Allen-Bradley

PowerFlex 700S and 700H Fan Inverter Upgrade Kit (Frame 9)

Introduction

Use this document to upgrade the fan inverter on a PowerFlex 700S or 700H frame 9 drive.

ATTENTION: To avoid an electric shock hazard, ensure that all power to the drive has been removed before performing the following.

ATTENTION: To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged before performing any work on the drive. Measure the DC bus voltage at the DC+ & DC- terminals. The voltage must be zero.

ATTENTION: HOT surfaces can cause severe burns. **Do not** touch the heatsink surface during operation of the drive. After disconnecting power allow time for cooling.

ATTENTION: Hazard of permanent eye damage exists when using optical transmission equipment. This product emits intense light and invisible radiation. Do not look into fiber-optic ports or fiber-optic cable connectors.

ATTENTION: This drive contains **ESD** (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference A-B publication 8000-4.5.2, "Guarding Against Electrostatic Damage" or any other applicable ESD protection handbook.

What this Kit Contains

Verify that your kit contains the items listed in the following table. If your kit does not contain the correct items, contact your Allen-Bradley sales representative.

Part No.	Quantity:	Description
FR09968	1	Connector Plate, EMI Protection Plate, Fan Assembly and Fan Motor Capacitor
133256	1	Disposable Static Discharge Wrist-strap

What You Need to Do

- ❒ Step 1: Remove power from the drive.
- ❒ Step 2: Remove the covers from the drive.
- ❒ Step 3: Remove the components from the Control Frame.
- ❒ Step 4: Remove the Control Frame and Conduit from the drive.
- ❒ Step 5: Remove the Cross Plate.
- ❒ Step 6: Remove the EMI-Protection Plate.
- ❒ Step 7: Remove the Main Fan.
- ❒ Step 8: Remove the Connector Plate.
- ❒ Step 9: Remove the AC components from the new Connector Plate (on DC Input Drives).
- ❒ Step 10: Assemble the new Connector Plate.
- ❒ Step 11: Replace the fan capacitor.
- ❒ Step 12: Connect the new components.
- ❒ Step 13: Reassemble the drive.

Step 1: Removing Power from the Drive

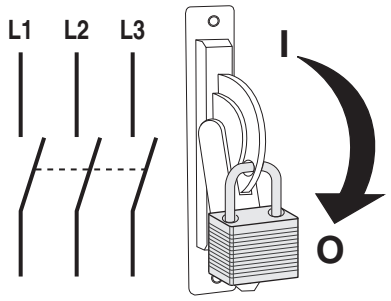
ATTENTION: To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged before performing any work on the drive. Measure the DC bus voltage at the DC+ & DC- terminals of the Power Terminal Block. The voltage must be zero.

ATTENTION: Remove power before making or breaking cable connections. When you remove or insert a cable connector with power applied, an electrical arc may occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system's field devices, causing unintended machine motion
- causing an explosion in a hazardous environment

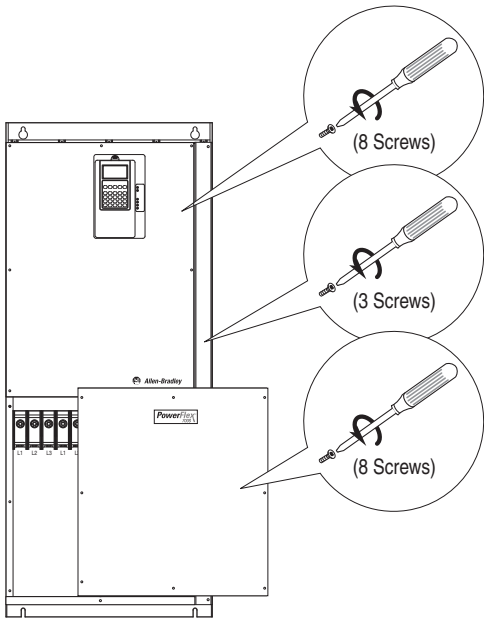
Electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.

1. Turn off and lock out input power. Wait five minutes.
2. Verify that there is no voltage at the drive's input power terminals.
3. Measure the DC bus voltage at the DC+ & DC- terminals on the Power Terminal Block. The voltage must be zero.



Step 2: Removing Covers from the Drive

Remove the M4x8 POZIDRIV® screws, which secure the covers to the drive, and then remove the covers. Proper tightening torque for reassembly is 3 N•m (27 lb•in).



POZIDRIV is a registered trademark of Phillips Screw Company

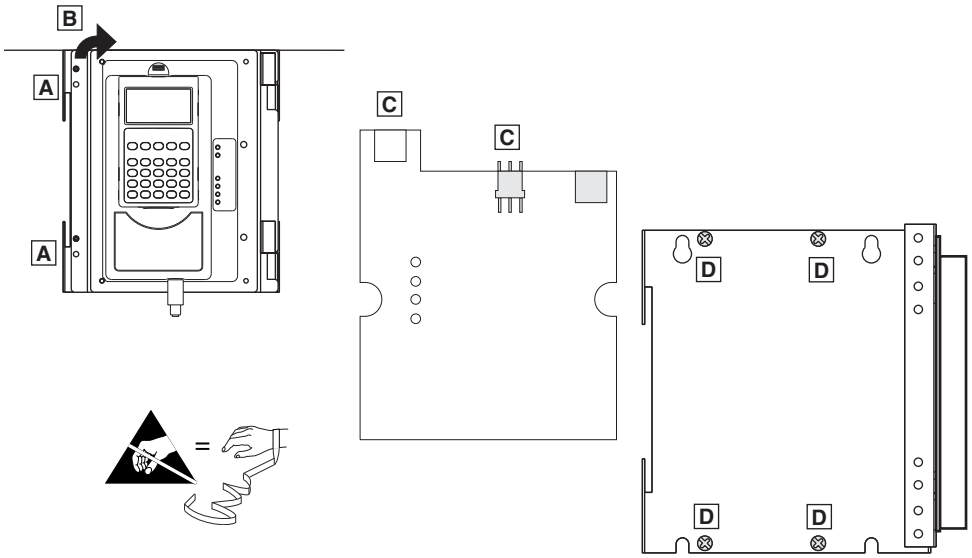
Step 3: Removing the Components from the Control Frame

DPI / HIM Assembly

You must remove the DPI / HIM Assembly from the Control Frame, in order to gain access to the fasteners that secure the Control Frame to the drive.

