

Installation Instructions

500 A Current Sensor Kit for D2h/D4h/D7h/D8h Enclosure Sizes

VLT[®] Series FC 102, FC 103, FC 202, and FC 302

Description

The 500 A current sensor kit is designed for D2h/D4h/D7h/D8h enclosure sizes in the power ranges shown in *Table 1.1*. To identify the power rating, see *Illustration 1.1*.

Product group and drive series	Voltage rating [V]	Power rating [kW (hp)]
VLT [®] HVAC Drive FC 102, VLT [®] Refrigeration Drive FC 103, VLT [®] AQUA Drive FC 202	(T4) 380–480 (T7) 525–690	200–315 (300–450) 200–400 (250–400)
VLT [®] AutomationDrive FC 302	(T5) 380–500 (T7) 525–690	200–250 (300–350) 160–315 (200–350)

Table 1.1 Applicable Power Range for 500 A Current Sensor Kit

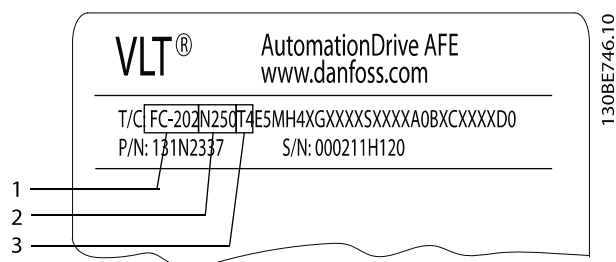
This 500 A current sensor kit provides an upgraded current sensor and all the components required to retrofit the current sensor for an existing D2h, D4h, D7h, or D8h enclosure.

For the kit parts list, refer to *Illustration 1.4*.

Identifying the Power Rating

To find the frequency converter power rating, use the following steps:

- Obtain the following information from the nameplate, which is on the frequency converter. Refer to *Illustration 1.1*.
 - Product group and drive series (characters 1–6)
 - Power rating (characters 7–10)
 - Voltage rating (phases and mains) (characters 11–12)
- Determine if the power rating is in *Table 1.1*.



1	Product group and drive series
2	Power rating
3	Voltage rating (phases and mains)

Illustration 1.1 Nameplate Information for an FC 202 250 kW D2h Enclosure

Kit Part Numbers

Part number	Kit description
176F3737	Current sensor kit for D2h/D4h/D7h/D8h enclosure sizes

Table 1.2 Part Number for the Current Sensor Kit

Safety Instructions

Only qualified personnel are allowed to install the parts described in these installation instructions. Make sure to read and save these instructions.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

VLT® frequency converters contain dangerous voltages when connected to mains voltage. Improper installation, and installing or servicing with power connected, can cause death, serious injury, or equipment failure.

To avoid 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 codes.

⚠ WARNING

DISCHARGE TIME

The frequency converter contains DC-link capacitors, which can remain charged even when the unit is off. High voltage can be present even when the warning indicator lights are off. Failure to wait for a minimum of 20 minutes after power has been removed before performing service or repair work can result in death or serious injury.

1. Stop the motor.
2. Disconnect AC mains and remote DC-link supplies, including battery back-ups, UPS, and DC-link connections to other frequency converters.
3. Disconnect or lock PM motor.
4. Wait 20 minutes for the capacitors to discharge.
5. Measure the voltage level to verify full discharge.

