



KIT INVERTER ASSEMBLY

100043-5, 8, and 11



Installation and servicing of Danfoss Turbocor® compressors by qualified and product trained personnel only. Follow these instructions and sound refrigeration/electrical/servicing practices relating to installation, commissioning, maintenance and service.

<p>Consult the appropriate Danfoss Turbocor (DTC) Service Manual on turbocor.danfoss.com for detailed service instructions.</p>	<p>Never power compressor without covers in place and secured.</p> <p>Removing the mains input cover will expose you to a voltage hazard of up to 575V. Ensure the mains input power is off and locked out before removing cover.</p> <p>Before removing top cover, wait at least 20 minutes after isolating AC power to allow the high voltage capacitors to discharge.</p>	<p>Always wear appropriately rated safety equipment when working around equipment and/or components energized with high voltage.</p> <p>This equipment contains hazardous voltages that can cause serious injury or death.</p>	<p>Recover all refrigerant from compressor in accordance with local codes and ensure pressure is fully vented before the removal of refrigerant containing components.</p>
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1 - Introduction

Inverter assembly removal and installation.

2 - Removing Refrigerant from Compressor:

- Recover refrigerant from compressor in accordance with local codes and practices.

3 - IMPORTANT NOTICE:

These components should only be replaced by technicians trained and competent in Danfoss Turbocor Compressor service techniques/procedures.

Danfoss Turbocor Compressor electrical isolation and ESD protection and personal grounding procedures must be followed. These procedures are found in Sections "Electrical Isolation of the Compressor" and "Handling Electronic Static Devices" of the Service Manual (M-SV-001).

- ⚠ Always wear appropriately rated safety equipment when working around equipment and/or components energized with high voltage. Faulty components can explode and cause serious injury or death.
- ⚠ Care must be taken in removal and installation of the covers to prevent the screws from falling in to the power electronic compartment. Dropping cover screws can cause a short circuit, energized components to explode, and damage to the power electronic parts of the compressor. Place the screws carefully after positioning the covers to minimize the risk of screws falling in to the power electronic areas.

4 - INVERTER ASSEMBLY Removal Instructions:

NOTE: Refer to the current Service Manual for more details in removal and installation.

1. Isolate compressor power as described in Section “Electrical Isolation of the Compressor” of the Service Manual (M-SV-001).
2. Release the four (4) screws that secure the Mains Input Cover and remove the cover.
3. Using an appropriately rated volt meter, confirm that the AC voltage is isolated.
4. Wait at least 20 minutes for the DC bus capacitors to discharge.

DANGER: Do NOT touch any components when removing the top cover. This is particularly true for compressors with CE covers because they are coated on the outside for the express purpose of being conductive

5. Release the nine (9) screws that secure the Top Cover and remove the cover, taking particular care not to touch ANY components underneath.
6. Using an appropriately rated volt meter, check the DC bus bars for voltage level. If the voltage is above 5VDC, wait five (5) minutes and recheck until 5VDC or below is achieved.
7. For F Series and later compressors, remove the Soft Start Temperature Harness. Refer to Figure 2 (Soft Start J9 Connector).

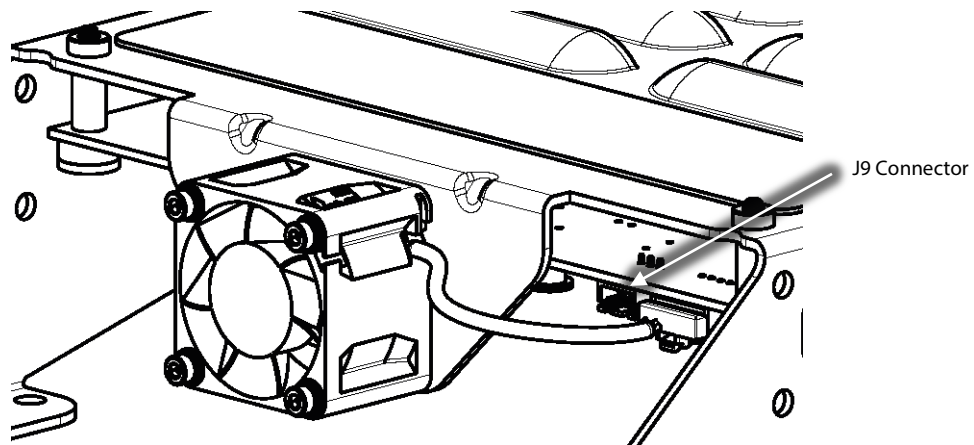


Figure 1 – Soft Start J9 Connector

8. Disconnect the Soft Start ground wire by removing the top nut and mains input ground wire from the ground post on the compressor housing at 3 phase connection point. Refer to Figure 2 (Ground Location).

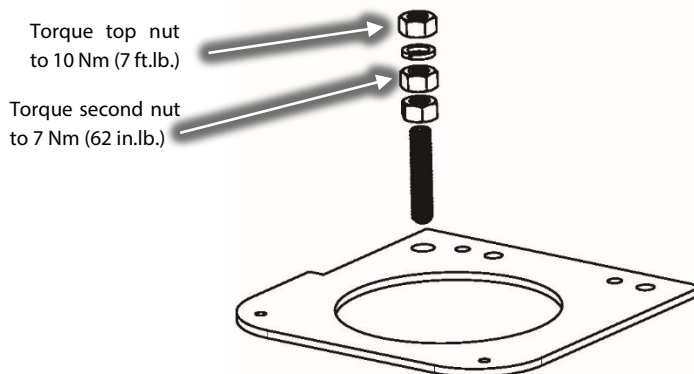


Figure 2 – Ground Location

- Remove the M5x15 fasteners that secure the Soft Start mounting bracket to the compressor. Refer to Figure 3 (Soft Start Mounting Screws).

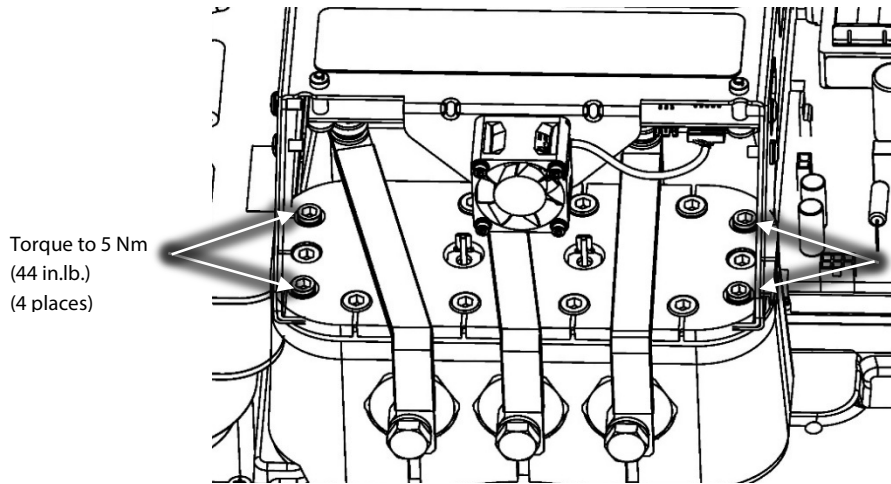


Figure 3 – Soft Start Mounting Screws

- Lift the Soft Start and turn it over, placing it board-side up on the AC Bus Bars. Refer to Figure 4 (Soft Start Lift).

