Installation Guide

Power Interface Board Replacement in Fx06-Fx08

iC7 Series Frequency Converters

1 Overview

1.1 Description: Power Interface Board Kit Fx06-Fx08

The power interface board replacement kit contains all components required to install a new power interface board in the following iC7 Series Frequency Converters. The frame is listed on the product label.

Follow the instructions in this guide to install the power interface board, and use the programming instructions (136R0444) to program the board.

- Fx06 frames = FA06/FB06/FK06
- Fx07 frames = FA07/FB07/FK07
- Fx08 frames = FA08/FB08/FK08

1.2 Spare Part Code Numbers

Use these instructions with the following programmable power interface boards.

Table 1: Programmable Power Interface Board Kits, Fx06–Fx08 Frames

Number	Description
136B2765	Program. Power Interface Board Fx06
136B2766	Program. Power Interface Board Fx07
136B2767	Program. Power Interface Board Fx08
136B3194	Program. Power Interface Board Fx06 24 V
136B3195	Program. Power Interface Board Fx07 24 V
136B3196	Program. Power Interface Board Fx08 24 V

1.3 Items Supplied

Table 2: Items Supplied in Power Interface Board Replacement Kit

Item	Quantity
Power interface board	1
Cable assembly, SAFE, power to PCBA, PIC (Ribbon cable)	1
Fasteners	Varies
Installation instructions (136R0445)	1
Programming instructions (136R0444)	1

2 Installation

2.1 Safety Information

NOTICE

QUALIFIED PERSONNEL

Only qualified personnel are allowed to install the parts described in these installation instructions.

- Disassembly and reassembly of the frequency converter must be done in accordance with the corresponding service guide.
- Use the standard fastener torque values from the service guide, unless the torque value is specified in these instructions.

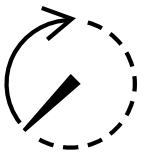
⚠ WARNING

ELECTRIC SHOCK HAZARD

The frequency converter contains dangerous voltages when connected to mains voltage. Improper installation, and installing or servicing with power connected, can cause death, serious injury, or equipment failure.

- Only use qualified electricians for the installation.
- Disconnect the frequency converter from all power sources before installation or service.
- Treat the frequency converter as live whenever the mains voltage is connected.
- Follow the guidelines in these instructions and local electrical safety regulations.

⚠ WARNING



DISCHARGE TIME

The frequency converter contains DC-link capacitors, which can remain charged even when the frequency converter is not powered. High voltage can be present even when the warning indicator lights are off.

Failure to wait the specified time after power has been removed before performing service or repair work can result in death or serious injury.

- Stop the motor.
- Disconnect AC mains, permanent magnet type motors, and remote DC-link supplies, including battery backups, UPS, and DC-link connections to other frequency converters.
- Disconnect or lock the motor.
- Disconnect any brake option.
- Disconnect any DC connection option and any connections to the DC terminals DC(+) and DC(-).
- Wait for the capacitors to discharge fully. The minimum waiting time is specified in the following discharge time table and is listed on the frequency converter labeling.
- Before performing any service or repair work, use an appropriate voltage measuring device to make sure that the capacitors are fully discharged.

Table 3: Discharge Time

Drive	Minimum waiting time
Fx06–Fx08 frequency converters	15 minutes

2.2 Disassembly of the Frequency Converter

A detailed disassembly/reassembly procedure for iC7 Series Fx06–Fx08 frequency converters is provided in the service guides.

Downloading the service guides from the Drives Service Extranet (danfoss.com) before starting the work is recommended.

To disassemble the frequency converter, select 1 of the following frames:

- FA06/FB06/FK06: Refer to 2.3.1 Disassembly
- FA07/FB07/FK07: Refer to 2.3.1 Disassembly
- FA08/FB08/FK08: Refer to 2.4.1 Disassembly

Table 4 lists iC7 series frame identification, which is used in the following disassembly/reassembly procedures.

Table 4: Frame Identification

Frame	Applies to
FA06–FA07–FA08	IP20/UL Open Type
FK06–FK07–FK08	IP21/UL Type 1
FB06–FB07–FB08	IP54/IP55/UL Type 12
Fx06	FA06/FB06/FK06
Fx07	FA07/FB07/FK07
Fx08	FA08/FB08/FK08

2.3 Frame FA06–FB06–FK06/FA07–FB07–FK07

2.3.1 Disassembly

1. Unfasten and remove the front cover.
   a. FA06/FA07: Unfasten 2 screws (T30) from the front cover.
   b. FK06/FK07: Unfasten 2 screws (T30) from the front cover.
   c. FB06/FB07: Unfasten 8 screws (T30) from the front cover.
2. Remove the control plate with control unit:

   The control unit can remain attached to the control plate.

   a. FA06: Unfasten 11 screws (T20) from the control plate.
   b. FB06–FK06: Unfasten 8 screws (T20) from the control plate.
   c. FA07: Unfasten 12 screws (T20) from the control plate.
   d. FB07–FK07: Unfasten 11 screws (T20) from the control plate
   e. Fx06/Fx07: Gently pull outwards in the top of the control plate, to disconnect the control unit from the frequency converter.
   f. Fx06/Fx07: Slide the control plate upwards and remove the control plate from the frequency converter.
3. Remove the mains input option:
   a. Fx06/Fx07 Unfasten 4 screws (T20) between the mains input option and the terminal plate.
   b. Fx06/Fx07 Unfasten 3 screws (T25) from the cables on the mains input option.
4. Remove the EMC plate and input plate:
   a. FA06/FA07: Remove the terminal protector covers.
   b. FA06/FA07: Unfasten 4 screws (T25) from the EMC plate.
   c. FB06–FK06/FB07–FK07: Unfasten 2 screws (T25) and remove the midplate from the input plate.
   d. FB06–FK06/FB07–FK07: Unfasten 4 screws (T25) and remove the input plate.

5. Remove the cable entry support, internal fan and, lower support body.
   a. FB06–FK06/FB07–FK07: Unfasten 6 screws (T25) and remove the cable entry support.
   b. FB06–FK06/FB07–FK07: Unplug the internal fan cable.
   c. FB06–FK06/FB07–FK07: Unfasten 4 screws (T25) and remove the internal fan.
   d. FB06–FK06/FB07–FK07: Unfasten 4 screws and remove the lower support body.

