

VACON[®] NX
AC DRIVES

**DC FAN WITH EXTERNAL SUPPLY
RETROFIT KIT**

INSTALLATION INSTRUCTIONS

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Document ID: DPD01926

Revision: A

Revision release date: 24.04.2017

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1. INTRODUCTION

This document introduces new fan cooling systems to existing NX drives in the range of FR9-14. The AC main fans will be updated to DC fan cooling systems. The efficiency of the fans is stated in the European Union directive (ErP) which all products now fulfill.

1.1 REASON FOR THE FAN CHANGE

The aim of the ErP Directive (Energy related Products Directive) is to protect the environment by increasing the total share of renewable energy in the EU to 20% by 2020 and by increasing energy efficiency by 20%. The ErP implementation measure for fans defines the minimum efficiency for fans in the 125W to 500kW power range.

The ErP Directive is being implemented in 2 steps: in 2013 Step 1, and in 2015 Step 2 become effective. The minimum efficiency requirement placed on the system efficiency is the prerequisite for a CE mark and is thus mandatory for utilisation in EU member states.

The directive does not require replacement of systems put into operation before the ErP start date. There is a period of transition for replacement fans, meaning, non-compliant fans may be installed as retrofits up to 31.12.2014. Starting from 01.01.2015 however, these also have to comply with the ErP requirements.

The ErP Directive is limited to the EU member states. However, importers in these countries are also required to meet the requirements.

All new drives with AC main fans which are affected by the ErP directive will be changed to DC fan cooling systems by the end of year 2012. Current AC fan spare part kits have been replaced by fully compatible DC fan kits. AC fan kits will still be available for a limited time but no longer than 2014.

1.2 COMPATIBILITY

The DC fan retrofit kits are available for NX drives in the range of FR9-FR14. Kits for inverter and NFE units in this range are also available. See Table 1 on page 3 for a complete list of available DC fan retrofit kits and their corresponding spare part numbers.

Retrofitting a DC fan supply system requires replacing the AC fan and external AC power supply with a DC fan and external DC power supply. Both the DC fan and external DC power supply must be installed at the same time, neither of them is compatible with the AC fan or external AC power supply. Do not install DC and AC fans in the same drive!

Table 1. DC fan retrofit kits

Retrofit kit	Spare part number
DC fan retrofit assembly kit for FR9	SPR-MEC27417
DC fan retrofit assembly kit for FR10	SPR-MEC27421
DC fan retrofit assembly kit for FR11	SPR-MEC23670
DC fan retrofit assembly kit for FR12	SPR-MEC27424
DC fan retrofit assembly kit for FR13 (FI13+2xNFE)	SPR-MEC25023
DC fan retrofit assembly kit for FR13 (FI13+3xNFE)	SPR-MEC25024
DC fan retrofit assembly kit for FR13 (FI13+4xNFE)	SPR-MEC25025
DC fan retrofit assembly kit for FR14 (FI14+3xNFE)	SPR-MEC25034
DC fan retrofit assembly kit for FR14 (FI14+4xNFE)	SPR-MEC25035
DC fan retrofit assembly kit for NFE	SPR-MEC26388
DC fan retrofit assembly kit for FI9	SPR-MEC23728
DC fan retrofit assembly kit for FI10	SPR-MEC23731
DC fan retrofit assembly kit for FI12	SPR-MEC23645
DC fan retrofit assembly kit for FI13	SPR-MEC25038
DC fan retrofit assembly kit for FI14	SPR-MEC25040

1.3 SAFETY NOTES

WARNING!



After disconnecting the AC drive from the mains, **wait** until the fan stops and the indicators on the keypad go out (if no keypad is attached see the indicators on the cover). Wait 5 more minutes before doing any work on the connections of drive. Do not open the cover before this time has expired. After expiration of this time, use measuring equipment to absolutely ensure that no voltage is present. **Always ensure the absence of voltage before starting any electrical work!**



WARNING!

Make sure that the AC drive is not connected to mains while the cover is open and the drive is being worked on.



CAUTION!

Only qualified trained service personnel are allowed to use this material and perform any of the service actions mentioned. The personnel performing local service work on the drives must have qualifications that are in accordance with their national laws.



CAUTION!

Remember to use ESD protection at all times when working with electronic components of the AC drive.

2. FI9 RETROFIT KIT INSTALLATION

2.1 RETROFIT KIT CONTENTS

Table 2. FI9 DC fan retrofit assembly kit (SPR-MEC23728) part list

#	Item number	Item description	Pcs
1	70CPA00556	DC main fan assembly	1
2	70CMC05006	External DC fan supply assembly	1
3	70CPA03288	Asic cover and fan assembly	1
4	PP00033	Jumper connector	1
5	70CMC06723	FI9 DC power air guide	1
6	MC00031	Screw M4x8-DIN7500CE-Thread Forming-Zn-Pz	5
7	MC00046	Screw M5x10-DIN7500CE-Thread Forming-Zn-Pz	4
8	MC00178	3.6x205 white/black cable tie	5
9	MC00705	Cable tie holder	1
10	MC00016	Bushing rubber GD16	2
11	70CPL00062	'Product modified' -sticker	1

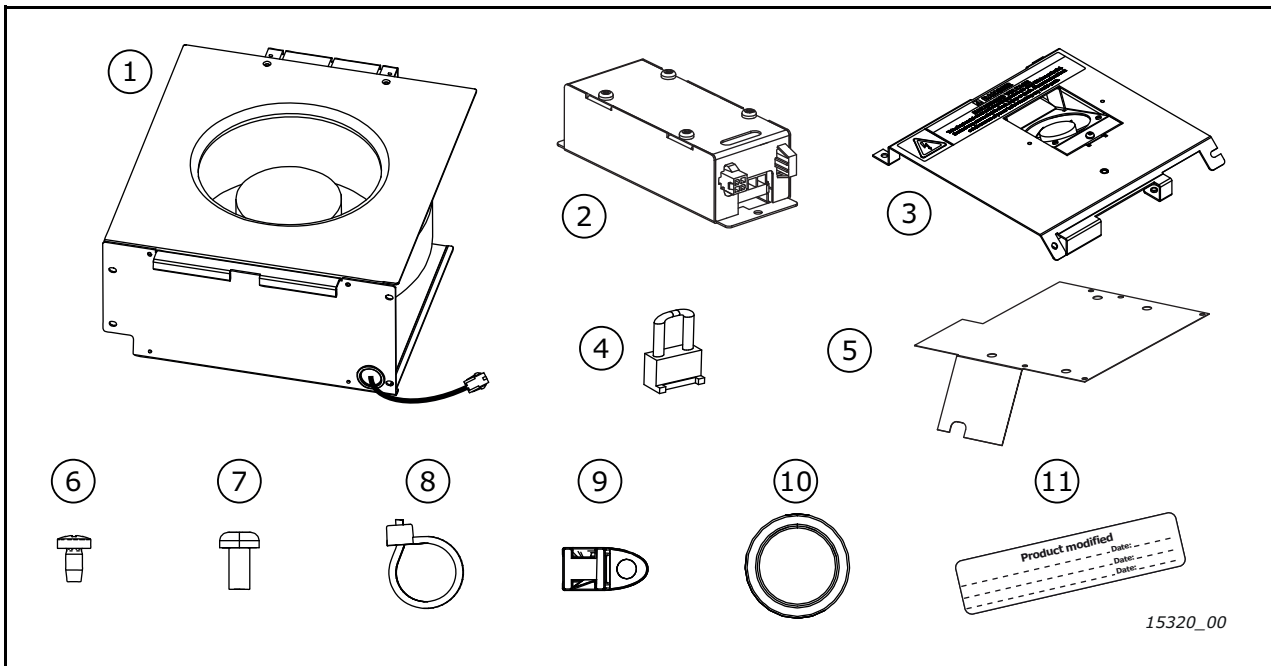


Figure 1. FI9 DC fan retrofit kit contents

2.2 REMOVING THE AC FAN AND EXTERNAL SUPPLY

Before installing the new DC fan and external DC power supply, remove the old AC fan and the external AC supply assembly. Parts to remove:

- AC fan and the external AC supply assembly
- Fan capacitor and bracket
- External fan capacitor wire set

1

Remove the connection and front covers. Release the four M5x16 mounting screws. Use bit PZ2 and torque 2 Nm.

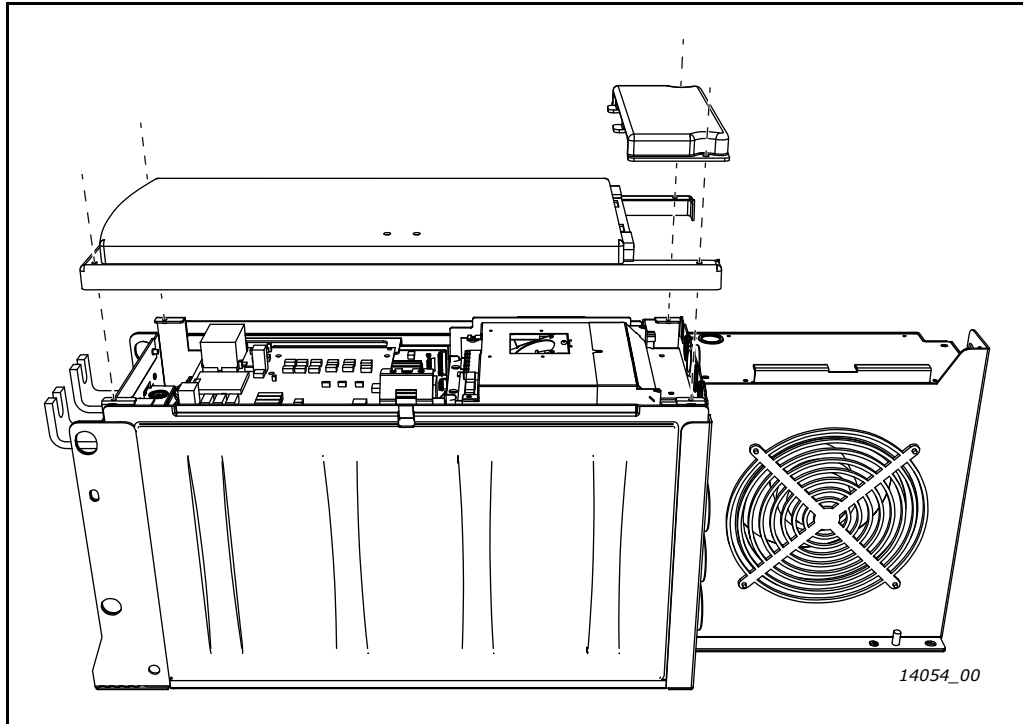


Figure 2. Removing the FI9 covers

2

Release the AC fan. First, disconnect the external fan capacitor wire (1) from the external AC supply box. Then, remove the four M5x10 mounting screws (2) with bit PZ2 and torque 3.5 Nm and pull out the fan.

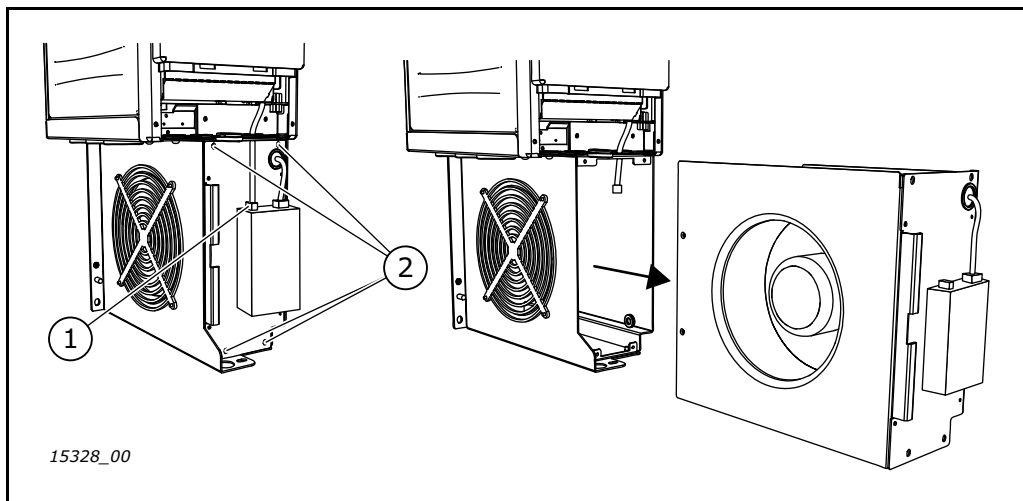


Figure 3. Removing the main fan and external AC power supply

3

Remove the asic assembly covers. Release them by removing the M4x8 combi screws. Use bit TX20 and torque 1.1 Nm.

NOTE! Notice the earthing wire under one of the cover mounting screws (marked with X in the figure below).

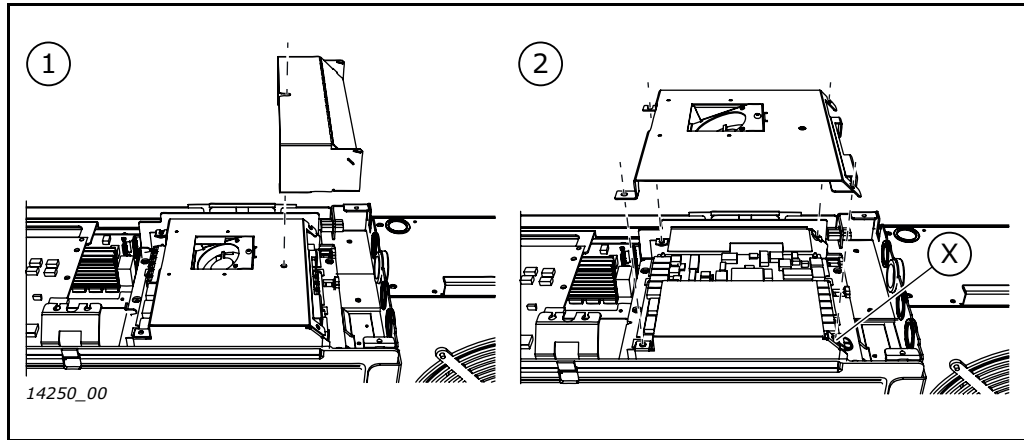


Figure 4. Removing the asic assembly covers

4

Remove the cable connector press from on top of the current measurement wires and driver-asic optical fibers.

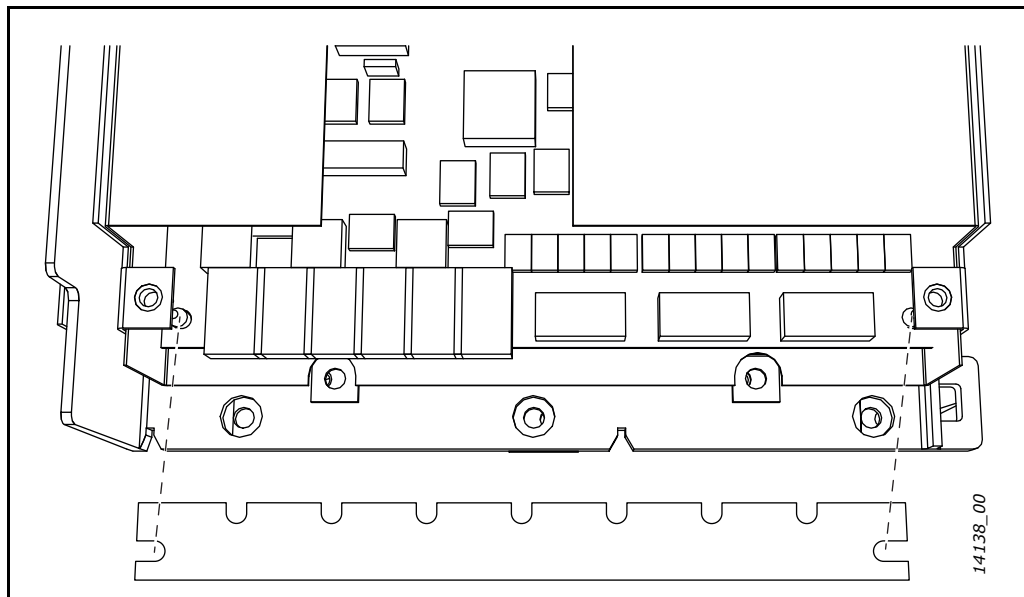


Figure 5. Cable connector press

5

Disconnect all wires from the ASIC board:

- control optical fibers (1-7)
- driver optical fibers (UH, UL, VH, VL, WH, WL)
- control 24 V_{DC} supply cable, connector X10
- ASIC internal fan wire, connector X1
- ASIC wire set, connector X6
- fan control wire, connector X11
- testing cable, connector X2
- current measurement cables, connectors X3, X4 and X5

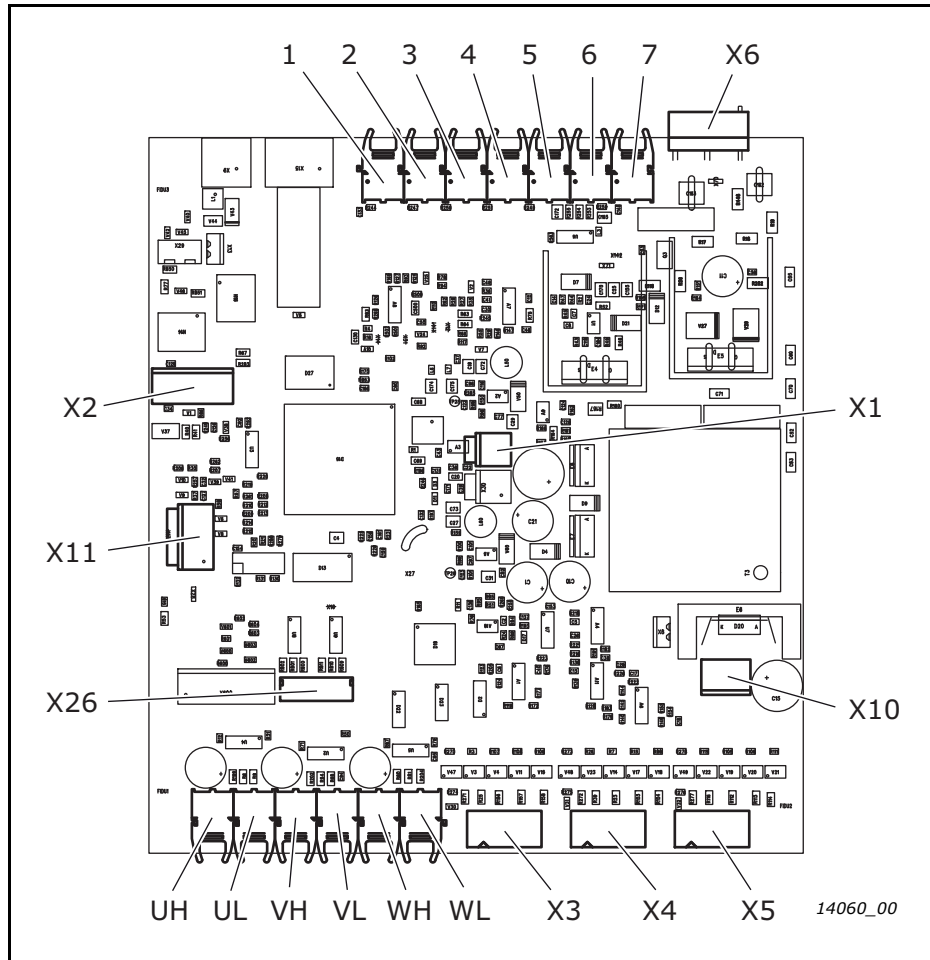


Figure 6. ASIC board connectors

6

Remove the Asic assembly from the drive. Release the four M4x8 mounting screws. Use bit PZ2 and torque 3.5 Nm.

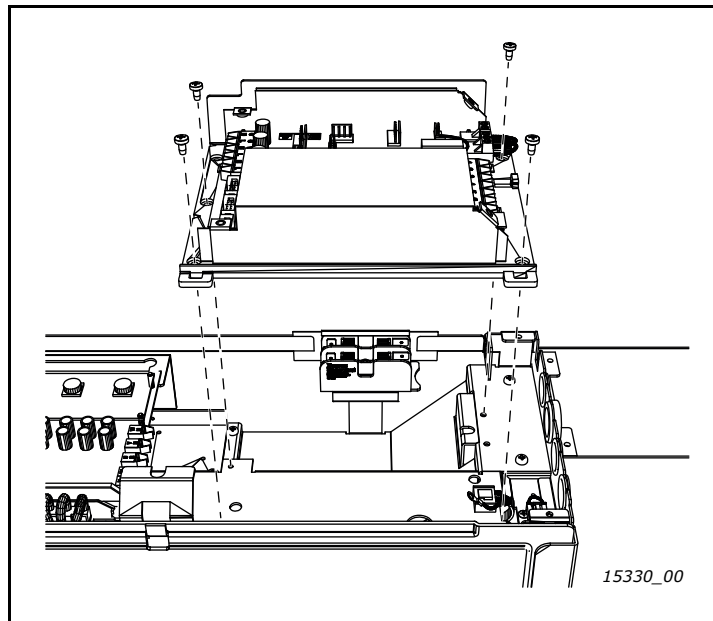


Figure 7. Removing the ASIC assembly

7

Disconnect all wires from the driver board:

- Optical fibers (UL, VL, WL, UH, VH, WH)
- Current measurement cable, connectors X13, X14, X15 and X32
- Measurement board flat cable, connectors X30 and X31
- Gate driver wire top transistor, connector X28
- Gate driver wire bottom transistor connector X29
- Driver power supply wires, connector X1

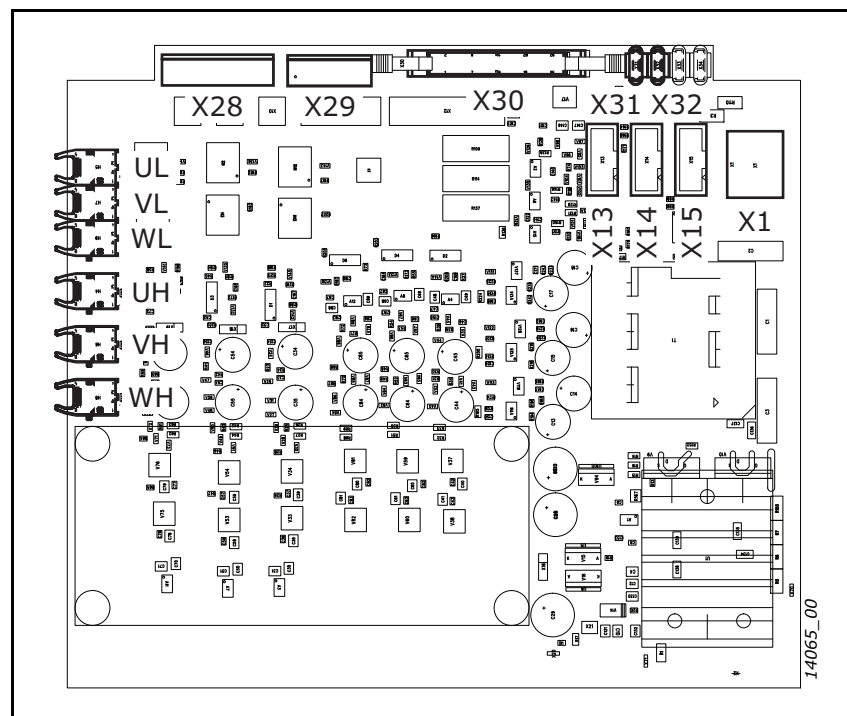


Figure 8. FI9 driver board connectors

8

Remove the four M4x12 mounting screws. Use bit TX20 and torque 0.7 Nm. Take off the connector holder and lift off the driver board.

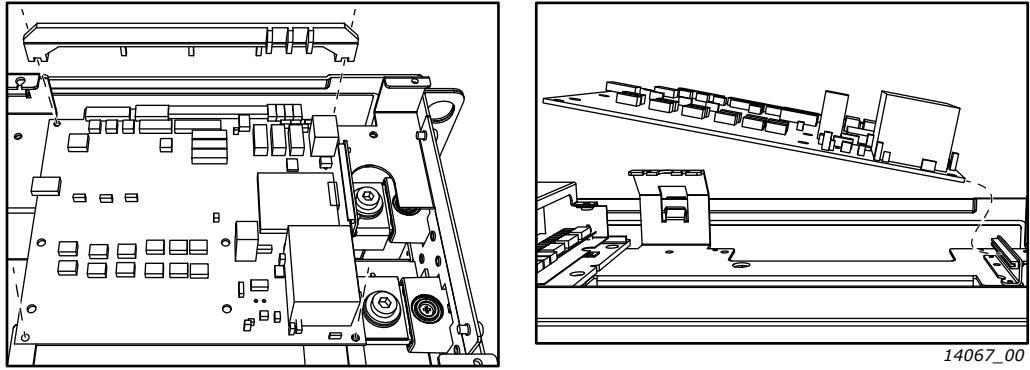


Figure 9. Driver board mounting. Notice the board holder.

9

Release the fan capacitor (1) from the capacitor bracket (2). Remove the mounting nut (3) with a 19 mm bit and torque 5 Nm.

Take off the capacitor bracket. Remove the M8x12 mounting screw. Use torque 20 Nm.

Also remove the external fan capacitor wire set (4).