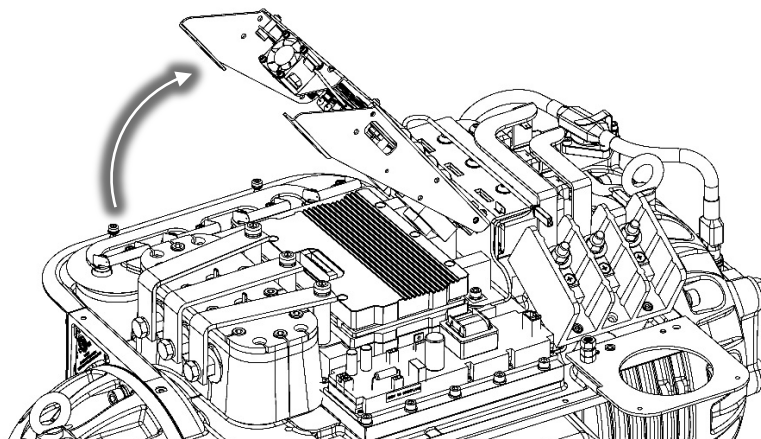


Figure 4 – Soft Start Lift

- Unplug the cable connectors from the Soft Start board. Refer to Figure 5 (Soft Start Harness Removal).

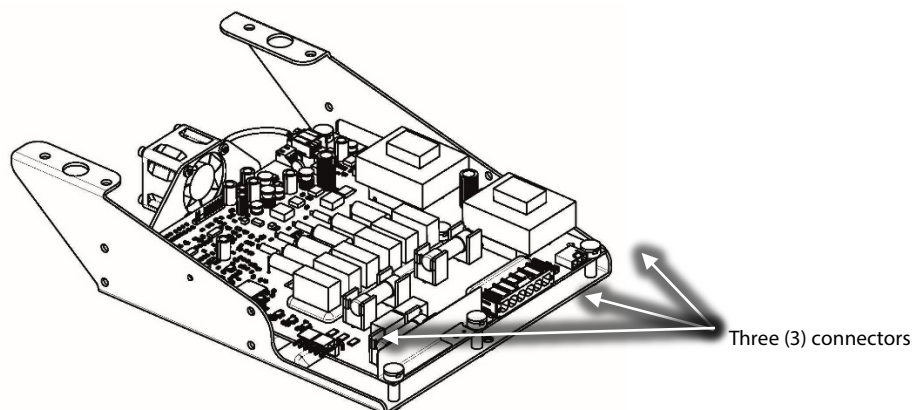


Figure 5 – Soft Start Harness Removal

12. Lift away the Soft Start assembly and place it in a safe location.
13. Unplug the SCR Gate cable harness from the AC/DC Bus and SCRs noting its orientation. Refer to Figure 6 (SCR Gate Cable and AC/DC Harness Connections) for the location of the connectors.

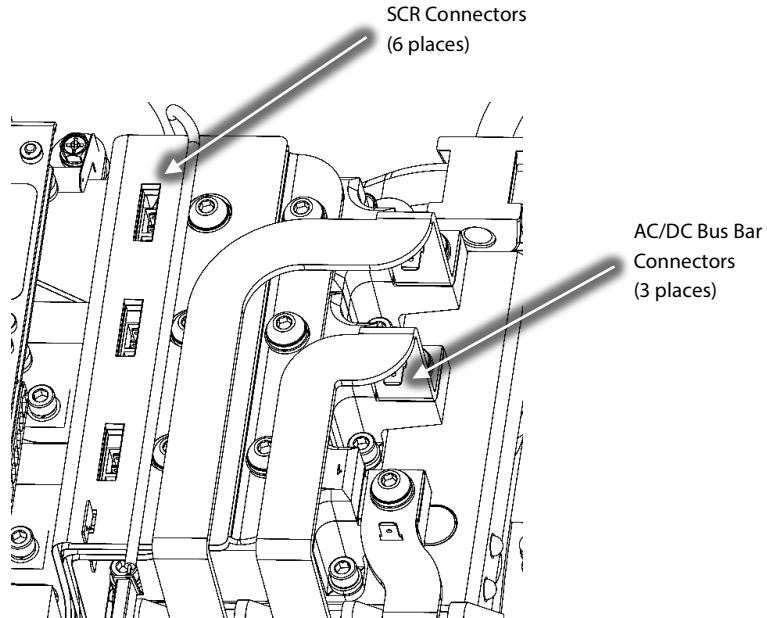


Figure 6 – SCR Gate Cable and AC/DC Harness Connections

14. Remove the AC mains input terminals and bus bars. Refer to Figure 7 (AC Mains Input Terminals and Bus Bar Removal).

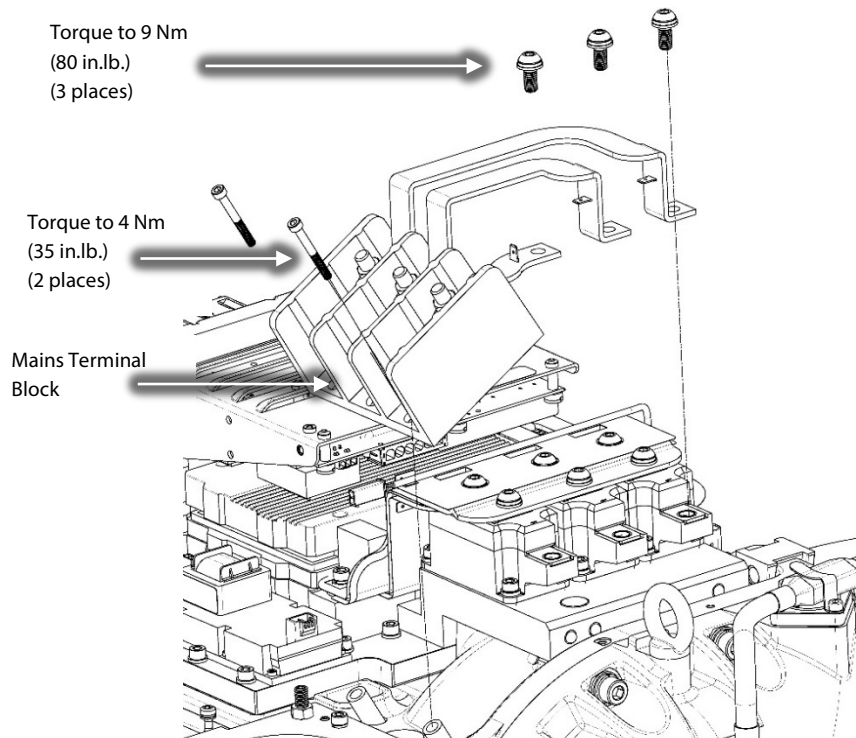


Figure 7 – AC Mains Input Terminals and Bus Bar Removal

15. Disconnect the three (3) snubber capacitors from the Inverter noting the leg orientation of one leg is longer than the other. Refer to Figure 8 (Snubber Capacitor Removal). (TT300 Shown).