   Pull the internal fan cable out of the oval cable entry hole on the lower support body.

6. Remove upper support body:
   a. Fx06/Fx07: Pull the cable plug to remove the control unit cables from the upper support body assembly.
   b. Fx06/Fx07: Unclip the control unit cables from the 2 cable clamps.
   c. Fx06/Fx07: Unfasten 4 screws (T30) and remove the upper support body assembly and 4 body spacers.
7. Remove the body.
   a. FA06/FA07: Unfasten 2 screws (T25) from the body.
   b. Fx06/Fx07: Carefully pull in the body until it is released from the sealing all the way around and remove the body from the frequency converter.

   Remove the body by hand, tools are not needed.

8. Remove the terminal plate assembly:
   a. Fx06/Fx07: Unfasten 6 screws (T25) from the Br/Ls busbar assembly.
   b. Fx06/Fx07: Unfasten 6 screws (T20) from the terminal plate and remove the terminal plate with Br/Ls busbar assembly.

2.3.2 Removing the Power Interface Board

To remove the power interface board from the frequency converter, use the following steps.

1. Fx06/Fx07: Unplug the cables from the power interface board connectors.

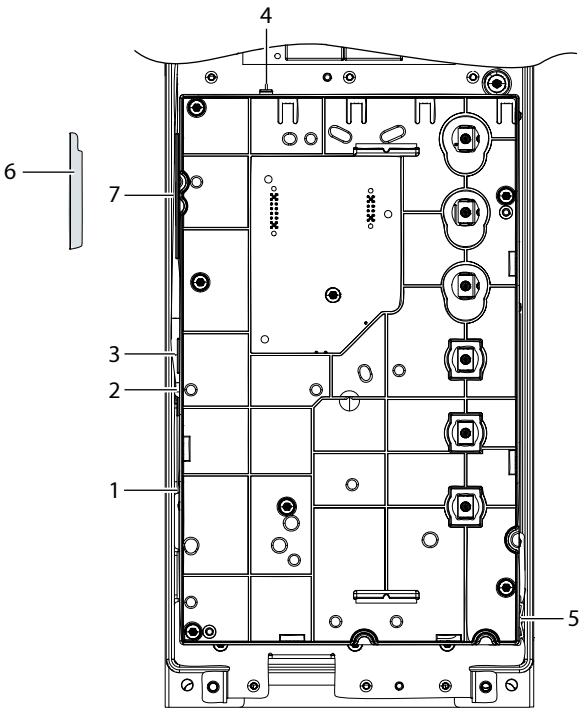


Figure 1: Removal of Cable Plugs from Power Interface Board

1	Fan cable	**2**	Control unit cable 1
3	Control unit cable 2	**4**	RFI cable
5	DC cable	**6**	Insulator clamp
7	Ribbon cable (power interface board/power board)		

2. Fx06/Fx07: Unfasten 7 screws (T20) and remove the power interface board.

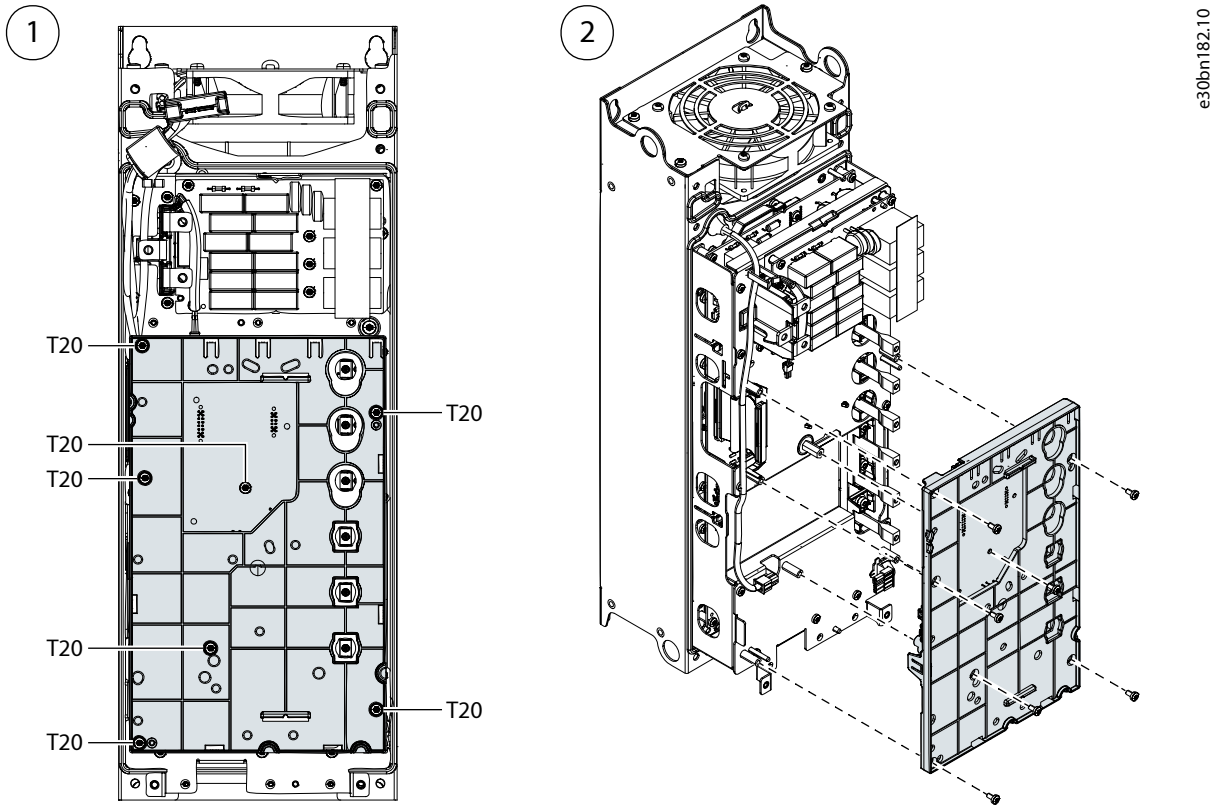


Figure 2: Removal of Power Interface Board

3. Fx06/Fx07: Unplug the ribbon cable from the power board and dispose of the ribbon cable in accordance with local waste regulations.