Removal Guidelines

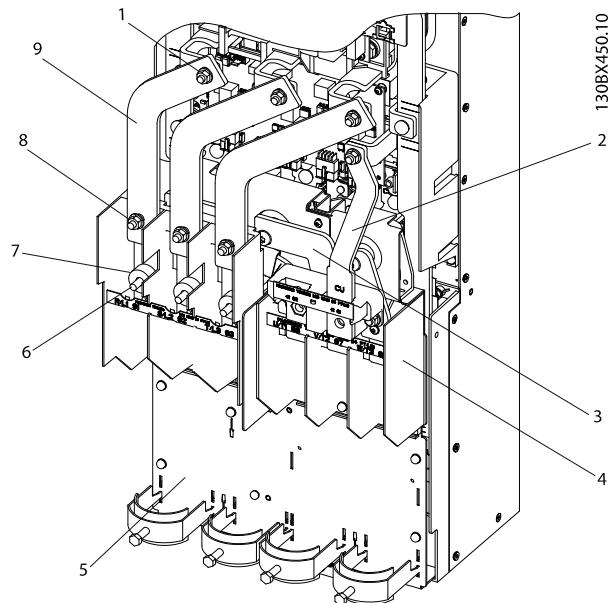
NOTICE

The current sensor kit includes an extra set of fasteners in case any fasteners are missing or unusable. To make the disassembly/reassembly process easier, use these general guidelines:

1. Follow the removal instructions for each component.
2. Place the component along with the removed fasteners together in one place.
3. Replace old component with the new component provided in the kit.
4. If any fasteners are stripped or lost, replace with similar fastener from kit.
5. Follow the installation instructions to replace and secure each component.

Removing AC Input Bus Bars

This step differs based on the following installed options:



1	Nut (13 mm)	6	Mains input terminal
2	Brake bus bar – optional	7	Fuse spacer
3	Motor terminal bus bar	8	Nut (13 mm)
4	Motor terminal block	9	Input power bus bar
5	Power terminal mounting plate		

Illustration 1.2 AC Input Bus Bars in Unit with Mains Fuses Option (Shown with Mains Fuses Removed)

No options

1. Take off the air baffle by removing 4 screws (T25).
2. Remove 3 nuts (13 mm) at the top of the input bus bars, 1 per phase.
3. Remove 6 nuts (13 mm) at the bottom of the input bus bars, 2 per phase.
4. Remove the input bus bars.

Mains fuses only**NOTICE**

The current sensor kit does not include components included with this option. Reuse these components.

1. Take off the air baffle by removing 4 screws (T25).
2. Remove the 3 mains fuses by removing 6 nuts (13 mm), 1 at each end of each fuse.
3. Remove 3 nuts (13 mm) at the top of the bus bars, 1 per phase.
4. Remove the bus bars.

RFI only**NOTICE**

The current sensor kit does not include components included with this option. Reuse these components.

1. Take off the air baffle by removing 4 screws (T25).
2. Remove 3 nuts (13 mm) at the top of the RFI filter, 1 per bus phase.
3. Remove 6 nuts (13 mm) at the bottom of the RFI filter, 2 per phase.
4. Remove 4 mounting thread-cutting screws (T20) connecting the RFI filter to the side channels of the frequency converter.
5. Remove the RFI filter and unplug the RFI cable from the MK100 connector on the printed circuit board assembly. Each connector is labeled on the board.

Fuses and RFI**NOTICE**

The current sensor kit does not include components included with this option. Reuse these components.

1. Take off the air baffle by removing 4 screws (T25).
2. Remove mains fuses by removing 6 nuts (13 mm), 1 at each end of each fuse.
3. Remove 3 nuts (13 mm) at the top of the RFI filter, 1 per phase.
4. Remove 4 thread-cutting screws (T20) connecting the RFI filter to the side channels of the frequency converter.
5. Remove the RFI filter and unplug the RFI cable from MK100 on the printed circuit board assembly. Each connector is labeled on the board.

Removing Input Terminal Block

1. Disconnect the customer input power wiring.
2. Remove the 2 screws (T25) at the bottom of the terminal block.
3. Free the current sensor wiring from the captive retaining clips.
4. To remove the terminal, slide the terminal down to disengage it from the metal clips holding it in place.

