




KIT DC BUS TEST HARNESS (SAFETY INTERFACE CABLE)

100326

 <p>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>			
<p>Consult the appropriate 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>

1 - Introduction

DC BUS TEST HARNESS (SAFETY INTERFACE CABLE) Removal and installation.

- ⚠ It is mandatory to use the DC Bus Test Harness when working on the Compressor power electronics. The Compressor contains hazardous voltages that can cause injury or death. Only qualified personnel should work on high-voltage electrical equipment. When servicing or replacing a Compressor, the high-voltage capacitors must be discharged before opening any of the Compressor access covers.

2 - Purpose of DC Bus Test Harness:

The purpose of using the DC Bus Test Harness is to allow the following to be accomplished while three-phase AC power is connected to the Compressor and the top cover and mains input cover are in place:

- Measurement of DC bus voltage.
- Measurement of 15VAC output of the Soft-Start Board.
- Ensuring integrity of the HV DC-DC Converter fuse.

3 - Description of DC Bus Test Harness:

Both versions of the DC Bus Test Harness have male/female plugs to allow piggyback connection to the required voltage measurement points on the Soft-Start Board (see Figure 1). Voltage measurements are made via shrouded multimeter jacks on the opposite end of the cables. Cable and personal protection are provided by inline fast-acting fuses (1/4 x 1 1/4, 62 milliamp 250V) and current-limiting 100kΩ 3W resistors.



Figure 1 DC Bus Test Harness (FIE model shown)

4 - Installation of the DC Bus Test Harness:

Follow the steps below to safely remove power from the Compressor and install the DC Bus Test Harness.

- ⚠ Before using the DC Bus Test Harness, integrity of the fuses/resistors and cable must be checked. This will be accomplished when performing the steps below.
1. Turn off AC power input to the Compressor.
 2. Secure/tag off/lock out the isolating switch to ensure against accidental or unauthorized reapplication of the AC power.
 3. Wait at least 15 minutes, then remove the mains input cover by releasing the four captive screws that secure the cover.
 4. Using an appropriately rated volt meter, confirm that the AC voltage is still isolated.
 5. Confirm integrity of the fuses/resistors in the DC Bus Test Harness by using a multimeter set to resistance. Check each cable individually (refer to Figure 2). Resistance should be approximately 100k Ω
 6. Remove the top cover by releasing the nine captive screws that secure the cover, taking particular care not to touch ANY components underneath.
 7. Using an appropriately rated volt meter, check the DC bus bars for voltage level. If the voltage is above 5VDC, wait five minutes and recheck until 5VDC or below is achieved.
 8. Remove the service-side cover by releasing the six captive screws that secure the cover.
 9. Disconnect the J1 and J7 connectors on the Soft-Start Board (refer to Figure 3).