Use the provided ribbon cable in the spare part package during reassembly of the power interface board.

4. Fx06/Fx07: Gently unclip the power interface board from the power interface board cover, starting at the bottom and working towards the top.

No tools are needed.

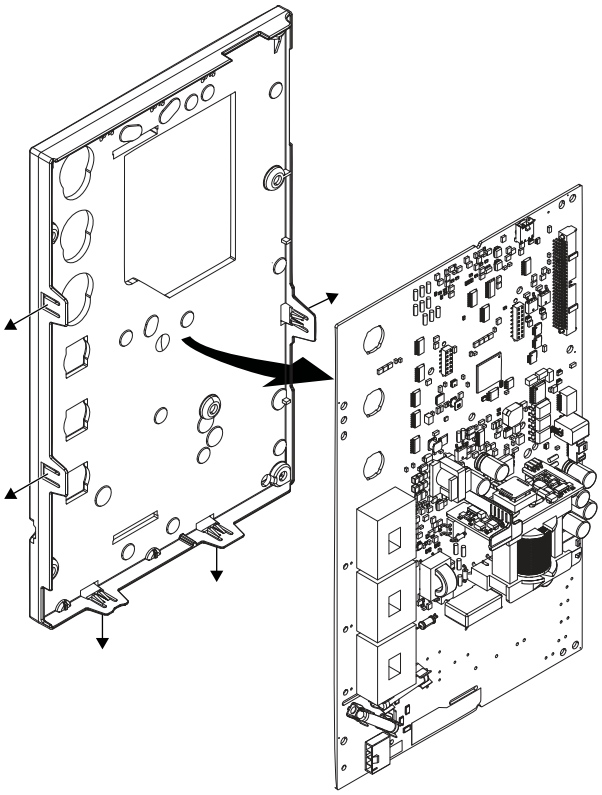


Figure 3: Disassemble the Power Interface Board from the Cover

2.3.3 Installing the Power Interface Board

To install the power interface board, use the following steps.

1. Fx06/Fx07: Position the power interface board from the spare part package on the cover.
2. Fx06/Fx07: Place the top of the power interface board under the 4 tabs in the cover, see position 1 in Figure 4.
3. Fx06/Fx07: Gently press the sides of the power interface board until the 5 tabs lock with a click, starting at the top and working towards the bottom.

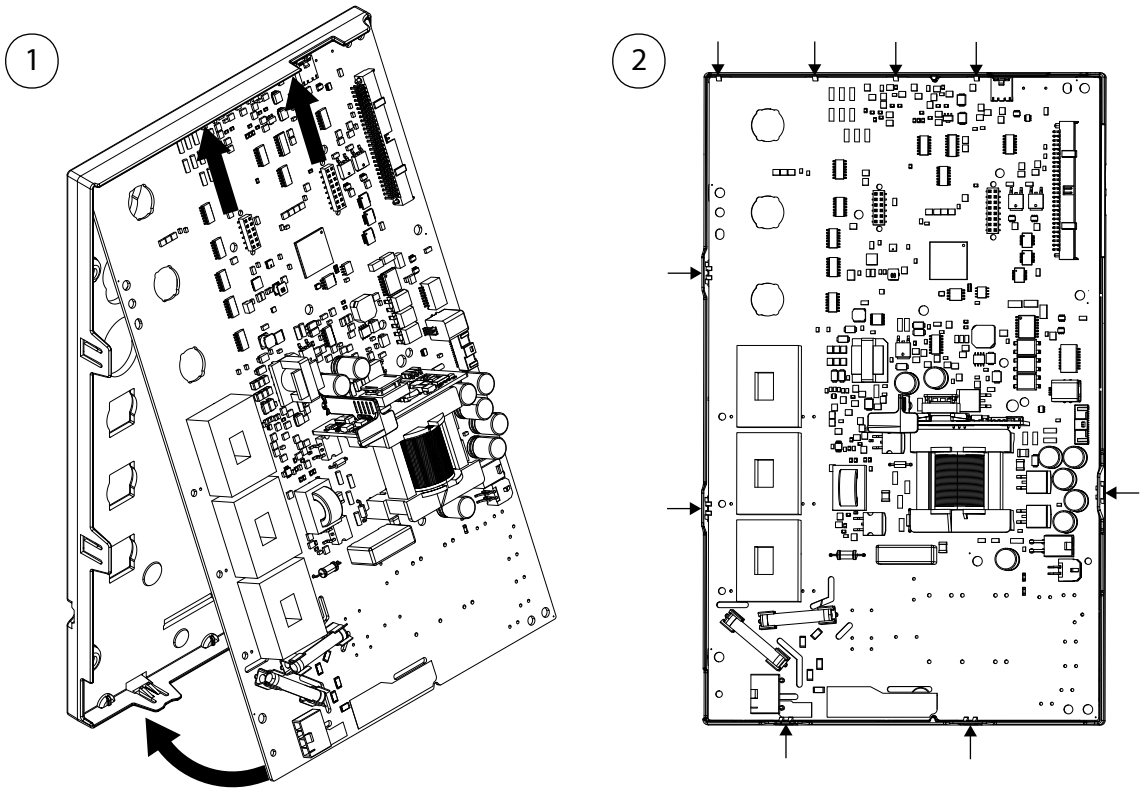


Figure 4: Positioning the Power Interface Board in the Cover

4. Fx06/Fx07: Position the power interface board on the frequency converter.
5. Fx06/Fx07: Fasten the power interface board with 7 screws (T20) .

   For position of screws, see Figure 2.

   Torque 2.5 Nm (22.1 in-lb).
6. Reconnect the cables to the power interface board.

   For position of the cable connectors on the power interface board, see Figure 1.

   a. Fx06/Fx07: Connect the ribbon cable between the power interface board and power board.

      Use the new ribbon cable provided in the spare part package.