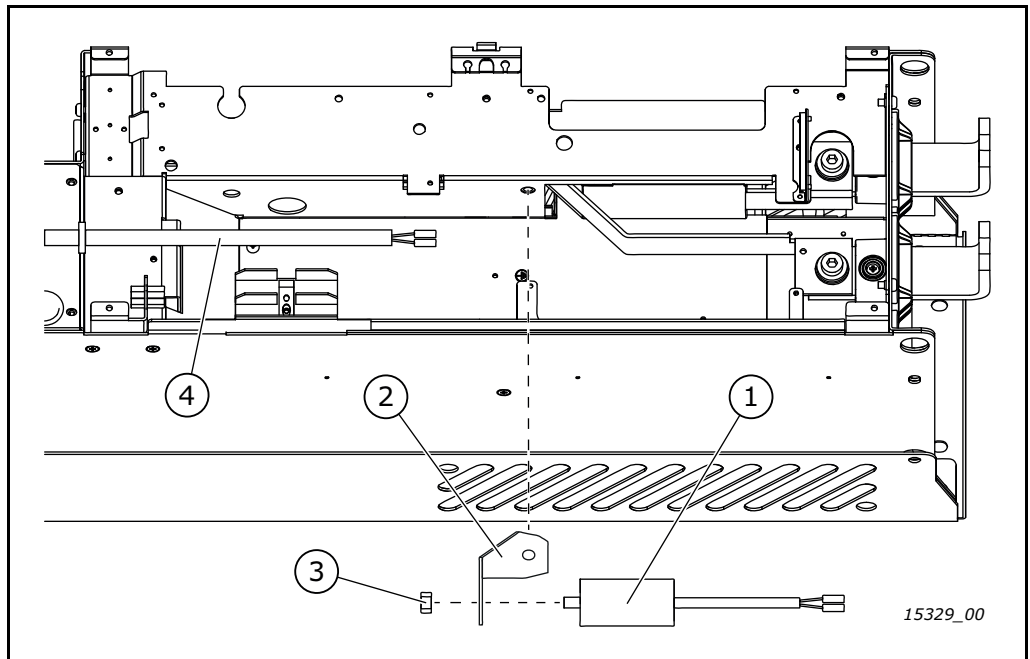
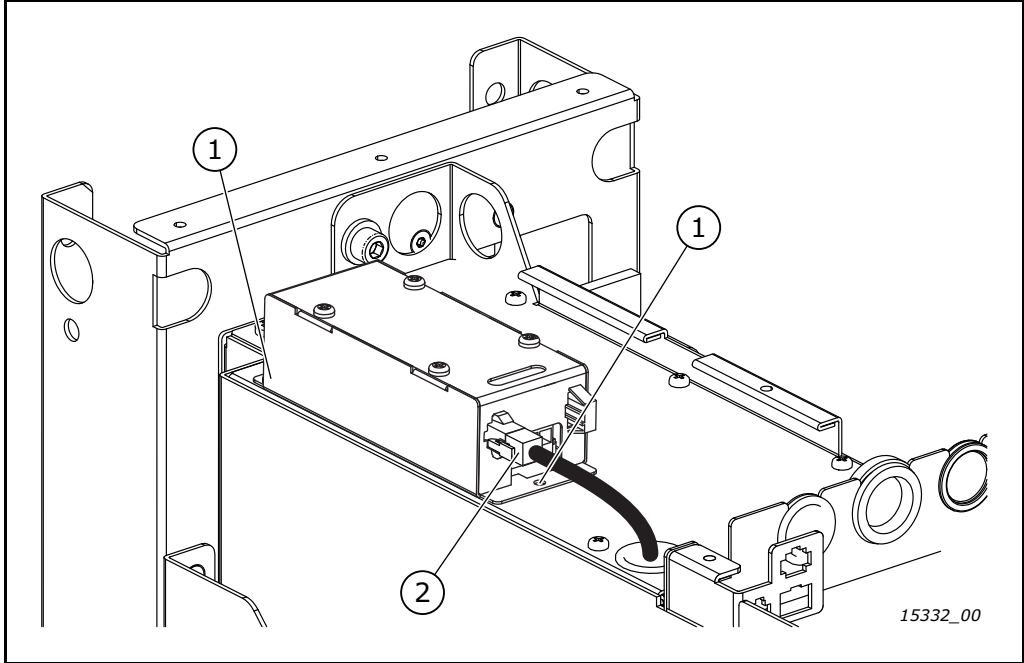
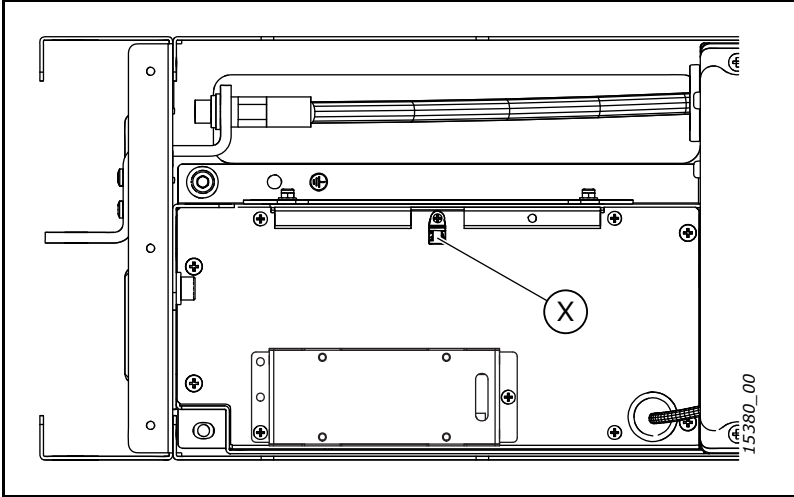


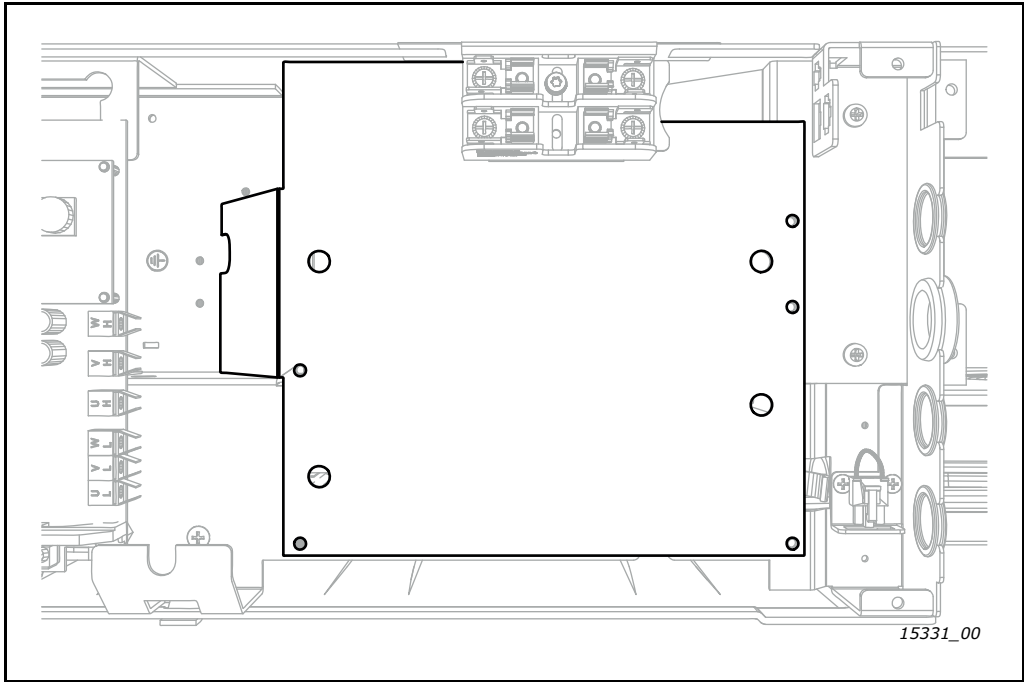
Figure 10. Removing the fan capacitor and bracket

2.3 DC FAN AND EXTERNAL DC POWER SUPPLY INSTALLATION

Once the AC fan and other old parts have been removed (see Chapter 2.2), install the DC fan and the external DC fan power supply assembly.

<p>1</p>	<p>Install the DC fan. The fan is mounted in the same way as the old AC fan (see Figure 3 on page 5). Use the four M5x10 mounting screws (MC00046) supplied in the retrofit kit.</p>
<p>2</p>	<p>Install the external DC fan supply assembly. Use the two M4x8 screws (1) included in the kit. Use a PZ2 bit and torque 3.5 Nm.</p> <p>Connect the power supply wire (2) from the fan to the external DC fan supply.</p>  <p style="text-align: right;"><i>15332_00</i></p> <p style="text-align: center;"><i>Figure 11. Installing the external DC fan supply</i></p>
<p>3</p>	<p>Install the cable tie holder on the frame next to the external DC fan supply assembly. Release M4x8 screw from the frame and use it to mount the holder. Use a TX20 bit and torque 1.1 Nm.</p>  <p style="text-align: right;"><i>15380_00</i></p> <p style="text-align: center;"><i>Figure 12. Installing the cable tie holder</i></p>

4 Install the DC power air guide under the Asic assembly.

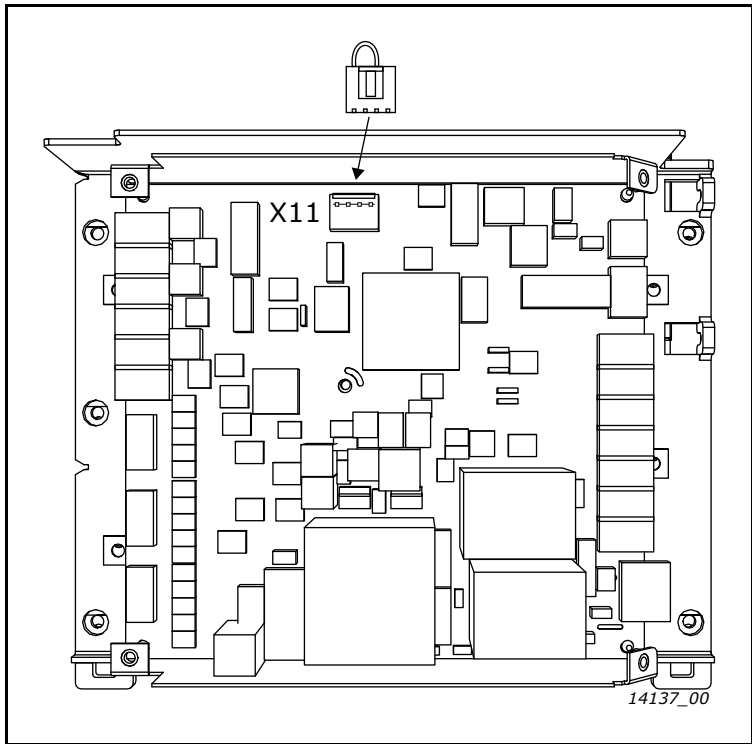


15331_00

Figure 13. Installing the DC power air guide

5 Re-attach the driver board and Asic assembly. Follow the instructions in Chapter 2.2 in reversed order.

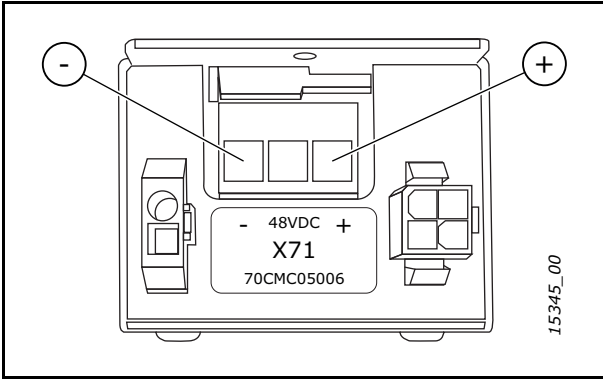
6 Install the jumper included in the kit on connector X11 on the Asic board.



14137_00

Figure 14. Installing the jumper connector on the Asic board

7 Install the new Asic cover and fan assembly. The cover is mounted in the same way as the old one (see Figure 4 on page 6).

<p style="text-align: center; font-size: 2em; font-weight: bold;">8</p>	<p>Connect an external 48 V_{DC} power supply on the terminal and check that the DC fan functions.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><i>Figure 15. External DC power supply terminal for the fan</i></p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">9</p>	<p>If the fan works properly, re-attach the covers on the drive. See Step 3 and Step 1 in Chapter 2.2.</p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">10</p>	<p>Attach the 'Product modified'-sticker supplied in the retrofit kit in a visible place on the front side of the drive. On the sticker, write "DC fan retrofit" and the installation date.</p>

3. NFE RETROFIT KIT INSTALLATION

3.1 RETROFIT KIT CONTENTS

Table 3. NFE DC fan retrofit assembly kit (SPR-MEC26388) part list

#	Item number	Item description	Pcs
1	70CPA00556	DC main fan assembly	1
2	70CMC05006	External 48 V fan supply assembly	1
3	70CPE05112	DC- additional wire kit	1
4	PP13053	External fan supply adapter	1
5	MC00016	Bushing rubber GD16	2
6	MC00051	Bushing rubber GD21	1
7	MC00031	M4x8-DIN7500CE-Thread Forming-Zn-Pz	4
8	MC00032	M4x8-DIN6900-3-Combi-Delta-TX 8.8	2
9	MC00046	M5x10-DIN7500CE-Thread Forming-Zn-Pz	4
10	MC00178	3.6x205 white/black cable tie	8
11	MC00705	Cable tie holder	1
12	70CPL00062	'Product modified' -sticker	1

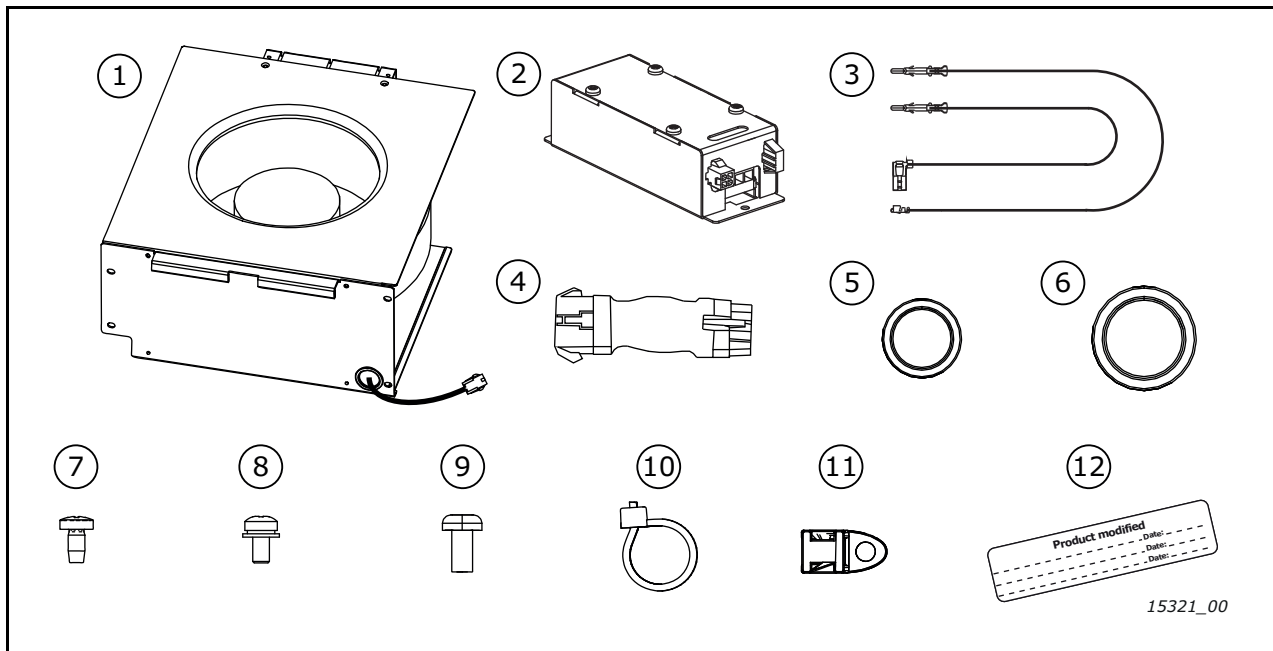


Figure 16. NFE DC fan retrofit kit contents

3.2 REMOVING THE AC FAN AND EXTERNAL SUPPLY

Before installing the new DC fan and external DC power supply, remove the old AC fan and the external AC supply assembly.

1

Remove the connection and front covers. Release the four M5x16 mounting screws. Use bit PZ2 and torque 2 Nm.

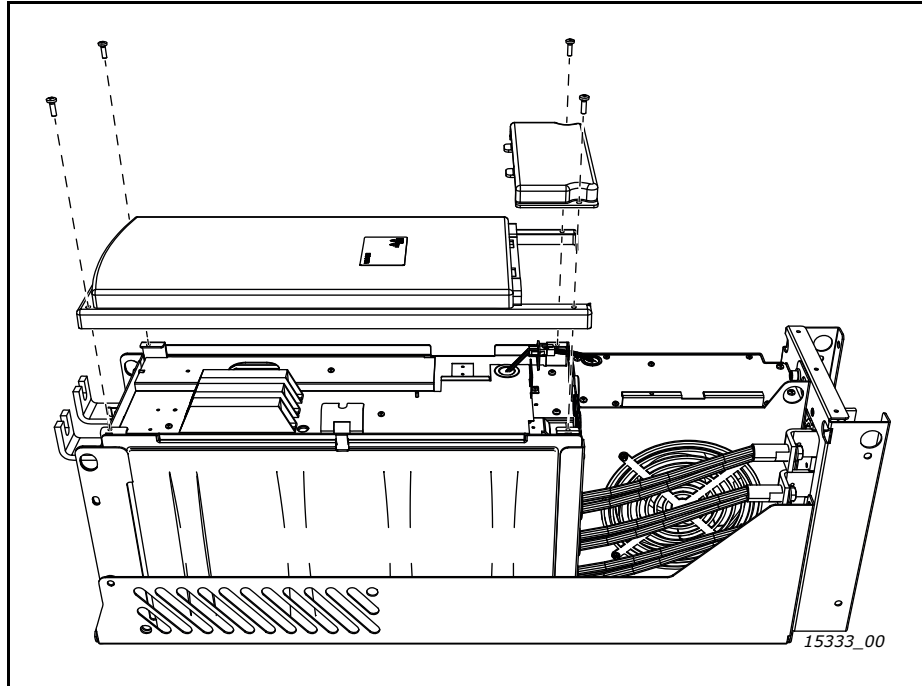


Figure 17. Removing the NFE front covers

2

If there are NFE units installed in parallel, disconnect and remove the AC link wire set from the external AC supply assemblies.

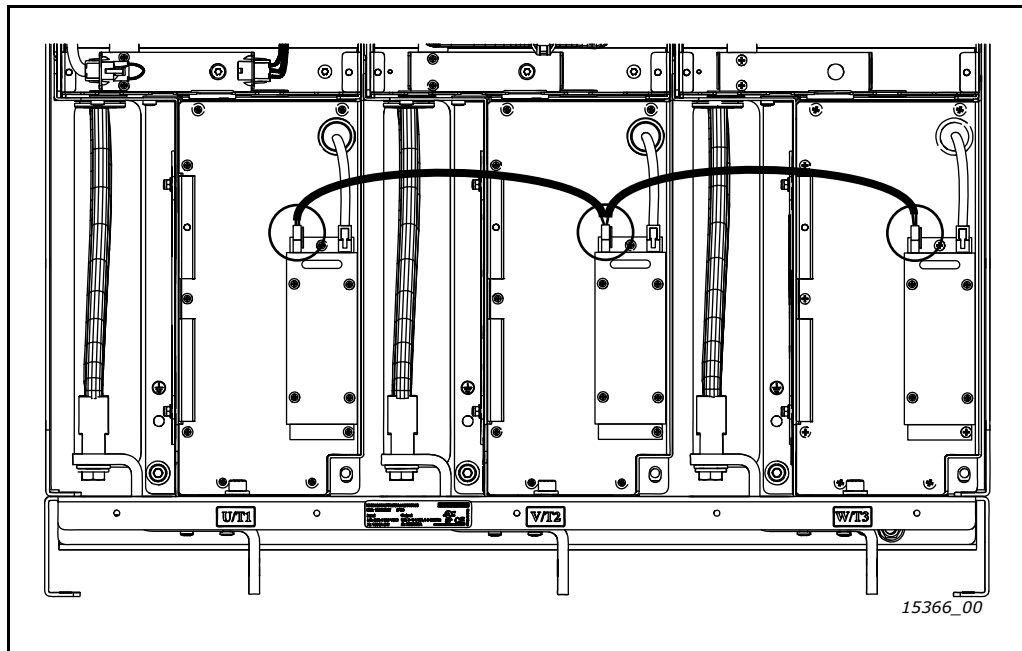


Figure 18. Removing the AC link wire set

3

Remove the AC fan. Remove the four M5x10 mounting screws with bit PZ2 and torque 3.5 Nm and pull out the fan.

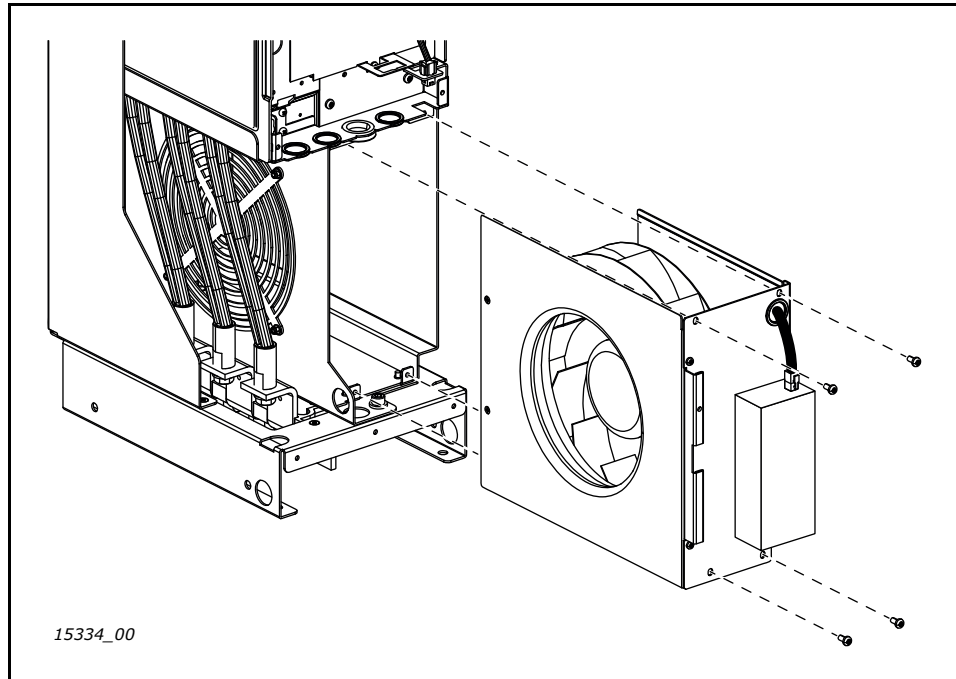
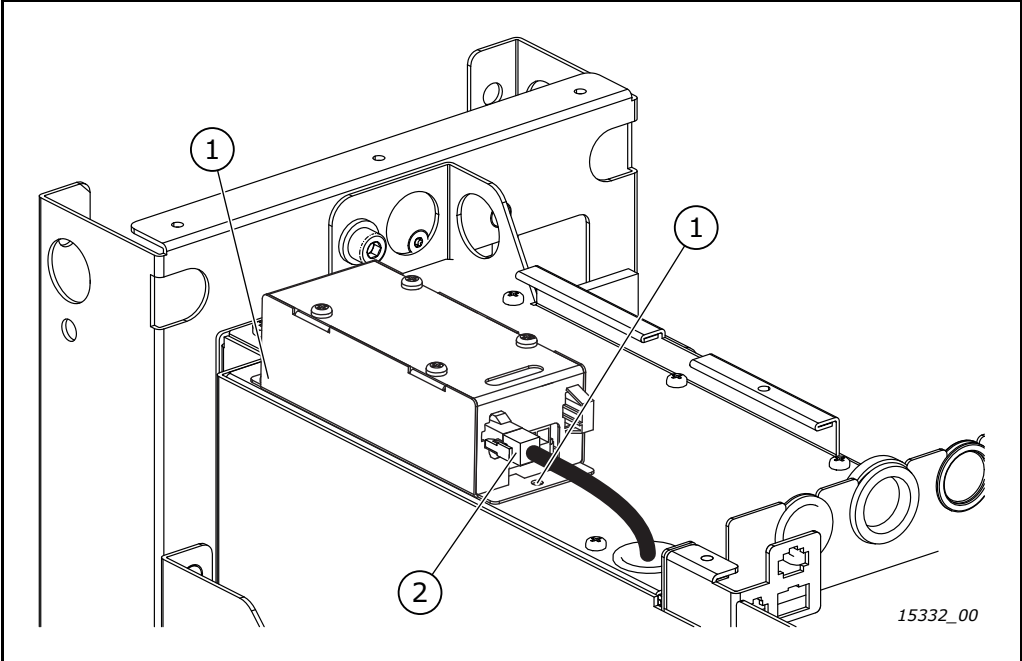
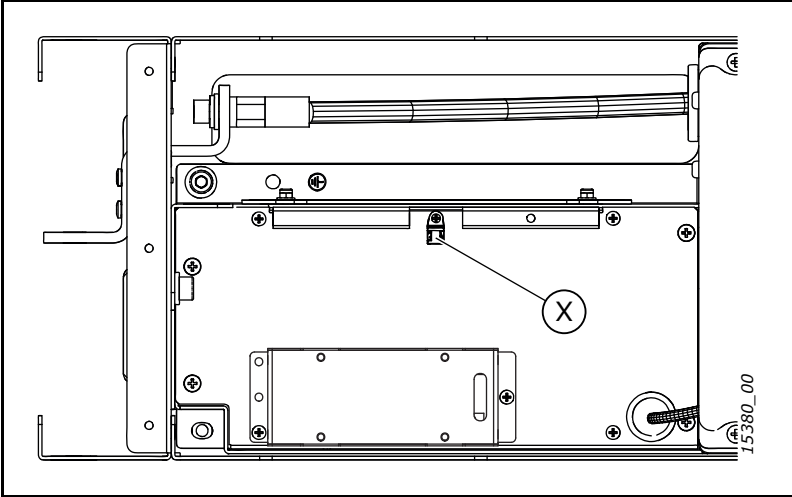
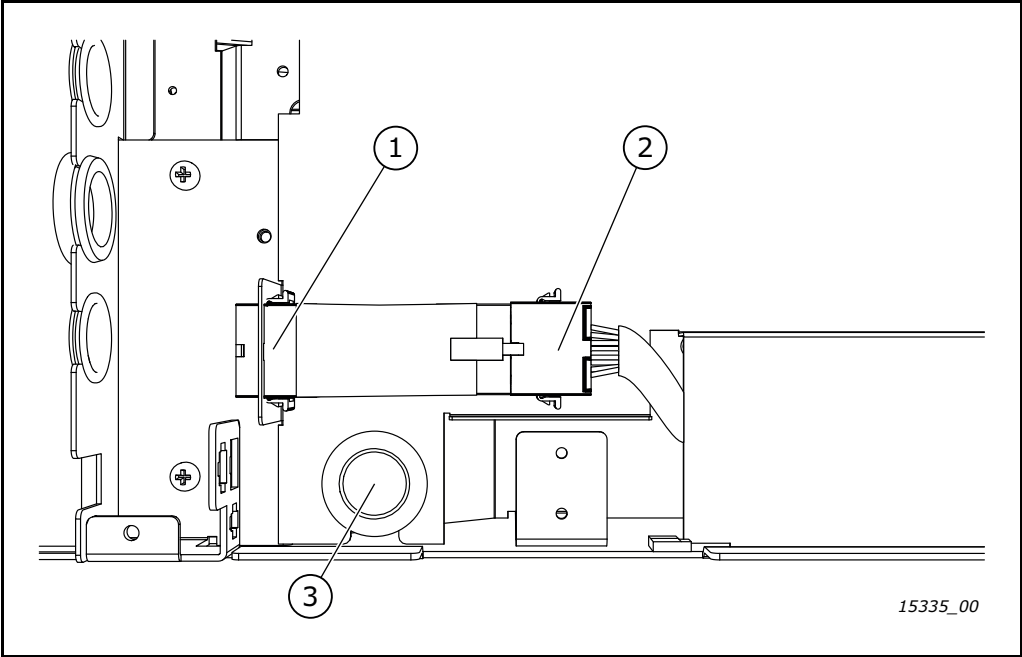
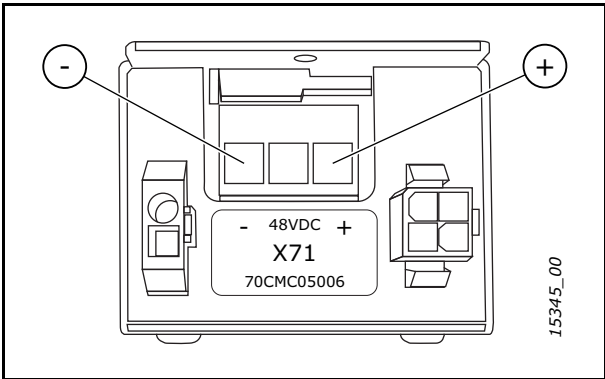


Figure 19. Removing the main fan and external AC power supply

3.3 DC FAN AND EXTERNAL DC POWER SUPPLY INSTALLATION

Once the AC fan and other old parts have been removed (see Chapter 3.2), install the new DC fan and external DC power supply.