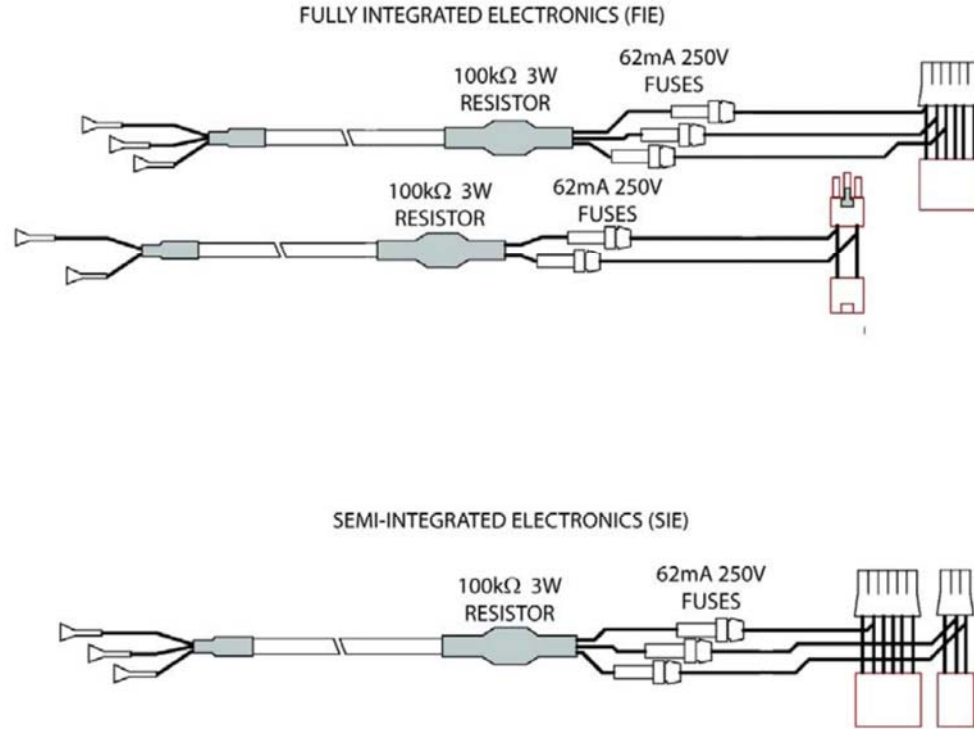


Figure 2 DC Bus Test Harness Diagram

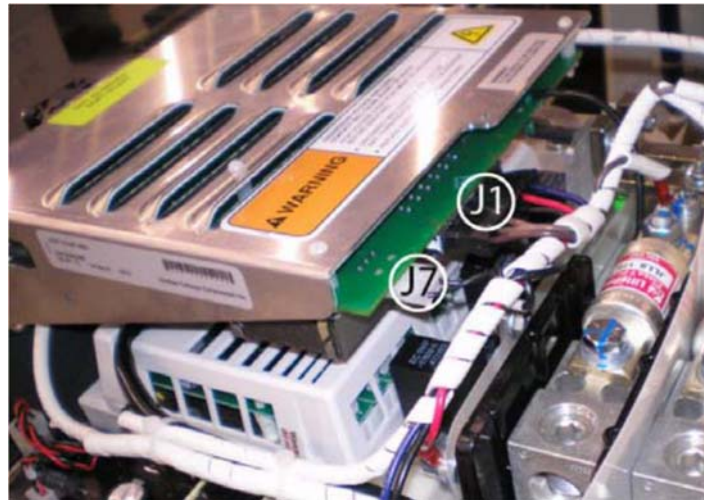


Figure 3 Soft-Start Board

10. Connect the two plugs of the Compressor cable harness into corresponding sockets of the DC Bus Test Harness (see Figure 4).