      NOTE: Handle the ribbon cable with care during installation. It is fragile and may break if excessive force is applied.

   b. Fx06/Fx07: Position the insulation clamp on the cable clamp slider.

   c. Fx06/Fx07: Place the fan cable and control unit cables in the cable clamp slider.

      Align the 2 cable plugs from the control unit cable with the 2 connectors on the power interface board.

   d. Fx06/Fx07: Reconnect the 5 cable plugs.

      - Fan cable
      - Control unit cable 1
      - Control unit cable 2

- RFI cable
- DC cable

2.3.4 Reassembly

1. Reassembly of the terminal plate assembly:
   a. Fx06/Fx07: Position and fasten the terminal plate assembly with 6 screws (T20).

      Torque 2.5 Nm (22.1 in-lb).

   b. Fx06/Fx07: Fasten the Br/Ls busbar assembly with 6 screws (T25).

      Torque 3.5 Nm (31 in-lb).

2. Reassembly of the body:
   a. FA06/FA07: Position the body on the frequency converter and fasten with 2 screws (T25).

      Torque 3.5 Nm (31 in-lb).

   b. FB06–FK06/FB07–FK07: Position the body on the frequency converter.
   c. FB06–FK06/FB07–FK07: Position the lower body support in the bottom part of the body.

      Pull the internal fan cable through the oval cable entry hole on the lower support body.

   d. FB06–FK06/FB07–FK07: Fasten the top of the lower support body with 4 screws (T25).

      2 standard metric screws in the top of the lower support body.
      Torque 3.5 Nm (31 in-lb).

      2 thread forming for plastic screws in the bottom of the lower support body.
      Torque 4.5 Nm (39.8 in-lb).

   e. FB06–FK06/FB07–FK07: Position the internal fan and fasten with 4 screws (T25).

      2 standard metric screws in the top of the internal fan.
      Torque 3.5 Nm (31 in-lb).

      2 thread forming for plastic screws in the bottom of the internal fan.
      Torque 4.5 Nm (39.8 in-lb).

   f. FB06–FK06/FB07–FK07: Reconnect the internal fan cable.
   g. FB06–FK06/FB07–FK07: Position the cable entry support and fasten with 6 screws (T25).

      Torque 3.5 Nm (31 in-lb).

3. Reassembly of the upper support body assembly:
   a. Fx06/Fx07: Insert 4 body spacers and position the upper support body assembly on the 4 body spacers.
   b. Fx06/Fx07: Fasten with 4 screws (T30)

      Torque 3.5 Nm (31 in-lb).

   c. Fx06/Fx07: Push the control unit cable plug into the rectangular punch on the upper support body assembly, and secure the cable in the 2 cable clamps.
4. Reassembly of the EMC plate and input plate:
   a. FA06/FA07: Position the EMC plate and fasten with 4 screws (T25).

      Torque 3.5 Nm (31 in-lb).

b. FA06/FA07: Install 2 terminal protector covers on the terminal blocks.

c. FB06–FK06/FB07–FK07: Position the input plate and fasten with 4 screws (T25).

Torque 3.5 Nm (31 in-lb).

d. FB06–FK06/FB07–FK07: Position the EMC midplate and fasten with 2 screws (T25).

Torque 3.5 Nm (31 in-lb).

5. Reassembly of the mains input option:

a. Fx06/Fx07: Fasten the mains input option assembly with 4 screws (T20).

Torque 2.5 Nm (22.1 in-lb).

b. Fx06/Fx07: Fasten the input option cables to the RFI busbars with 3 screws (T25).

Torque 3.5 Nm (31 in-lb).

6. Reassembly of the control plate with control unit:

a. Fx06/Fx07: Gently slide the control plate downwards from the top of the frequency converter, until it is aligned with the screw holes.

The control unit can remain attached to the mounting plate.

b. Fx06/Fx07: Align the connector on the back of the control plate with the connector in the upper support body assembly.

Gently push down on the top of the control plate to reconnect the control unit with the frequency converter.

c. FA06: Fasten the control plate with 11 screws (T20).

Torque 2.0 Nm (17.7 in-lb).

d. FB06–FK06: Fasten the control plate with 8 screws (T20).

Torque 2.0 Nm (17.7 in-lb).

e. FA07: Fasten the control plate with 12 screws (T20).

Torque 2.0 Nm (17.7 in-lb).

f. FB07–FK07: Fasten the control plate with 11 screws (T20).

Torque 2.0 Nm (17.7 in-lb).

7. Position the front cover and fasten to the frame.

a. FA06–FK06/FA07–FK07: Fasten the front cover with 2 screws (T30).

Torque 3.5 Nm (31 in-lb).

b. FB06/FB07: Fasten the front cover with 8 screws (T30).

Torque 3.5 Nm (31 in-lb).

2.4 Frame FA08–FB08–FK08

2.4.1 Disassembly

1. Unfasten and remove the front cover.

a. FA08–FK08: Unfasten 2 screws (T30) from the front cover.

b. FB08: Unfasten 8 screws (T30) from the front cover.

2. Remove the control plate with control unit assembly.
   a. FB08–FK08: Unclip the 2 Ethernet cables from the control support plate
   b. Fx08: Press downward on the tab and remove the functional extension option.

      This step is optional. Only perform this procedure if the functional extension option is installed in the frequency converter.

   c. Fx08: Unfasten 8 screws (T20) and gently pull outwards in the top of the control plate, to disconnect the control unit from the frequency converter.
   d. Fx08: Remove the control plate with the control unit from the frequency converter.
3. Fx08: Unfasten 1 screw (T20) and remove the wire harness clamp.
4. Fx08: Unfasten 2 screws (T20) and remove the control support upwards.

   Turn the cable connector 90° and pull the cable connector through the hole in the control support.