Removing EMC Partition

1. Remove 1 screw (T20).
2. Remove the EMC shield.

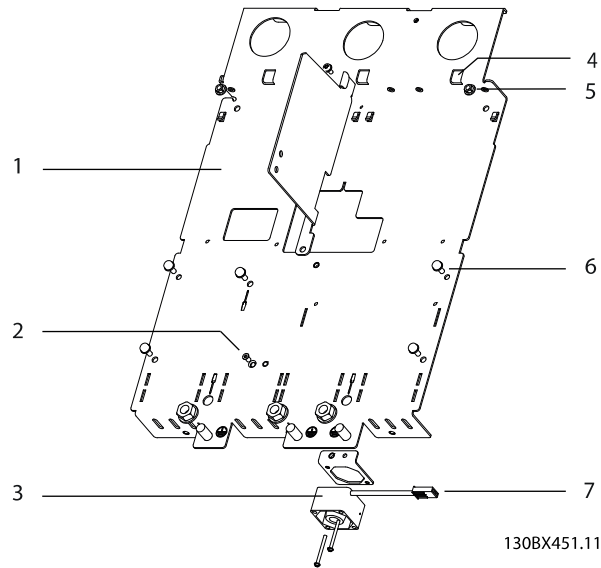
Removing Brake Terminal (optional)

1. Disconnect the customer brake wiring.
2. To detach the R (+) terminal, remove the 1 thread-forming screw (T25) at the terminal block, and 1 additional screw (T40).
3. To detach the R (-) terminal, remove the 1 thread-forming screw (T25) at the terminal block, and 1 additional nut (13 mm).
4. To detach the brake terminal block, remove 2 nuts (13 mm).

Removing Output Terminal Block

1. Disconnect customer motor wiring.
2. To detach the U output bus bar, remove the 1 thread-forming screw (T25) in the center of the bus bar and the 1 bolt (T40) at the current sensor end.
3. To detach the V output bus bar, remove the 1 thread-forming screw (T25) in the center of the bus bar and the 1 bolt (T40).
4. To detach the W output bus bar, remove the 1 thread-forming screw (T25) in the center of the bus bar and the 1 bolt (T40).
5. Remove the 3 current sensor cylinders.
6. Remove the 2 screws (T25) at the bottom of the terminal block.
7. To remove the terminal, slide the terminal down to disengage it from the metal clips holding it in place.