Task	Description
A	Remove the two M3x6 Phillips® screws, which secure the door on the front of the DPI / HIM Assembly. Proper tightening torque for reassembly is 0.9 N•m (8 lb•in).
B	Open the door.
C	Unplug the DPI cable from the X2 connector. Disconnect cables from communication adapter if present. On 700S drives only, unplug the cable from the X4 connector.
D	Remove the four M3x6 Phillips screws, which secure the DPI / HIM Assembly to the Control Frame, and remove the Assembly. Proper tightening torque for reassembly is 0.9 N•m (8 lb•in).

IMPORTANT Before removing connections and wires, mark the connections and wires to avoid incorrect wiring during assembly.



Phillips is a registered trademark of Phillips Screw Company

700S Control Assembly (on 700S drives only)

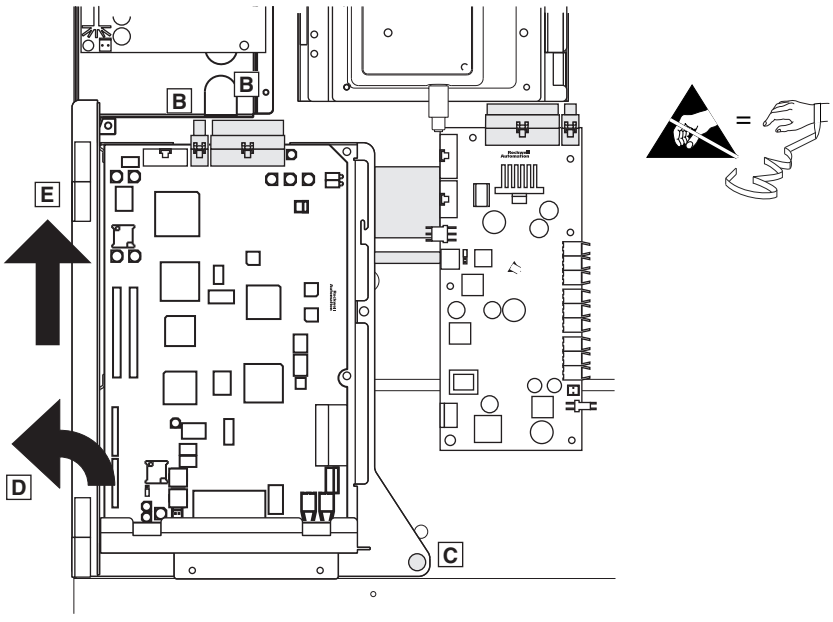
On 700S drives, you must also remove the Control Assembly, the Voltage Feedback Circuit Board and the Power Interface Circuit Board.

Task	Description
A	On the 700S control assembly, unplug I/O and SynchLink cables from the Main Control Board, unplug feedback wiring from feedback option card and unplug communication cables from Drivelogix controller.
B	Unplug the J2 and J7 ribbon cables from the Main Control Board.
C	Loosen the captive screw.
D	Swing the Control Assembly towards the front of the drive.
E	Lift the Control Assembly up and off of the hinge.

ATTENTION: Hazard of permanent eye damage exists when using optical transmission equipment. This product emits intense light and invisible radiation. Do not look into fiber-optic ports or fiber-optic cable connectors.

IMPORTANT Minimum inside bend radius for fiber-optic cable is 25.4 mm (1 in.). Any bends with a shorter inside radius can permanently damage the fiber-optic cable. Signal attenuation increases with decreased inside bend radii.

IMPORTANT Before removing connections and wires, mark the connections and wires to avoid incorrect wiring during assembly.



700S Voltage Feedback Circuit Board (on 700S drives only)

Task	Description
A	Carefully disconnect fiber-optic cables from sockets J4 and J5 of the Voltage Feedback Circuit Board, and carefully set them aside.
B	Disconnect cables from sockets J1, J2 and J8.
C	Remove the four M3x6 Phillips screws, which secure the clear plastic shield to the standoffs, and remove the shield. Proper tightening torque for reassembly is 0.9 N•m (8 lb•in).
D	Remove the five 3 mm hex standoffs, which support the clear plastic shield, and secure the Voltage Feedback Circuit Board to its mounting plate. Proper tightening torque for reassembly is 0.9 N•m (8 lb•in).
E	Remove the Voltage Feedback Circuit Board from its mounting plate.

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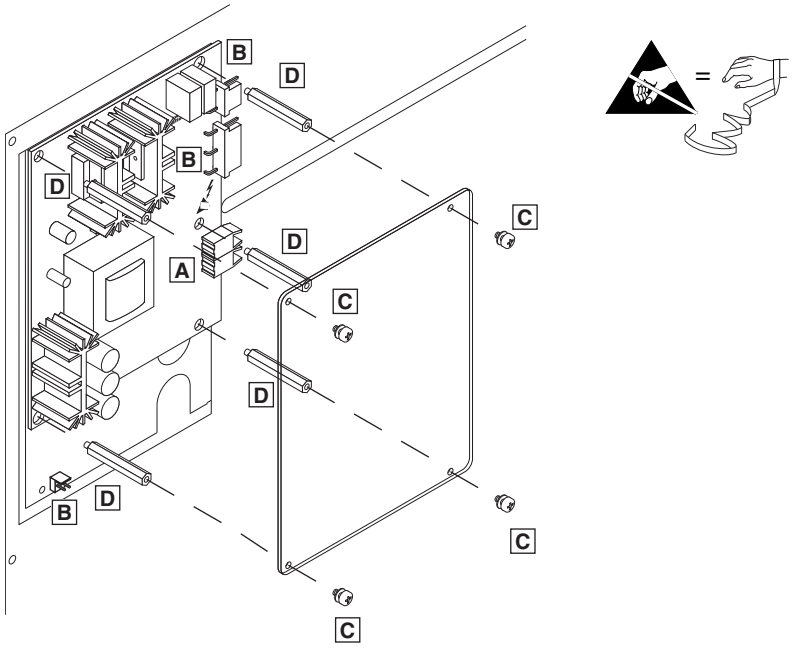
IMPORTANT Before removing connections and wires, mark the connections and wires to avoid incorrect wiring during assembly.



700S Power Interface Circuit Board (on 700S drives only)

Task	Description
A	Disconnect the ribbon cables from the sockets at the top of the Power Interface Circuit Board, and carefully set them aside.
B	Carefully disconnect fiber-optic cables from sockets along the right-hand side of the Power Interface Circuit Board, and carefully set them aside.
C	Disconnect the other cables from the sockets on the Power Interface Circuit Board, and carefully set them aside.
D	Remove the five M3x6 Phillips screws, which secure the Power Interface Circuit Board to the Control Frame, and remove the circuit board. Proper tightening torque for reassembly is 0.9 N•m (8 lb•in).
E	Remove the Power Interface Circuit Board from the Control Frame.