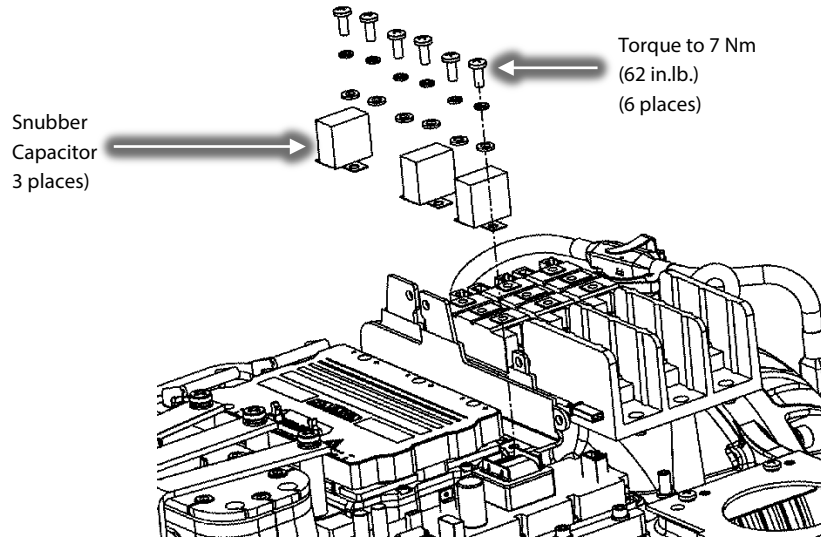


Figure 8 – Snubber Capacitor Removal

16. Remove the six (6) DC bus screws from the SCRs. Refer to Figure 9 (SCR Bus Screw Removal).

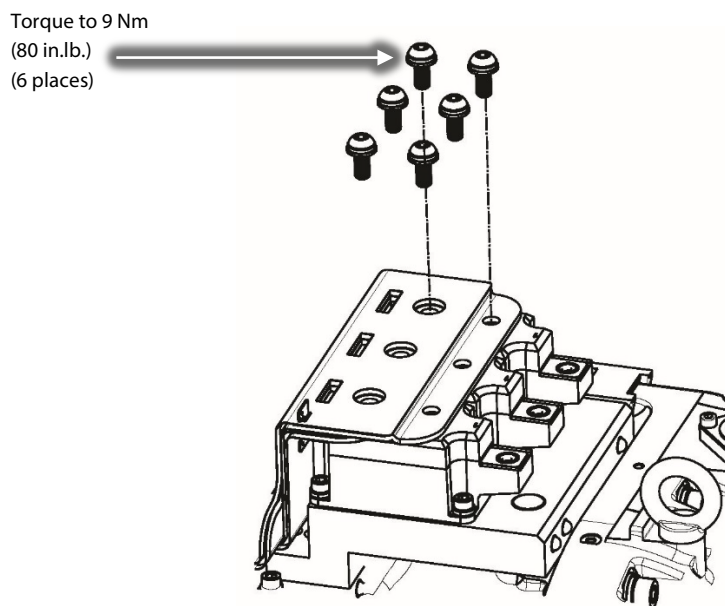


Figure 9 – SCR Bus Screw Removal

- Remove the nylon nuts and foil at the base of the DC capacitor assembly, under the main compressor housing. Refer to Figure 10 (Capacitor Nut Removal).

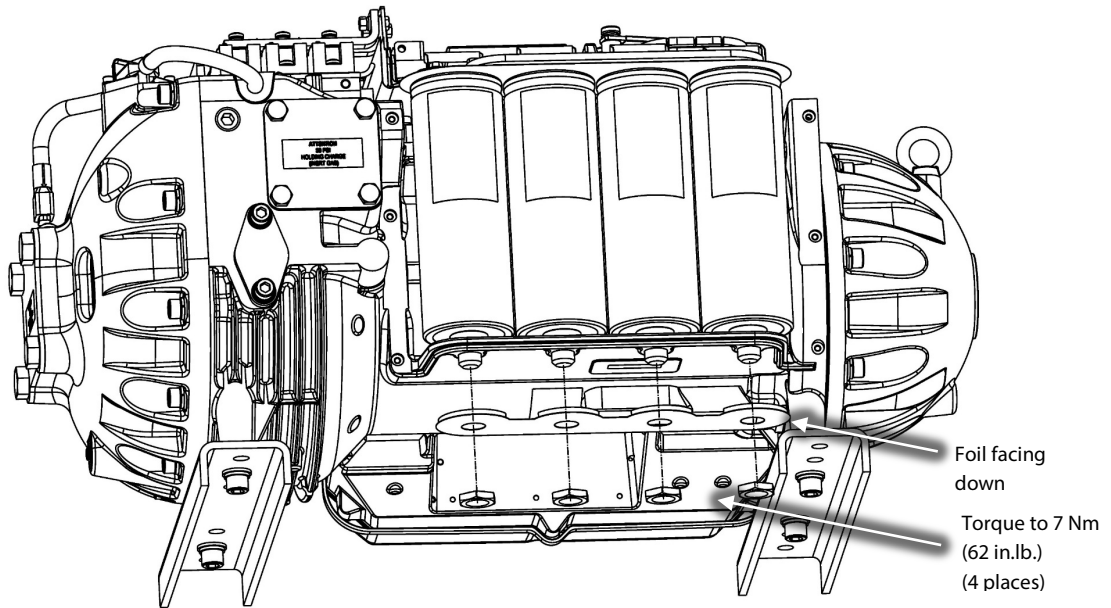


Figure 10 – Capacitor Nut Removal

- Carefully lift the DC Bus Bars and capacitors out as an assembly. Do not remove the bleed resistors or capacitors from the bus bars. Refer to Figure 11 (Capacitor Assembly Removal) (TT300 Shown).

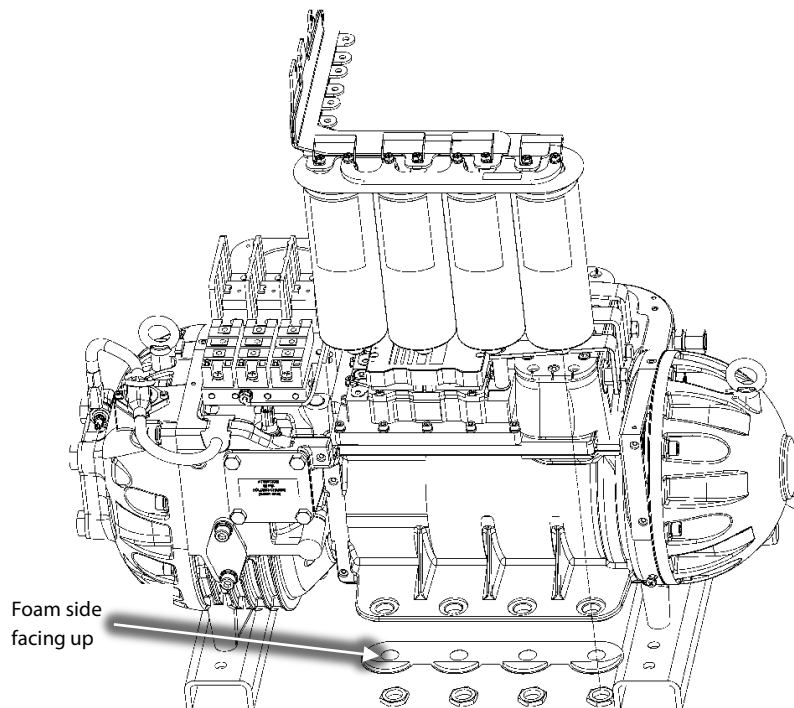


Figure 11 – Capacitor Assembly Removal

- Loosen the screw containing the Retainer Clip and rotate the clip to allow for the connector to be removed. Refer to Figure 12 (Retainer Clip Rotation).