<p>1</p>	<p>Install the DC fan. The fan is mounted in the same way as the old AC fan (see Figure 19 on page 15). Use the four M5x10 mounting screws (MC00046) supplied in the retrofit kit.</p>
<p>2</p>	<p>Install the external DC fan supply assembly. Use the two M4x8 screws (1) included in the kit. Use a PZ2 bit and torque 3.5 Nm.</p> <p>Connect the power supply wire (2) from the fan to the external DC fan supply.</p>  <p style="text-align: right;"><i>Figure 20. Installing the external DC fan supply</i></p>
<p>3</p>	<p>Install the cable tie holder on the frame next to the external DC fan supply assembly. Release M4x8 screw from the frame and use it to mount the holder. Use a TX20 bit and torque 1.1 Nm.</p>  <p style="text-align: right;"><i>Figure 21. Installing the cable tie holder</i></p>

<p>4</p>	<p>1. Place the external fan supply adapter on the connector holder. 2. Route the wire harness as shown below and connect it to the adapter. 3. Install a cable grommet on the hole.</p>  <p style="text-align: center;"><i>Figure 22. Installing the external fan supply adapter</i></p>
<p>5</p>	<p>Connect an external 48 V_{DC} power supply on the terminal and check that the DC fan functions.</p>  <p style="text-align: center;"><i>Figure 23. External DC power supply terminal for the fan</i></p>
<p>6</p>	<p>If the fan works properly, re-attach the drive covers. See the instructions in Step 1 on page 14.</p>
<p>7</p>	<p>Attach the 'Product modified'-sticker supplied in the retrofit kit in a visible place on the front side of the drive. On the sticker, write "DC fan retrofit" and the installation date. If there are parallel NFE units, place a sticker on all of them.</p>

4. FR9 RETROFIT KIT INSTALLATION

4.1 RETROFIT KIT CONTENTS

Table 4. FR9 DC fan retrofit assembly kit (SPR-MEC27417) part list

#	Item number	Item description	Pcs
1	70CPA00551	DC main fan assembly	1
2	PP01068	Internal fan	2
3	70CPA03289	External fan power supply assembly	1
4	70CMC00394	M4x8-DIN7500CE-Thread Forming-Zn-Tx	4
5	MC00046	M5x10-DIN7500CE-Thread Forming-Zn-Pz	4
6	70CMC06914	M3x14-DIN7985-8.8-Zn-Tx	2
7	MC00581	M5x10-DIN7500CE-Thread Forming-Zn-Tx	2
8	MC00178	3.6x205 white/black cable tie	3
9	MC00068	2.4x112 black cable tie	1
10	70CPL00062	'Product modified'-sticker	1
11	PP00033	Jumper connector	1

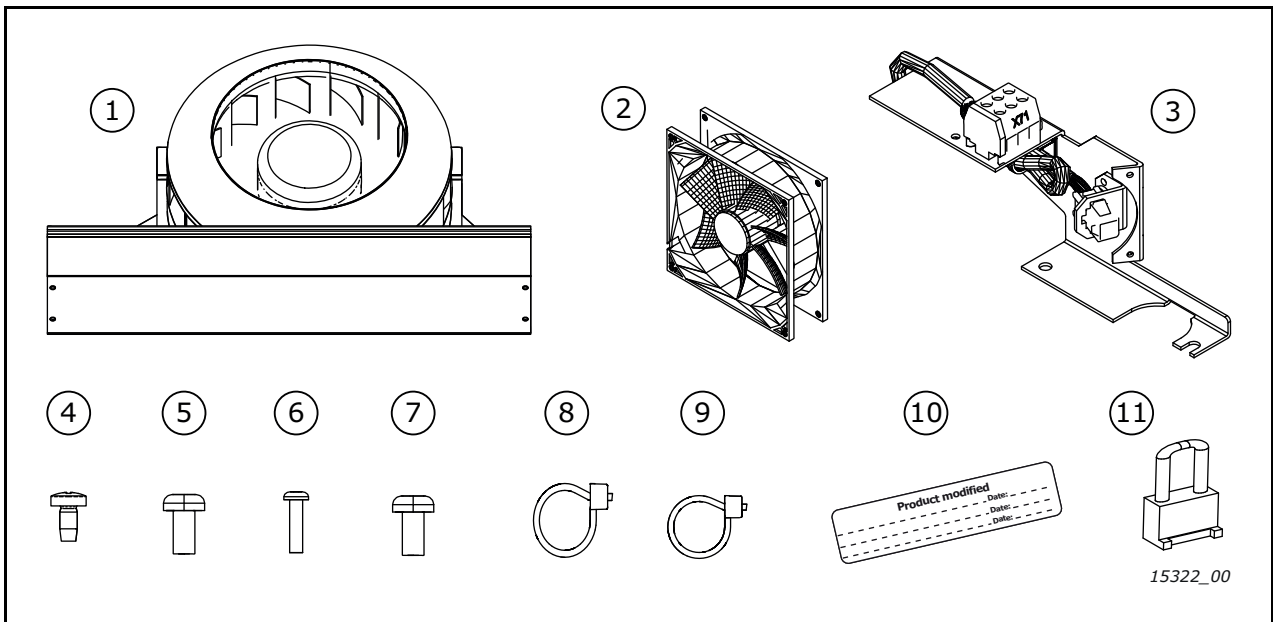
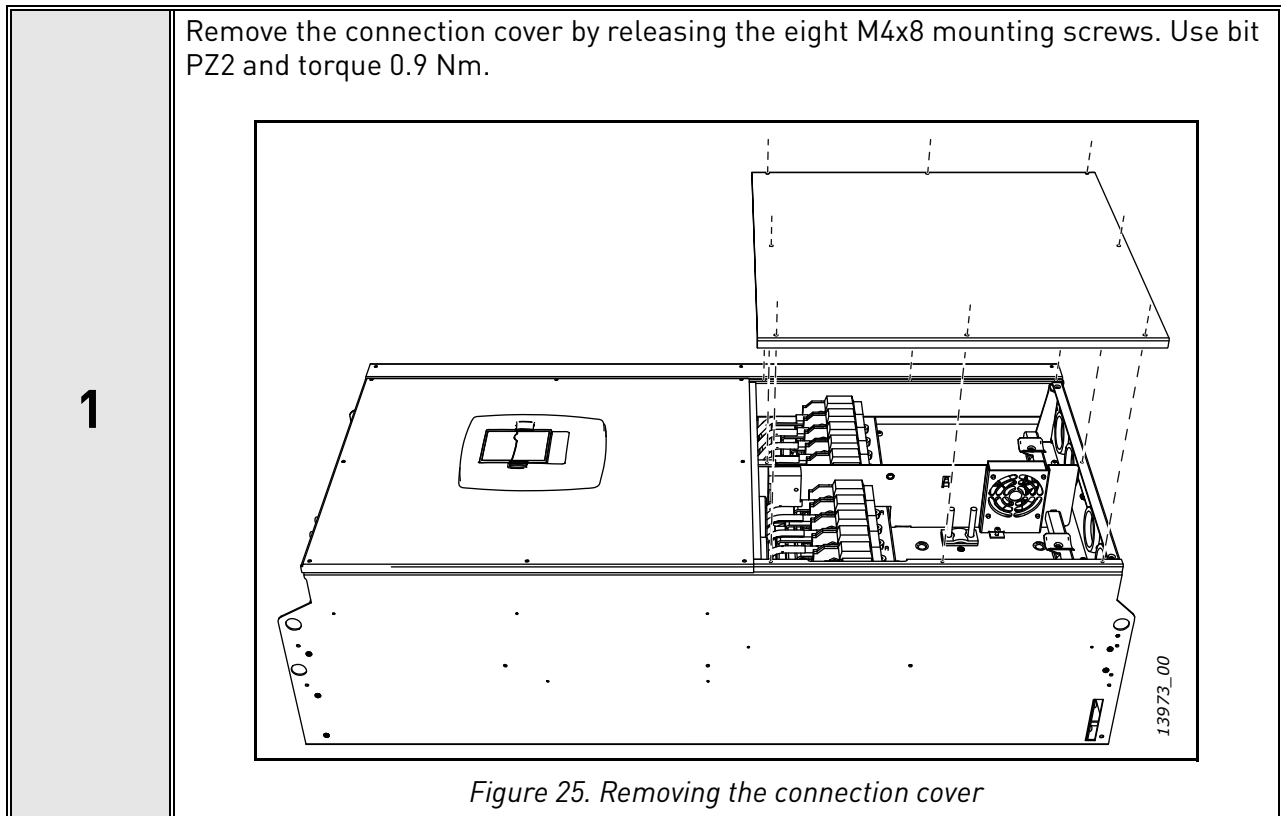


Figure 24. FR9 DC fan retrofit kit contents

4.2 REMOVING THE AC FAN AND EXTERNAL SUPPLY

Before installing the new DC fan and external DC power supply, remove the old AC fan and the external AC supply assembly. Parts to remove:

- AC fan
- Fuse base assembly
- SAF power cable
- Isolation transformer assembly



2

Remove the main cover by releasing the eight M4x8 mounting screws (MC00031). Use bit PZ2 and torque 0.9 Nm.

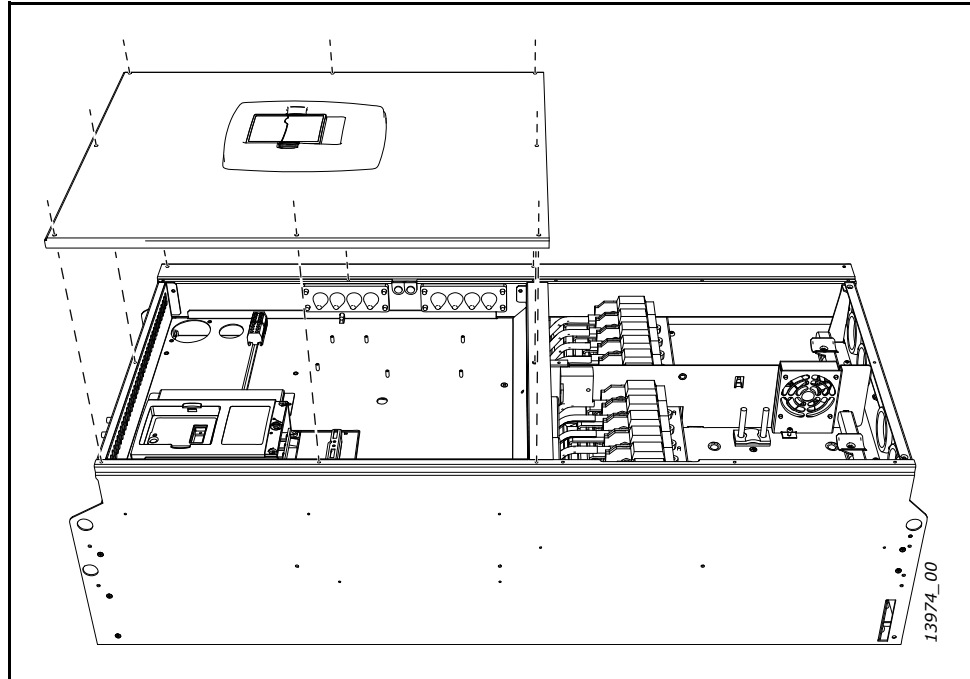


Figure 26. FR9 main cover mounting

3

Remove the control cover by releasing the three M4x8 mounting screws (MC00031). Use bit PZ2 and torque 0.9 Nm.

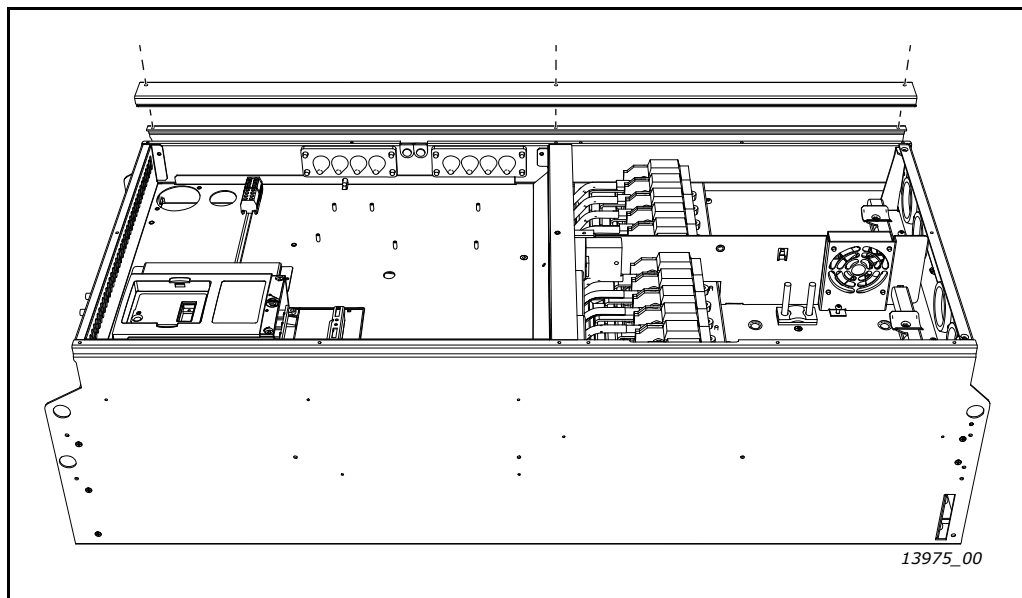


Figure 27. FR9 control cover mounting

4

Remove the control frame. Release the twelve M4x8 mounting screws (70CMC00394). Use bit TX20 and torque 1.3 Nm (marked 1 in figure below) or 0.9 Nm (marked 2).

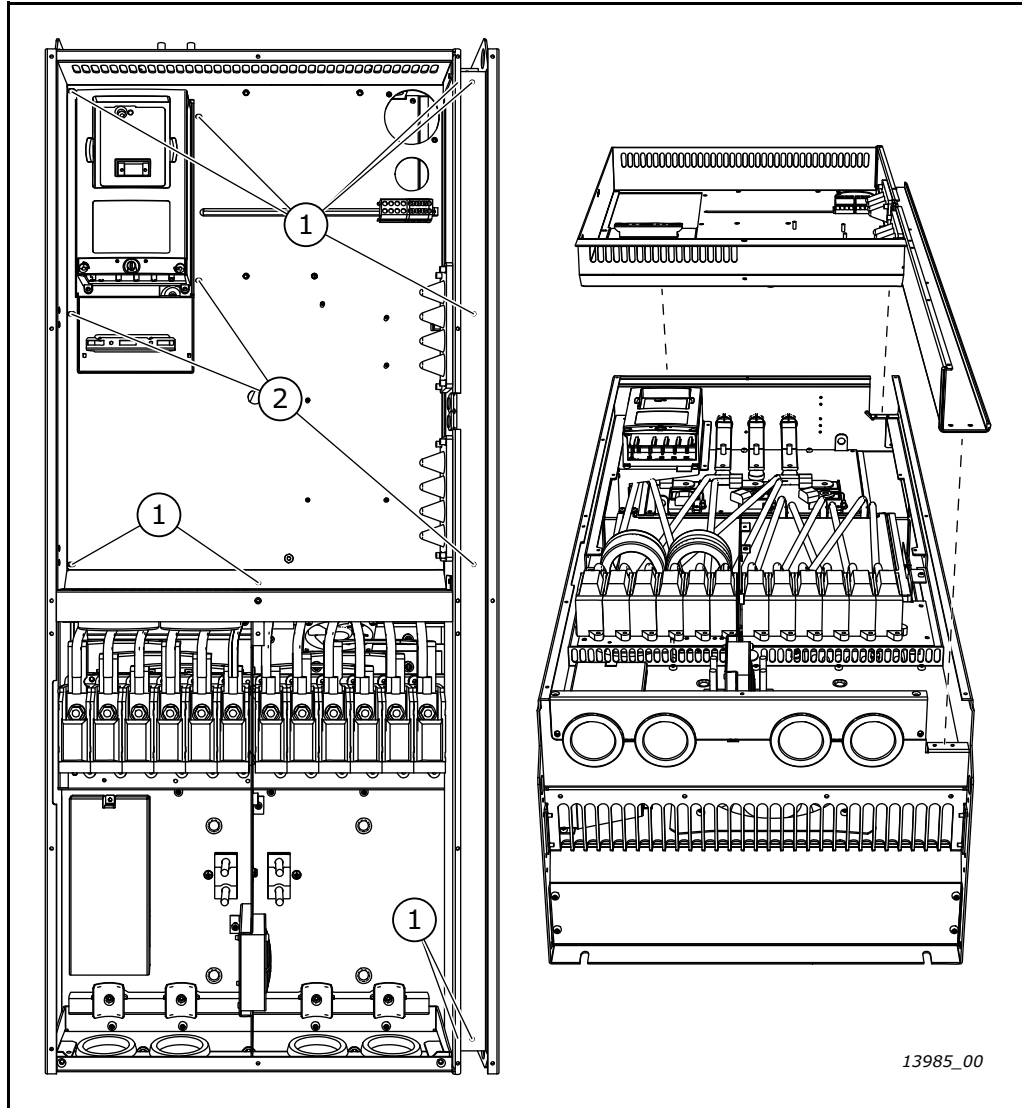


Figure 28. FR9 control frame mounting screws

1. Disconnect the input cables from the AC choke. Remove the three M8x25 mounting screws (MC00514). Use bit HOP6 and torque 17 Nm.
2. When re-attaching the cables in EMC-level H units, make sure the cables do not touch the ferrite rings.
3. In EMC level H/L units, make sure the choke capacitors are mounted on the cable mounting screws.
4. Make sure the L1 cable connector does not touch the lifting ring.

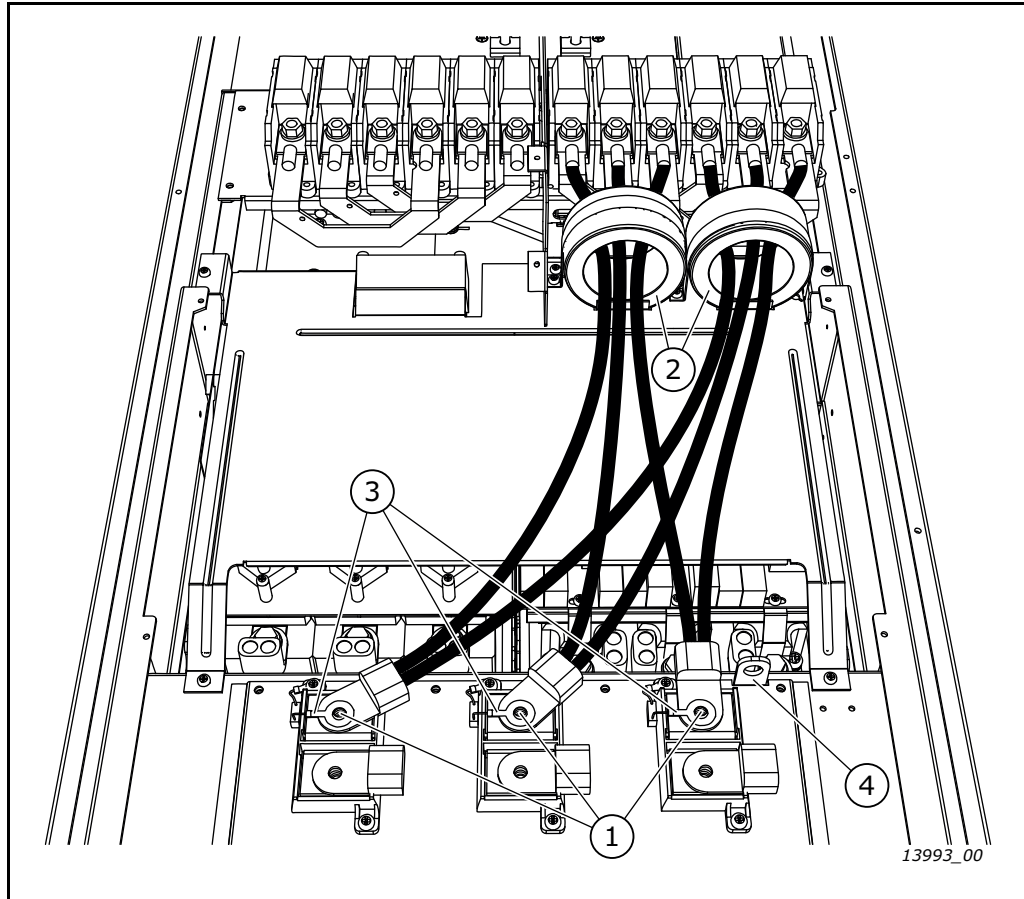
5

Figure 29. Mounting the input cables on the AC choke terminals

6

Disconnect the motor cables from the power module. Remove the three M8x16 mounting screws (MC00392). Use bit HOP6 and torque 14 Nm.

When re-attaching the cables to the power module, first attach phase W, then phase V and last phase U.

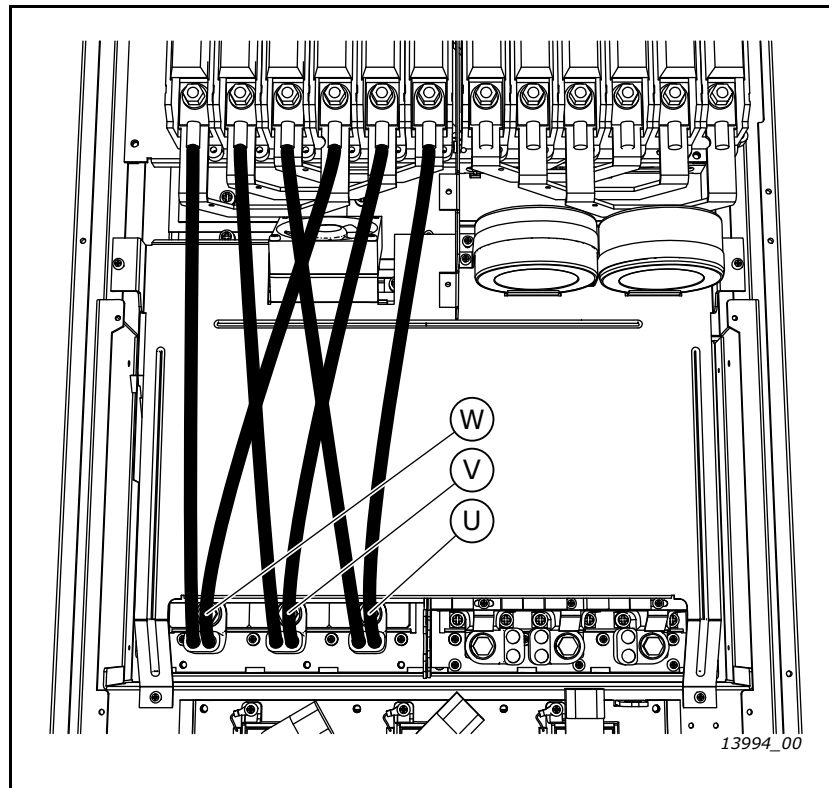


Figure 30. Motor cables mounted on the power module

7

Disconnect the internal fan wire from power board wire X8.

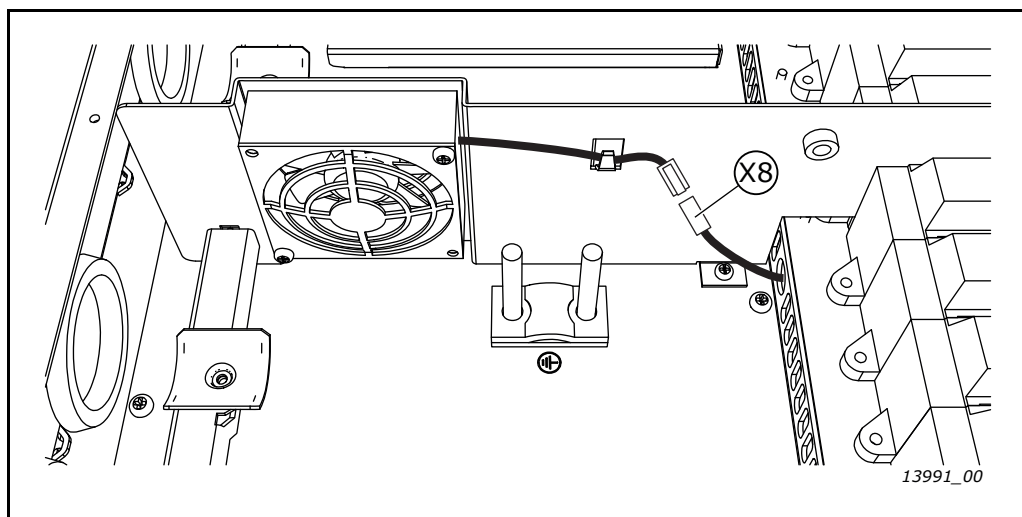


Figure 31. FR9 divider fan wire

8

Remove the terminal EMC cover. Release the three M4x8 mounting screws (70CMC00394). Use bit TX20 and torque 2.3 Nm. Notice the screw tightening order marked in the figure below.