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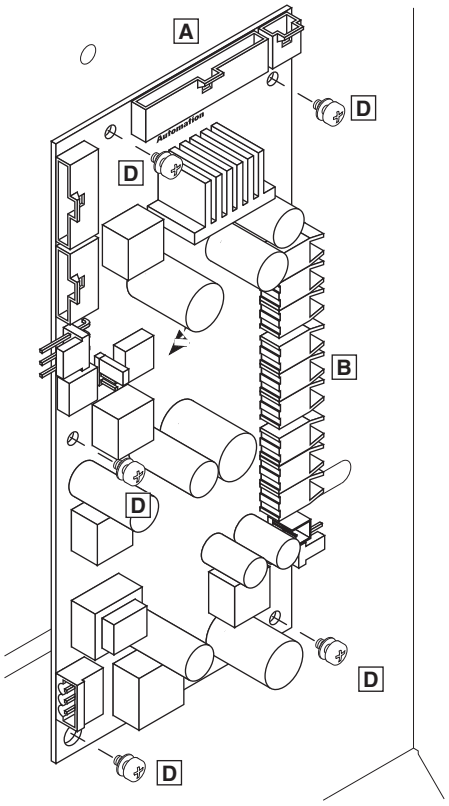
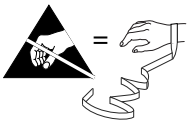
IMPORTANT Minimum inside bend radius for fiber-optic cable is 25.4 mm (1 in.). Any bends with a shorter inside radius can permanently damage the fiber-optic cable. Signal attenuation increases with decreased inside bend radii.

IMPORTANT Before removing connections and wires, mark the connections and wires to avoid incorrect wiring during assembly.



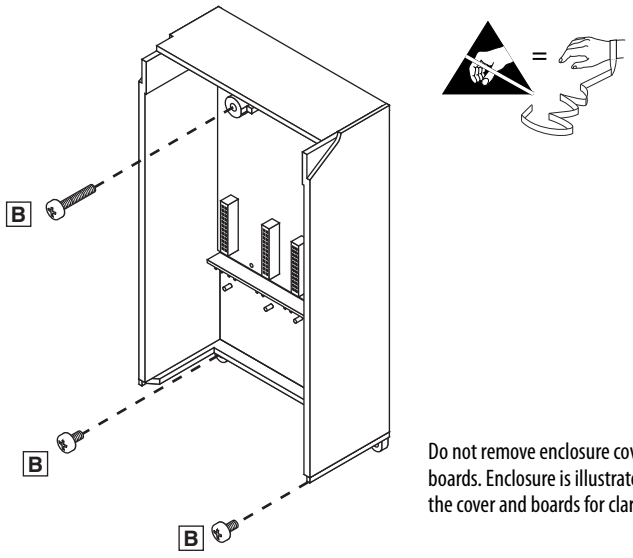


700H I/O Boards and Control Assembly (on 700H drives only)

On 700H drives, you must also remove the Control Assembly and I/O boards.

Task	Description
A	Open the enclosure that contains the Control and I/O Boards and carefully unplug the DPI cable and any I/O cables.
B	Remove the three M4 Pozidrive screws, which secure the Control Assembly to the drive. Proper tightening torque for reassembly is 0.9 N•m (8 lb•in).
C	Remove the Control Assembly.

IMPORTANT Before removing connections and wires, mark the connections and wires to avoid incorrect wiring during assembly.

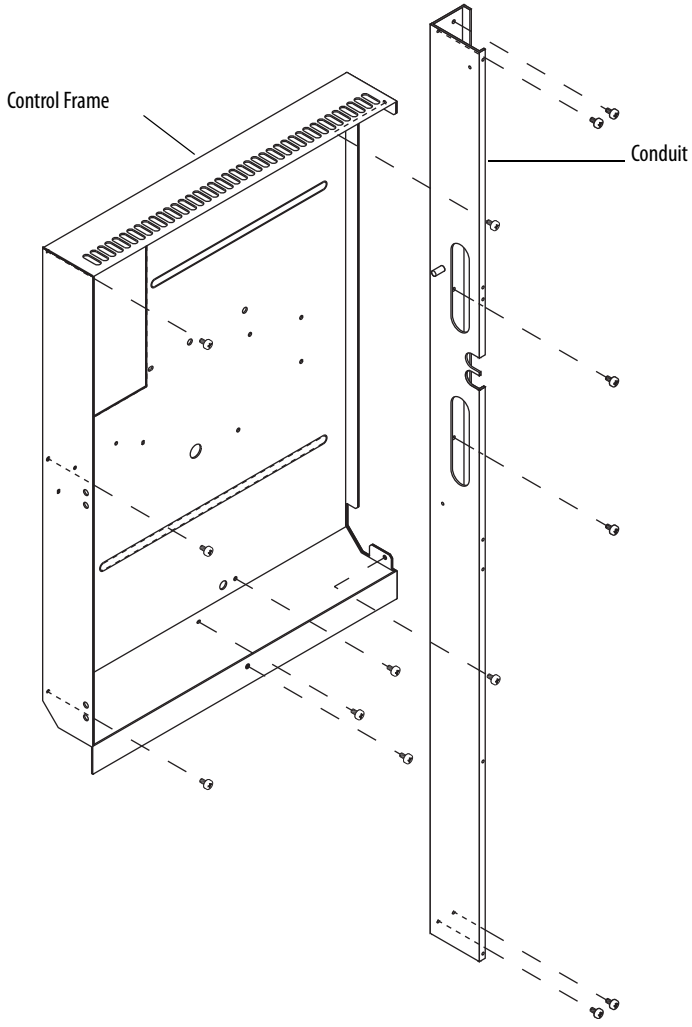


Do not remove enclosure cover or I/O boards. Enclosure is illustrated without the cover and boards for clarity.