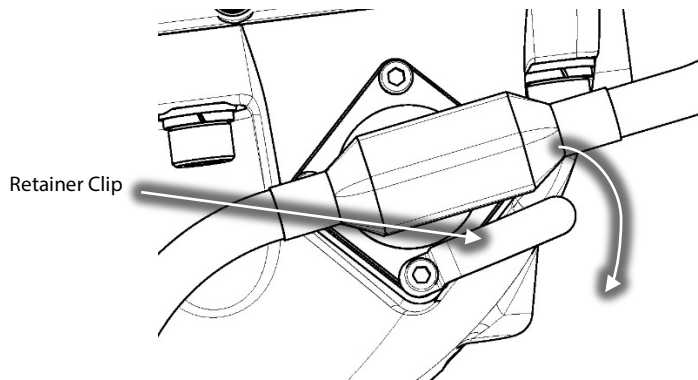


Figure 12 – Retainer Clip Rotation

- Disconnect the compressor cable harness from the IGV Motor, Suction and Discharge Sensors, and SCR Temperature Sensor. Refer to Figure 13 (Compressor Cable Harness Removal).

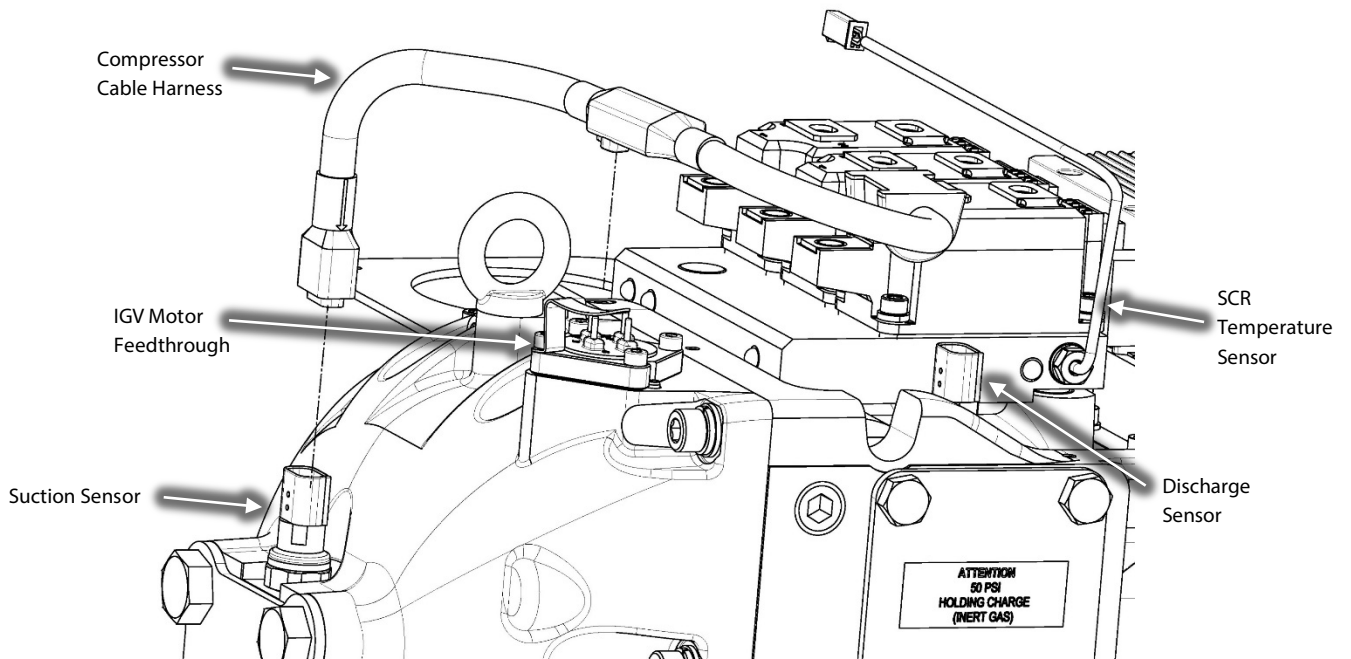


Figure 13 – Compressor Cable Harness Removal

21. Remove the four (4) screws that secure the SCR Cooling Manifold to the IGBT Heat Sink Plate. (Refer to Figure 14 (SCR Manifold Removal)).
22. Carefully remove the SCR Cooling Manifold from the IGBT Heat Sink Plate and the SCR Manifold Return Brass Fitting. Refer to Figure 14 (SCR Manifold Removal).

NOTE: Removal of the SCR Cooling Manifold will require the manifold to be rocked back and forth to disengage it from the SCR Manifold Return Brass Fitting. If necessary, use a flat-blade screwdriver to gently pry the manifold upward. Use extreme caution to not damage any of the components.

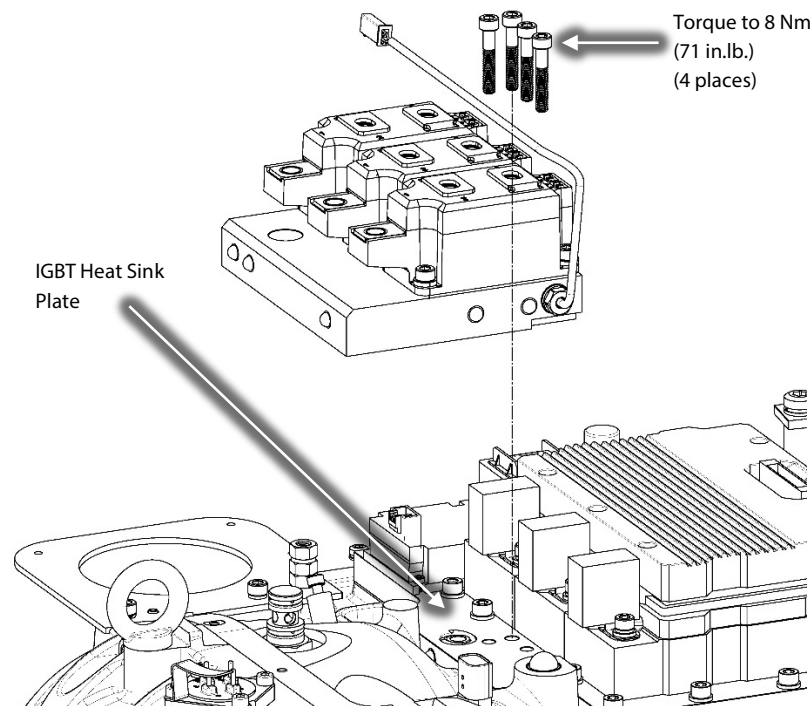


Figure 14 – SCR Manifold Removal

23. Remove the Motor Bus Bar screws, copper tubes, and washers from the Inverter. Refer to Figure 15 (Motor Bus Bar Removal).