5. Fx08: Unfasten 6 screws (T25) and remove the shield.
6. FA08: Remove 3 terminal protective cover from the terminals.
7. Remove the cable set (-DC) (+DC/R+) (R-) with terminal block 95.
   a. Fx08: Unfasten 3 screws (T25) from the 3 cable lugs on the cable set.
   b. Fx08: Unfasten 3 screws (T25) and remove the cable set with terminal block 95.
8. Remove the busbar (RFI).
   a. Fx08: Unfasten 3 screws (T25) from the top of the busbars.
   b. Fx08: Unfasten 3 screws (T25) from the bottom and remove the busbars.
9. Fx08: Unfasten 5 screws (T20) and remove the RFI board.
10. Fx08: Unfasten 3 screws (T25) and remove the EMC shield insulator.
11. Fx08: Unfasten 6 screws (T25) and remove the common-mode assembly.
12. Remove the upper mid plate.
    a. Fx08: Unfasten 2 screws (T25) and remove the RST busbar holder.
    b. Fx08: Unplug the PIC to inrush cable and unclip the cable from the cable clamp.
    c. Fx08: Unclip the control unit cable from the 2 cable clamps
    d. Fx08: Unfasten 8 screws (T25) and remove the upper mid plate.
13. Unfasten the bottom upper midplate.
    a. Fx08: Unfasten 5 screws (T20) and remove the motor shield.
    b. Fx08: Unfasten 3 screws (T30) from the motor busbar assembly.
    c. Fx08: Unfasten 9 screws (T25) from the bottom upper midplate.

2.4.2 Removing the Power Interface Board

To remove the power interface board from the frequency converter, use the following steps.

1. Disconnect the cables from the power interface board.

   NOTE: Cables are connected on the back of the bottom upper midplate. The figure to the left illustrates the back of the bottom upper midplate.

   a. Fx08: Gently open the left side of the bottom upper midplate.
   b. Fx08: Disconnect the cables, see position 1–5.
   c. Fx08: Open the bottom upper midplate and disconnect the cable in the right bottom corner, see position 6.

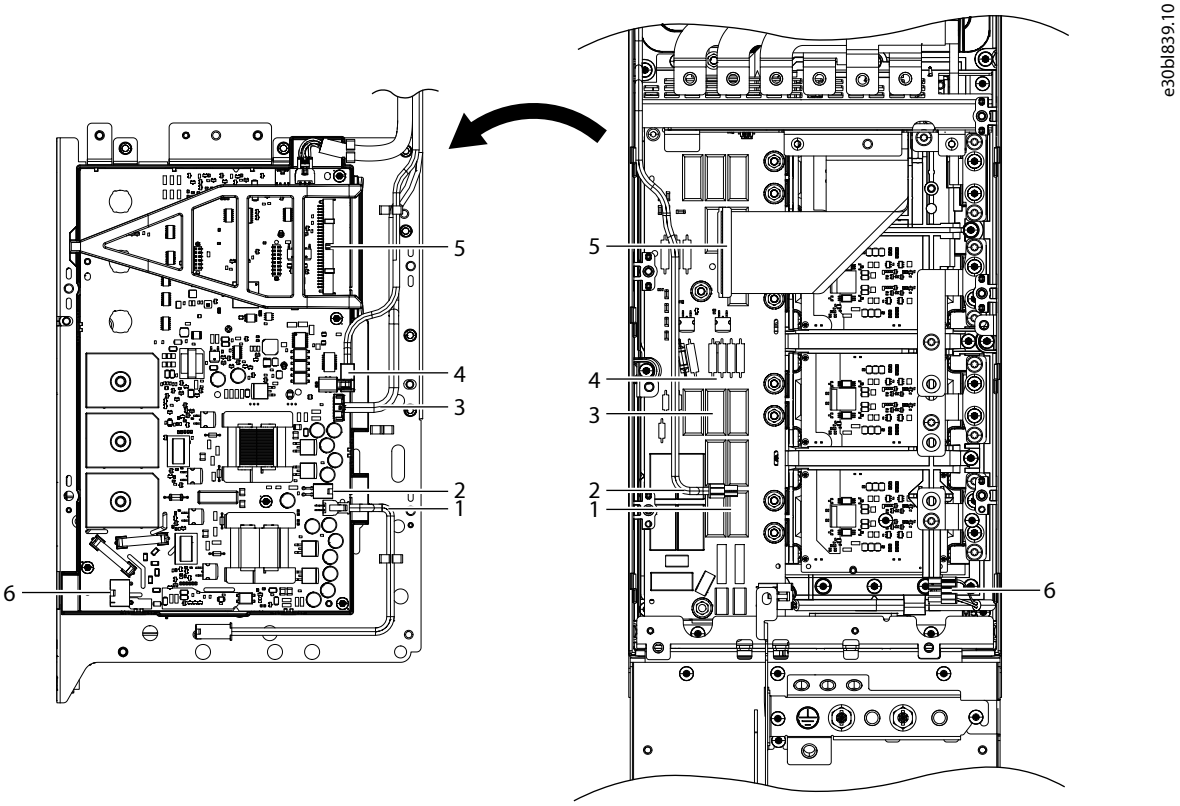


Figure 5: Disconnect Cables for Power Interface Board

2. Fx08: Remove the bottom upper mid plate with the power interface board from the frequency converter.

3. Fx08: Unclip the bridge for the power interface board on the left side and slide it to the right until it is released. Remove the bridge for the power interface board.