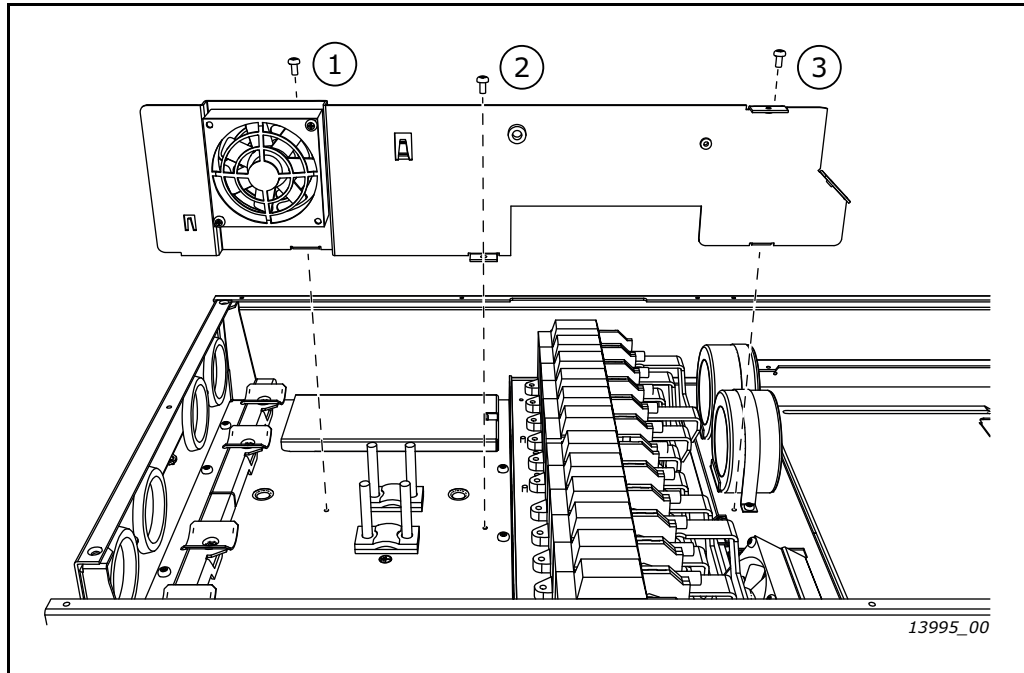


Figure 32. Terminal EMC cover mounting

9

Release the internal fan from the terminal EMC cover. Remove the two M4x35 mounting screws. Use bit TX20 and torque 0.3 Nm.

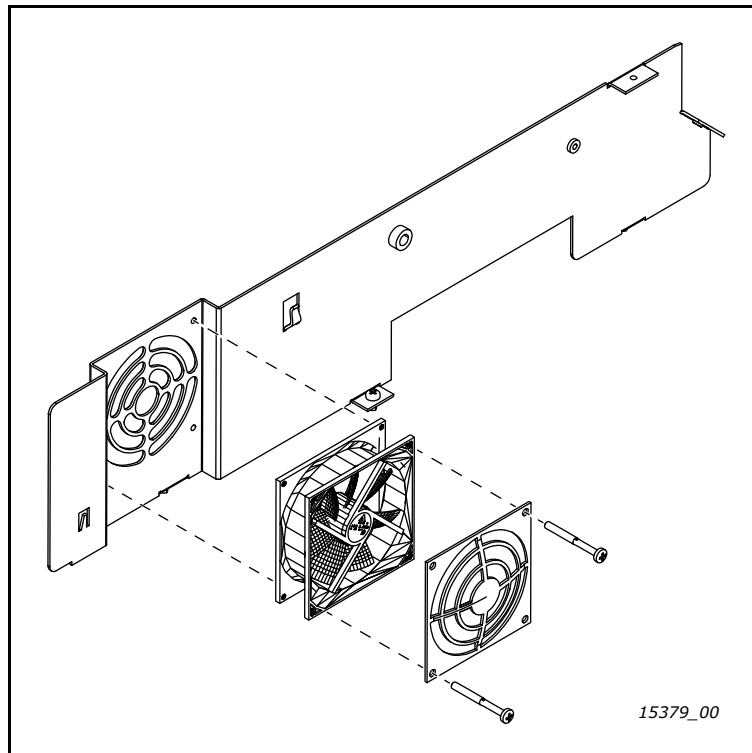


Figure 33. Releasing the internal fan from the terminal EMC cover

10

Disconnect the board internal fan wire from power board wire X5 and release the power unit EMC cover. Remove the four M4x8 mounting screws (70CMC00394). Use bit TX20 and torque 2.3 Nm.

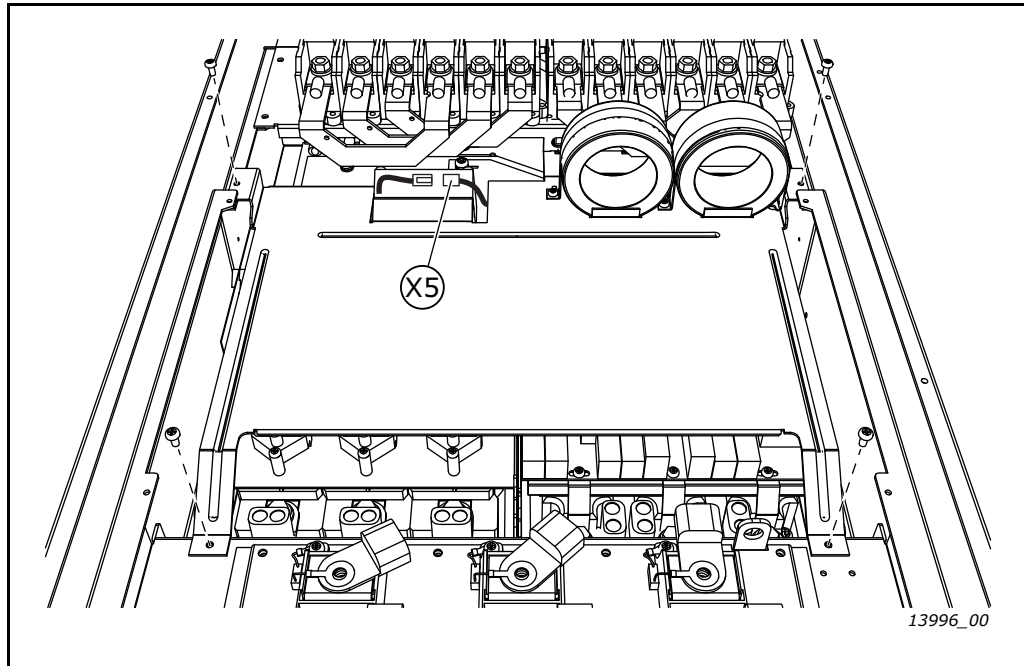


Figure 34. FR9 power module EMC cover and internal fan wire

11

Release the internal fan from the power unit EMC cover. Remove the two M4x10 mounting screws. Use bit TX20 and torque 0.4 Nm.

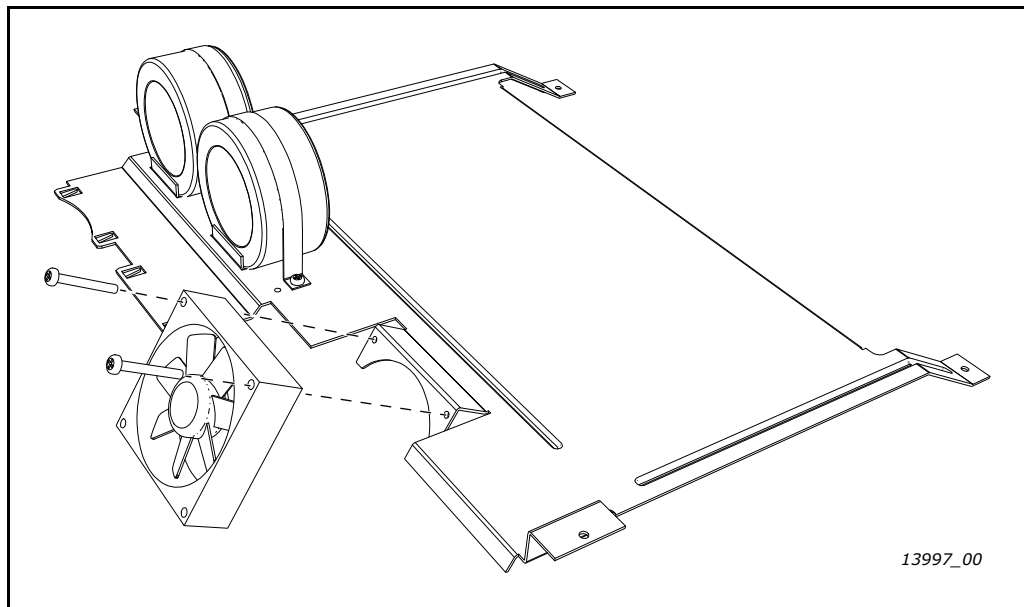


Figure 35. Releasing the internal fan from the power unit EMC cover

12

Release the SAF power wires from the input busbars. Remove the two screws (X).

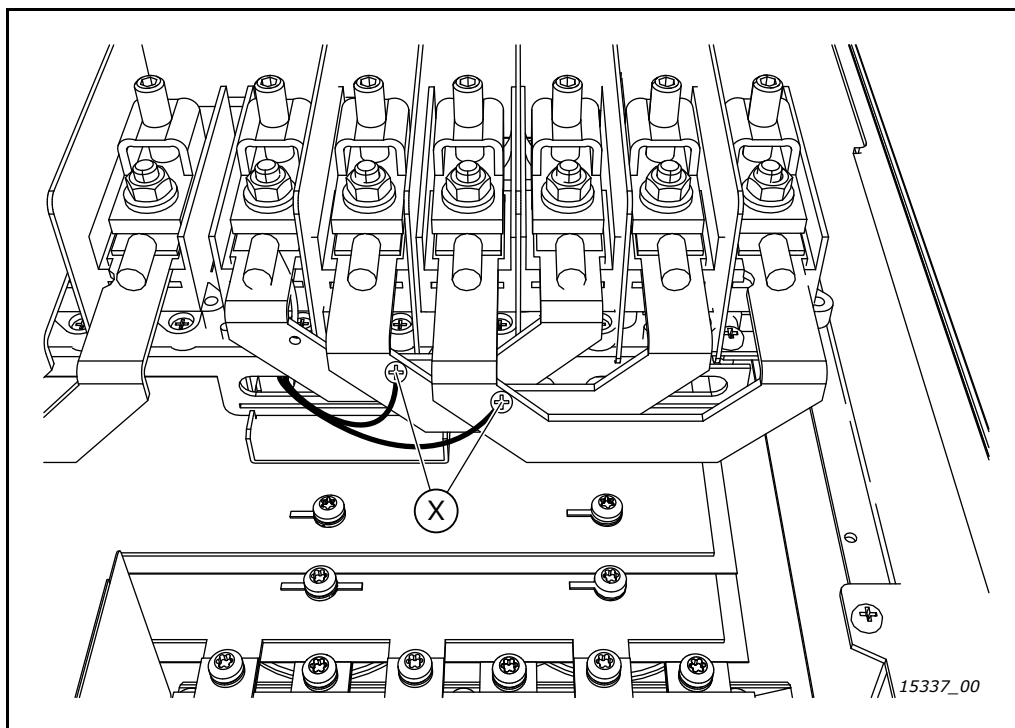


Figure 36. Removing the SAF power wires from the input busbars

13

Remove the fan inverter cover. Release the M4x8 screw. Use bit TX20 and torque 1.3 Nm.

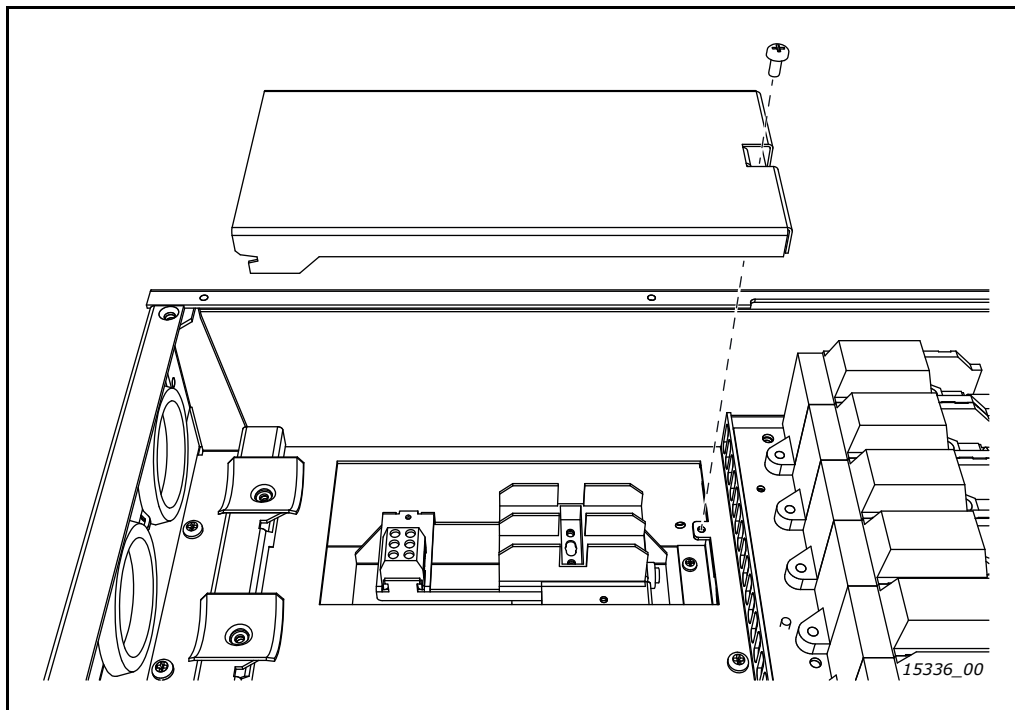


Figure 37. Removing the fan inverter cover

14

1. Disconnect the wires from the fuse holder.
2. Disconnect the SAF transformer wires from the connectors.
3. Remove the SAF power wire.

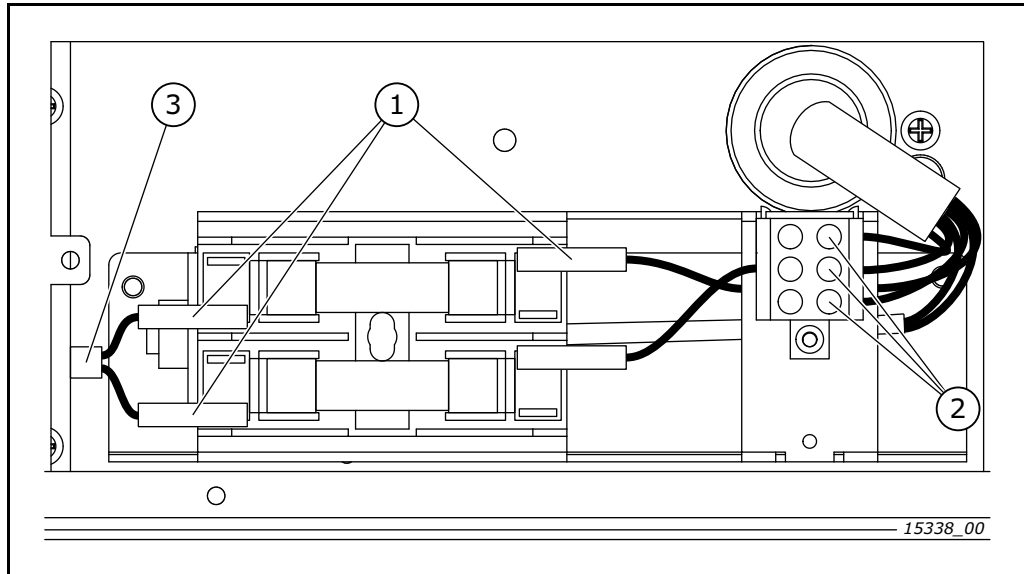


Figure 38. Fuse holder wiring

15

Remove the fuse base assembly. Release the two M5x10 mounting screws. Use bit PZ2 and torque 2.3 Nm.

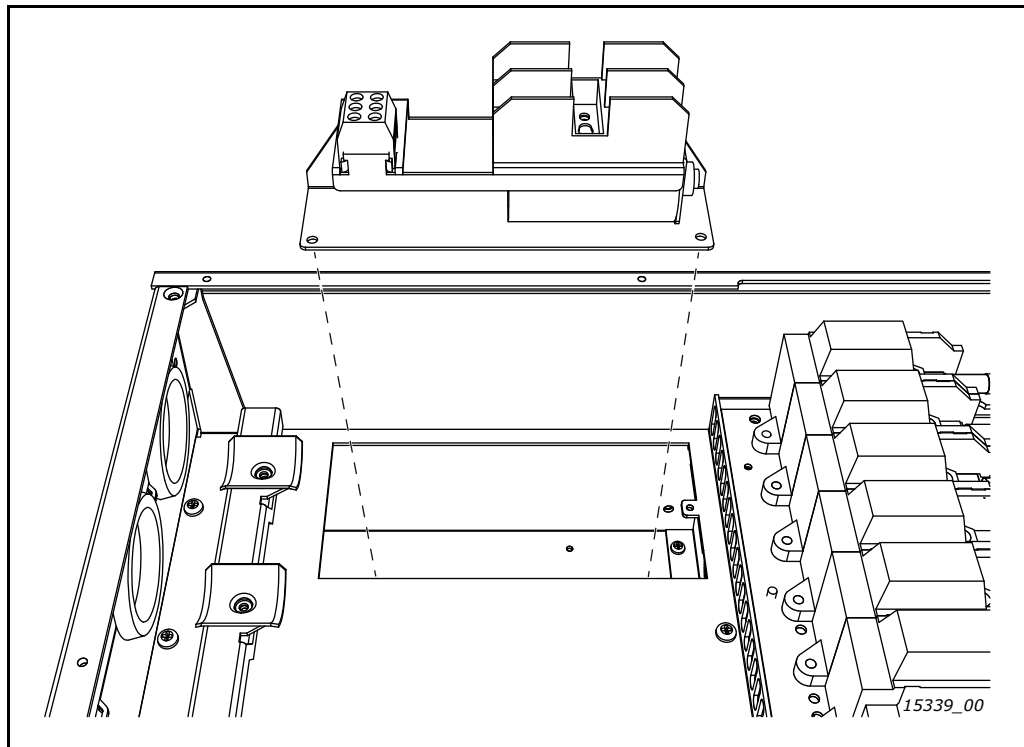


Figure 39. Removing the fuse base assembly

16

1. Remove the four rubber grommets to access the fan inlet cone mounting screws.
2. Loosen the four screws with bit PZ2 and torque 3.2 Nm. The inlet cone should rise a few millimeters.

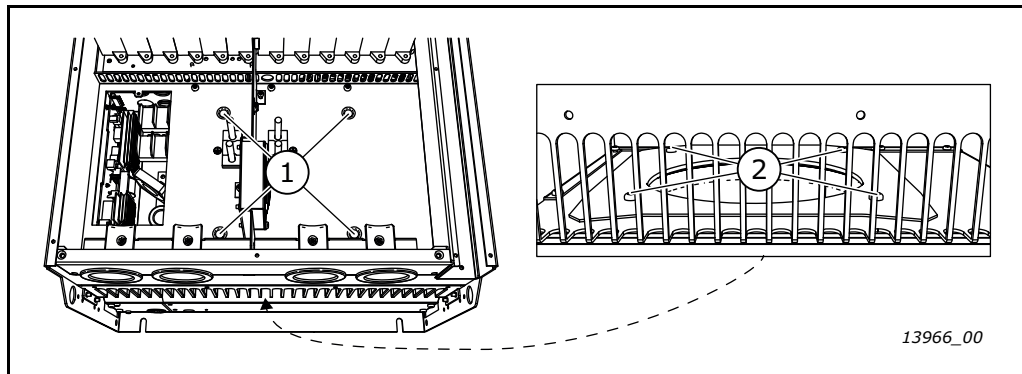


Figure 40. Loosening the fan inlet cone screws

17

Disconnect the fan power supply cable. Carefully release the grommet, pull out the AC fan supply cable and disconnect it from the connector.

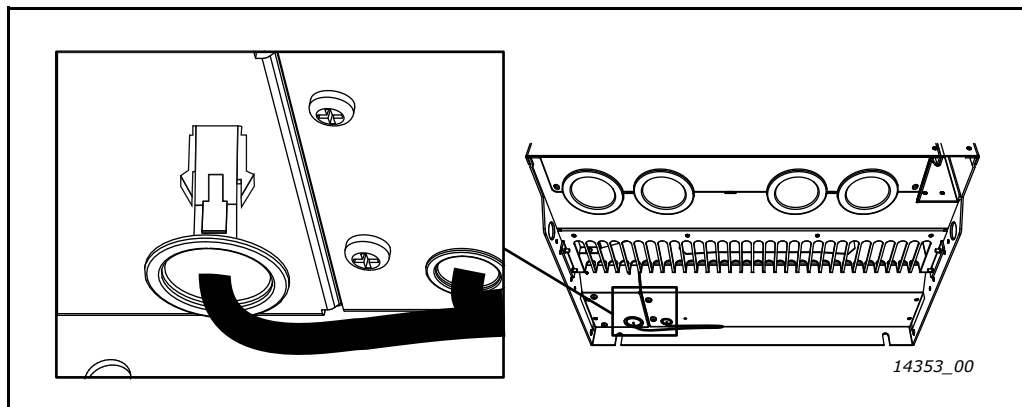


Figure 41. AC fan supply cable

18

Remove the four M5x10 fan mounting screws. Use bit PZ2 and torque 3.2 Nm. Pull out the AC fan.

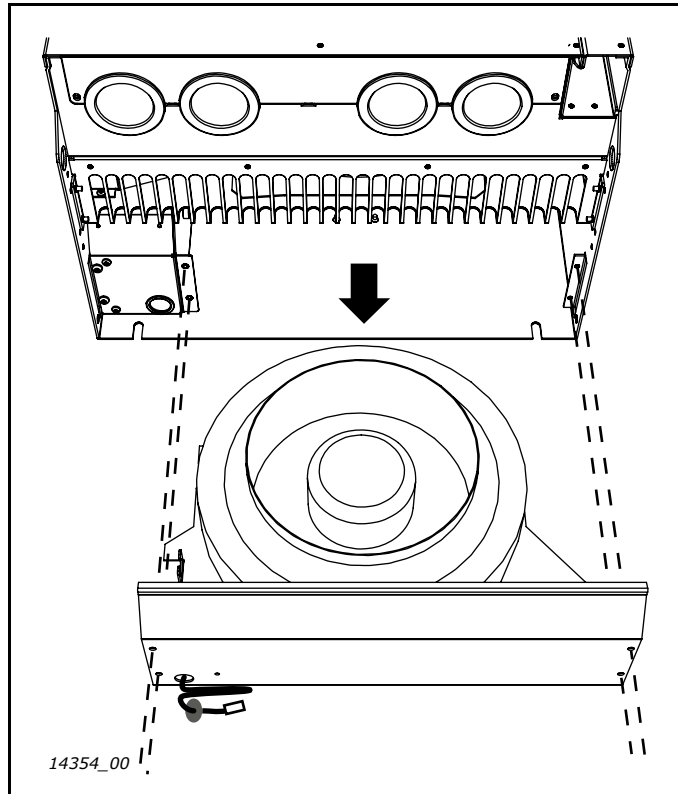


Figure 42. Removing the AC fan

19

Remove the isolation transformer assembly. Pull out the isolation transformer cable and grommet and release the two M5x10 mounting screws. Use bit PZ2 and torque 3.2 Nm.

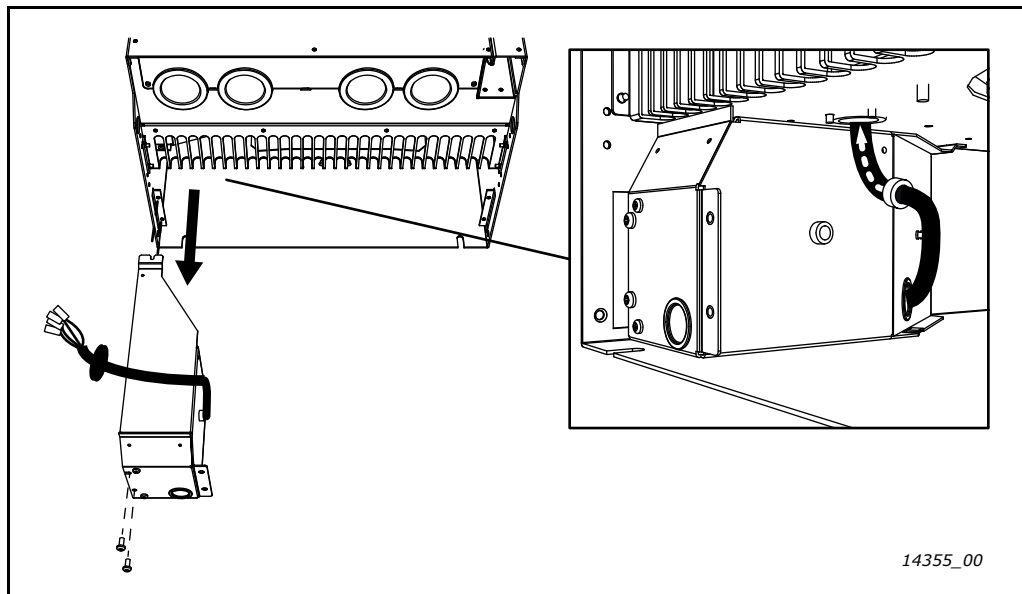


Figure 43. Removing the isolation transformer assembly

4.3 DC FAN AND EXTERNAL DC POWER SUPPLY INSTALLATION

Once the AC fan and other old parts have been removed (see Chapter 4.2), install the new DC fan and external DC power supply.