NOTE: The Motor Bus Bars do not need to be removed. Figure 15 (Motor Bus Bar Removal) is only used to provide clarification of the individual components.

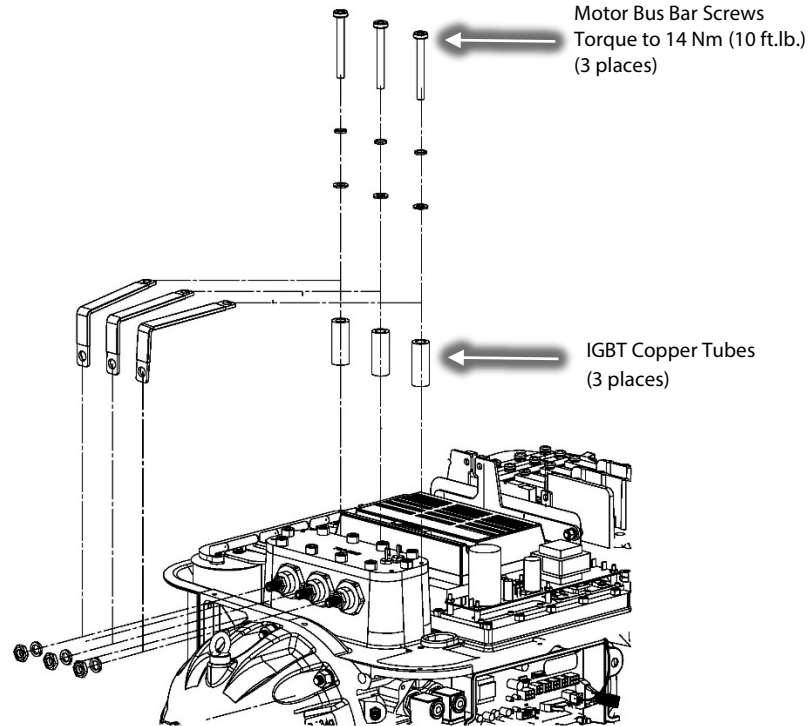


Figure 15 – Copper Tube Removal

24. Remove the Inverter cable harness from the top of the Inverter. Refer to Figure 16 (Inverter Harness Removal).

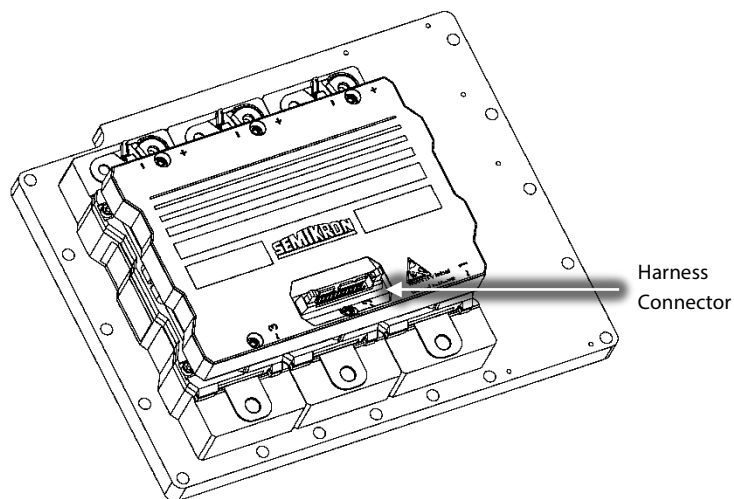


Figure 16 –Inverter Harness Removal

25. Disconnect all wiring connections from the HV DC-DC. Refer to Figure 17 (HV DC-DC Harness Removal).

NOTE: There is no need to remove the HV DC-DC converter from the Inverter heat sink plate at this time.

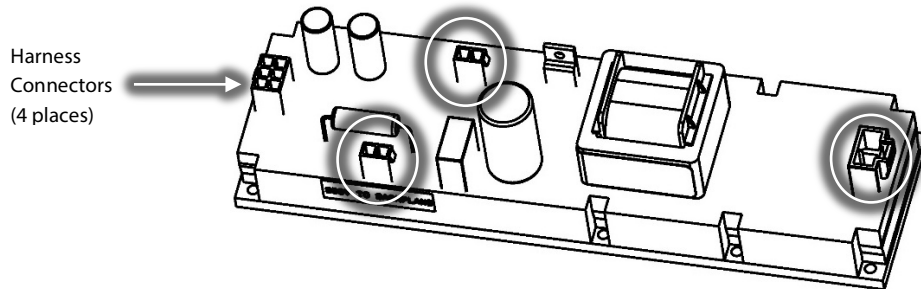


Figure 17 – HV DC-DC Harness Removal

26. Disconnect the wires from the Motor Winding Sensor. Refer to Figure 18 (Motor Winding Sensor Connector Removal).

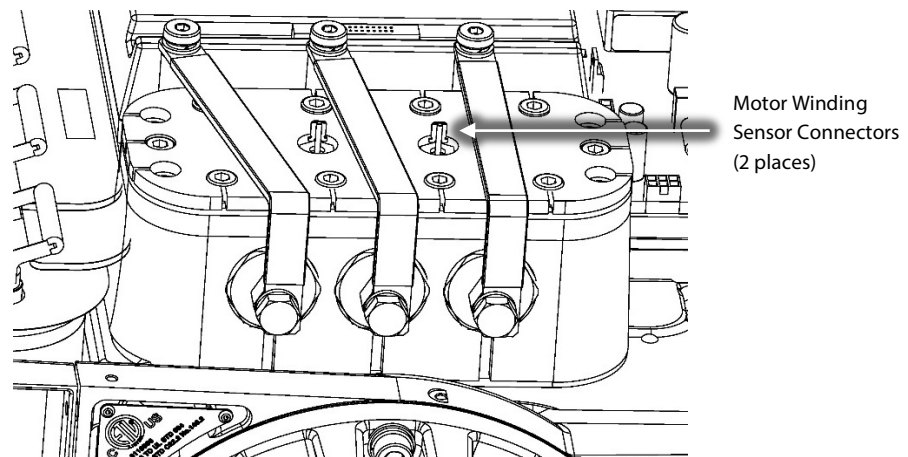


Figure 18 – Motor Winding Sensor Connector Removal

27. Recover refrigerant from compressor in accordance with local codes and practices.

28. Remove the 20 fasteners that secure the Inverter to the compressor main housing. Refer to Figure 19 (Inverter Removal).