Step 4: Removing the Control Frame and Conduit

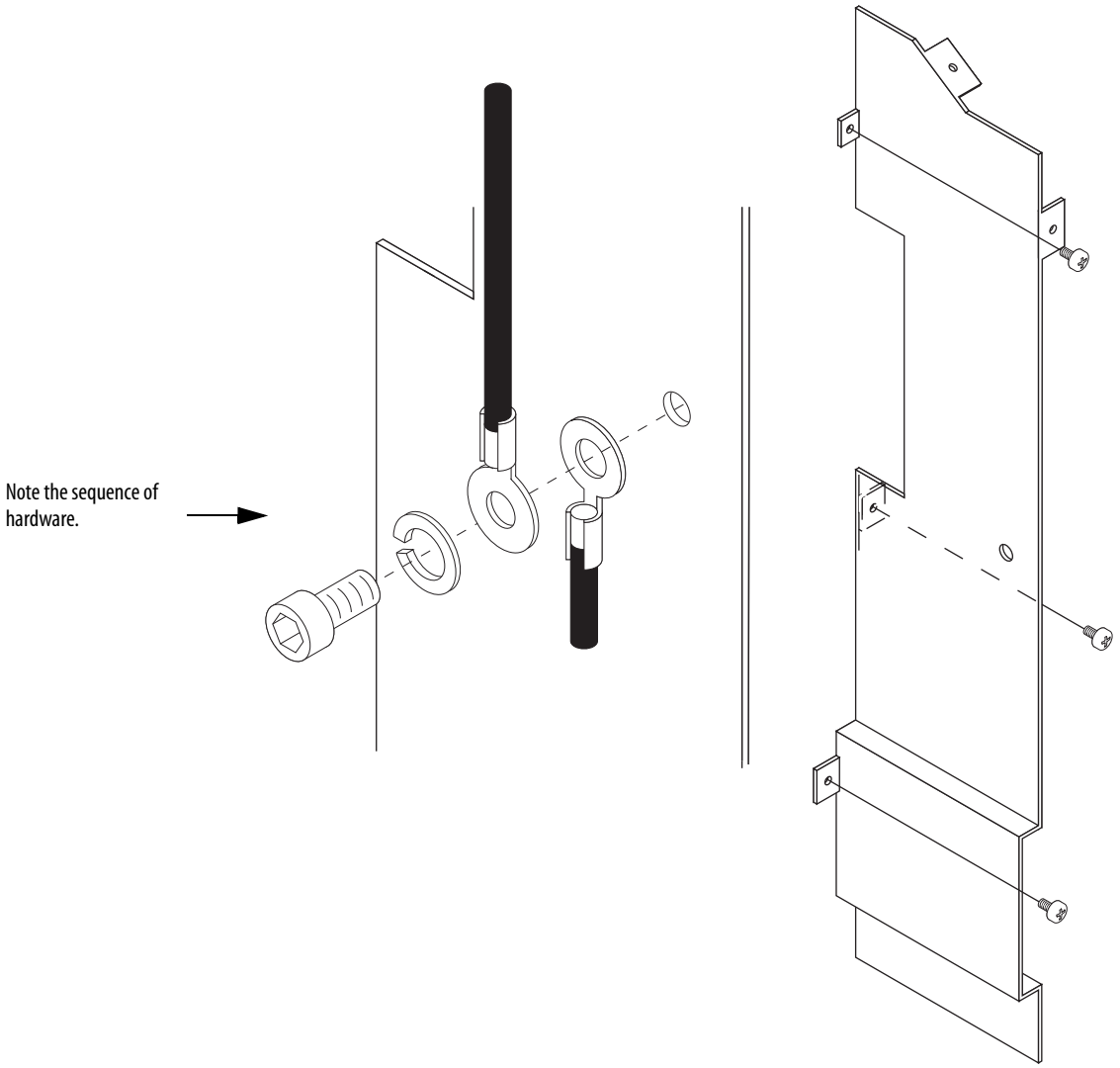
Task	Description
A	If removing a Control Frame from a DC input drive with precharge interlock, disconnect the wiring from terminal strip X50.
B	Remove the eight M4x8 Pozidrive screws, which secure the Control Frame to the drive. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
C	Remove the six M4x8 Pozidrive screws, which secure the Conduit to the drive. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
D	Remove the Conduit from the drive.
E	Remove the Control Frame from the drive while carefully routing the cables and wires through the access hole of the Control Frame.

IMPORTANT Before removing connections and wires, mark the connections and wires to avoid incorrect wiring during assembly.