1

Install the DC fan. Use the four M5x10 mounting screws (MC00046) supplied in the retrofit kit to mount the fan. Use bit PZ2 and torque 3.2 Nm.

NOTE! Lead in the fan supply cable before mounting the fan and close the hole with the grommet.

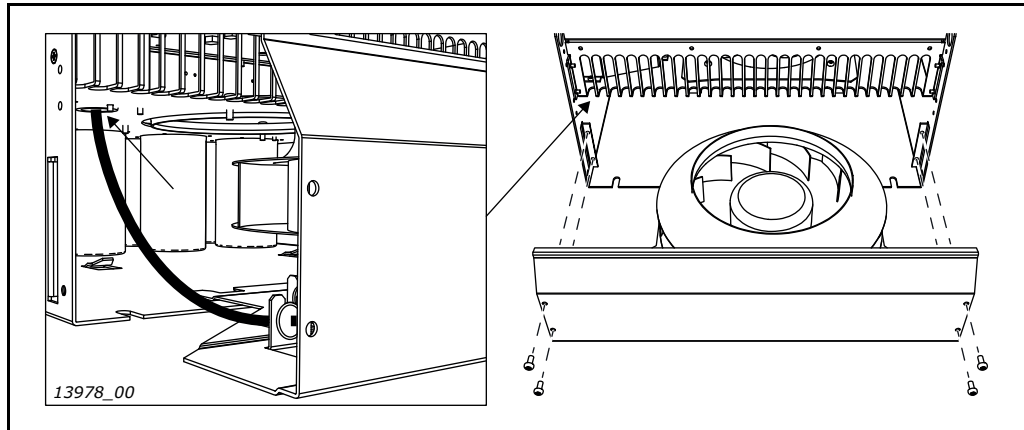


Figure 44. DC fan mounting and fan supply cable routing

2

1. Mount the external power supply assembly on the drive in place of the old fuse base assembly. Use two M5x10 screws, a TX25 bit and torque 2.3 Nm.
2. Connect the fan power supply cable on the external power supply harness.

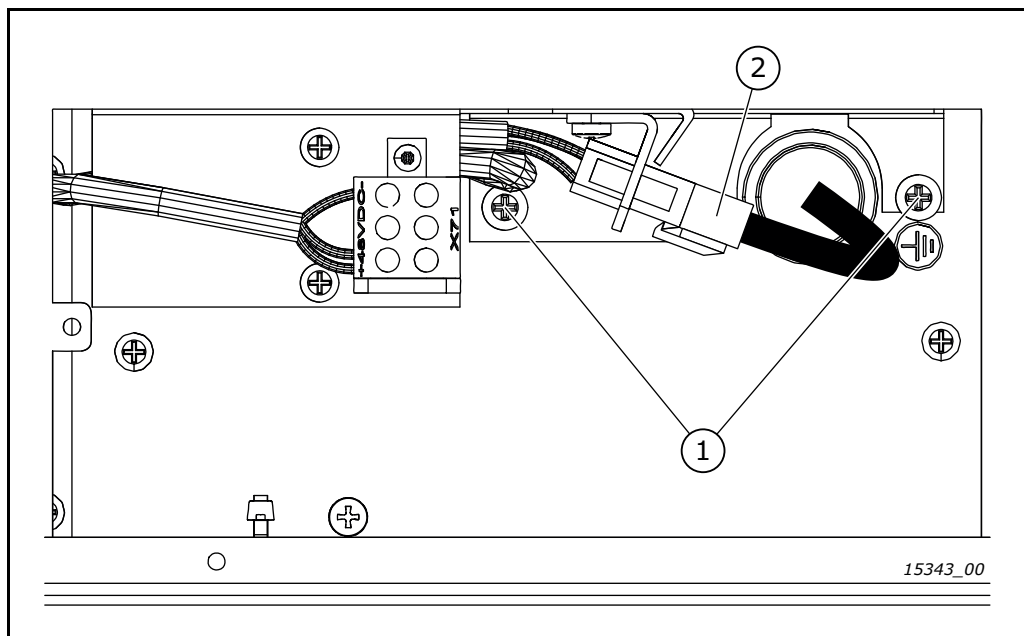
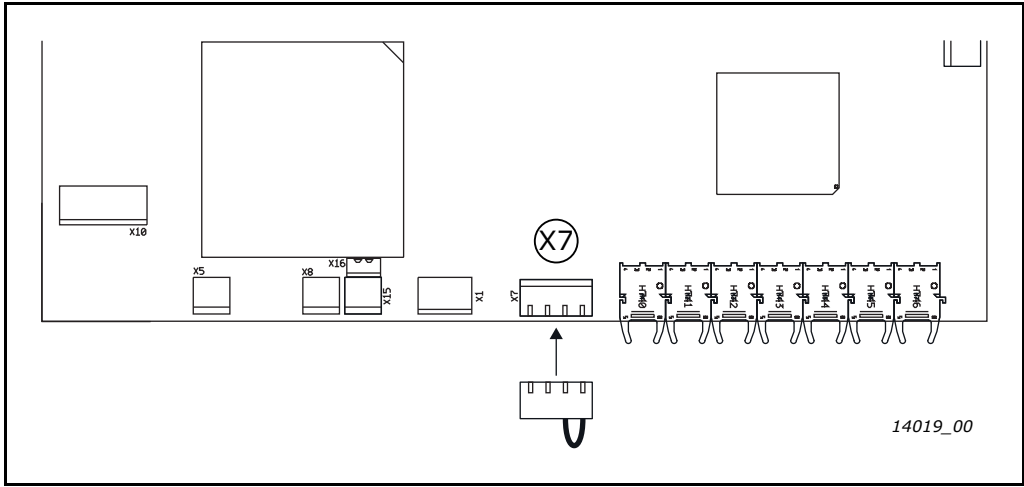
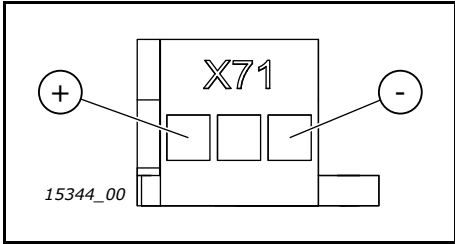


Figure 45. Installing the external fan power supply assembly

<p style="text-align: center; font-size: 24pt; font-weight: bold;">3</p>	<p>Install the jumper connector on power board connector X7.</p>  <p style="text-align: center;"><i>Figure 46. Installing the jumper connector on the power board</i></p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">4</p>	<p>Install the two new internal fans. They are installed the same way as the old ones. See Figure 33 on page 24 and Figure 35 on page 25.</p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">5</p>	<p>Connect an external 48 V_{DC} power supply on the terminal and check that the DC fan functions.</p>  <p style="text-align: center;"><i>Figure 47. External DC power supply terminal for the fan</i></p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">6</p>	<p>If the fan works properly, re-assemble the drive. Follow the instructions in Chapter 4.2 in reversed order.</p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">7</p>	<p>Attach the 'Product modified'-sticker (70CPL00062) supplied in the retrofit kit in a visible place on the front side of the drive. On the sticker, write "DC fan retrofit" and the installation date.</p>

5. FI10 AND FI12 RETROFIT KIT INSTALLATION

5.1 RETROFIT KIT CONTENTS

Table 5. FI10 and FI12 DC fan retrofit assembly kits (SPR-MEC23731 and SPR-MEC23645) part list

#	Item number	Item description	Pcs	
			FI10	FI12
1	70CPA00556	DC main fan assembly	1	2
2	70CMC05006	External 48 V fan supply assembly	1	2
3	70CPA03288	Asic cover and fan assembly	1	2
4	MC00031	M4x8-DIN7500CE-Thread Forming-Zn-Pz	2	4
5	MC00046	M5x10-DIN7500CE-Thread Forming-Zn-Pz	4	16
6	MC00178	3.6x205 white/black cable tie	3	6
7	PP00033	Jumper connector	1	2
8	70CPL00062	'Product modified' -sticker	1	2
9	MC00016	Bushing rubber GD16	2	4

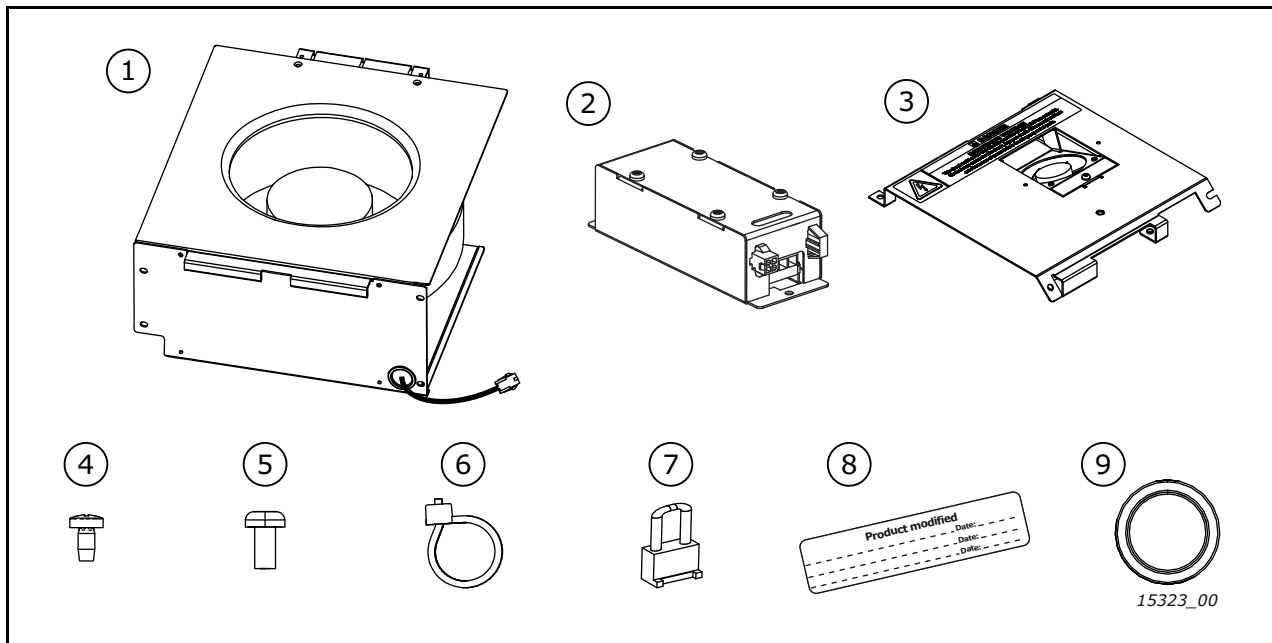


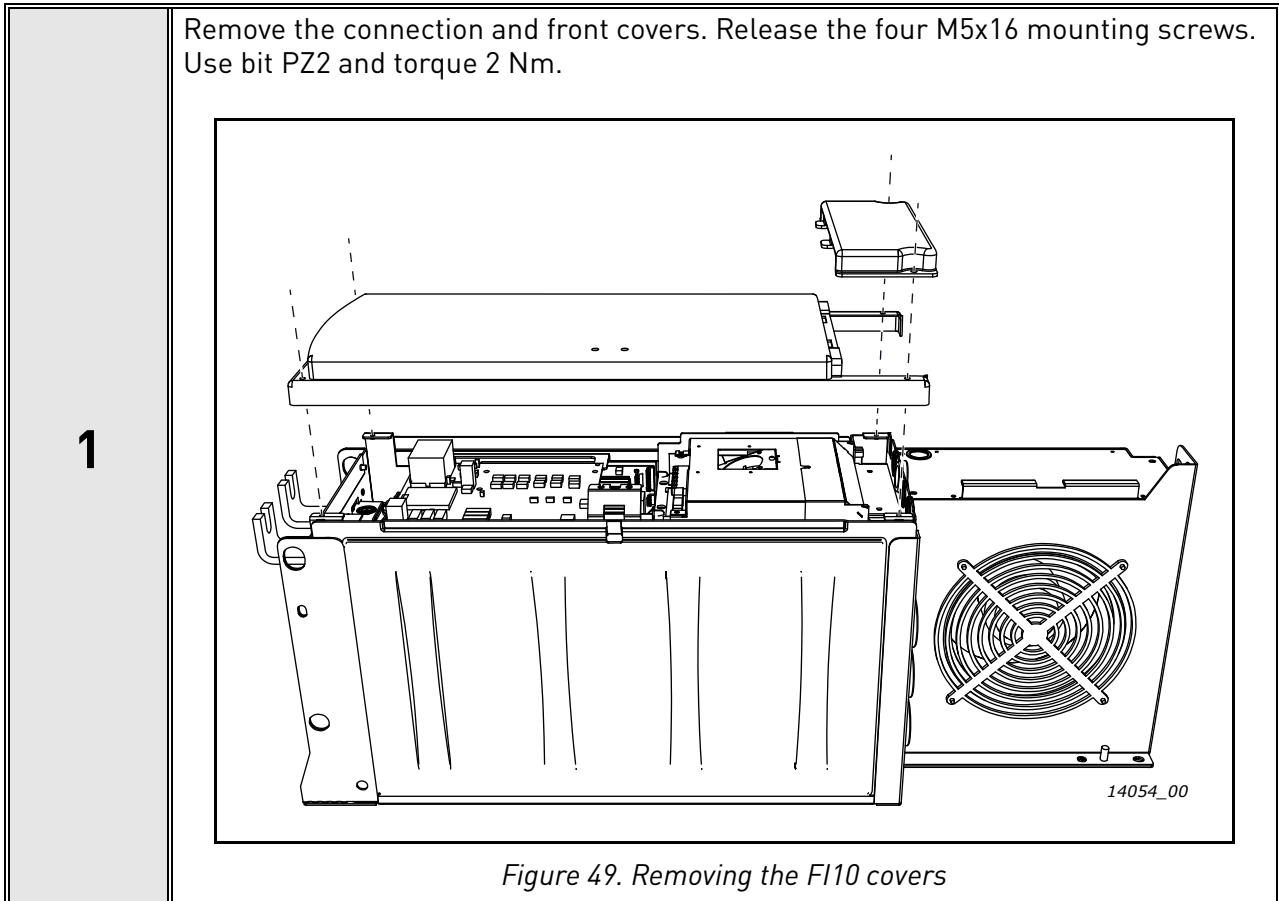
Figure 48. FI10 and FI12 DC fan retrofit assembly kit contents

5.2 REMOVING THE AC FAN AND EXTERNAL SUPPLY

Before installing the new DC fan and external DC power supply, remove the old AC fan and the external AC supply assembly. Parts to remove:

- AC fan and the external AC supply assembly
- Fan capacitor and external fan capacitor wire set

NOTE! The following instructions apply to both FI10 and FI12, since the FI12 unit consists of two FI10 units.



2

Release the AC fan. First, disconnect the external fan capacitor wire (1) from the external AC supply box. Then, remove the four M5x10 mounting screws (2) with bit PZ2 and torque 3.5 Nm and pull out the fan.

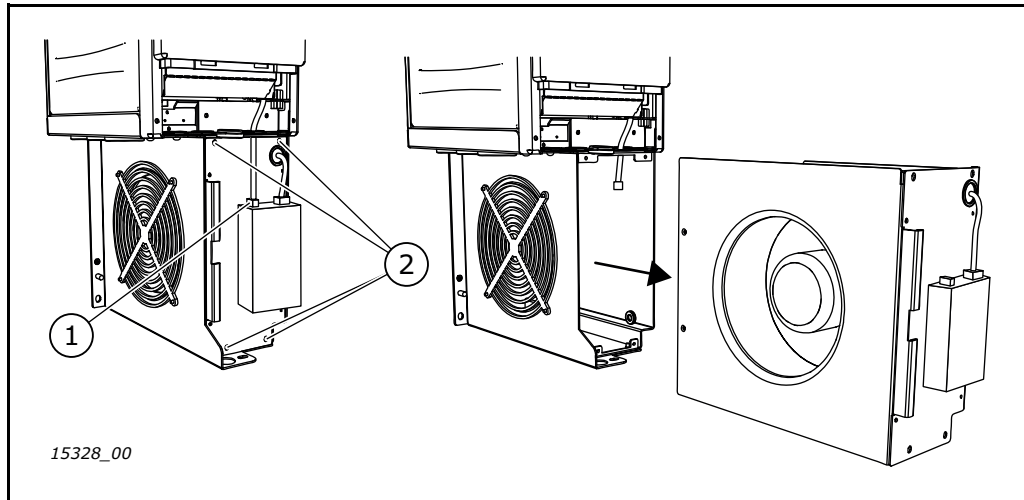


Figure 50. Removing the main fan and external AC power supply

3

Cut off the cable ties (1) holding the external fan capacitor cable and pull the cable and grommet (2) out through the lead-in hole.

Remove the four M5x10 fan inverter mounting screws. Use bit PZ2 and torque 3.5 Nm. Pull out the fan inverter assembly.

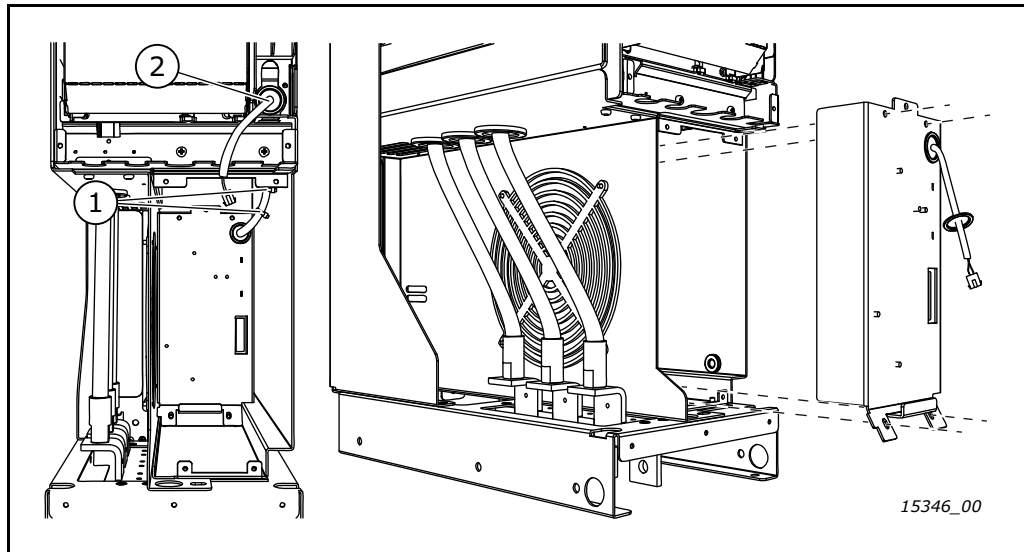


Figure 51. Removing the fan inverter assembly

4

1. Remove the capacitor mounting nut and take out the fan capacitor. Use a 19 mm bit and torque 8 Nm.
2. Release the external fan capacitor cable from the cable tie and pull the cable and grommet out through the lead-in hole.

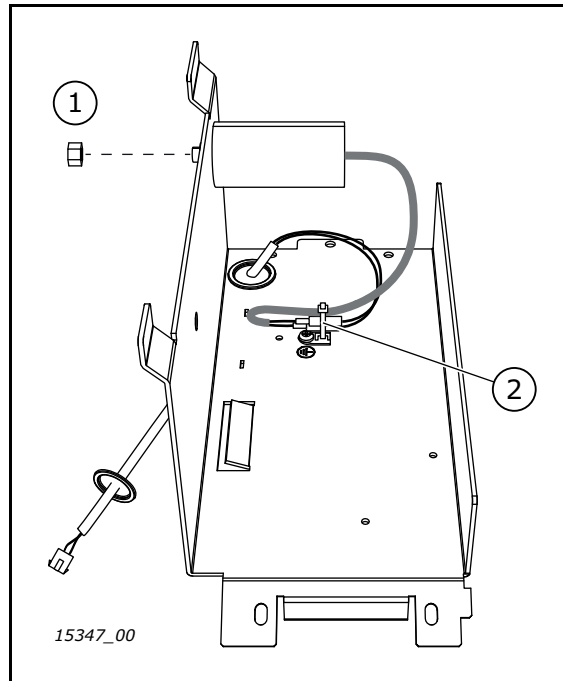


Figure 52. Removing the fan capacitor and cable

5

Remove the asic assembly covers. Release them by removing the M4x8 combi screws. Use bit TX20 and torque 1.1 Nm.

NOTE! Notice the earthing wire under one of the cover mounting screws (marked with X in the figure below).

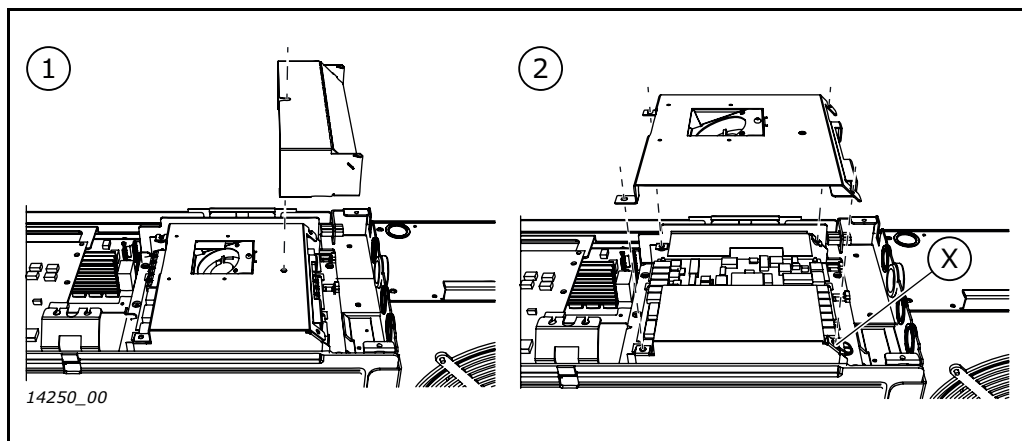


Figure 53. Removing the asic assembly covers

5.3 DC FAN AND EXTERNAL DC POWER SUPPLY INSTALLATION

Once the AC fan and other old parts have been removed (see Chapter 5.2), install the new DC fan and external DC power supply assembly.

NOTE! The following instructions apply to both FI10 and FI12, since the FI12 unit consists of two FI10 units.

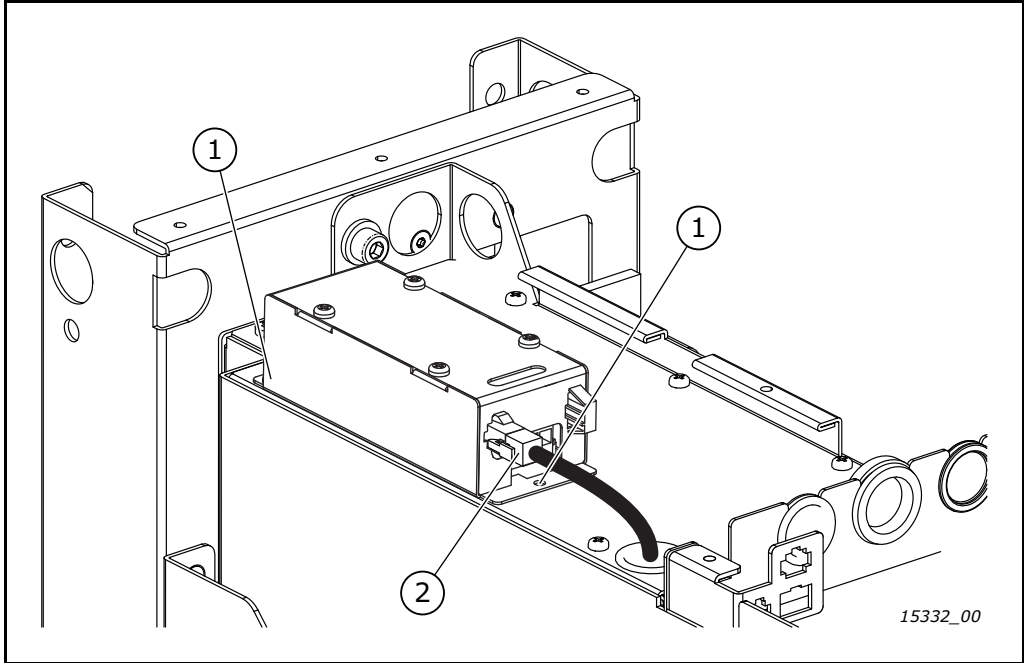
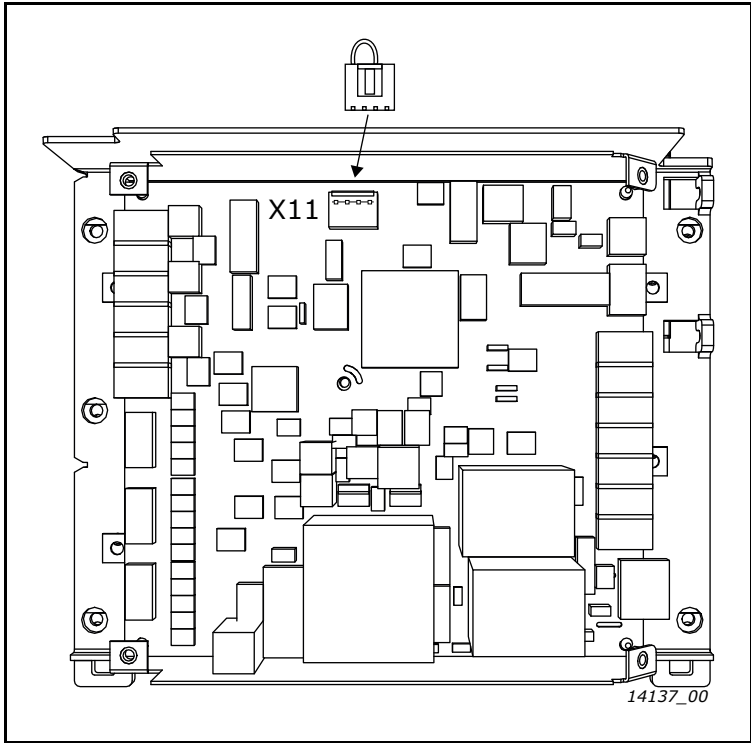
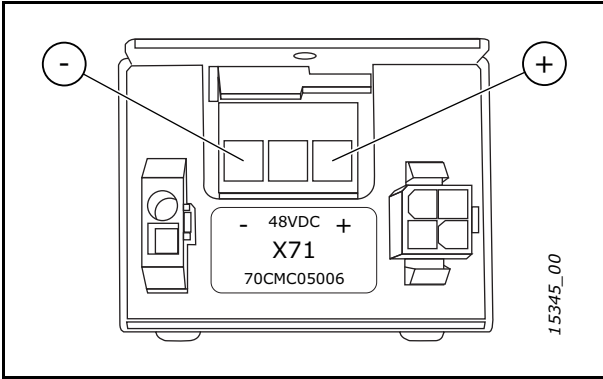
1	Re-install the fan inverter assembly. See Figure 51 on page 34. Use the four M5x10 mounting screws (MC00046) supplied in the retrofit kit.
2	Install the DC fan. The fan is mounted in the same way as the old AC fan (see Figure 50 on page 34). Use the four M5x10 mounting screws (MC00046) supplied in the retrofit kit.
3	<p>Install the external DC fan supply assembly. Use the two M4x8 screws (1) included in the kit. Use a PZ2 bit and torque 3.5 Nm.</p> <p>Connect the power supply wire (2) from the fan to the external DC fan supply.</p> <div style="text-align: center;">  </div>

