Softstarter

Changing of Thyristors and Bypass Relay/Contactor PSE18…370

1SFC132064M0201 Rev B April-16

PSE18…370

Contents

Safety information

 Warning! A qualified electrician must carry out installation, commissioning and service on the product by following installation standards and regulations. The product user hazardous voltage that can cause death or serious injury. Always disconnect power before working on equipment. Do not touch terminals when voltage is applied, output terminals can have live voltage even when the device is in off position. The product should only be used within the specified ratings. Check that you have the correct product in regards to mains voltage, supply voltage and rated product data.

 Varning! Installation, idrifttagning och service av denna produkt skall endast utföras av behörig el-personal. Säkerhets- och installationsnormer skall följas. Produkten använder livsfarlig spänning, innan arbete utförs ska alltid spänningen frånskiljas. Rör inga anslutningar när produkten är spänningssatt, anslutningarna är spänningssatta även när produkten är i frånläge. Produkten skall endast användas inom dess specifierade data, kontrollera den gentemot huvudspänning, kontrolspänning och övriga märkdata.

 Warnung! Installation, Inbetriebnahme und Service dieses Produktes darf nur durch qualifiziertes Fachpersonal unter Beachtung der nachfolgenden Hinweise und Erklärungen erfolgen. Die in dem Gerät vorhandenen Spannungen können bei Berührung zu tödlichen oder ernsthaften Verletzungen führen. Vor Arbeiten an dem Gerät ist grundsätzlich die Versorgung abzuschalten. Bei Anliegen der Versorgungsspannung dürfen keine Klemmen berührt werden, an den Ausgangsklemmen kann auch bei ausgeschaltetem Gerät eine gefährliche Spannung anliegen. Der Einsatz des Gerätes darf nur innerhalb der spezifizierten Bedingungen erfolgen. Überprüfen Sie vor Einsatz, dass die Geräetype bezüglich Versorgungsspannung, Schaltspannung und sonstiger Daten den Anforderungen entspricht.

 Avvertenza! L'installazione, la messa in servizio e la manutenzione di questo prodotto devono essere effettuate solo da un elettricista qualificato, seguendo fedelmente le disposizioni in materia di installazione e sicurezza. Il prodotto utilizza tensioni pericolose che possono causare gravi danni o morte. Scollegare sempre l'alimentazione prima di accedere all'apparecchio. Non toccare mai i terminali quando l'apparecchio è sotto tensione: i terminali di uscita sono in tensione anche quando l'apparecchio è SPENTO. Prima dell'istallazione; verificare di aver scelto il prodotto corretto specialmente in termini di tensione di alimentazione, principale ed ausiliaria, ma più in generale per tutte le caratteristiche tecniche. Il prodotto va utilizzato solo nelle condizioni specificate.

 **警告!** 产品的安装、调试及运行必须由具备资质的专业电工遵照相关标准及安全规范完成。
产品使用能致命或引起严重伤害的危险电压。在产品上进行操作时务必断开电源。通电时不可接 触接线端子，产品关断后输出端子仍有 电压。产品仅能按照规定额定值使用。检查主回路电压，控制回路电压及其它产品参数符合产品规定。

 Avertissement! Un électricien qualifié doit éxecuter l'installation, la mise en service et l'entretien de ce produit en suivant les normes d'installation et les règles de sécurité. Le produit utilise une tension dangereuse qui peut causer la mort ou des blessures graves. Toujours débrancher l'alimentation avant de travailler sur l'équipement. Ne teuchez pas les prises de raccordements lorsqu'une tension est appliquée, les prises de raccordements de sortie auront toujours une tension résiduelle, même si l'appareil est sur OFF.
Le produit doit être seulement utilisé dans les calibres spécifiées. Vérifiez que vous avez le bon produit en ce qui concerne la tension du secteur, la tension d'alimentation nominale et les données produits.

 **Осторожно!** Установка, ввод в эксплуатацию и обслуживание данного оборудования должны производиться квалифицированным персоналом, специально допущенным к таким работам, в соответсвии с действующим законодательством и требованиями предъявляемыми к обслуживанию электроустановок и обеспечению безопасности. В изделии используется опасное для человека напряжение, которое может привести к смерти или серьезным травмам. Всегда отключайте напряжение перед началом любых работ на оборудовании. Не дотрагивайтесь до клемм и токоведущих частей когда приложено напряжение. На выходных клеммах может быть напряжение даже если прибор выключен. Прибор должен использоваться строго в соответствии с заявленными параметрами. Проверьте, что прибор подобран правильно и номинальные параметры находятся в соответствии с силовым напряжением и напряжением управления.

