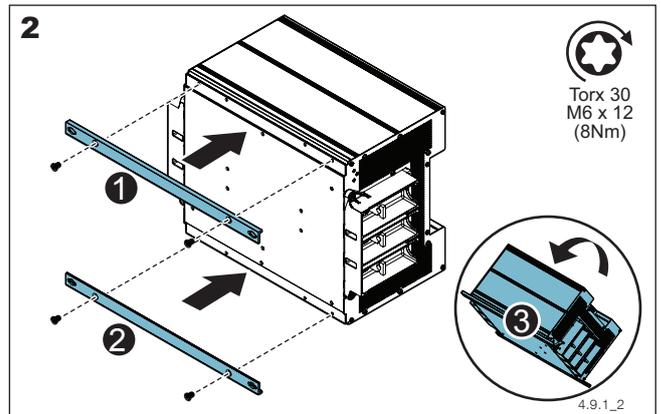
1. Remove left and right stays

- 1 Rotate the Softstarter to the right.
- 2 Loosen (2x) Torx 30 M6x12 and remove the left stays.
- 3 Loosen (2x) Torx 30 M6x12 and remove the right stays.



2. Place the Stays

- 1 Place the new left stays on the Softstarter. Fasten the left stays with (2x) Torx 30 M6x12 (8Nm).
- 2 Place the new right stays on the Softstarter. Fasten the right stays with (2x) Torx 30 M6x12 (8Nm).
- 3 Rotate the Softstarter to the left.



REASSEMBLE THE SOFTSTARTER

Connect main power cables and control cables

Connect the main power cables and the control cables as described in **chapter 4.3.4, step 1-2**.