Figure 54. Installing the external DC fan supply

4	<p>Install the jumper included in the kit on connector X11 on the Asic board.</p>  <p style="text-align: right; font-size: small;">14137_00</p> <p style="text-align: center;"><i>Figure 55. Installing the jumper connector on the Asic board</i></p>
5	<p>Install the new Asic cover and fan assembly. The cover is mounted in the same way as the old one (see Figure 53 on page 35).</p>
6	<p>Connect an external 48 V_{DC} power supply on the terminal and check that the DC fan functions.</p>  <p style="text-align: right; font-size: small;">15345_00</p> <p style="text-align: center;"><i>Figure 56. External DC power supply terminal for the fan</i></p>
7	<p>If the fan works properly, re-attach the covers on the drive. See Step 5 and Step 1 in Chapter 5.2.</p>
8	<p>Attach the 'Product modified'-sticker (70CPL00062) supplied in the retrofit kit in a visible place on the front side of the drive. On the sticker, write "DC fan retrofit" and the installation date.</p> <p>In FI12, place a sticker on both units.</p>

6. FR10 AND FR12 RETROFIT KIT INSTALLATION

6.1 RETROFIT KIT CONTENTS

Table 6. FR10 and FR12 DC fan retrofit assembly kit (SPR-MEC27421 and SPR-MEC27424) part list

#	Item number	Item description	Pcs	
			FR10	FR12
1	70CPA00553	DC main fan assembly	2	4
2	70CPA03292	External fan supply assemblies (left and right)	1	2
3	70CPA02033	Asic cover and fan assembly	1	2
4	MC00042	M6x20-DIN6900-3-Combi-Delta-Tx	4	8
5	MC00046	M5x10-DIN7500CE-Thread Forming-Zn-Pz	6	12
6	70CMC06913	M3x8-DIN7985-4.8-Zn-Tx	4	8
7	MC00581	M5x10-DIN7500CE-Thread Forming-Zn-Tx	2	4
8	PP00033	Jumper connector	2	4
9	70CPL00062	'Product modified' -sticker	1	2

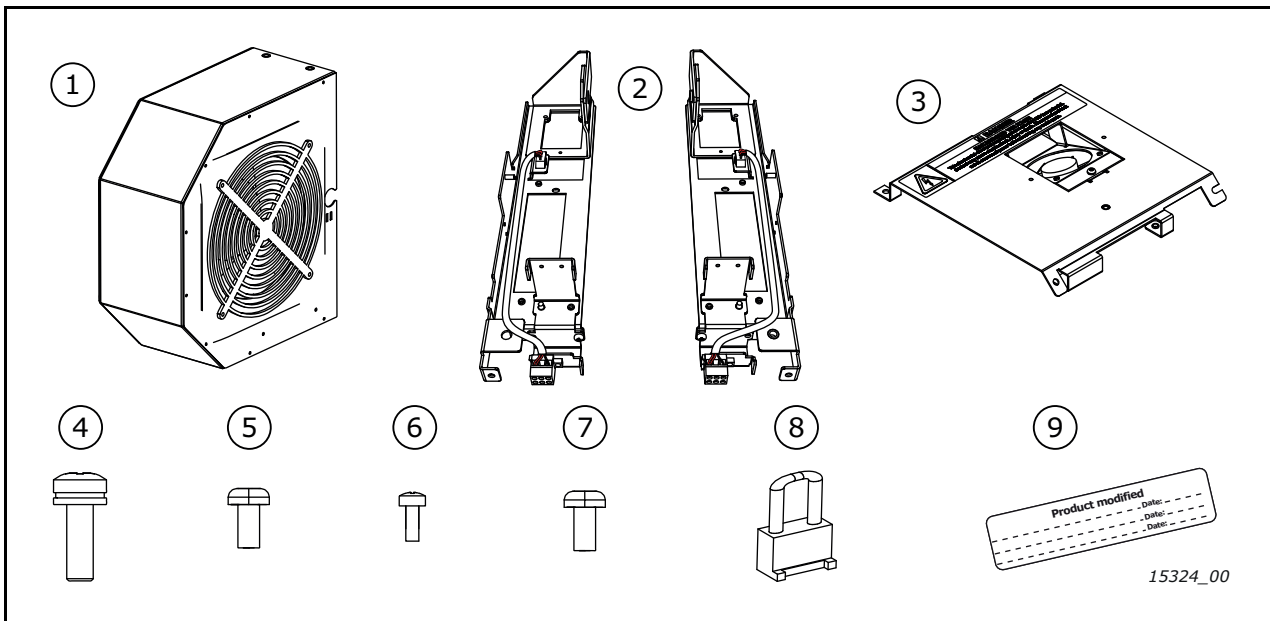


Figure 57. FR10 and FR12 DC fan retrofit assembly kit contents

6.2 REMOVING THE AC FAN AND EXTERNAL SUPPLY

Before installing the new DC fan and external DC power supply, remove the old AC fan and the external AC supply assembly. Parts to remove:

- AC fans
- Isolation transformers and capacitors
- Fuse base and fuses
- Fan capacitors
- SAF power cables and connectors

NOTE! The following instructions apply to both FR10 and FR12, since the FR12 unit consists of two FR10 units.

Take off the main covers. Remove the M5x16 mounting screws from the connection covers and then the main cover. Use bit PZ2 and torque 2.3 Nm. Also take off the side covers.

1

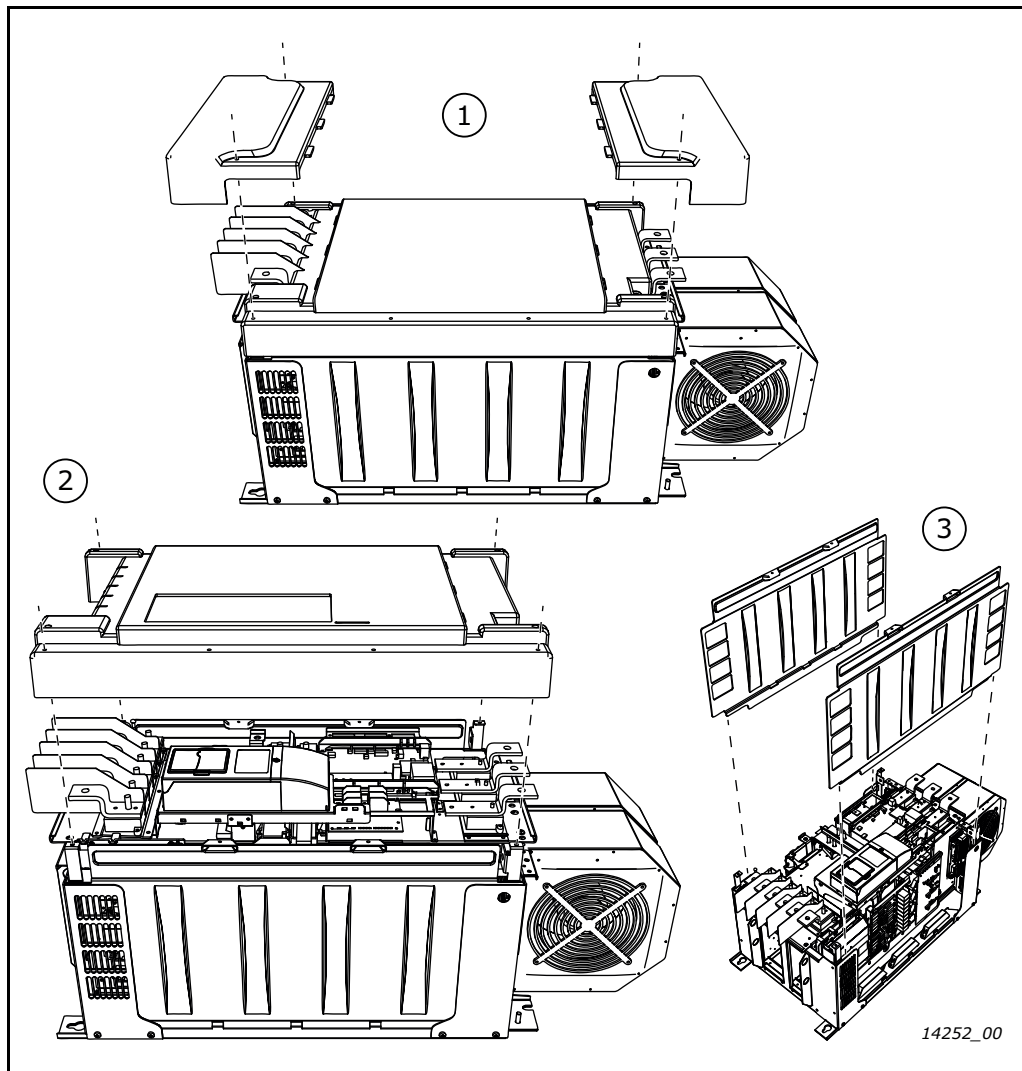


Figure 58. Removing the covers

2

1. Disconnect the fan supply cables.
2. Release the AC fans. Remove the four M6x20 mounting screws (MC00042) with bit TX30 and torque 1.3 Nm and take off the fans.

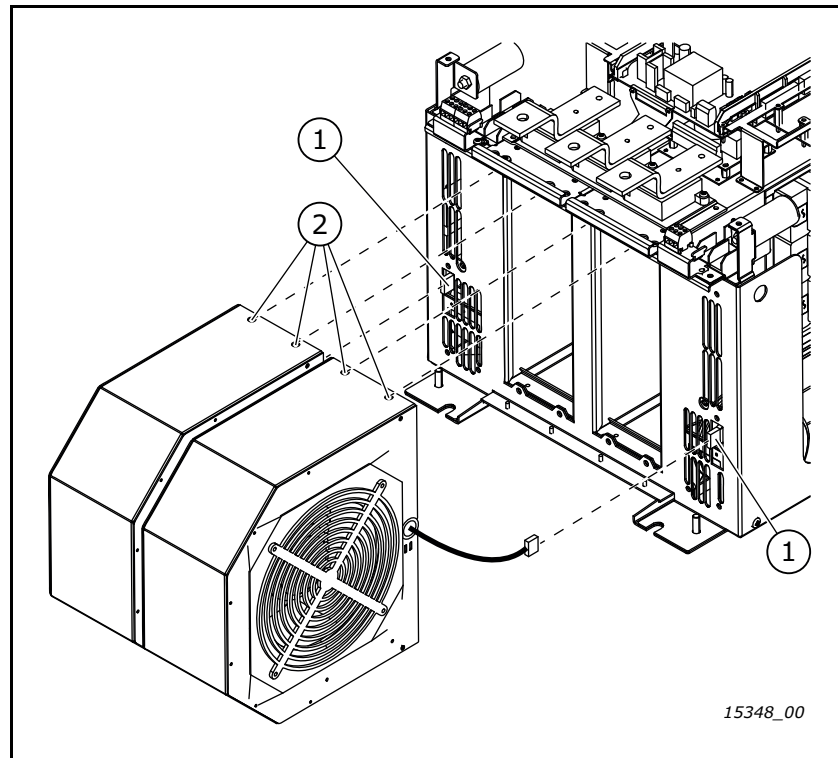


Figure 59. Removing the AC fans

3

1. Disconnect the SAF transformer power cable from the fuse base terminals.
2. Release the fan power supply assemblies. Remove the M5x10 mounting screws. Use bit PZ2 and torque 1.8 Nm. Lift out the fan power supply assemblies.

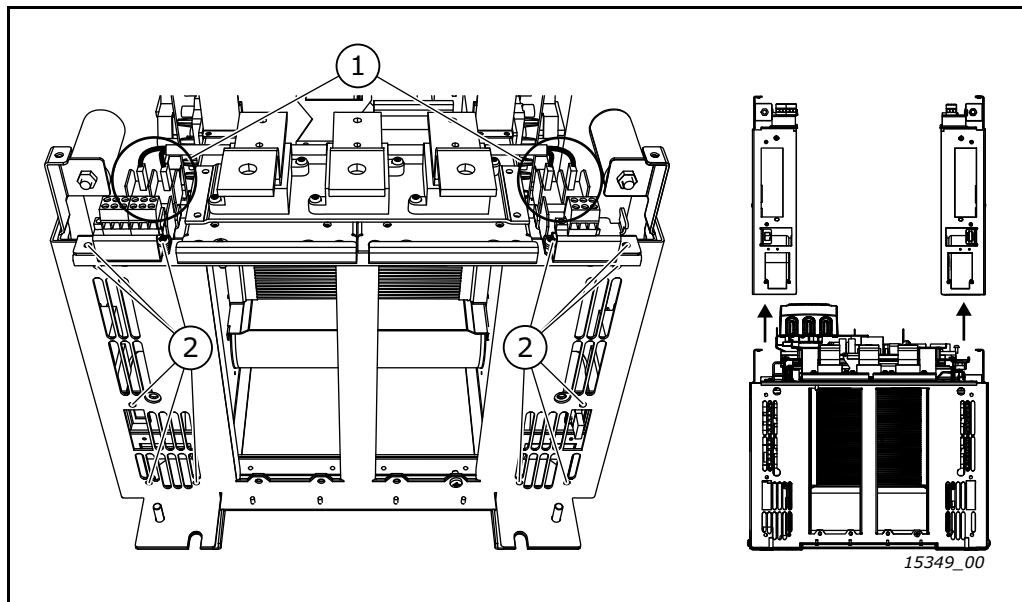


Figure 60. Removing the fan power supply assemblies

4

Take off the Asic plastic cover. Remove the M4x8 screw (MC00032). Use bit TX20 and torque 0.9 Nm.

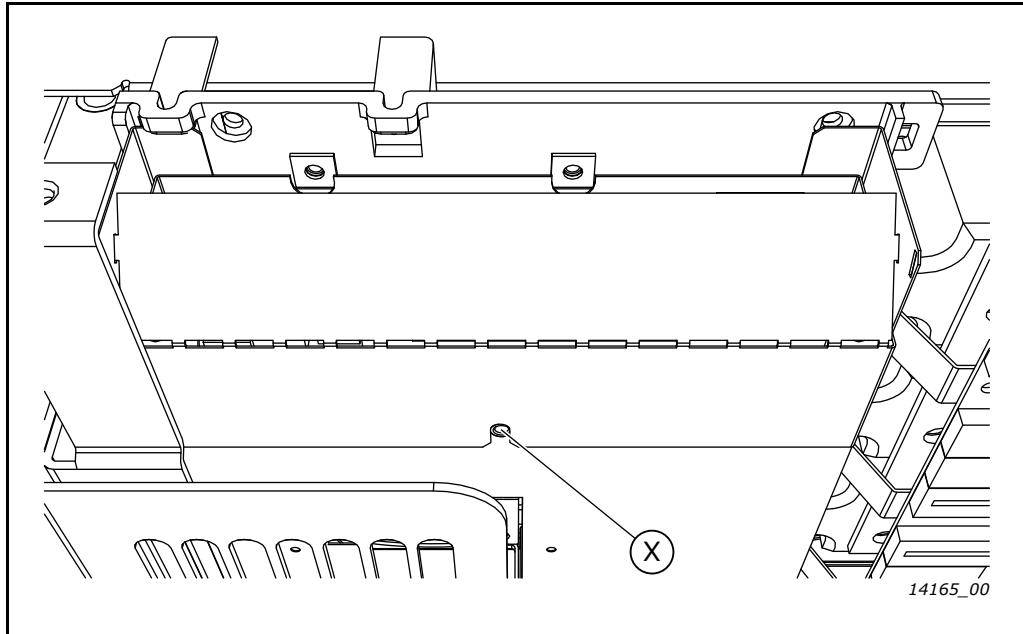


Figure 61. Removing the Asic plastic cover

5

Release the asic assembly. Remove the two M4x12 mounting screws (MC00037). Use bit TX20 and torque 0.9 Nm.

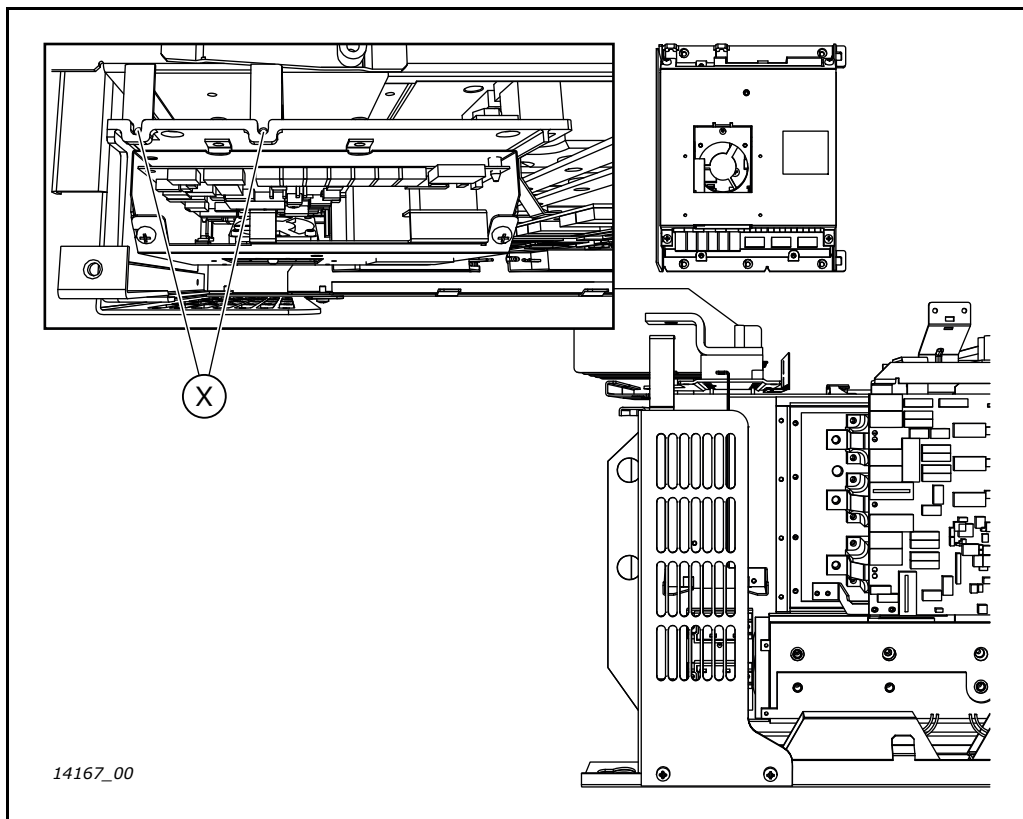


Figure 62. Releasing the Asic assembly

6

Release the asic cover assembly. Remove the four M4x8 mounting screws (MC00032). Use bit TX20 and torque 0.9 Nm. Notice the DC- wire mounted on the cover under one of the screws.

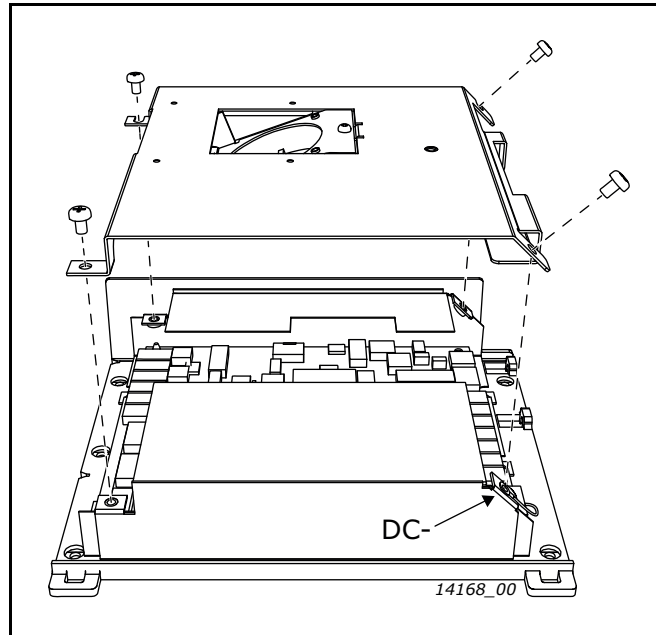
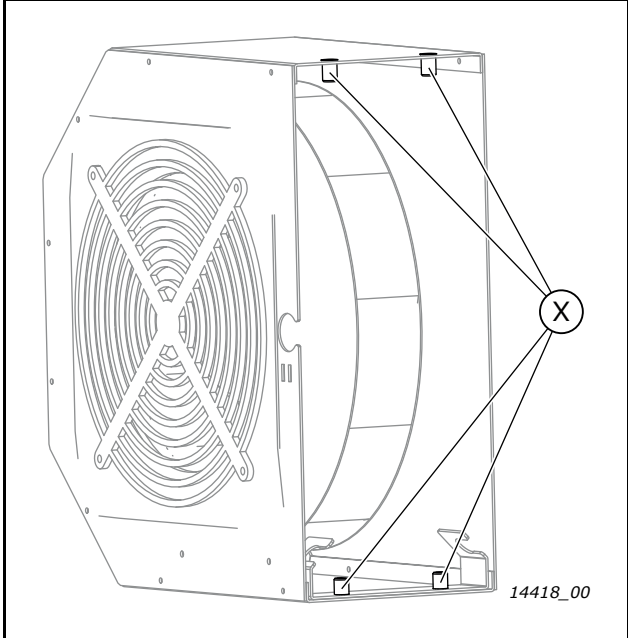


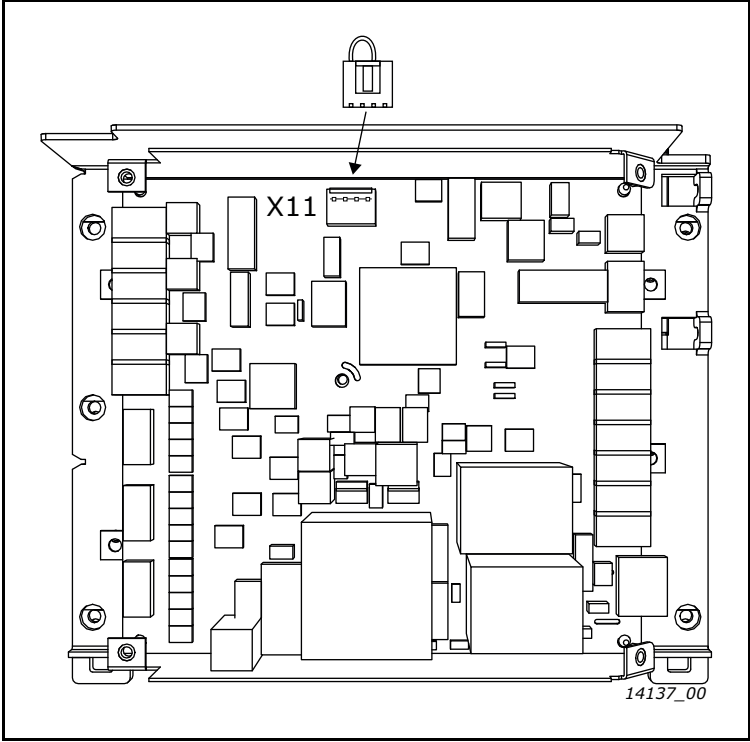
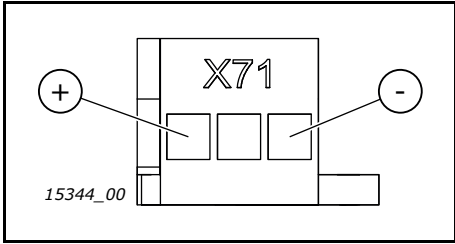
Figure 63. Removing the Asic cover assembly

6.3 DC FAN AND EXTERNAL DC POWER SUPPLY INSTALLATION

Once the AC fans and other old parts have been removed (see Chapter 6.2), install the new DC fans and external DC power supplies.

NOTE! The following instructions apply to both FR10 and FR12, since the FR12 unit consists of two FR10 units.