Removing Power Terminal Mounting Plate



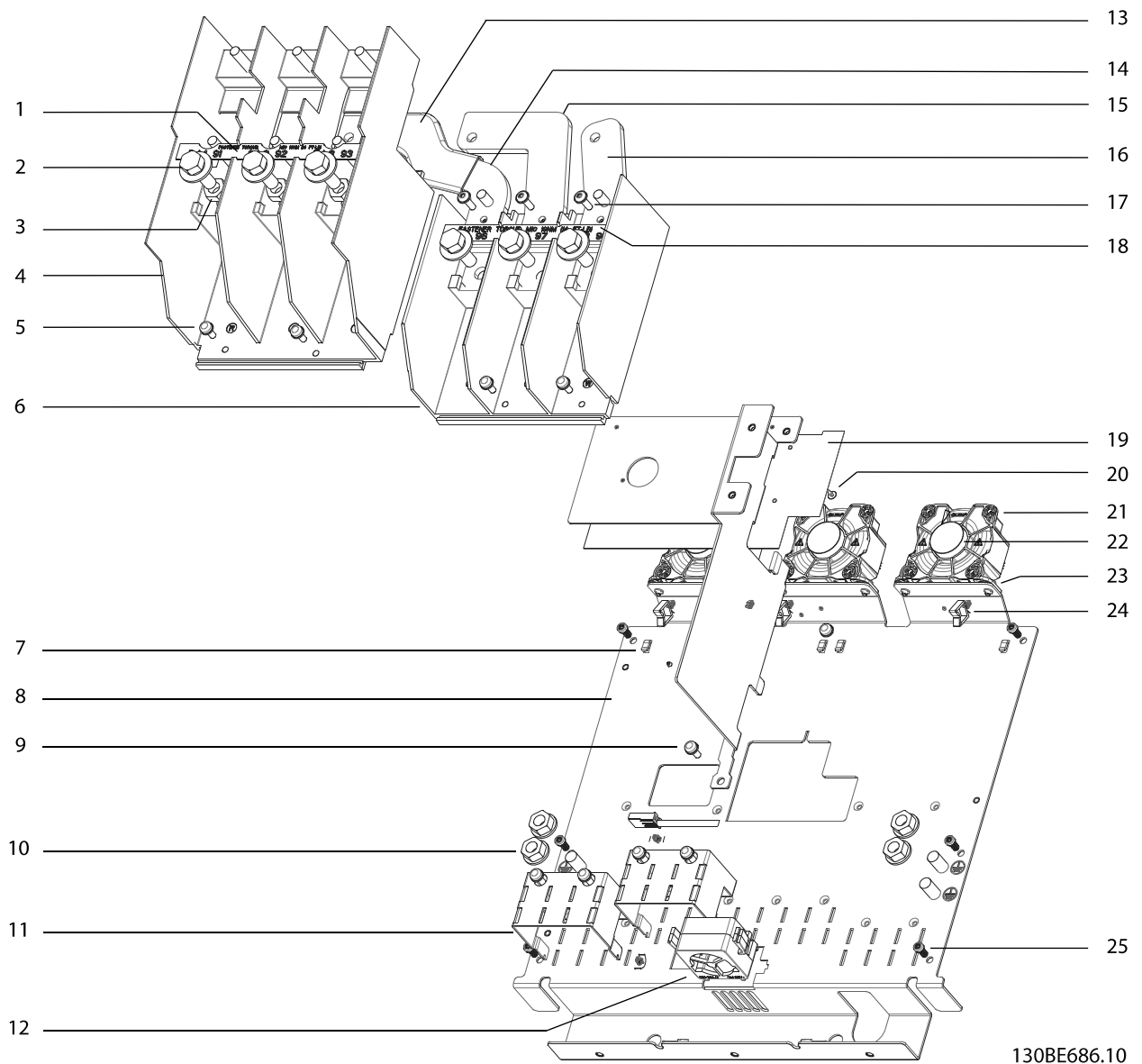
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1	Power terminal mounting plate	5	Nut (8 mm)
2	Fan retaining screw	6	Thread-cutting screw (T25)
3	Mixing fan	7	Mixing fan cable
4	Current sensor cable routing		

Illustration 1.3 Power Terminal Mounting Plate

1. Remove the 5 thread-cutting screws (T25) from the top of the plate. The fan screw can remain in place.
2. Remove the 2 nuts (8 mm).
3. Remove the current sensor cables.
4. While pulling the plate up, unplug the mixing fan that is located under the mounting plate.

Installing the Current Sensor Kit



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1	Label, input	14	Motor bus bar, U
2	M10x30 machine screw with captive washer (Qty 6)	15	Motor bus bar, V
3	M10 nut (Qty 6)	16	Motor bus bar, W
4	Input/mains terminal block	17	M5x16 Torx screw (Qty 3)
5	M5x12 machine screw with captive washer (Qty 4)	18	Label, output
6	Output/motor terminal block	19	Partition with EMI shield
7	Mounting plate tab that secures the terminal blocks	20	Plastic fastener (Qty 3)
8	Power terminal mounting plate Qty: 1 (IP21/54), 1 (IP20)	21	Current sensor (Qty 3)
9	M5x12 machine screw with captive washer (Qty 6)	22	Mylar insulator (Qty 3)
10	M10 grounding nut with captive washer (Qty 4)	23	M4x10 thread-forming screw (Qty 6)
11	Bracket (Qty 2)	24	Multiple wire guide (Qty 6)
12	Mixing fan and housing assembly	25	M5x11 thread-cutting screw (Qty 6)
13	Bus bar insulation sleeve (Qty 1)		