تحذير! يسمح فقط للفني أو المهندس الكهربائي المختص للقيام بأعمال الترآيب و التجهيز و الصيانة لهذا النوع من ا لاجهزة وذلك من خلال اتباع انظمة التوصيل والترآيب الكهربائية العلامية وشروط السلامة المعتمدة.
هذا النوع من الأجهزة يستخدم جهد خطر قد يؤدي لحدوث الاصابة أو الوفاة . دائما افصل مصدر التيار قبل بدء العمل على الجهاز . لاتلمس أطراف التوصيل عندما يكون هنلاك جهد مطبق للأن مخارج أطراف التوصيل تحتفظ بلاجهد حتى بعد فصل مصدر الجهد. هذا الجهاز يجب استخدامه مع ما يناسبه من قيم محددة . تأآد دائما من حصولك على الجهاز المناسب لمصدر الفولتية والتردد والقيم المحددة للتيار .

1. ESD Warning

Please note!

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 printed circuit board 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 of the product.

2. Tools

Small screwdriver for removing the cover.
Torx screwdriver Tx20
Torx screwdriver Tx25
Torx screwdriver Tx30
Torx screwdriver Tx40
Allen key 4mm
Allen key 8mm
Torque wrench 3 - 12 Nm

3. Step by step

1. **Before disconnecting any cables - mark it so you can put it back in same location.**

2. **All screws with built-in conical spring washers and single conical spring washers which are removed shall be exchanged to new unused ones.**

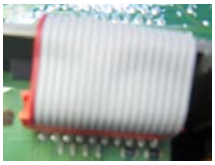
3. Disconnect all cables from the terminals 1 through 14, external keypad and the fieldbus plug accessory.

4. Disconnect the cables from 1L1, 3L2, 5L3, 2T1, 4T2, 6T3. For PSE18…105 remove the connection unit.

5. Detach the HMI module with a small screwdriver.

6. **Discharge the tools and yourself by touching earth (if you are not earthed).**

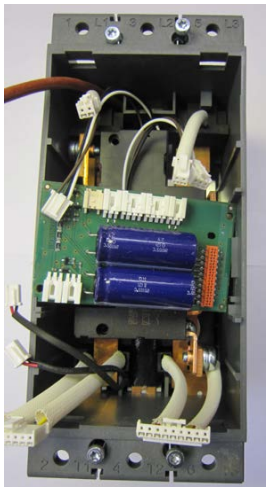
7. Disconnect the gate cables from the main-board.



8. Disconnect the ribbon cable from the sub-board.

9. For PSE210…370 disconnect the other cables between the main-board and the sub-board.

10. Remove the HMI module.

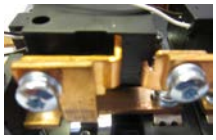


11. Disconnect all the cables from the sub-board.

12. Remove the sub-board from the middle part.

13. Remove the middle part (4-6 screws).

PSE18…105



Change of bypass relay / contactor.

PSE18…170

PSE142…170

14. Remove the screws which hold the relay.

15. If only the relay is broken, mount the new relay and go to step 38 to reassemble the unit.

16. If the thyristor is broken go to step 24.

PSE210…370

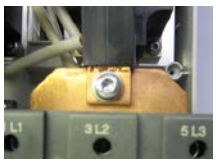
17. If the by-pass contactor is broken, remove the flexi bars which are connected to the copper bars on the broken contactor.

18. Remove the copper bar from the contactor.

19. Remove the cables from the coil terminals A1 and A2 and remove the contactor.

20. Mount the copper bar to the new contactor. It shall be mounted in the upper connection. Use the torque specified in **Table 1.**

21. Put the new contactor in place and mount the cables to the coil terminals A1 and A2.



22. Mount the copper bars on the contactor and then mount the flexi bars. Use the torque specified in **Table 1.**

23. If the thyristor is broken, go to step 31 otherwise go to step 38.

Change of thyristors

PSE18…170

24. Disconnect the copper bars from the broken thyristor then remove the thyristor.

25. Clean the contact surfaces on the heat sink and the tyristor module with ethanol. Use lint-free cloth (paper or linen cloth).

26. A very thin layer of heat transfer compound shall be put on the contact surfaces of the thyristor module with a lint-free cloth. Too much compound between the module and the heat sink will give bad thermal conduction and cause risk of overheating the thyristor.

27. Mount the new thyristor. Use the torque specified in **Table 1.**

28. Mount the gate connectors on the thyristor according to **"5. Connection of gate cable".**

29. Mount the bars on the thyristor and the bypass relays. Use the torque specified in **Table 1.**

30. Go to step 38.

PSE210…370

31. Disconnect the copper bars and the flexi bars from the thyristor.

32. Remove the broken thyristor.

33. Clean the contact surface on the heat sink and the thyristor module with ethanol.
Use lint-free cloth (paper or linen cloth).

34. A very thin layer of heat transfer compound shall be put on the contact surfaces of the thyristor module with a lint-free cloth.
Too much compound between the module and the heat sink will give bad thermal conduction and cause risk of overheating the thyristors.