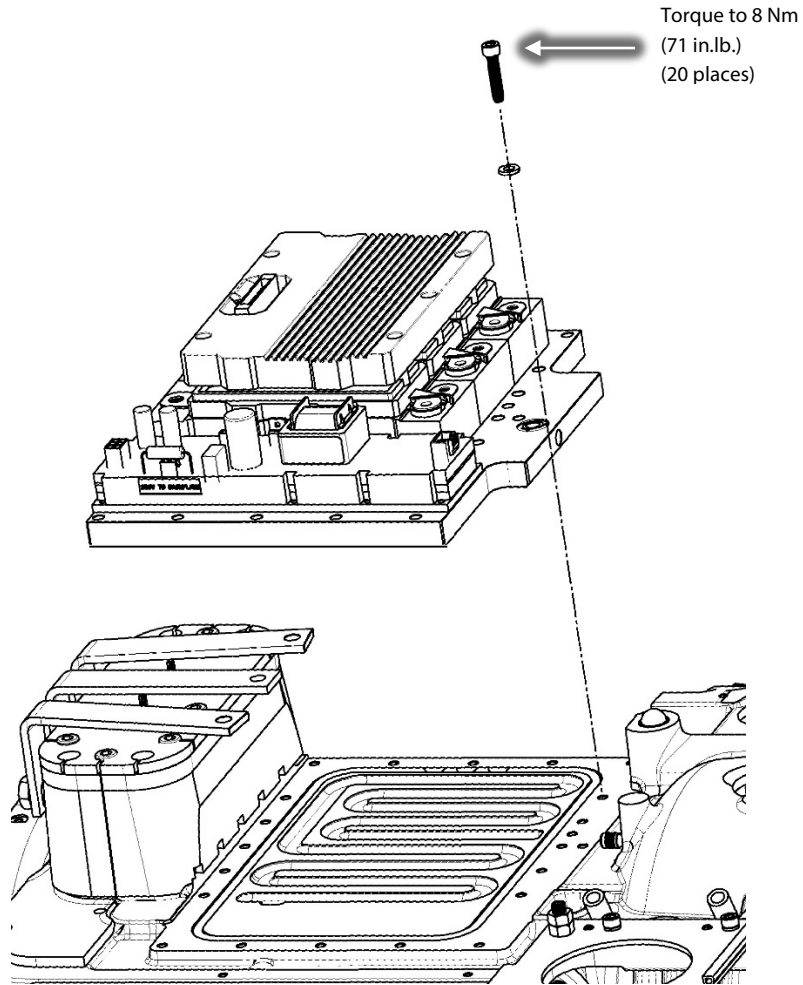


Figure 19 – Inverter Removal

29. Remove and discard the large Inverter O-ring from the compressor housing. (Refer to Figure 20 (Inverter O-ring Removal)).

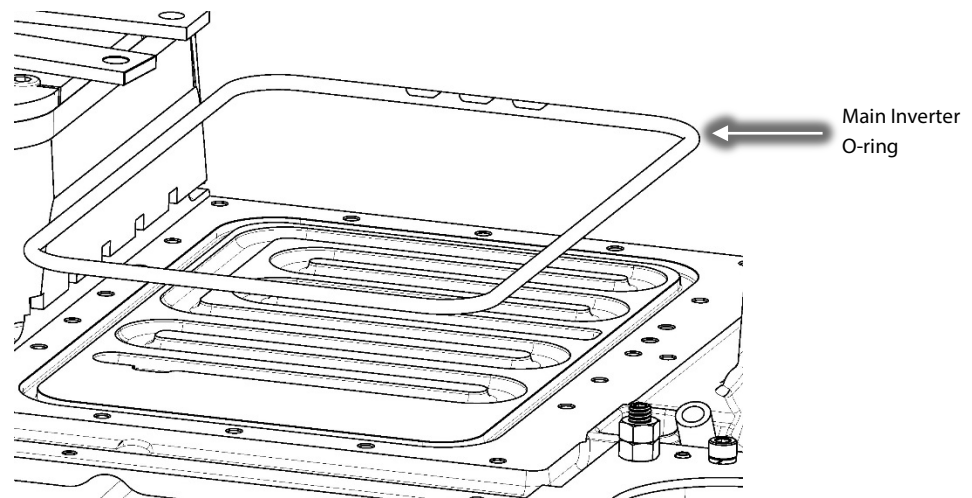


Figure 20 – Inverter O-ring Removal

30. Remove the two (2) O-rings from the SCR Manifold Return Brass Fitting. Refer to Figure 21 (SCR Manifold Return Brass Fitting O-rings).

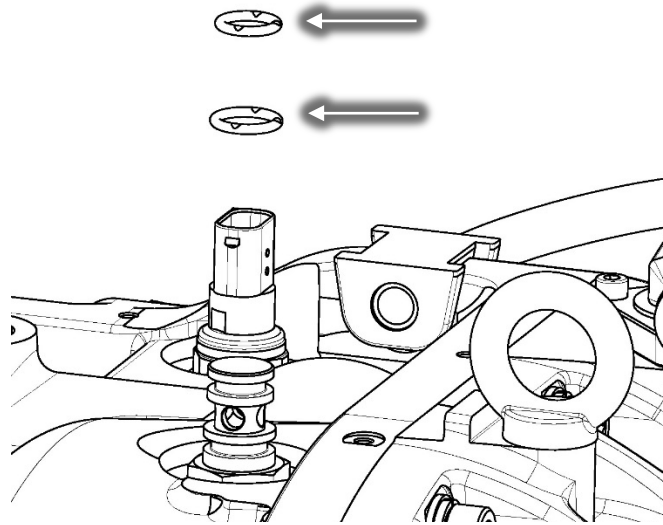


Figure 21 – SCR Manifold Brass Fitting O-ring Removal

31. Remove the HV DC-DC from the IGBT Heat Sink Plate. Refer to Figure 22 (HV DC-DC Removal).

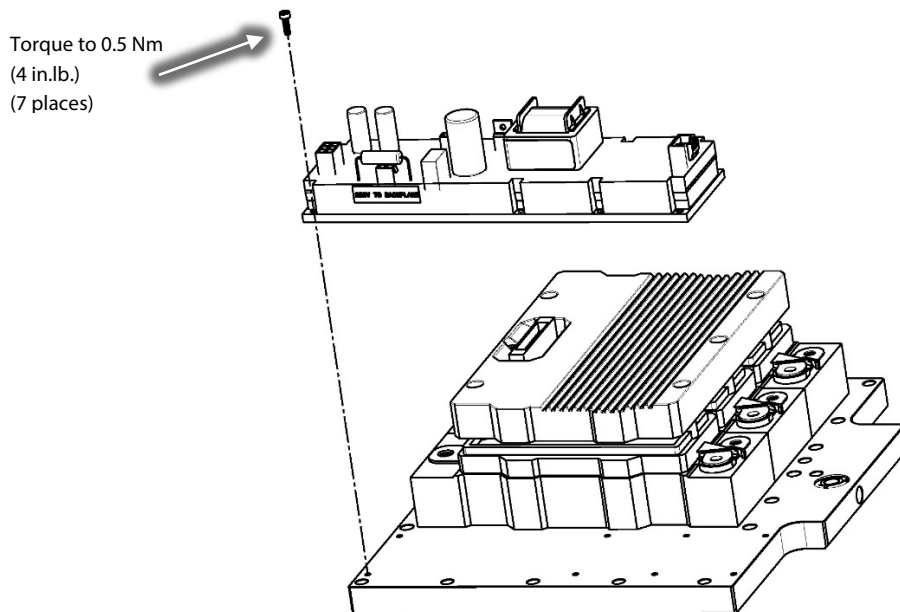


Figure 22 – HV DC-DC Removal

5 - O-ring Installation Information:

It is important to replace any used/removed O-rings with new ones. It is far more desirable to carefully inspect the new O-rings prior to installation and to take care of them during the installation rather than needing to repeatedly overhaul components with faulty seals.