Illustration 1.4 Exploded View and Parts List of 500 A Current Sensor Kit

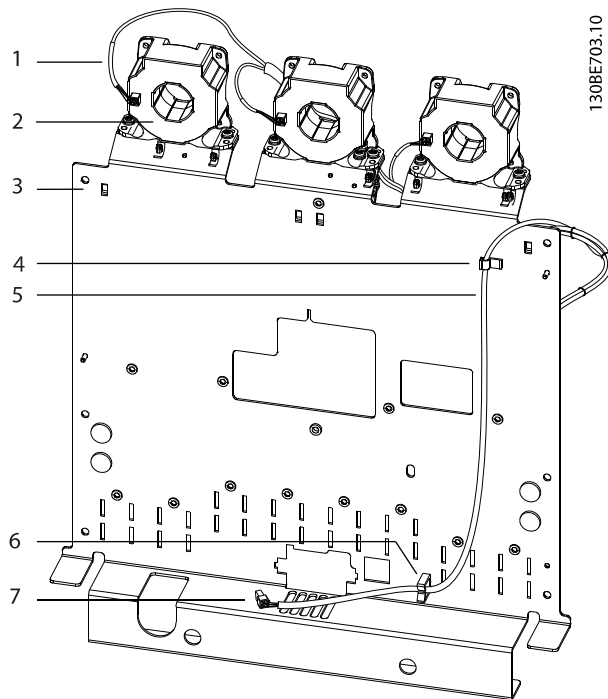
Installing Current Sensors

NOTICE

TERMINAL MOUNTING PLATE

There are 2 mounting plates included in the kit (1 for IP20 and 1 for IP21/IP54). Use the one that fits your enclosure type.

1. Making sure that the arrows on the current sensor are pointing toward the front of the frequency converter, reinstall the 3 current sensors onto the power terminal mounting plate provided in the kit. Fasten securely using 2 thread-forming screws (M4x10) per sensor. Torque to 2.8 Nm (24 in-lb).
2. Connect the wire harness to the current sensors.
3. Insert 1 single wire guide and 1 multiple wire guide as shown in *Illustration 1.5*.
4. Run the wire harness through the wire guides.