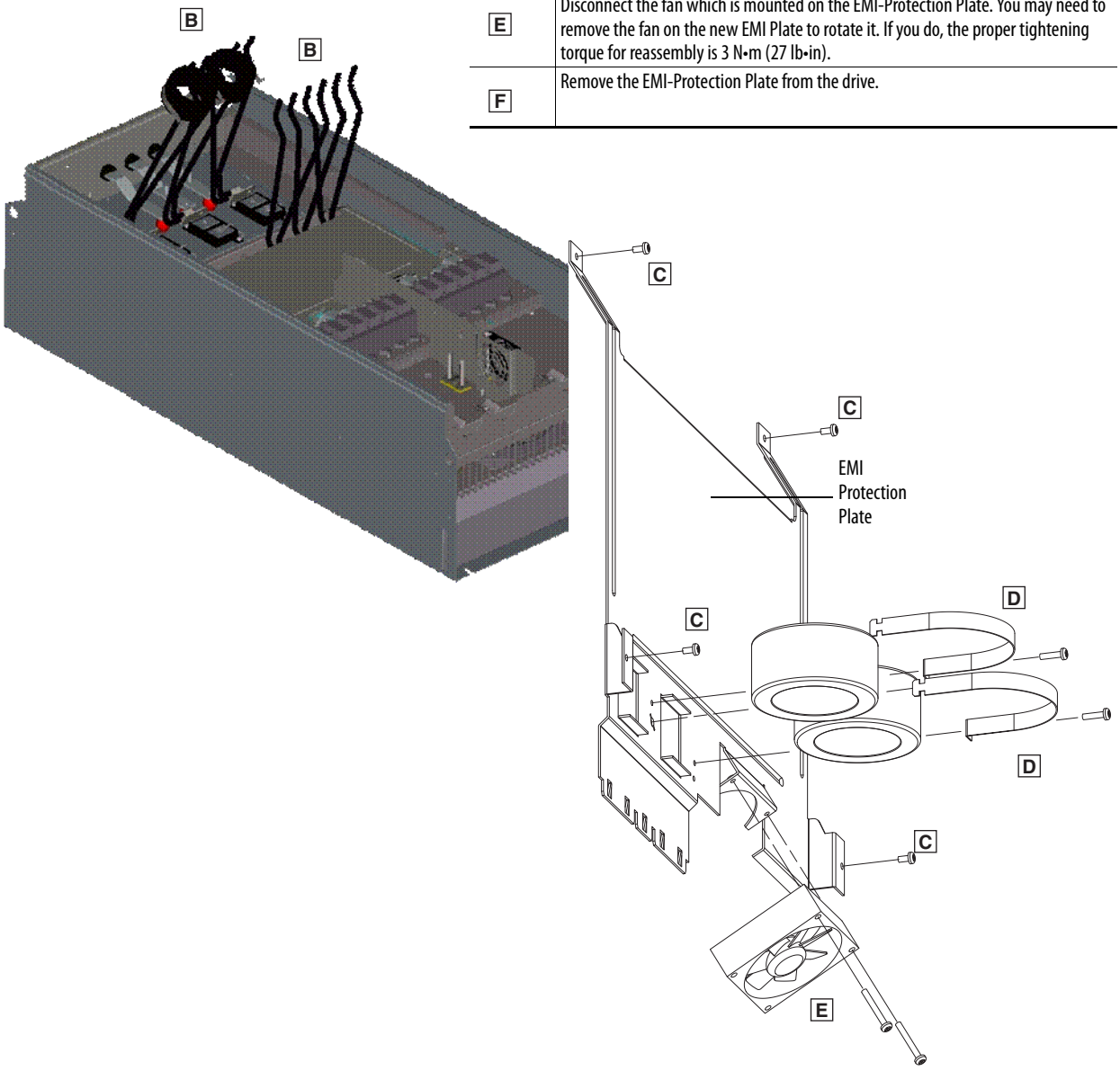
Step 5: Removing the Cross Plate

Task	Description
A	Disconnect the MOV if present.
B	Disconnect the Cross Plate fan if present.
C	Disconnect the grounding wires. Proper tightening torque for reassembly is 4 N•m (35 lb•in).
D	Remove the three M4x8 Pozidrive screws, which secure the Cross Plate to the drive. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
E	Remove the Cross Plate from the drive.



Step 6: Removing the Old EMI-Protection Plate

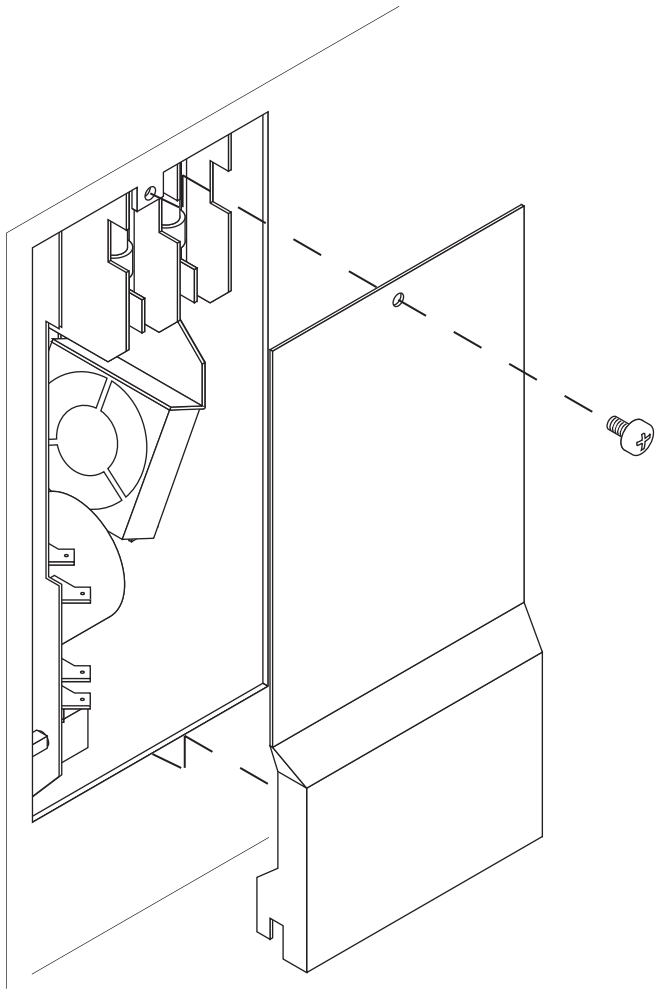
Task	Description
A	Disconnect the external cables, which connect the drive to incoming AC power and the motor, from the power terminal block.
B	Disconnect the internal cables from the power terminal block and place them at the top of the drive, in order to gain access to the EMI-Protection Plate. Proper tightening torque for reassembly is 20 N•m (177 lb•in).
C	Remove four M4x8 Pozidrive screws, which secure the EMI-Protection Plate to the drive. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
D	Remove the two screws, which secure the common mode inductors. Then remove the inductors. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
E	Disconnect the fan which is mounted on the EMI-Protection Plate. You may need to remove the fan on the new EMI Plate to rotate it. If you do, the proper tightening torque for reassembly is 3 N•m (27 lb•in).
F	Remove the EMI-Protection Plate from the drive.



Step 7: Removing the Old Main Fan

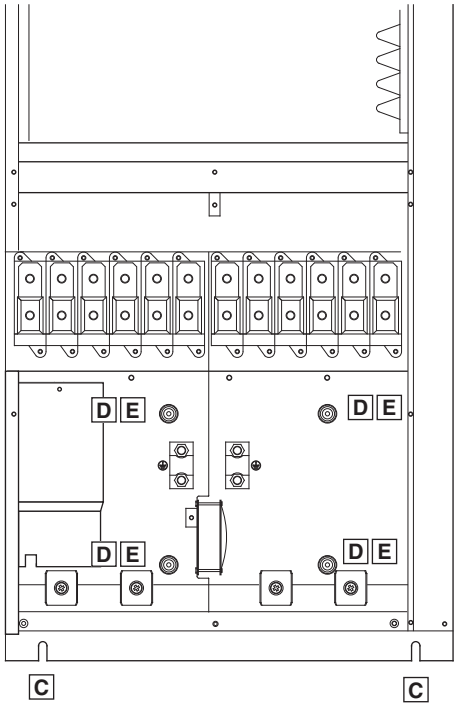
Task	Description
A	Remove the M4x8 Pozidrive screw, which secures the fan inverter cover. Then lift and pull the plate away from the drive. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
B	Disconnect the motor lead wires including the ground wire. Refer to Figure 1 on page 20, when reconnecting the motor.