1	<p>Install the two external fan power supply assemblies in place of the old power supply assemblies. The power supplies are mounted in the same way as the old assemblies (see Figure 60 on page 40). Use the M5x10 screws (MC00046) supplied in the retrofit kit.</p>
2	<p>Install the two DC fans. The fans are mounted in the same way as the old AC fans (see Figure 59 on page 40). Use the four M6x20 mounting screws (MC00042) supplied in the retrofit kit.</p> <p>When installing the fans, make sure that the pins (X) are aligned with the holes in the drive frame. First, install the backside of the assembly. Then, lift the frontside up in order to align the screw holes.</p> <div data-bbox="564 860 1195 1496"></div> <p data-bbox="708 1514 1050 1554"><i>Figure 64. Installing the fan</i></p>

<p style="text-align: center; font-size: 2em; font-weight: bold;">3</p>	<p>Install the jumper included in the kit on connector X11 on the Asic board.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><i>Figure 65. Installing the jumper connector on the Asic board</i></p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">4</p>	<p>Install the new Asic cover and fan assembly. The cover is mounted in the same way as the old one (see Figure 63 on page 42).</p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">5</p>	<p>Re-install the Asic assembly. See Step 5 and Step 4 in Chapter 6.2.</p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">6</p>	<p>Connect an external 48 V_{DC} power supply on the fan supply terminals and check that the DC fans function.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><i>Figure 66. External DC power supply terminal for the fan</i></p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">7</p>	<p>If the fans and power supplies work properly, re-attach the drive covers. See Figure 58 on page 39.</p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">8</p>	<p>Attach the 'Product modified' -sticker (70CPL00062) supplied in the retrofit kit in a visible place on the front side of the drive. On the sticker, write "DC fan retrofit" and the installation date.</p> <p>In FR12, place a sticker on both units.</p>

7. FR11 RETROFIT KIT INSTALLATION

7.1 RETROFIT KIT CONTENTS

Table 7. FR11 DC fan retrofit assembly kit (SPR-MEC23670) part list

#	Item number	Item description	Pcs
1	70CPA00553	DC main fan assembly	3
2	70CPA03293	External fan supply assembly	3
3	70CPA02033	Asic cover and fan assembly	1
4	PP11016	Asic wire set for external supply	1
5	MC00042	M6x20-DIN6900-3-Combi-Delta-Tx	6
6	MC00046	M5x10-DIN7500CE-Thread Forming-Zn-Pz	9
7	MC00031	M4x8-DIN7500CE-Thread Forming-Zn-Pz	4
8	70CMC06913	M3x8-DIN7985-4.8-Zn-Tx	6
9	MC00581	M5x10-DIN7500CE-Thread Forming-Zn-Tx	3
10	PP00033	Jumper connector	3
11	70CPL00062	'Product modified' -sticker	1

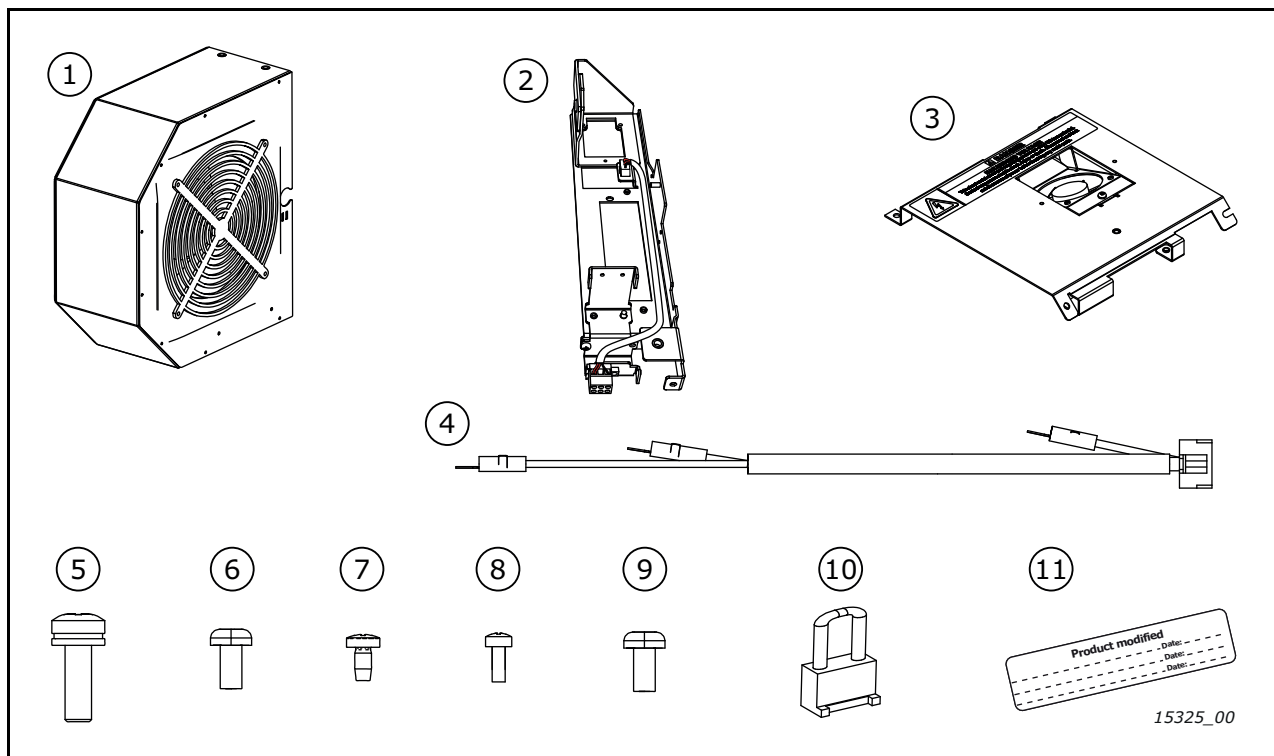
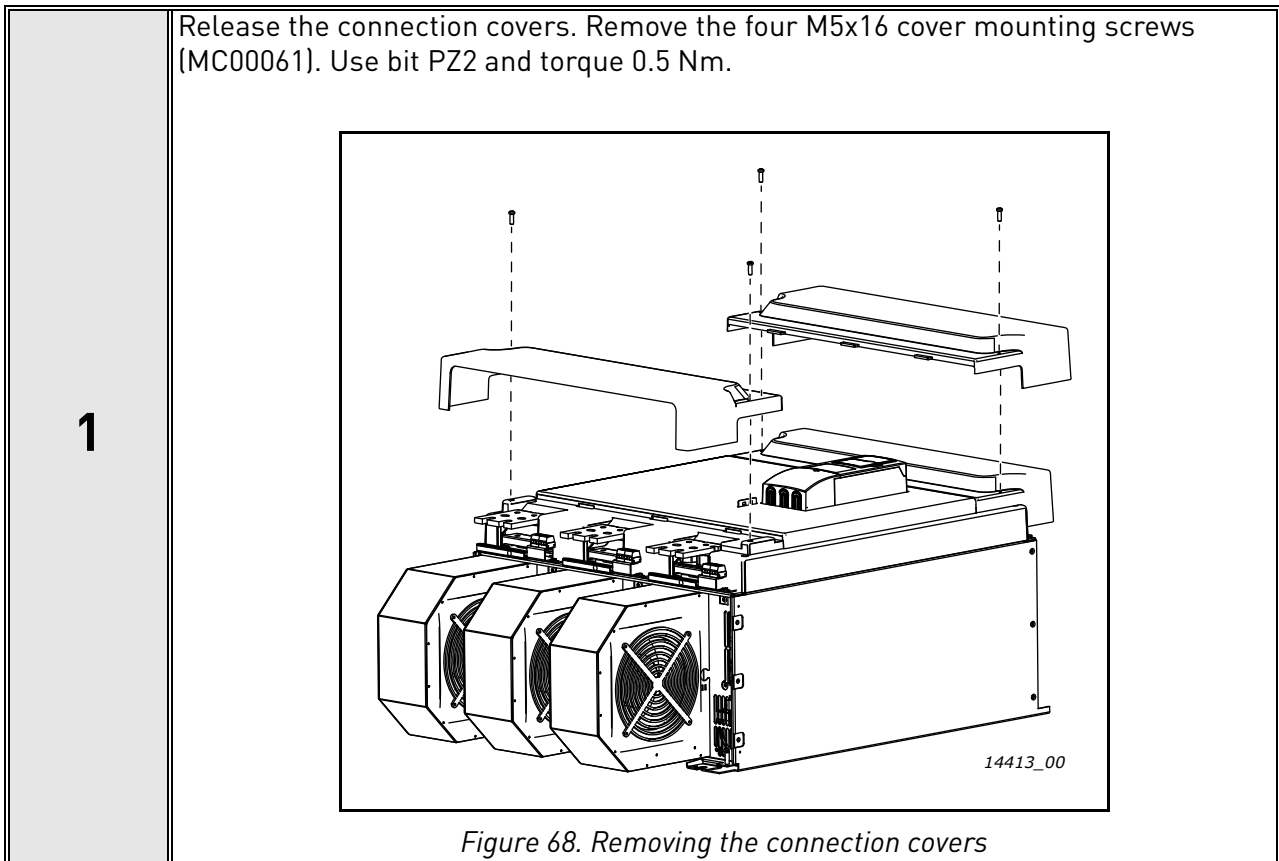


Figure 67. FR11 DC fan retrofit assembly kit contents

7.2 REMOVING THE AC FAN AND EXTERNAL SUPPLY

Before installing the new DC fan and external DC power supply, remove the old AC fan and the external AC supply assembly. Parts to remove:

- AC fans
- Isolation transformers and capacitors
- Fuse base and fuses
- Fan capacitors
- SAF power cables and connectors



2

Release the main cover. Remove the four M5x16 cover mounting screws (MC00061). Use bit PZ2 and torque 1 Nm.

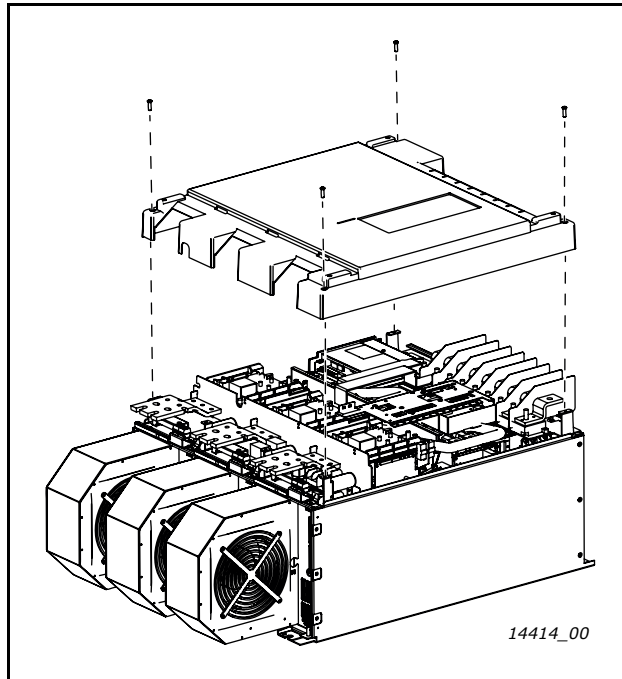


Figure 69. Removing the main cover

3

Disconnect the fan supply wires from the fan inverter connectors.

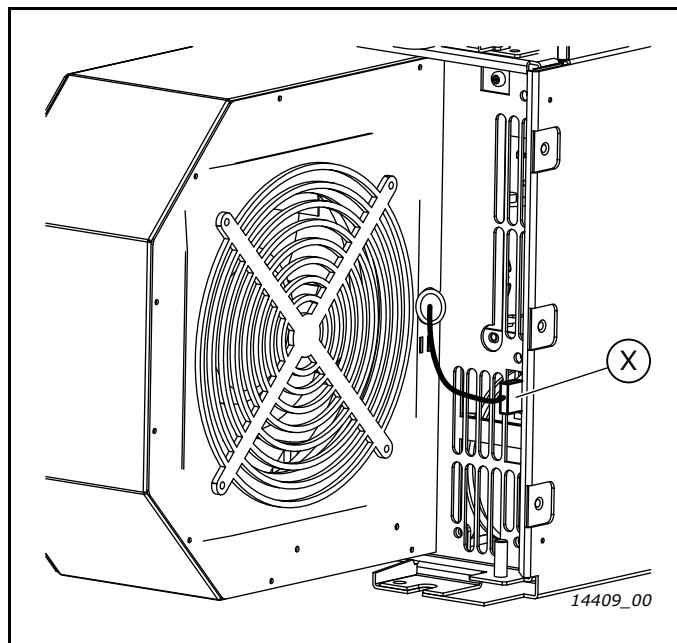


Figure 70. Fan supply wire connector (X)

4

Release the fan assemblies. Remove the M6x20 fan mounting screws. Use bit TX30 and torque 4.5 Nm.

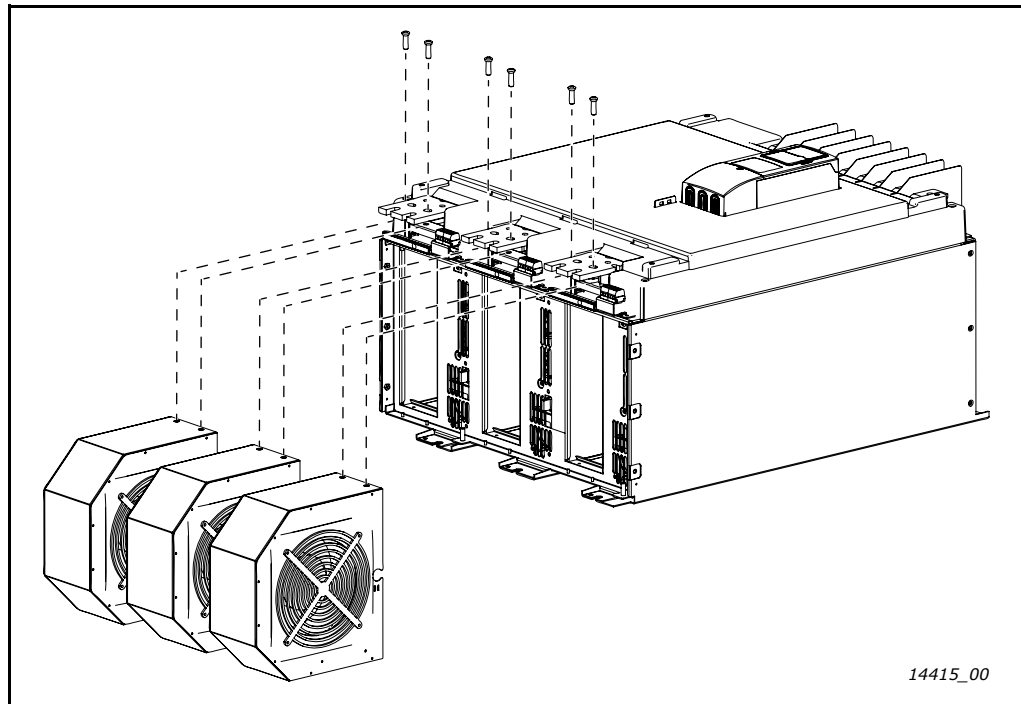


Figure 71. Releasing the main fans

5

Disconnect the SAF transformer power cable from the fuse base terminals (1) and the connector in phase U (2).

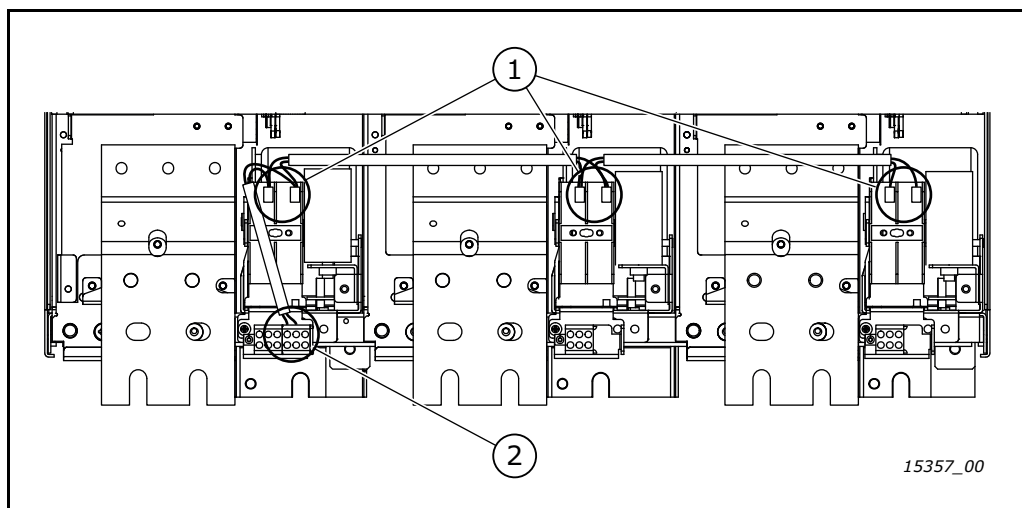


Figure 72. Removing the SAF transformer power cable

6

Release the fan supply assemblies. Remove the M5x10 mounting screws. Use bit PZ2 and torque 2.3 Nm.

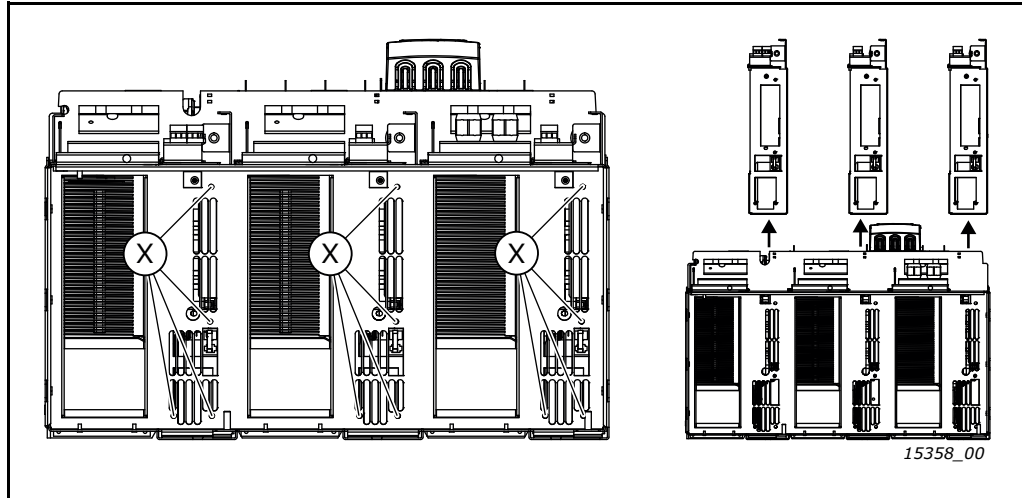


Figure 73. Removing the fan supply assemblies

7

Release the asic cover assembly. Remove the five M4x8 mounting screws (MC00032). Use bit TX20 and torque 2.6 Nm. Notice the DC- wire (X) mounted on the cover under one of the screws.

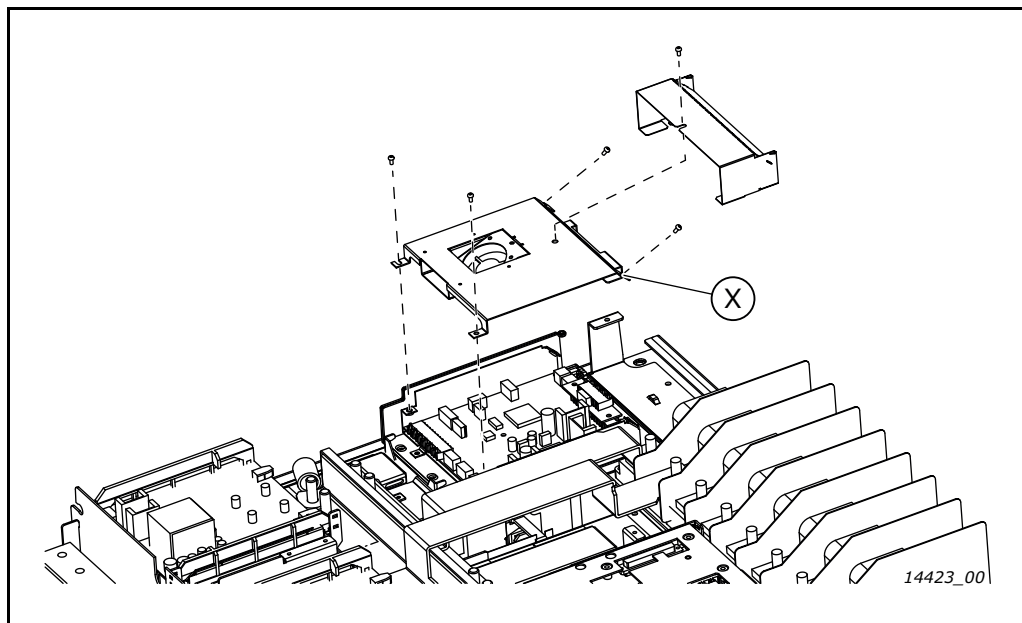


Figure 74. Removing the Asic covers

7.3 DC FAN AND EXTERNAL DC POWER SUPPLY INSTALLATION

Once the AC fans and other old parts have been removed (see Chapter 7.2), install the new DC fans and external DC power supplies.

<p>1</p>	<p>Install the three external fan power supply assemblies in place of the old power supply assemblies. The power supplies are mounted in the same way as the old fan supply assemblies (see Figure 73 on page 49). Use the M5x10 screws (MC00046) supplied in the retrofit kit.</p>
<p>2</p>	<p>Install the three DC fans. The fans are mounted in the same way as the old AC fans (see Figure 71 on page 48). Use the four M5x10 mounting screws (MC00046) supplied in the retrofit kit.</p> <p>When installing the fans, make sure that the pins (X) are aligned with the holes in the drive frame. First, install the backside of the assembly. Then, lift the front side up in order to align the screw holes.</p> <div data-bbox="568 775 1193 1393" data-label="Image"> </div> <p style="text-align: center;"><i>Figure 75. Installing the fan</i></p>
<p>3</p>	<p>Connect the fan supply cables. See Figure 70 on page 47.</p>

4

Install the Asic wire set for external supply to the DC busbars and the Asic supply connector X6.

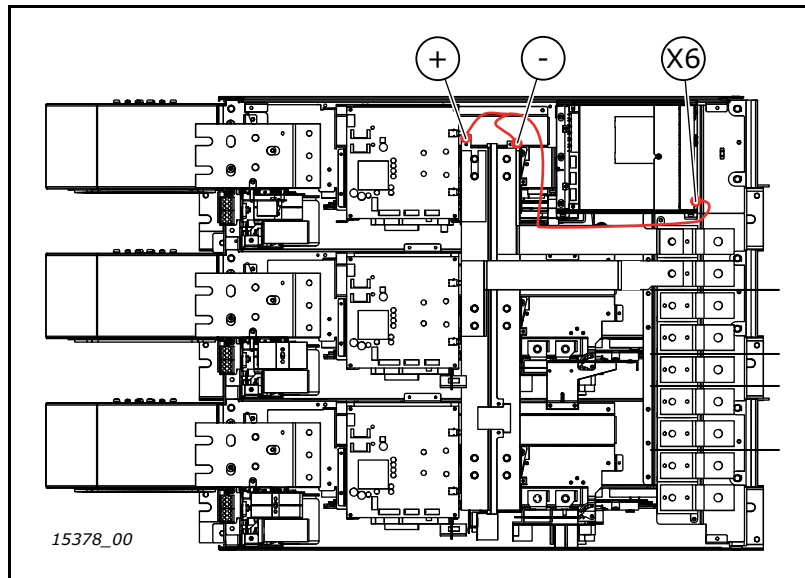


Figure 76. Installing the Asic wire set for external supply

5

Install the jumper included in the kit on connector X11 on the Asic board.

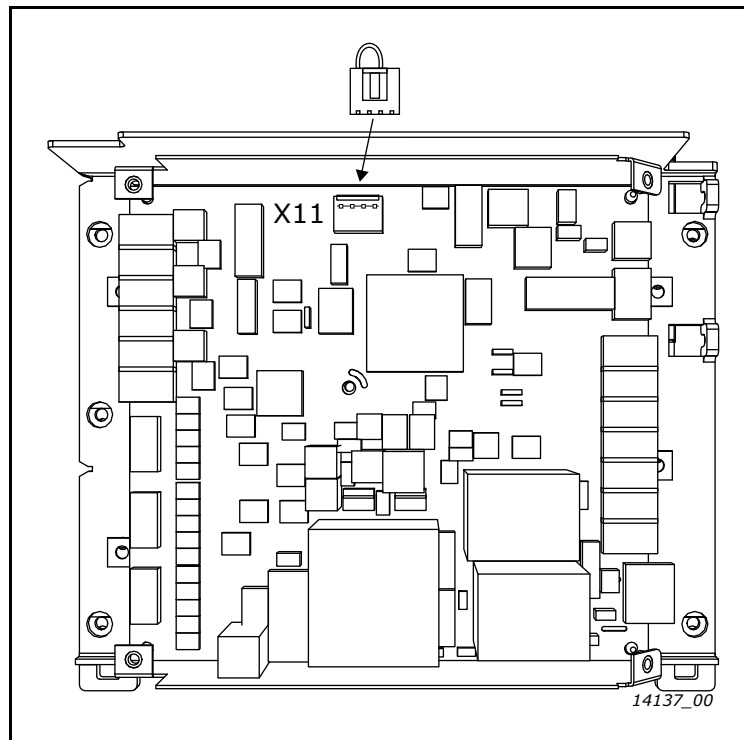
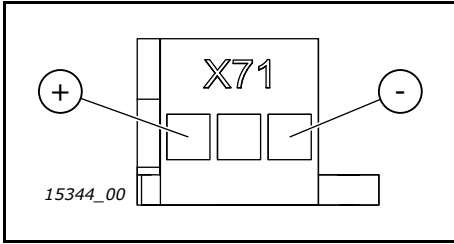


Figure 77. Installing the jumper connector on the Asic board

6

Install the new Asic cover and fan assembly. The cover is mounted in the same way as the old one. See Figure 74 on page 49.