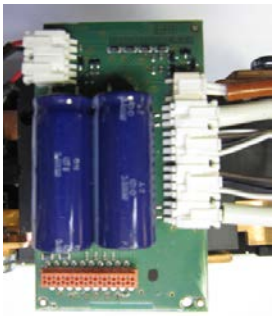
35. Mount the new thyristor. Use the torque specified in **Table 1.**

36. Mount the gate connectors on the thyristors according to **"5. Connection of gate cable".**

37. Mount the bars and flexi bars on the thyristor.

38. Mount the cables on the sub-board according to the fig below. It is very important that each cable is correctly mounted to the correct terminal.

PSE18…105



Fan

Temp. sensor
CT L1
Bypass L1

Bypass L3
CT L3

PSE142…170

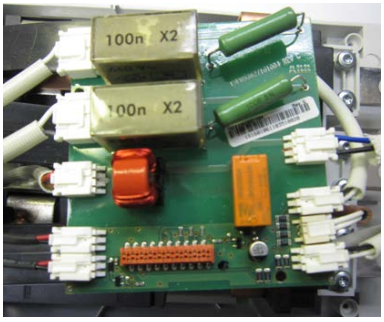
From thyristor L1

From thyristor L3

Fan

Temp. sensor
CT L1
Bypass
CT L3

PSE210…370



From thyristor L1

From thyristor L3

To bypass contactor

Fan

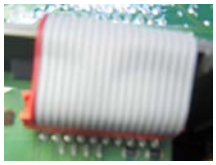
From Mainboard

CT L1
Temp. sensor
CT L3

39. Mount the middle part (4-6 screws).

40. Mount the sub-board into the middle part.

41. Connect the ribbon cable on the sub-boards.



42. Connect the gate cables to the main-boards.

43. For PSE210…370 connect the cable between the main board and the sub board.

44. Mount the HMI module.

45. For PSE18…105 mount the connection unit.

46. Connect the cables to 1L1, 3L2, 5L3 (main voltage) and 2T1, 4T2, 6T3 (motor connection).

47. Connect all the cables to the terminals 1 through 14, external keypad and the fieldbus plug accessory.

Ready for start!!

4. Table 1

Softstarter	Thyristor				Bypass		Flexi bar and copper bar connection	
	Mounting		Terminal connection		Terminal connection			
	Torque	Screw	Torque	Screw	Torque	Screw	Torque	Screw
PSE18…72	3Nm	M5 Tx25	3Nm	M5 Tx25	5Nm	M6 Tx30	-	-
PSE85…105	3Nm	M5 Tx25	5Nm	M6 Tx30	5Nm	M6 Tx30	-	-
PSE142…170	3Nm	M5 Tx25	5Nm	M6 Tx30	8Nm	M6 Tx30	7Nm	M6 Tx30
PSE210	3Nm	M5 Tx25	8Nm	M8 Tx40	8Nm	M8 Allen key 4 mm	7Nm	M6 Tx30
PSE250…370	3Nm	M5 Tx25	12Nm	M10 Allen key 8 mm	8Nm	M8 Allen key 4 mm	7Nm	M6 Tx30

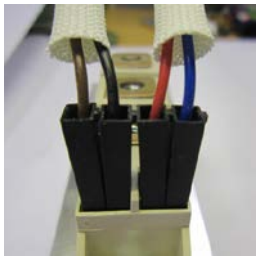
5. Connection of gate cable

PSE18…72

IXYS

G K K G

Semikron



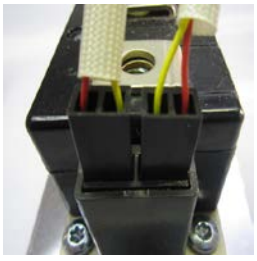
G K G K

PSE85…170

All manufactures

G (Yellow) G (Yellow)
K (Red) K(Red)

PSE210



K G G K

PSE250…370

G (Yellow) G (Yellow)
K (Red) K(Red)

All gate cables are coded for PSE85…370.

6. Screws with built-in conical spring washers and single conical spring washers.

To be exchanged when changing one broken thyristor.

Pieces to change

Softstarters	M5x10 Tx25	M6x12 Tx30	M8x16 Tx40	6,4x14	13x29
PSE18…72	3	4	-	-	-
PSE85…105	-	7	-	-	-
PSE142…170	-	3	-	6	-
PSE210	-	-	3	2	-
PSE250…370	-	-	-	2	3

To be exchanged when changing broken bypass relay / contactor.

Pieces to change

Softstarters	M5x10 Tx25	M6x12 Tx30	M8x16 Tx40	6,4x14	13x29
PSE18…72	-	2	-	-	-
PSE85…105	-	2	-	-	-
PSE142…170	-	-	-	4	-
PSE210	-	-	-	2	-
PSE250…370	-	-	-	2	-

ABB AB Control Products
SE-721 61 Västerås, SWEDEN
Telephone +46 21 32 07 00
TELEFAX +46 21 12 60 01
www.abb.com/lowvoltage