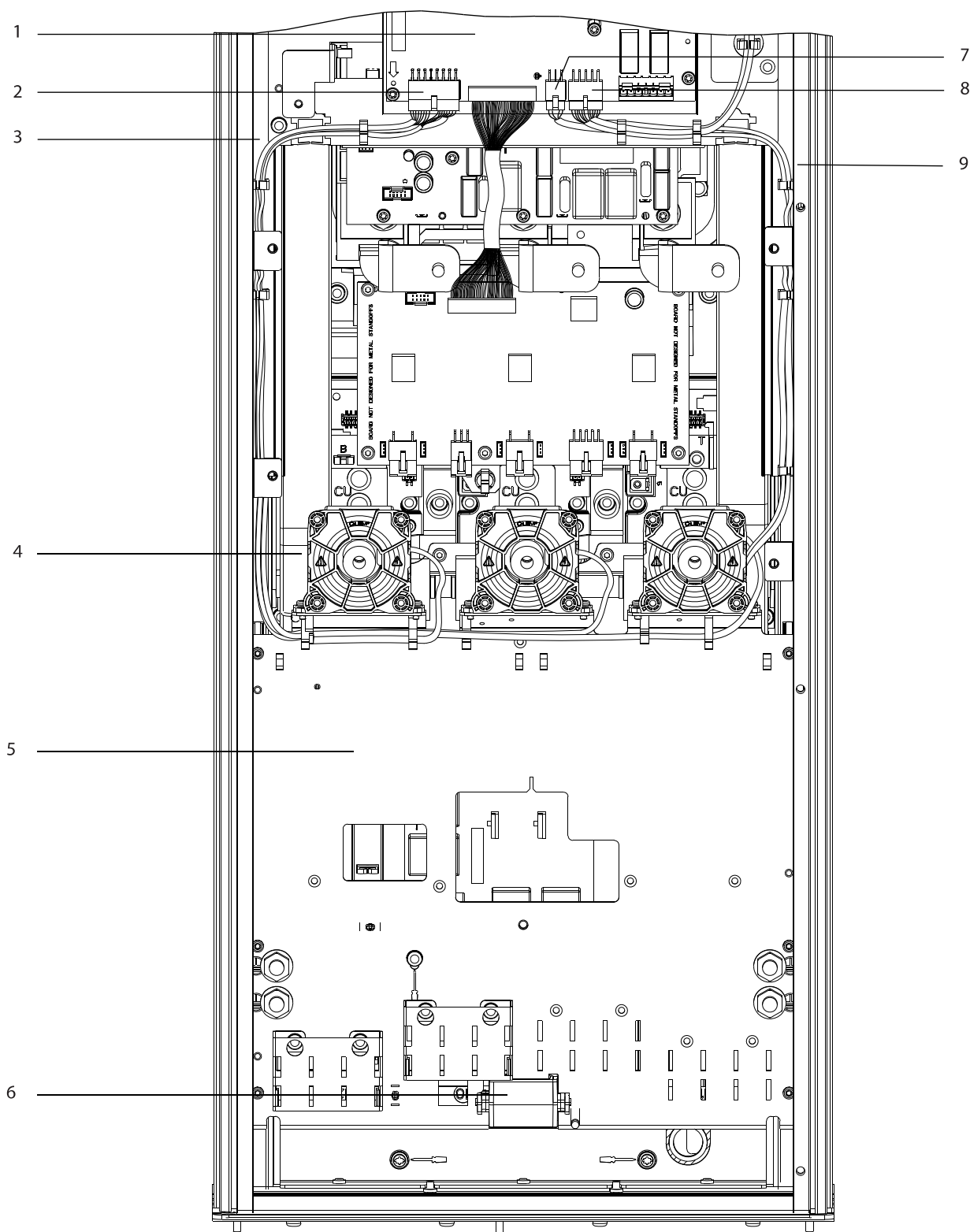


1	Wire harness (current sensor)	5	Wire harness (fan)
2	Current sensor	6	Multiple wire guide
3	Power terminal mounting plate	7	Fan connector
4	Single wire guide		

Illustration 1.5 Wire Harness on Backside of the Power Terminal Mounting Plate

Installing Power Terminal Mounting Plate

1. Unplug the old wire harness from the power card and discard the harness.
2. Insert the power terminal mounting plate into the unit. To ease installation, insert the bottom of the plate near the bottom of the frequency converter. Secure the plate with 7 thread-cutting screws (M5x11). Torque to 1.7 Nm (15 in-lb).
3. Connect the top of the wire harness to the power card. See *Illustration 1.6*.
4. Connect the bottom of the wire harness to the mixing fan.
5. Insert the mixing fan into the fan housing, with the label facing the open side of the housing.
6. Push the fan wire connector to the left to make room for the fan assembly. With the fan label facing up, insert the mixing fan assembly into the plate opening. The fan assembly is level with the plate once properly seated.
7. To install the 2 brackets, place the slotted tab on the bottom of the bracket into the slots in the plate. Secure with 2 T25 machine screws from the old unit.
8. Install 4 ground nuts with captive washer (M10) onto the power terminal mounting plate. Torque to 19 Nm (169 in-lb).