5 Wiring Diagrams

5.1 Circuit diagram PSTX

5.1.1 Circuit diagram

PSTX30...PSTX1250 (IEC version) 82

5.1.2 Circuit diagram

PSTX30...PSTX1250 (UL version) 82

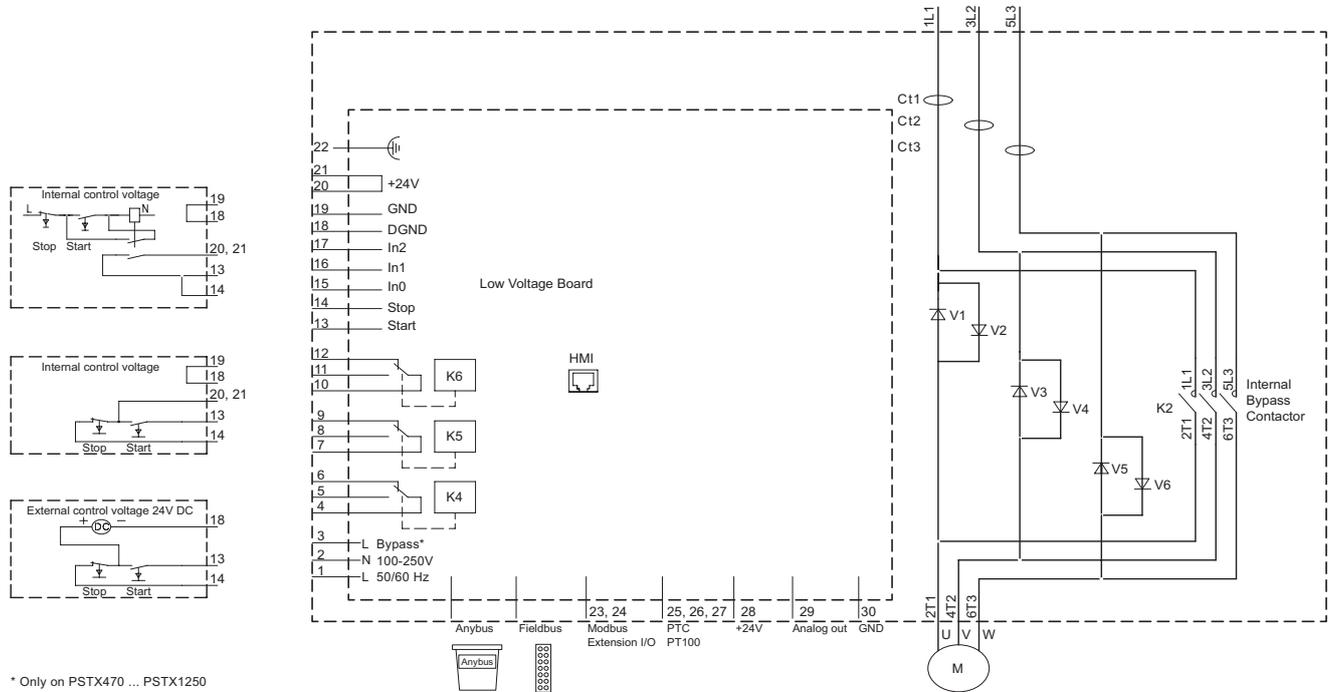
5.1 Circuit diagram PSTX

5.1.1 Circuit diagram PSTX30...PSTX1250 (IEC version)



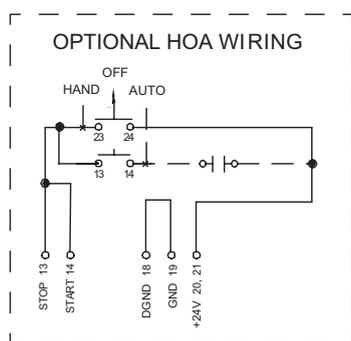
CAUTION

Terminal 22 is a function earth, it is not a protection earth. It shall be connected to the mounting plate.

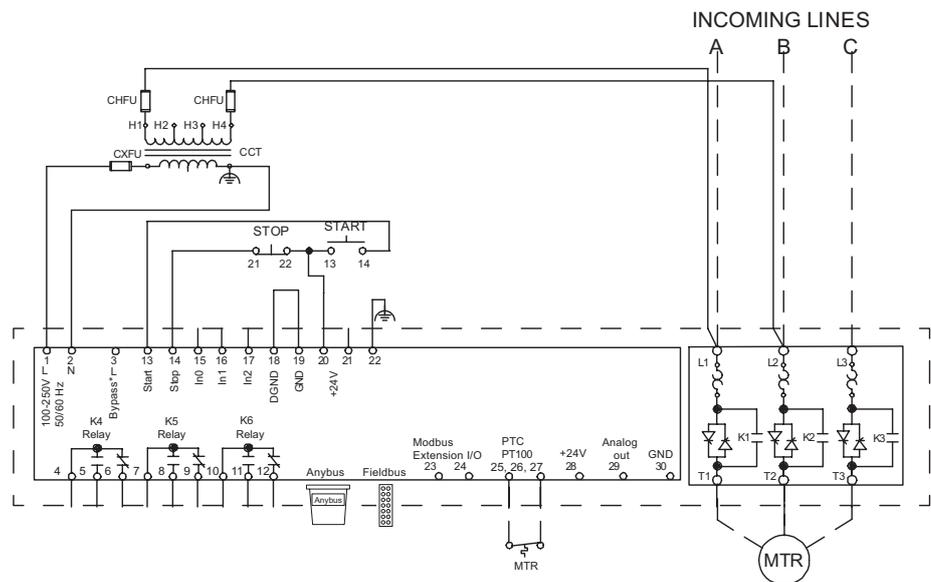


* Only on PSTX470 ... PSTX1250

5.1.2 Circuit diagram PSTX30...PSTX1250 (UL version)



* Only on PSTX470 ... PSTX1250



6 Revisions

The following revisions is done on this document:

Table 5

Document number	Revision	Chapter	Description	Date
1SFC13105M0201	A		First release	2015-12-07
1SFC13105M0201	B	1, 3 and 4	Updates	2017-06-30
1SFC13105M0201	C		Updates	2021-04-23

ABB Electrification Sweden AB

Smart Power - Motor Starting & Safety
SE-721 61 Västerås, Sweden

<https://solutions.abb/softstarters>