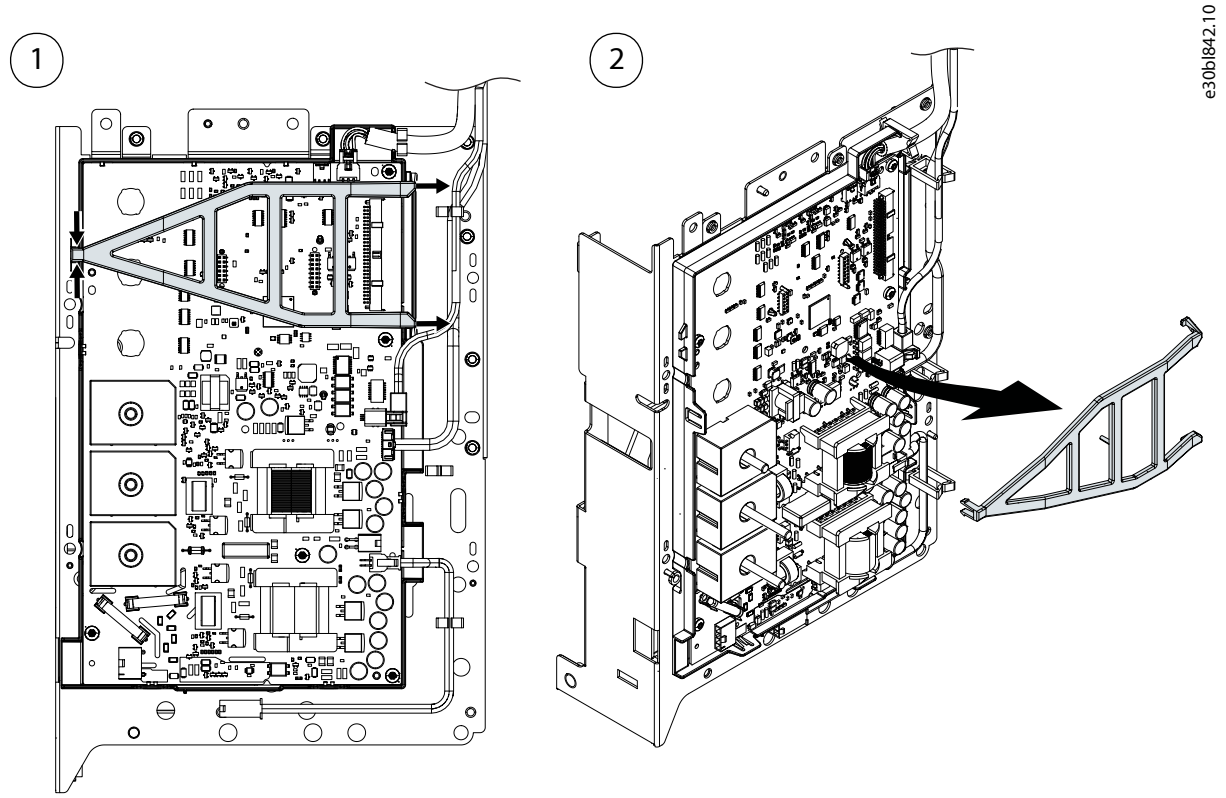


Figure 6: Removal of Bridge for Power Interface Board

4. Fx08: Unfasten 6 screws (T20) and remove the power interface board from the bottom upper midplate.

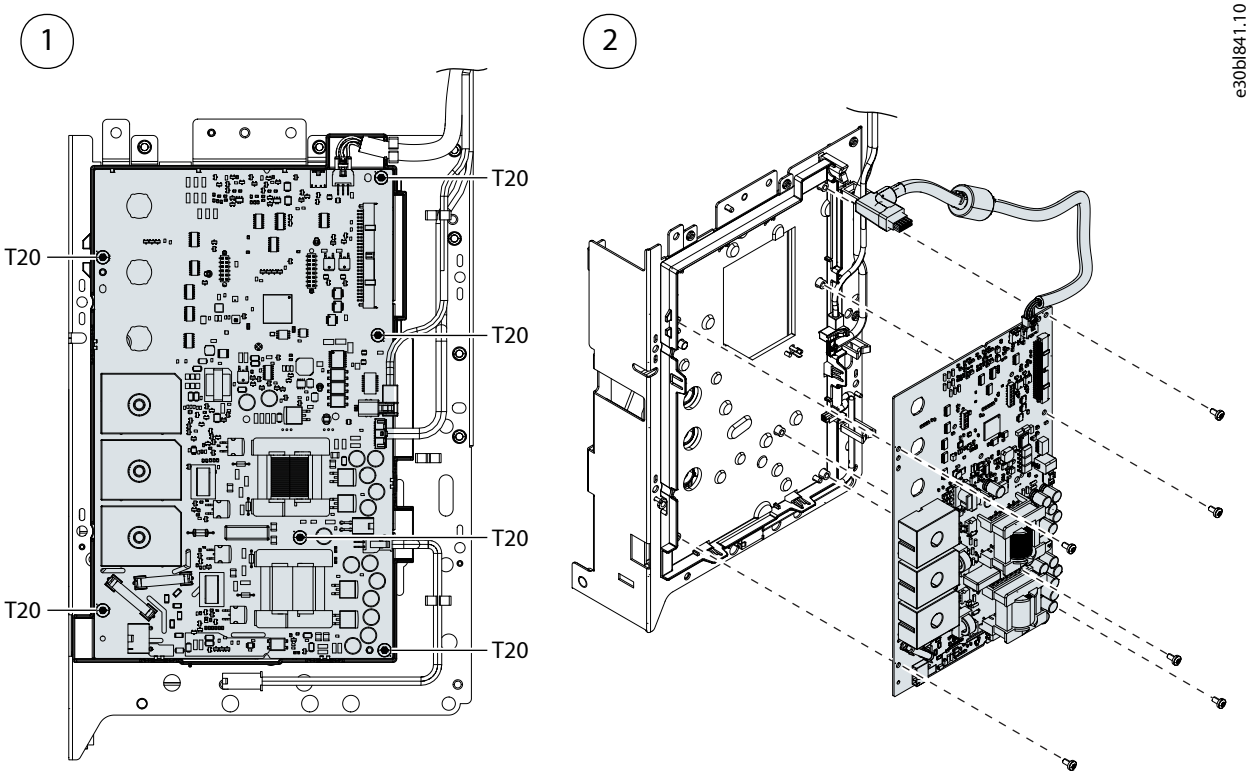


Figure 7: Removal of Power Interface Board

5. Fx08: Unplug the PIC to inrush cable from the top of the power interface board.

6. Access the ribbon cable on the gate drive board on the frequency converter.
   a. Fx08: Unfasten 5 screws (T25) and remove the brake.
   b. Fx08: Unfasten 2 screws (T25) and remove the top mounting bracket.
7. Fx08: Unplug the ribbon cable from the gate drive board and dispose of the ribbon cable in accordance with local waste regulations.

   Use the provided ribbon cable in the spare part package during reassembly of the power interface board.

2.4.3 Installing the Power Interface Board

To install the power interface board, use the following steps.