7	<p>Connect an external 48 V_{DC} power supply on the fan supply terminals and check that the DC fans function.</p> <div data-bbox="651 286 1106 528" data-label="Diagram"></div>
8	<p>If the fans work properly, re-attach the front covers.</p>
9	<p>Attach the 'Product modified'-sticker (70CPL00062) supplied in the retrofit kit in a visible place on the front side of the drive. On the sticker, write "DC fan retrofit" and the installation date.</p>

8. FI13 AND FI14 RETROFIT KIT INSTALLATION

8.1 RETROFIT KIT CONTENTS

Table 8. FI13 and FI14 DC fan retrofit assembly kit (SPR-MEC25038 and SPR-MEC25040) part list

#	Item number	Item description	Pcs	
			FI13	FI14
1	70CPA00556	FI9 Maintenance DC fan assembly	3	6
2	70CMC05006	External 48 V fan supply assembly	3	6
3	70CPA03288	Asic cover and fan assembly	1	2
4	PP13059	Fan feedback cable	1	2
5	MC00031	M4x8-DIN7500CE-Thread Forming-Zn-Pz	6	12
6	MC00046	M5x10-DIN7500CE-Thread Forming-Zn-Pz	24	48
7	MC00178	3.6x205 white/black cable tie	10	30
8	MC00016	Bushing rubber GD16	6	12
9	70CPL00062	'Product modified'-sticker	1	2

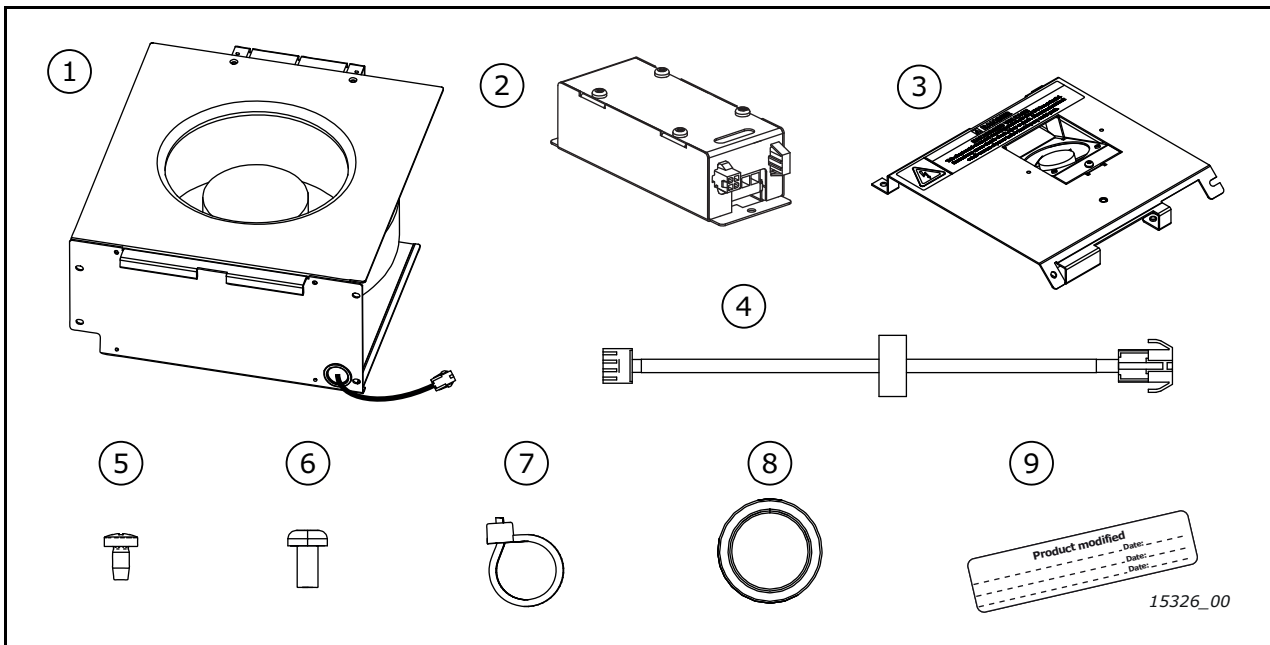


Figure 79. FI13 and FI14 DC fan retrofit assembly kit contents

8.2 REMOVING THE AC FAN AND EXTERNAL SUPPLY

Before installing the new DC fan and external DC power supply, remove the old AC fans and the external AC supply assemblies.

NOTE! The following instructions apply to both FI13 and FI14, since the FI14 unit consists of two FI13 units.

1

Take off the front and connection covers. Remove the M5x16 mounting screws. Use bit PZ2 and torque 1.6 Nm.

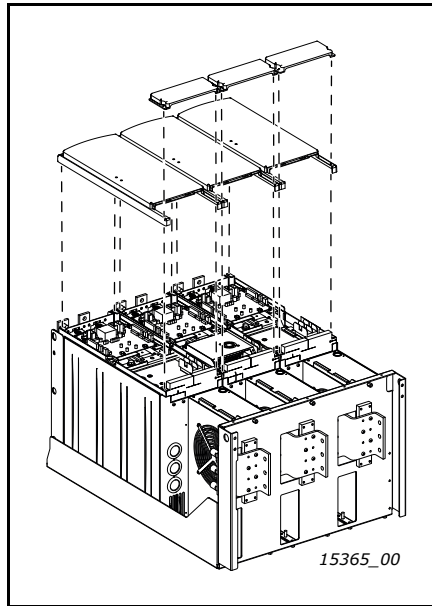


Figure 80. Removing the front covers

2

Disconnect and remove the AC link wire set from the external AC supply assemblies.

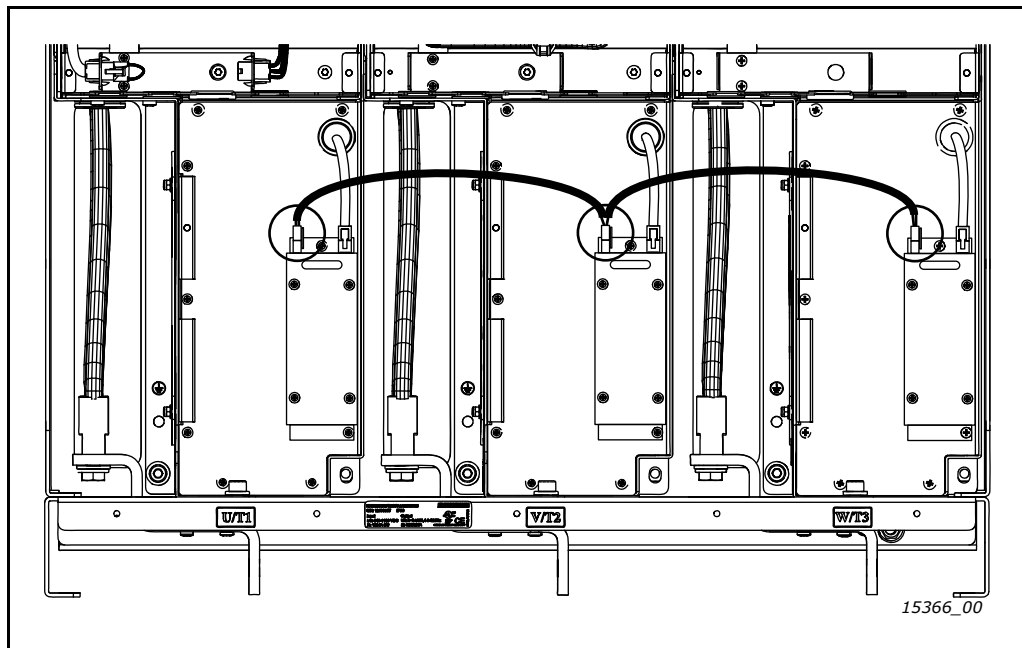


Figure 81. Removing the AC link wire set

3

Release the asic cover assembly. Remove the five M4x8 mounting screws (MC00032). Use bit TX20 and torque 1.1 Nm.

NOTE! Notice the earthing wire (X) under one of the cover mounting screws.

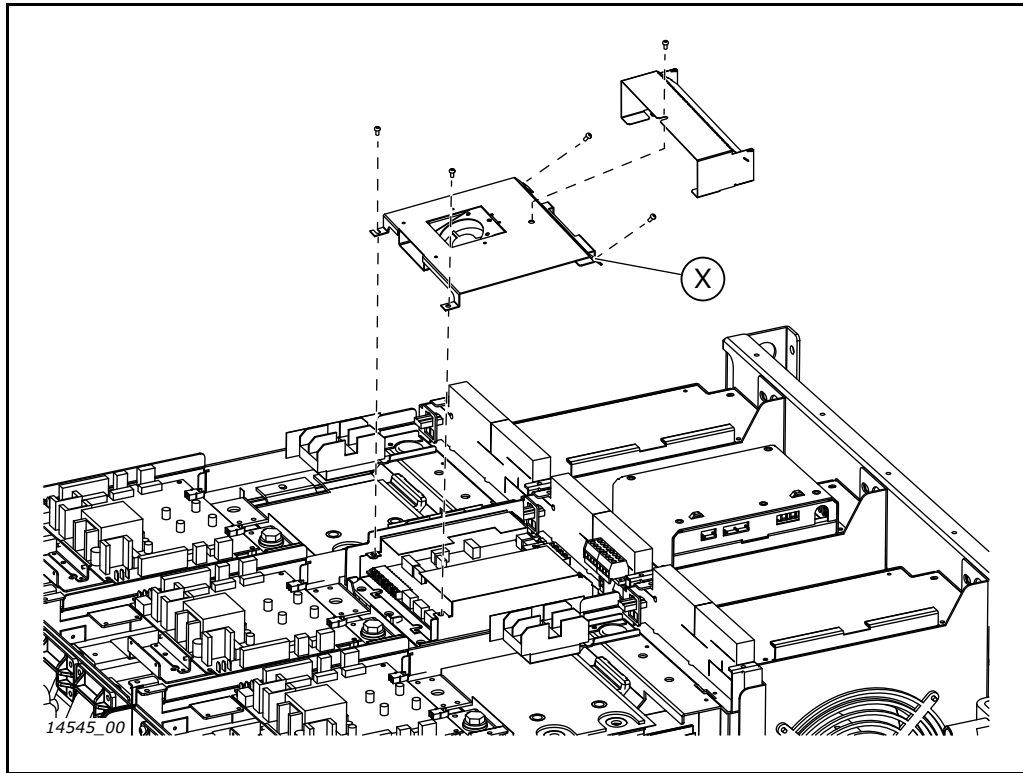


Figure 82. Removing the Asic covers

4

Release the AC fans. Remove the M5x10 screws mounting screws. Use bit PZ2 and torque 3.5 Nm. Pull out the fans.

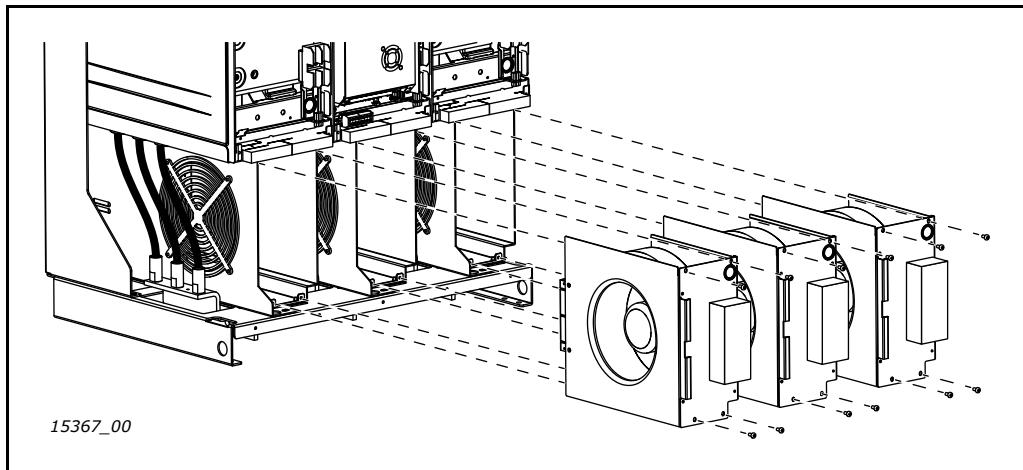


Figure 83. Removing the AC fans

8.3 DC FAN AND EXTERNAL DC POWER SUPPLY INSTALLATION

Once the AC fans and other old parts have been removed (see Chapter 8.2), install the new DC fans and external DC power supply assemblies.

NOTE! The following instructions apply to both FI13 and FI14, since FI14 consists of two FI13 units.

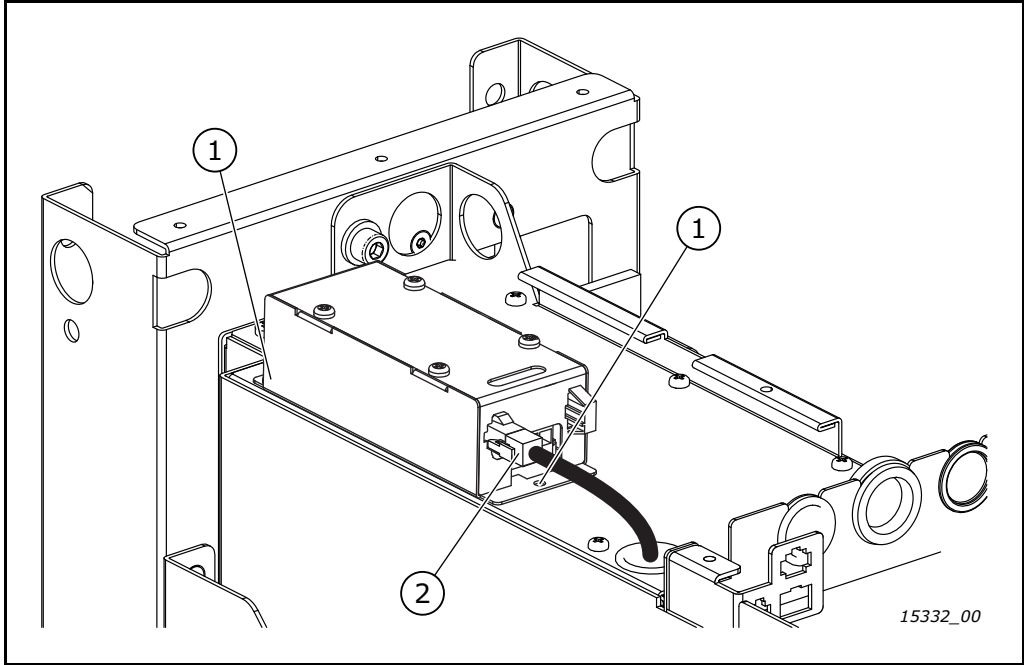
1	<p>Install the three DC fans. The fans are mounted in the same way as the old AC fans. Use the M5x8 mounting screws (70CTC1104026) supplied in the retrofit kit. See Figure 83 on page 55.</p>
2	<p>Install the external DC fan supply assemblies Use the M4x8 screws (1) included in the kit. Use a PZ2 bit and torque 3.5 Nm.</p> <p>Connect the power supply wires (2) from the fans to the external DC fan supplies.</p> <div style="text-align: center;">  </div>

Figure 84. Installing the external DC fan supplies

3	<p>Install the fan feedback cable on the Asic board connector X11 and the other end of the cable (X3) on the cable plug holder as shown below.</p> <div data-bbox="365 286 1394 875" style="text-align: center;"> </div> <p style="text-align: center;"><i>Figure 85. Installing the fan feedback wire</i></p>
4	<p>Install the new Asic cover and fan assembly. The cover is mounted in the same way as the old one. See Figure 82 on page 55.</p>
5	<p>Connect an external 48 V_{DC} power supply on the terminals and check that the DC fans function.</p> <div data-bbox="572 1149 1182 1527" style="text-align: center;"> </div> <p style="text-align: center;"><i>Figure 86. External DC power supply terminal for the fan</i></p>
6	<p>If the fans work properly, re-attach the covers on the the drive. See Figure 82 on page 55 and Figure 80 on page 54.</p>
7	<p>Attach the 'Product modified'-sticker (70CPL00062) supplied in the retrofit kit in a visible place on the front side of the drive. On the sticker, write "DC fan retrofit" and the installation date.</p> <p>In FI14, place a sticker on both units.</p>

9. FR13 AND FR14 RETROFIT KIT INSTALLATION

9.1 RETROFIT KIT CONTENTS

Table 9. FR13 (2x/3x/4xNFE) and FR14 (3x/4xNFE) DC fan retrofit assembly kit (SPR-MEC25023, SPR-MEC25024, SPR-MEC25025, SPR-MEC25034 and SPR-MEC25035) part list

#	Item number	Item description	FR13			FR14	
			2xNFE	3xNFE	4xNFE	3xNFE	4xNFE
1	70CPA00556	DC main fan assembly	5	6	7	9	10
2	70CMC05006	External 48 V fan supply assembly	5	6	7	9	10
3	PP13053	External fan supply adapter	2	3	4	3	4
4	70CPA03288	Asic cover and fan assembly	1	1	1	2	2
5	70CMR00188	48 V _{DC} fan extension wire	2	3	4	3	4
6	70CPE05112	DC- additional wire kit	2	3	4	3	4
7	PP13059	Fan feedback cable	1	1	1	2	2
8	MC00031	M4x8-DIN7500CE-Thread Forming-Zn-Pz	10	8	10	8	10
9	MC00032	M4x8-DIN6900-3-Combi-Delta-TX 8.8	4	6	8	6	8
10	MC00046	M5x10-DIN7500CE-Thread Forming-Zn-Pz	20	20	25	35	45
11	MC00016	Bushing rubber GD16	14	6	7	9	10
12	MC00051	Bushing rubber GD21	2	3	4	3	4
13	MC00178	3.6x205 white/black cable tie	20	20	30	30	40
14	MC00705	Holder TA1S8 M4	2	3	4	3	4
15	70CPL00062	'Product modified'-sticker	3	4	5	5	6
16	PP13101	FR13 wire harness for 2-NFE	1				2
17	PP13100	FR13 wire harness for 3-NFE		1		1	
18	PP13108	FR13 wire set 12-pulse			1		

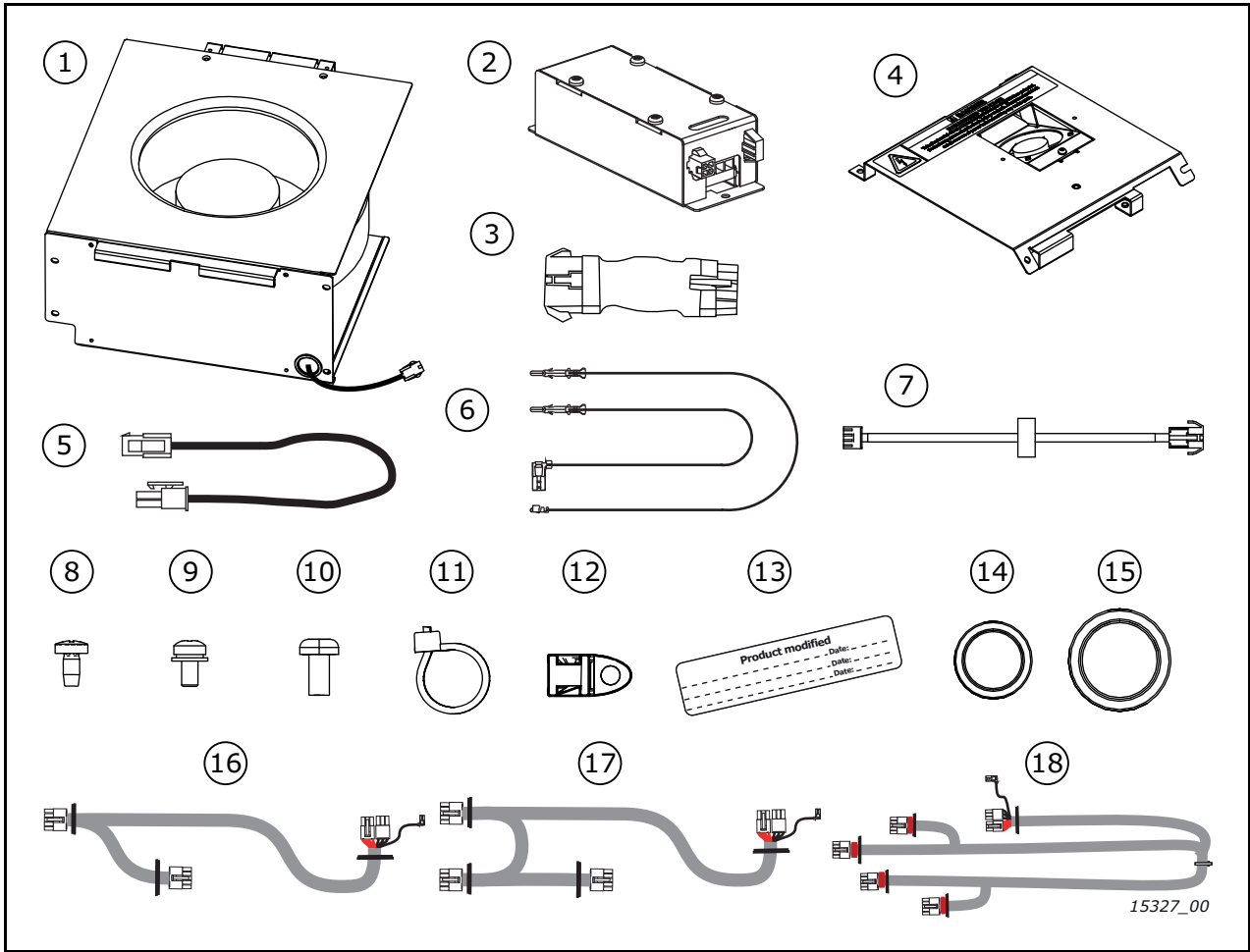
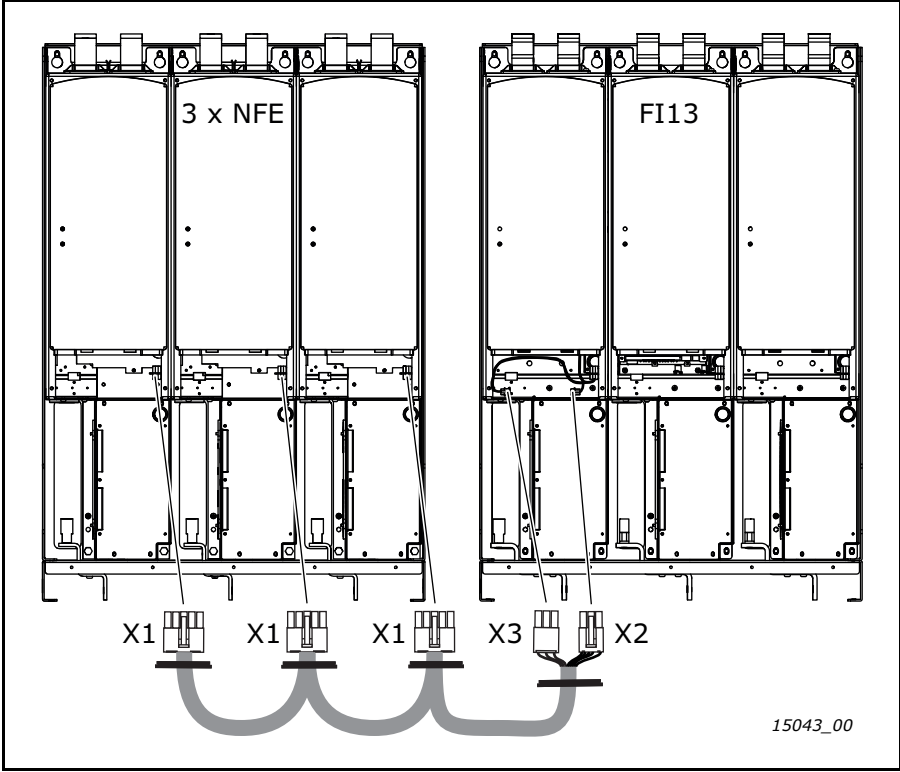


Figure 87. FR13 and FR14 DC fan retrofit assembly kit contents

9.2 REMOVING THE AC FAN AND EXTERNAL SUPPLY

Before installing the new DC fans and DC power supplies, remove the old AC fans and the external AC supply assemblies.

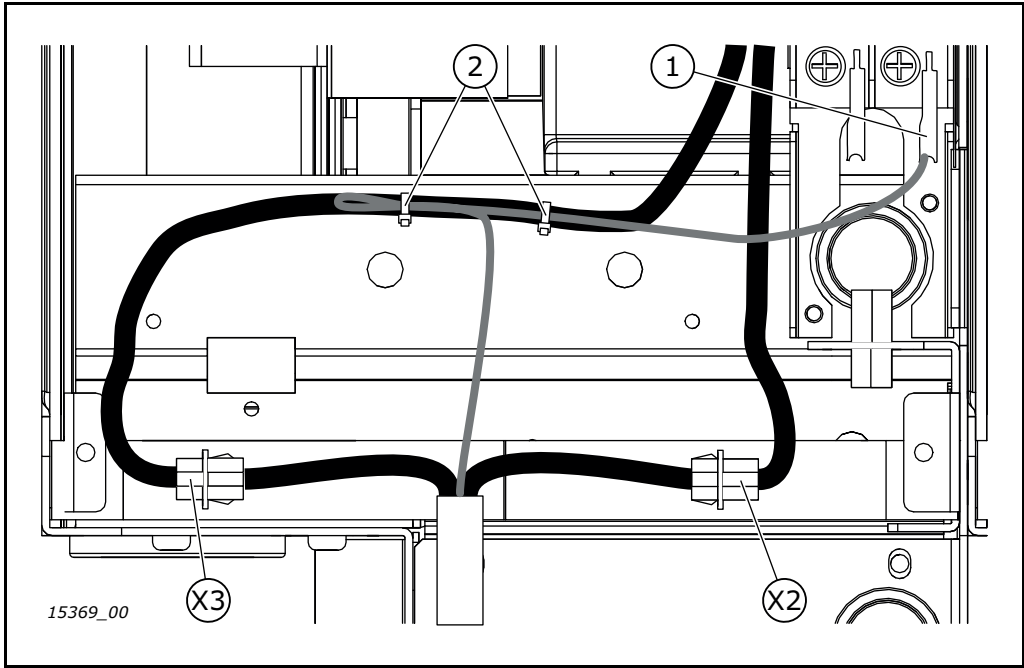
NOTE! The following instructions apply to both FR13 and FR14, since the FR14 unit consists of two FR13 units.

1	<p>Remove the FR13 wire harness from between the FI13 and NFE units. There can be between 2-4 NFE units depending on the setup.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><i>Figure 88. FR13 wire harness for 3 NFE units</i></p>
2	<p>Remove the AC fans and external AC supply assemblies from the FI13 unit. See the instructions in Chapter 8.2.</p>
3	<p>Remove the AC fans and external AC supply assemblies from the NFE units. See the instructions in Chapter 3.2.</p>

9.3 DC FAN AND EXTERNAL DC POWER SUPPLY INSTALLATION

Once the AC fans and other old parts have been removed (see Chapter 9.2), install the new DC fans and external DC power supply assemblies.

NOTE! The following instructions apply to both FR13 and FR14, since the FR14 unit consists of two FR13 units.

1	Install the new DC fans, external DC power supply assemblies and Asic cover and fan assemblies to the FI13 unit. See the instructions in Chapter 8.3.
2	Install the new DC fans and external DC power supply assemblies to the NFE units. See the instructions in Chapter 3.3.
3	<p>Connect the FR13 wire harness supplied in the retrofit kit (PP13100, PP13101 or PP13108) between the FI13 and NFE units. The harness is connected as shown in Figure 88 on page 60, except the new wire harness has an additional DC- wire, which needs to be connected on the FI13 fuse base (see 1 in the figure below).</p> <p>Use two cable ties (MC00178, see 2 in figure below) supplied in the retrofit kit to tie the DC- wire on the FI13 wire harness.</p>  <p style="text-align: center;"><i>Figure 89. FR13 wire harness installation to the FI13 unit</i></p>

Document ID:



DPD01926A

Rev. A