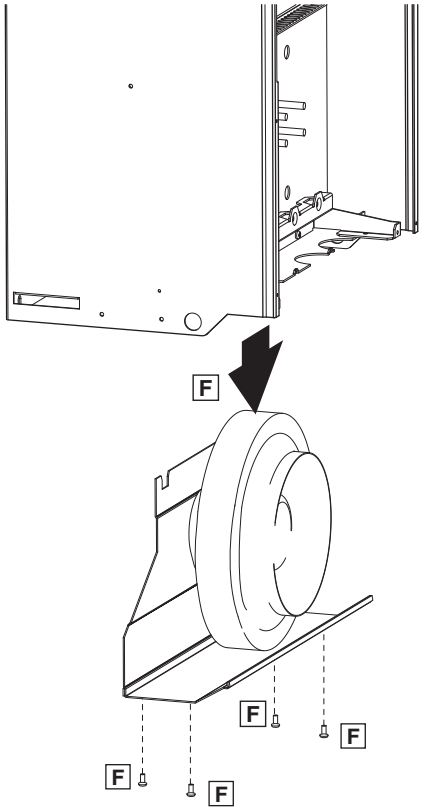
If a common mode choke is present on the cover, disconnect and remove it.



Step 7: Removing the Old Main Fan (continued)

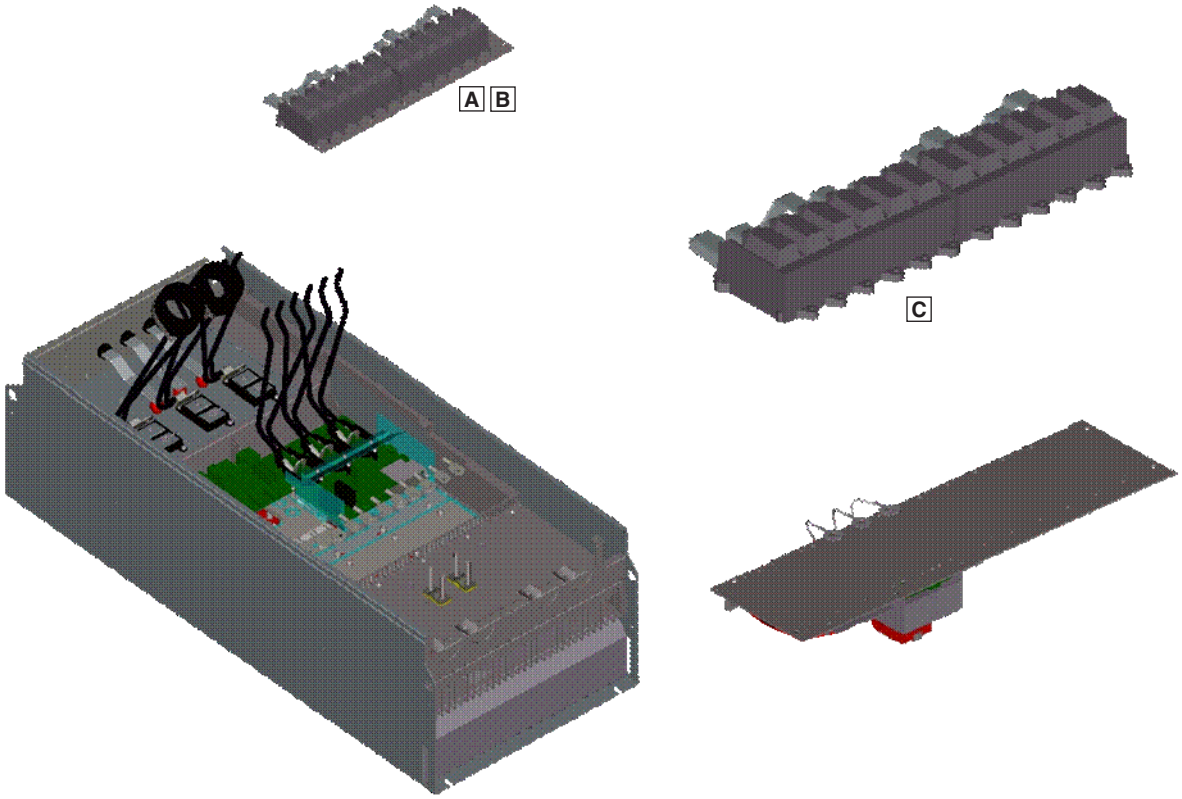
Task	Description
C	Check that the upper mounting bolts securely hold drive on the wall of the system enclosure. Remove lower mounting bolts from the bottom of the frame.
D	Remove the four rubber bushings, which cover the screws that mount the fan assembly.
E	Loosen, but do NOT remove, four M4X8 Pozidrive front screws (which are accessible through the holes vacated by the rubber bushings) so that the fan assembly can easily slide off. To loosen, but not remove these front screws, turn them 12 times. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
F	Remove four M4X8 Pozidrive screws from bottom of the frame. The fan plate should now easily slide down. If it does not, loosen the front screws another turn and attempt again. Continue loosening the screws until the fan plate slides easily from the drive. Proper tightening torque for reassembly is 3 N•m (27 lb•in).





Step 8: Removing the Connector Plate

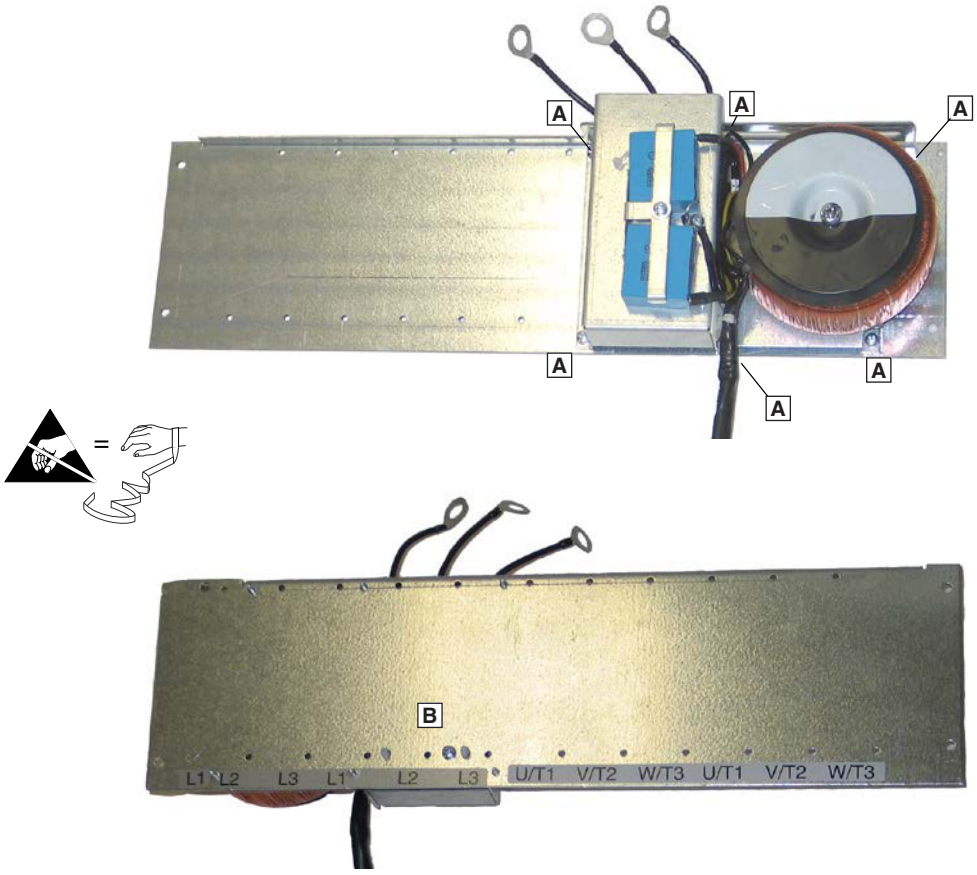
Task	Description
A	Remove the M5 Pozidrive screws, which secure the Connector Plate. Proper tightening torque for reassembly is 4 N•m (35 lb•in).
B	Then lift and pull the plate away from the drive.
C	Remove all connectors and bus bars from the old Connector Plate. Proper tightening torque for reassembly is 4 N•m (35 lb•in).