1. Fx08: Connect the ribbon cable on the gate drive board on the frequency converter.

   Use the new ribbon cable provided in the spare part package.

   NOTE: Handle the ribbon cable with care during installation. It is fragile and may break if excessive force is applied.

2. Reassemble the brake and top mounting bracket.
   a. Fx08: Fasten the top mounting bracket with 2 screws (T25).

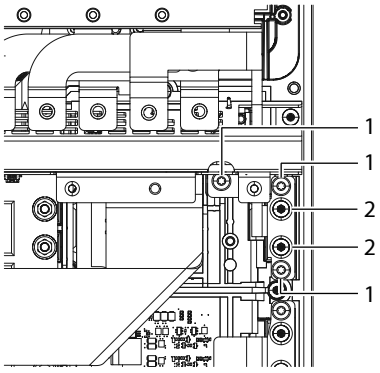
      Torque 3.5 Nm (31 in-lb).

   b. Fx08: Fasten the brake with 3 screws (T25) to the IGBT cradle.

      Torque: 5.5 Nm (48.7 in-lb). Refer to position 1 in Figure 8.

   c. Fx08: Fasten the brake with 2 screws (T25) to the power module.

      Torque 6.0 Nm (53.1 in-lb). Refer to position 2 in Figure 8.



e30bl867.10

Figure 8: Torque for Brake

3. Fx08: Fasten the power interface board with 6 screws (T20) on the bottom upper midplate.

   For position of screws, see Figure 7.

   Torque 2.0 Nm (17.7 in-lb).

4. Reassemble the bridge for the power interface board.
   a. Fx08: Slide the bridge into the 2 notches on the right side of the power interface board cover.
   b. Fx08: Press down on the left side of the bridge until it is clamped to the power interface board cover.

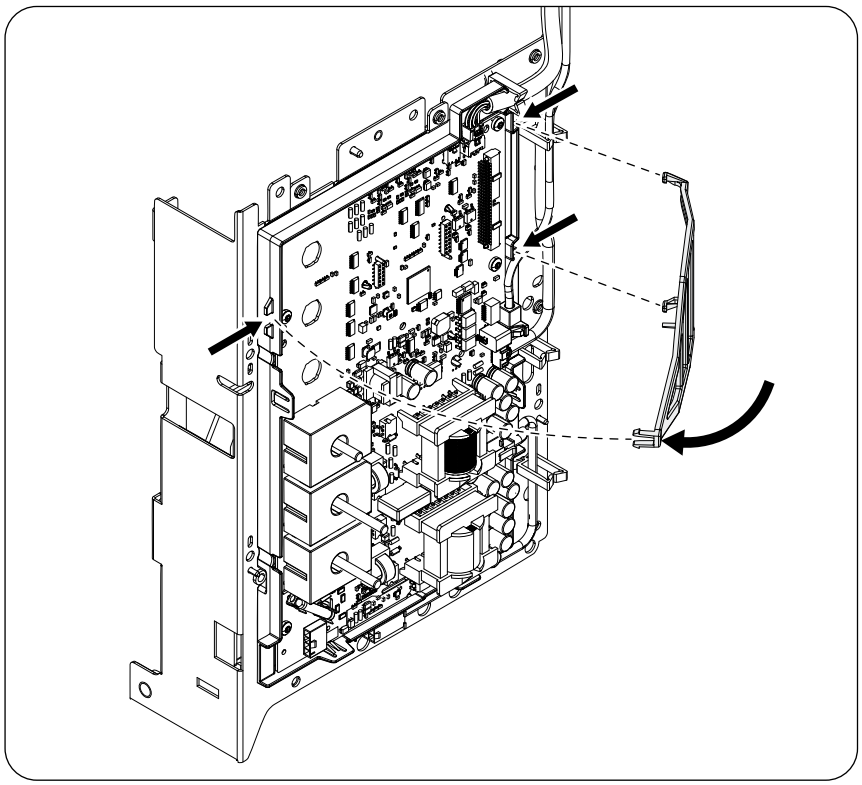


Figure 9: Reassemble the Bridge for the Power Interface Board Fx08

5. Fx08: Reconnect the PIC to inrush cable to the connector on the top of the power interface board.
6. Fx08: Align the 3 round busbars with the holes in the motor busbar assemblies on the frequency converter

   Refer to position 1 in Figure 10.

7. Fx08: Position the bottom upper midplate on the frequency converter and lift the left side of the bottom upper midplate, as illustrated in position 2.