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1	Power card	6	Mixing fan
2	Power card connector to current sensor wire harness	7	Power card connector to RFI
3	Wire harness (current sensor)	8	Power card connector to fan wire harness
4	Current sensor	9	Wire harness (fan)
5	Power terminal mounting plate	10	Ground nuts

Illustration 1.6 Installing Power Terminal Mounting Plate

Installing Output Terminal Block

1. Place the output terminal label (identified by U, V, W) above the terminal connections. See the removed output terminal block for the best label position.
2. Push the output terminal block up against the metal clips on the power terminal mounting plate until they engage.
3. Secure with 2 machine screws (M5x12) at the bottom of the terminal block. Torque to 2.3 Nm (20 in-lb).
4. Roll up the mylar insulator and insert it into the middle of each current sensor.
5. Insert the current sensor cylinder inside the mylar insulator.
6. Slide the insulation sleeve over the U-phase bus bar.
7. Attach the motor bus bars. Secure each bus bar with 1 Torx screw (M5x16) at the current sensor end and 1 thread-forming screw in the center of the bus bar. Torque the Torx screw to 2.3 Nm (20 in-lb) and the thread-forming screw to 4.0 Nm (35 in-lb).

Installing Brake Terminal (optional)

1. Install the brake terminal block using 2 nuts (M8). Torque to 9.6 Nm (85 in-lb).
2. Install the R(-) terminal using 1 thread-forming screw (M4x10) at the terminal block, and 1 nut (M8). Torque the thread-forming screw to 2.8 Nm (24 in-lb) and the nut to 9.6 Nm (85 in-lb).
3. Install the R(+) terminal using 1 thread-forming screw (M4x10) at the terminal block, and 1 screw (T40). Torque the thread-forming screw to 2.8 Nm (24 in-lb) and the T40 screw to 9.6 Nm (85 in-lb).
4. Connect the customer brake wiring.

Installing Partition with EMC Shield

1. Install the partition with EMC shield to the left of the motor terminal block.
2. Secure with 2 machine screws (M5x12). Torque to 2.3 Nm (20 in-lb).

Installing Input Terminal Block

1. Place the input terminal label (identified by R, S, T) above the terminal connections. See the removed input terminal block for the best label position.
2. Push the input terminal block up against the metal clips on the power terminal mounting plate until they engage.
3. Secure with 2 machine screws (M5x12) at the bottom of the terminal block. Torque to 2.3 Nm (20 in-lb).

Installing AC Input Bus Bars

The next step differs based on the following installed options:

No options

1. Attach the bus bars.
2. Secure each bus bar with 1 nut (M8) at the top of the bus bar and 2 nuts (M8) at the bottom of the bus bar. Torque to 9.6 Nm (85 in-lb).

Mains fuses only

1. Attach the bus bars. Secure each bus bar at the top with 1 nut (M8). Torque to 9.6 Nm (85 in-lb).
2. Install the mains fuses using 6 nuts (M8), 1 at each end of each fuse. Torque to 9.6 Nm (85 in-lb).

RFI only

1. Connect the RFI cable from MK100 on the printed circuit board assembly to the RFI filter.
2. Attach the RFI filter to the side channels of the frequency converter with 4 thread-cutting screws (T20). Torque to 5.7 Nm (50 in-lb).
3. Secure the top of the RFI filter using 3 nuts (M8), 1 per phase. Torque to 9.6 Nm (85 in-lb).
4. Secure the bottom of the RFI filter using 6 nuts (M8), 2 per phase. Torque to 9.6 Nm (85 in-lb).

Fuses and RFI

1. Connect the RFI cable from MK100 on the printed circuit board assembly to the RFI filter.
2. Attach the RFI filter to the side channels of the frequency converter with 4 thread-cutting screws (T20). Torque to 5.7 Nm (50 in-lb).
3. Secure the RFI filter using 3 nuts (M8) at the top of the RFI filter, 1 per phase. Torque to 9.6 Nm (85 in-lb).
4. Install mains fuses using 6 nuts (M8), 1 at each end of each fuse. Torque to 9.6 Nm (85 in-lb).

Reconnecting Customer Wiring

1. Reconnect the motor wiring to the U, V, and W terminals.
2. If a brake terminal is present, reconnect the customer brake wiring.
3. Reconnect the mains wiring to the R, S, and T terminals.
4. Install the air baffle using 4 screws (T25) and 2 nuts (M8). Torque to 2.3 Nm (20 in-lb).

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