Step 9: Removing AC Components from the New Connector Plate (on DC Input Drives Only)

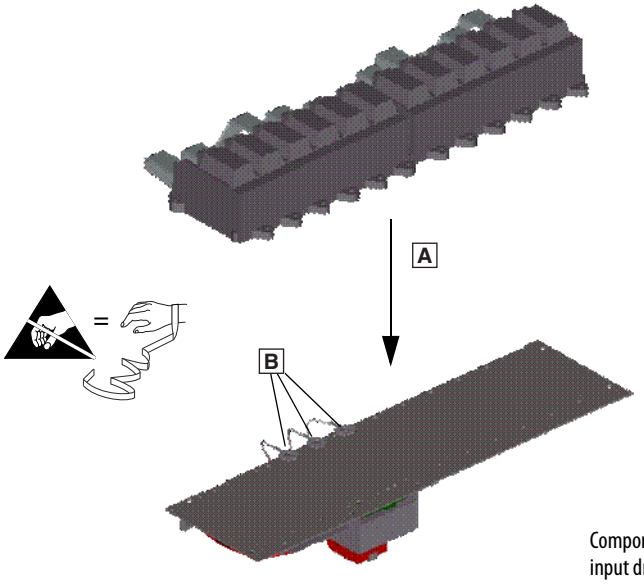
IMPORTANT Do not perform this step on drives with AC input. It removes noise mitigation circuitry, which is important to drives with AC input.

Task	Description
A	Remove the 6 M4 Pozidrive screws on the front of the connector plate, which secure the cover for the circuit board containing AC conditioning circuitry. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
B	Remove the M4 Pozidrive screw on the back of the connector plate, which secures the cover for the circuit board containing AC conditioning circuitry. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
C	Remove the plate.
D	Remove the circuit board.
E	Replace the plate and screws.



Step 10: Assembling New Connector Plate

Task	Description
A	Mount the connectors and bus bars on the new connector plate. Proper tightening torque for reassembly is 3 N•m (27 lb•in).
B	Connect the AC conditioning circuit to the terminals for incoming three-phase power.

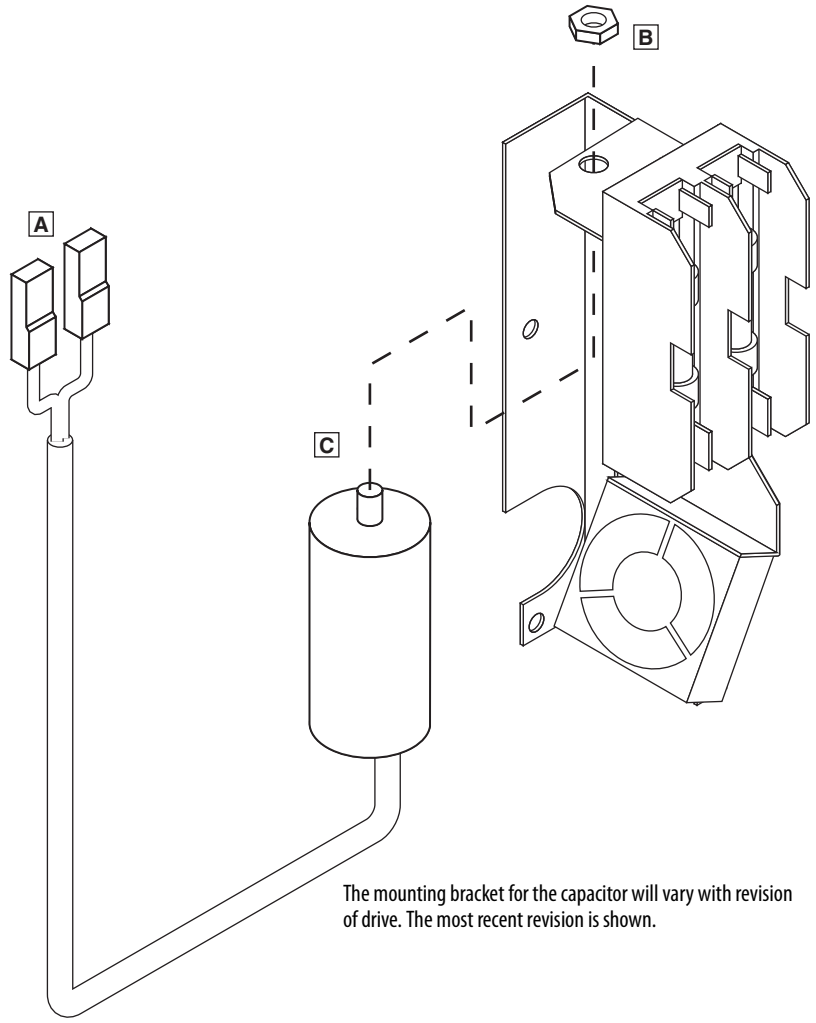


Components from AC input drive shown.

Step 11: Replacing the Motor Capacitor

Task	Description
A	Disconnect the wires from the old motor capacitor.
B	Remove the nut, which secures the capacitor to its bracket.
C	Remove the old capacitor and install the new one.
D	Install the new capacitor in reverse order of above steps.