- Remove each O-ring to be installed from its package and inspect for defects such as blemishes, abrasions, cuts, or punctures
- Slight stretching of the O-ring when it is rolled inside out will help to reveal some defects not otherwise visible
- After inspection and prior to installation, lubricate the O-ring with a light coat of Super-O-Lube
- Avoid rolling or twisting the O-ring when maneuvering it into place
- Keep the position of the O-ring mold line constant
- Pre-shaped O-Rings which are coated by white powder should be cleaned up using O-lube and a soft rag

6 - Inverter Assembly Installation Instruction:

1. Clean O-ring groove in the main compressor housing and SCR Manifold Return Brass Fitting with a lint-free cloth.
2. Apply O-lube and install the O-rings SCR Manifold Return Brass Fitting.
3. Apply O-lube and install the Inverter O-ring in the compressor housing groove.
4. Apply a thin film of thermal paste to the Inverter Cooling Manifold and the bottom of the HV DC-DC Converter and install the DC-DC Converter.

NOTE: Installing the HV DC-DC at this point will ease installation rather than waiting until the Inverter assembly has been installed onto the compressor.

5. Remove the backing material from the Inverter Cooling Manifold of the new Inverter. Use caution to not damage the bottom sealing surface of the Inverter.
6. Install the new M6X30 screws into the Inverter assembly with the exception of the four (4) M6X35 SCR Manifold screws and carefully lower the assembly onto the compressor housing. Use the installed screws to properly line up the inverter. Refer to Figure 23 (Inverter Screw Locations).

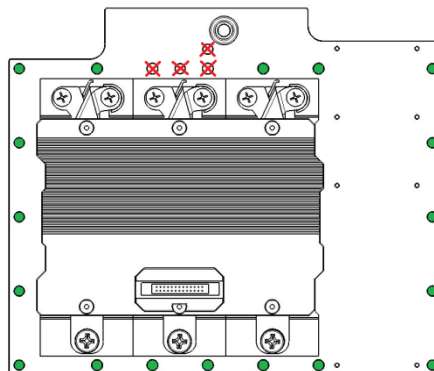


Figure 23 – Inverter Screw Locations

7. Once the Inverter is in place, finger-tighten the Inverter screws in a diagonal pattern and torque to 3 Nm (27 in.lb.) on the first pass then to 8 Nm (71 in.lb.) on the second pass.
8. Clean the O-ring groove on top of the Inverter Cooling Manifold with a lint-free cloth.
9. Clean the O-ring groove on top of the IGBT Heat Sink Plate.

- Apply O-Lube to the provided SCR Heat Sink O-ring (#2-113) and place in the O-ring groove in the IGBT Heat Sink Plate and install. Refer to Figure 24 (IGBT Heat Sink Plate O-ring Install).

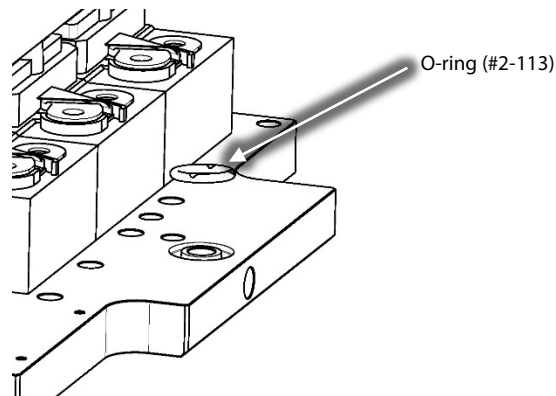


Figure 24 – IGBT Heat Sink Plate O-ring Install

- Install two (2) new O-rings on the SCR Manifold Return Brass Fitting (#2-112 and #2-113, smaller one on top). Apply O-lube to each O-ring before installation. Refer to Figure 25 (SCR Manifold Return Brass Fitting O-ring Install).

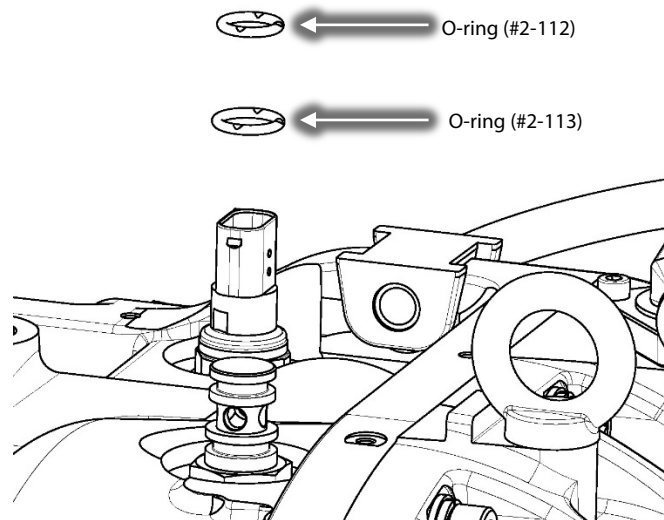


Figure 25 –SCR Manifold Return Brass Fitting O-ring Install

- Carefully install the SCR cooling plate over the SCR Manifold Return Brass Fitting.

NOTE: Before proceeding, ensure that the SCR Cooling Plate is fully seated onto the SCR Manifold Return Brass Fitting.

- Install the four (4) M6X35 SCR Cooling Manifold screws and torque to specification.
- Leak test and evacuate the compressor to appropriate pressure and accepted industry standards.

15. Install the three (3) copper tubes and torque the screws to specification. Refer to Figure 26 (Motor Bus Bar Installation).

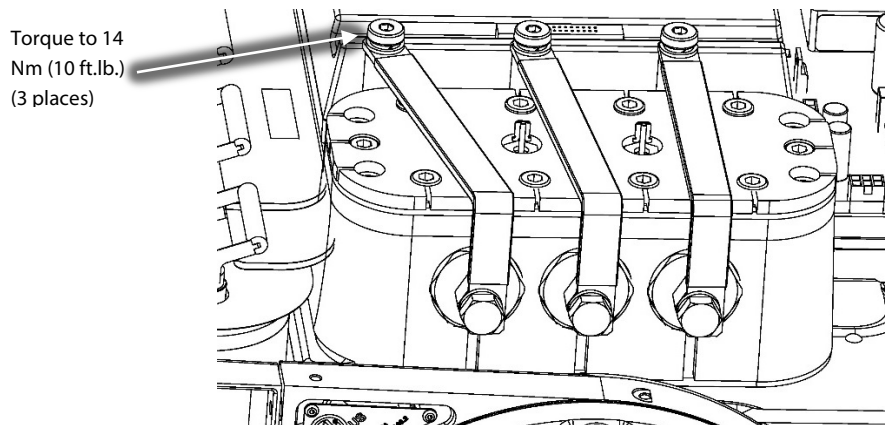


Figure 26 – Motor Bus Bar Installation

16. Verify the compressor cable harness and the SCR Temperature Sensor Cable is properly placed across the cooling manifold.
17. Connect the compressor cable harness to the IGV Motor feed through, suction and discharge sensors, and SCR Temperature sensor.
18. Rotate the Retainer Clip until it is directly above the IGV Connector and torque the screw to specification. Refer to Figure 27 (Retainer Clip Rotation).