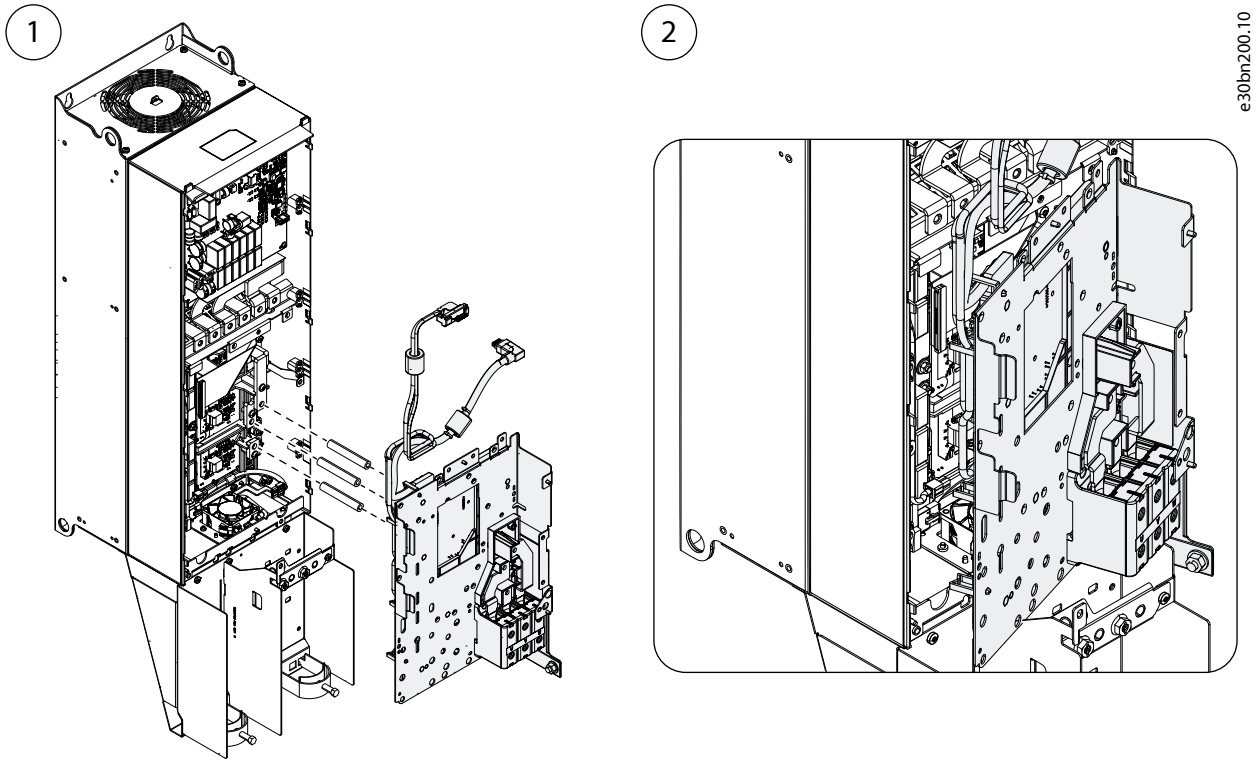


Figure 10: Reassembly of Bottom Upper Midplate Fx08

8. Reconnect the 5 cable plugs, refer to Figure 5.

a. Fx08: Connect the cable (position 6) to the power interface board.

b. Fx08: Gently lower the bottom upper midplate until the remaining cables can reach the connection points. Connect cables (position 1-5) to the power interface board.

2.4.4 Reassembly

1. Reassembly of the bottom upper midplate.

a. Fx08: Fasten the bottom upper mid plate with 8 screws (T25).

Torque 3.5 Nm (31 in-lb).

b. Fx08: Fasten the terminal block with 1 screw (T25).

Torque 2.0 Nm (17.7 in-lb).

c. Fx08: Fasten the motor busbar assembly with 3 screws (T30)

Torque 6.0 Nm (53.1 in-lb).

2. Fx08: Position the motor shield over the motor busbar assembly and fasten with 5 screws (T20).

Torque 2.5 Nm (22 in-lb).

3. Reassembly of the upper midplate.

a. Fx08: Position the upper midplate on the frequency converter.

Gently pull the control unit cable and PIC to inrush cable through the rectangular hole in the bottom part of the upper midplate.

b. Fx08: Fasten the upper midplate with 8 screws (T25).

Torque 3.5 Nm (31 in-lb).

c. Fx08: Secure the 2 cable assemblies in the 3 cable clamps on the upper midplate, and reconnect the PIC to the inrush cable.

4. Fx08: Position the RST busbar holder on the upper midplate and fasten with 2 screws.

Torque 3.5 Nm (31 in-lb).

5. Reassembly of the common-mode assembly on the bottom upper midplate.

a. Fx08: Fasten the top of the common-mode assembly with 4 screws (T25).

Torque 3.5 Nm (31 in-lb).

b. Fx08: Fasten the bottom of the common mode assembly with 2 screws (T25).

Torque 2.0 Nm (17.7 in-lb).

6. Fx08: Position the EMC shield insulator on the common-mode assembly plate and fasten with 3 screws (T25).

Torque 3.5 Nm (31 in-lb).

7. Fx08: Fasten the RFI board on the common-mode assembly with 5 screws (T20).

Use 1 M4x12 screw in the top right corner of the RFI board.
Torque 1.8 Nm (15.9 in-lb).

Use 4 M4x12 mm screw in the remining screw holes of the RFI board.
Torque 3.5 Nm (31 in-lb).

8. Fx08: Position the 3 busbars between the common-mode assembly and rectifier busbars and fasten with 6 screws (T25).

Torque 6.0 Nm (53.1 in-lb).

9. Reassembly of cable set (-DC) (+DC/R+) (R-).

a. Fx08: Position the cable set (-DC) (+DC/R+) (R-) with terminal block 95 on the bottom upper midplate.

b. Fx08: Fasten the cable set to the rectifier busbars with 3 screws (T25).

Torque 6.0 Nm (53.1 in-lb).

c. Fx08: Fasten the terminal block 95 with 3 screws (T25).

Torque 2.0 Nm (17.7 in-lb).

d. FA08: Install 3 terminal protector covers by the 3 terminals.

10. Reassembly of control support and shield.

a. Fx08: Position the shield and fasten with 6 screws (T25).

Torque 3.5 Nm (31 in-lb).

b. Fx08: Position the control support and fasten with 2 screws (T20).

Pull the cable connector from the control unit cable through the hole in the control support and turn the cable connector 90°.
Torque 2.5 Nm (22.1 in-lb).

c. Fx08: Fasten the wire harness clamp with 1 screw (T20)

Torque 2.5 Nm (22.1 in-lb).

11. Reassembly of control plate with control unit assembly.

a. Fx08: Position the control plate with the control unit assembly on the frequency converter.

b. Fx08: Align the connector on the back of the control plate with the connector in the control support.

Gently push down on the top of the control plate to reconnect the control unit with the drive.

c. Fx08: Fasten the control plate with 8 screws (T20).

Torque 2.5 Nm (22.1 in-lb).

d. Fx08: Position the functional extension option on the side of the control unit, and press the top until it clicks into place.

This step is optional. Perform this procedure if the functional extension option is installed in the frequency converter.

e. FB08–FK08: Place the Ethernet cables in the 2 cable clamps on the control support.

12. Position the front cover and fasten to the frame.

a. FA08–FK08: Fasten the front cover with 2 screws (T30).

Torque 3.5 Nm (31 in-lb).

b. FB08: Fasten the front cover with 8 screws (T30).

Torque 3.5 Nm (31 in-lb).

Danfoss A/S
DK-6300 Graasten
Ulsnaes 1
drives.danfoss.com

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalog descriptions, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogs, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the product. All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.

M00478