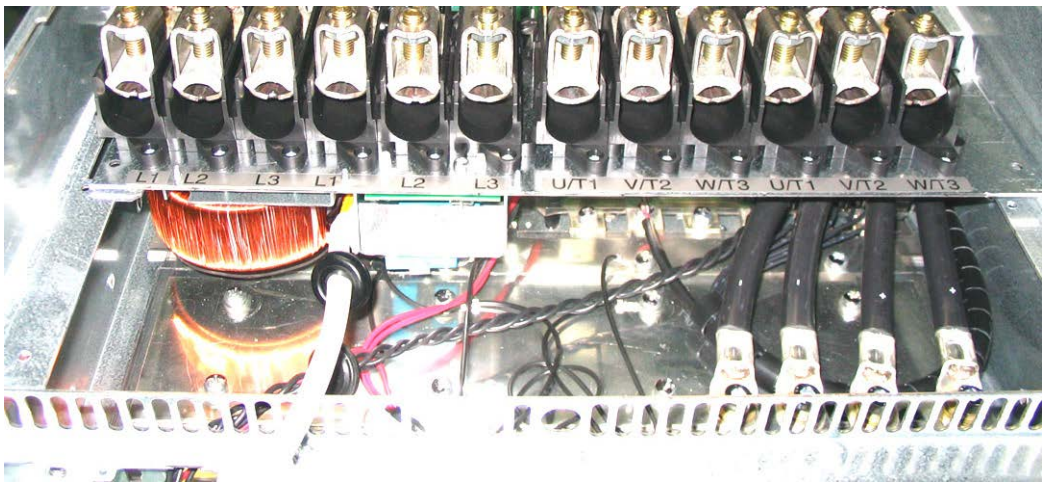
IMPORTANT Before removing connections and wires, mark the connections and wires to avoid incorrect wiring during assembly.



The mounting bracket for the capacitor will vary with revision of drive. The most recent revision is shown.

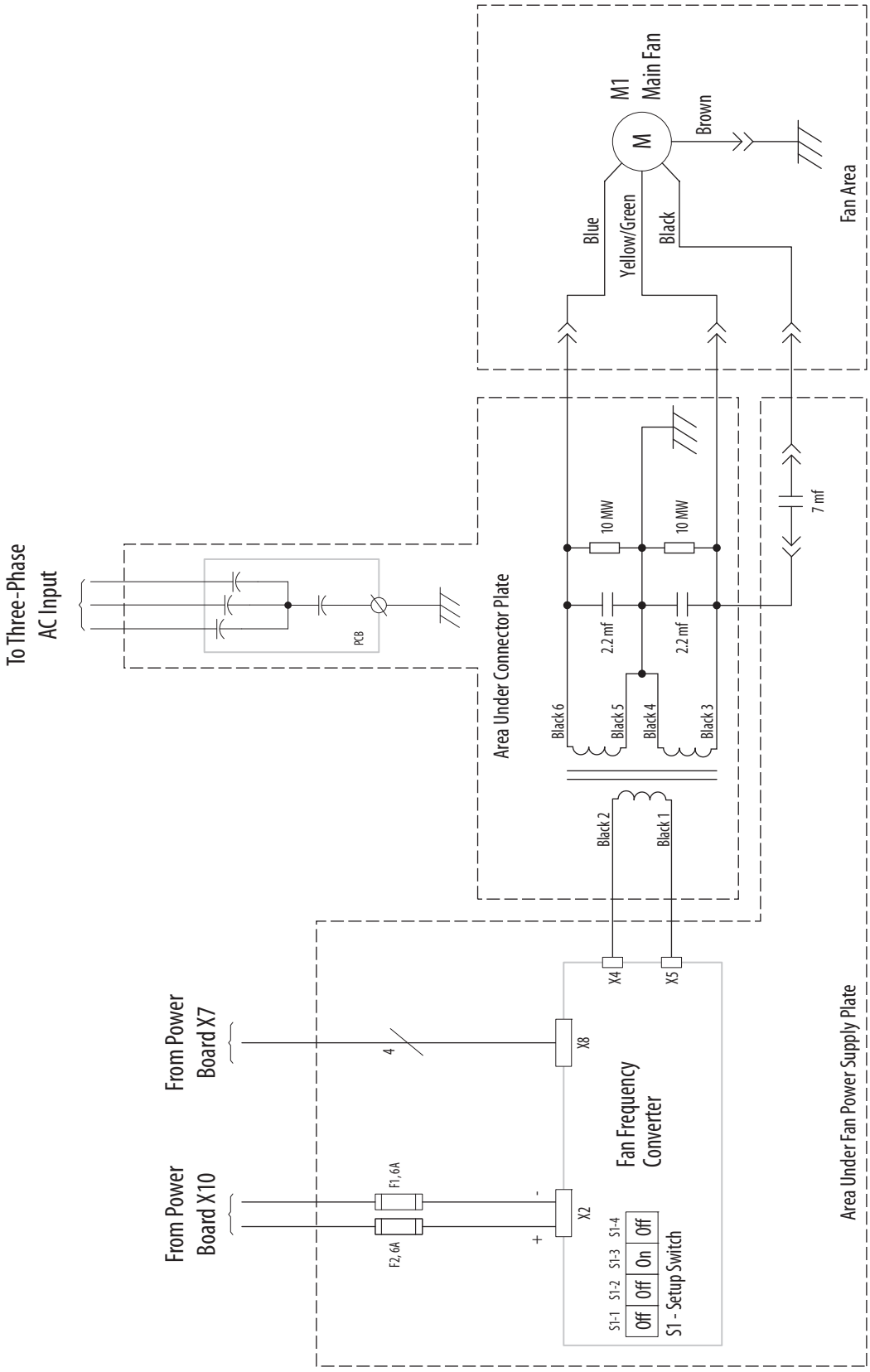
Step 12: Connecting the New Components

Task	Description
A	Pre-install the new connector plate by laying it near its final position.
B	Connect the components as shown in Figure 1 on page 20.



Components from AC input drive shown.

Figure 1 - Schematic of Upgraded Fan Inverter Scheme



Step 13: Reassemble the Drive

Assemble the drive in reverse order of disassembly.

When reconnecting internal cables to the power terminal block, remember to route incoming AC cables through the common mode inductors on the new EMI Protection Plate.

If the cable for the fan on the new EMI Protection Plate does not reach the connection point, rotate the fan 180 degrees.

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If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

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