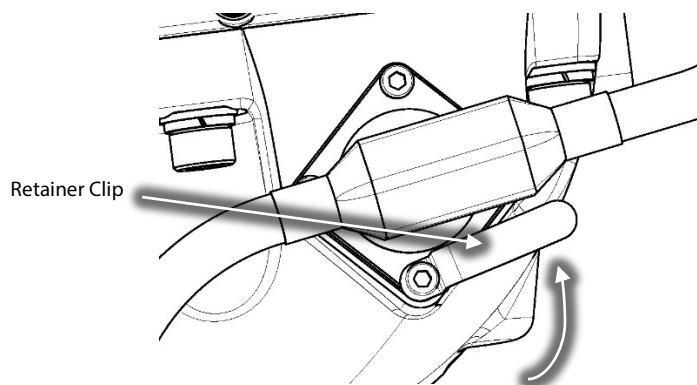


Figure 27 – Retainer Clip Rotation

19. Install the DC Bus Bar and Capacitor assembly over the Inverter.
20. Connect the snubber capacitors to the Inverter noting the leg orientation and torque to specification. Starting from the DC Bus Capacitor side, torque to specification. Refer to Figure 9 (Snubber Capacitor Removal).
21. Tighten the DC bus assembly to the SCRs and torque to specification.
22. Place the capacitor membrane foil side down, underneath the main compressor housing and then reinstall the nylon nuts to the base of the DC capacitor assembly, under the main compressor housing and torque to specification. Refer to Figure 10 (Capacitor Nut Removal).
23. Connect the motor winding, DC-DC, and Inverter cables.
24. Connect all electrical connections to the HV DC-DC converter. Refer to Figure 17 (HV DC-DC Harness Removal).
25. Connect the SCR temp sensor.
26. Install the Mains Input Terminal.
27. Connect the three (3) AC wires from the Soft Start AC/DC cable harness to the appropriate AC bus bar.
28. Connect the SCR Gate cable harness to the SCRs noting its orientation.
29. Connect all wiring harnesses to the Soft Start.

30. Place the Soft Start into mounting position, secure to the compressor, and torque to specification.
31. Route and connect the Soft Start ground wire to the ground post on the compressor housing at 3 phase connection point and torque to specification.
32. Charge the compressor with refrigerant.
33. Install top-side covers.

Capacitor Cover

34. Place the Capacitor Cover and secure it with the long screw (M5 x 20) and flat washer in position number three (3) as shown in the following figure. Use five (5) remaining screws to secure the cover. Fasten according to the sequence in Figure 28 (Capacitor Cover Torque Sequence). Follow the sequence twice.

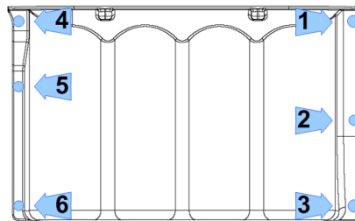


Figure 28 – Capacitor Cover Torque Sequence

Top and Mains Input Cover

35. Ensure that no residue remains on the contact surfaces of Top Cover and casting sides.
36. Place the Top Cover and secure it with the nine (9) M5x15 screws according to the following sequence. Follow the sequence twice. The first time, only fasten screws half way down to allow for adjustments. Torque to 13 in.lb. on the second pass. Refer to Figure 29 (Top Cover Torque Sequence).

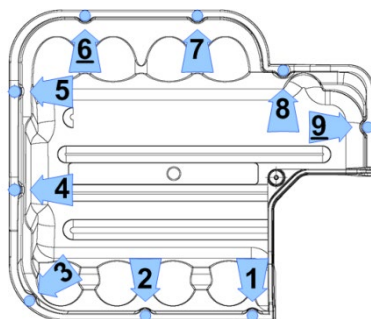


Figure 29 – Top Cover Torque Sequence

37. Ensure that no residue remains on the contact surfaces of the Mains Input Cover and casting sides.
38. Place the Mains Input Cover and secure it with the four (4) M5x15 screws. Tighten according to Figure 30 (Mains Input Cover Torque Sequence).

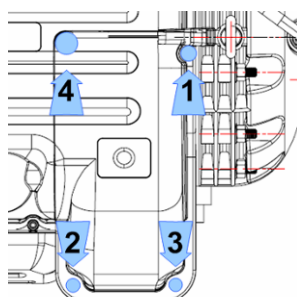


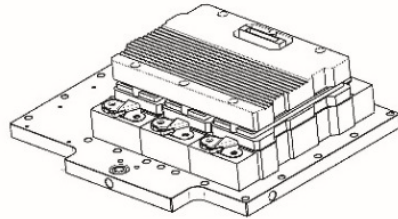


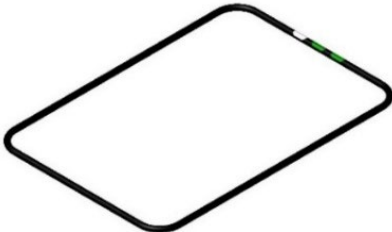


Figure 30 – Mains Input Cover Torque Sequence



39. Follow the sequence twice. The first time, only fasten screws to half way down to allow for adjustment. Torque to 13 in.lb. on the second pass. Fasten the # 4 screw only once and use caution as to not overtighten this screw.

7 - Torque Specifications

Component	Torque Value
Inverter to compressor housing	8 Nm (71 in.lb.)
Soft Start to compressor housing	5 Nm (44 in.lb.)
Motor bus bar to motor	13 Nm (9.5 ft.lb.)
Motor bus bar to Inverter	14 Nm (10 ft.lb.)
Snubber capacitors to Inverter	7 Nm (5 ft.lb.)
Nylon nuts	7 Nm (5 ft.lb.)
DC bus to SCRs	9 Nm (80 in.lb.)
AC bus bars to SCRs	9 Nm (80 in.lb.)
HV DC-DC	0.5 Nm (4 in.lb.)
SCR Manifold Screws	8 Nm (71 in.lb.)
IGV Feedthrough Screws	5 Nm (44 in.lb.)
Mains Terminal Block Screws	4 Nm (35 in.lb.)
Ground post top nut	15 Nm (11 ft.lb.)
Ground post second nut	7 Nm (62 in.lb.)
Cover Screws	1.5 Nm (13 in.lb.)

8 - Kit Contents

KIT	100043-5, -8, and -11	
QTY	Part(s) Description	Picture(s)
1	INVERTER ASSEMBLY	
1	O-RING #2-112	
2	O-RING #2-113	
1	O-RING #2-377	
1	LUBRICATION-SUPER-O-LUBE-2G	
18	WASHER M6 FLAT	

18	SCREW M6X30 SOCKET HEAD CAP	
4	SCREW M6X35 SOCKET HEAD CAP	



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