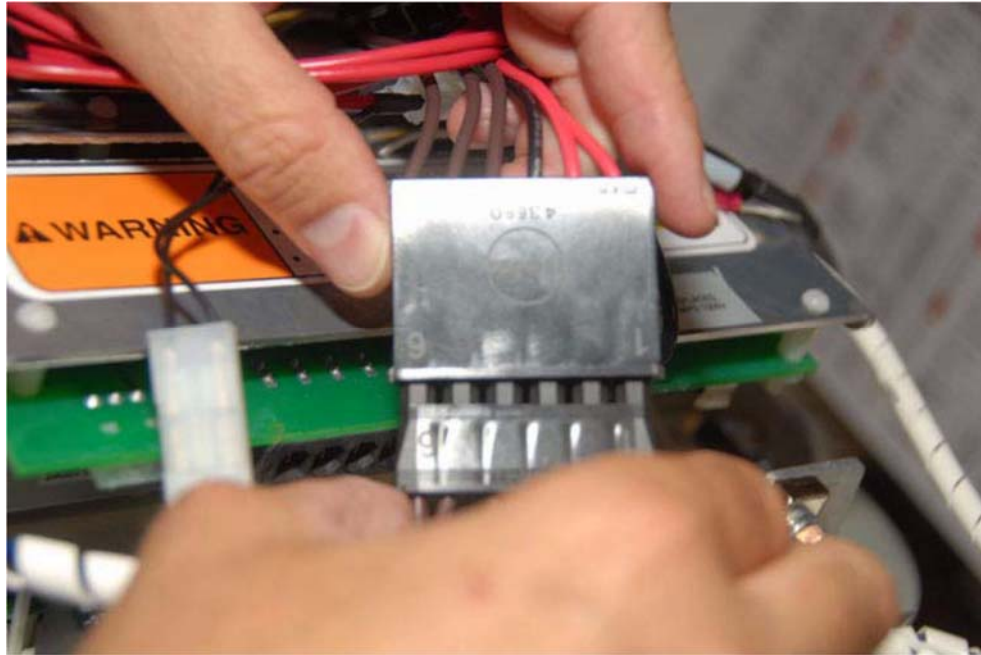


Figure 4 Connect Test Harness to Compressor

11. Connect the two plugs of the DC Bus Test Harness into the Soft-Start Board (see Figure 5).



Figure 5 Connect Test Harness to Soft-Start Board (As Seen From Top Side of Board)

12. Carefully push the plugs away so that the covers can fit into place.
13. Route the cable into the cable passage on either side of the HV DC-DC Converter, down into the service side (see Figure 6 and Figure 7). If the main housing has two cable passages, either passage can be used.



Figure 6 Cable Passages

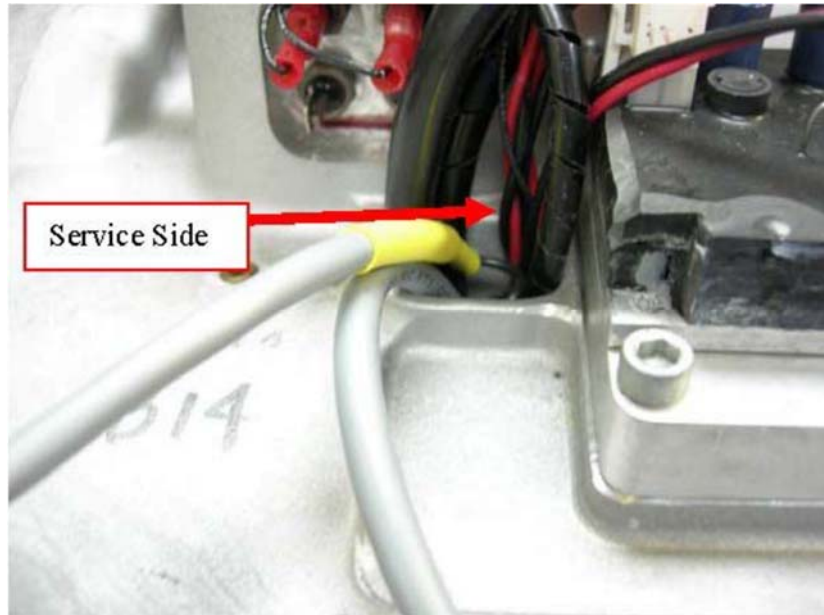


Figure 7 Service Side of Compressor

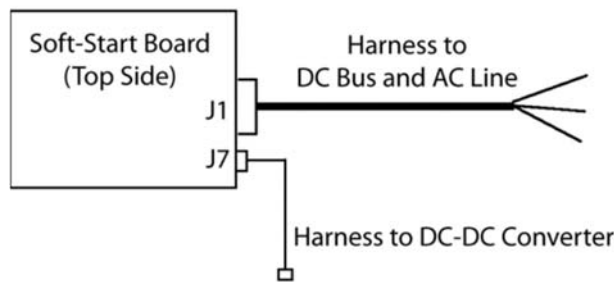
14. Reinstall the mains input cover and top cover and tighten all screws.
15. Reapply AC power to the Compressor.
16. Using an appropriately rated voltmeter with the 1000VDC range selected, insert the positive voltmeter lead into the DC(+F) test harness lead, and the negative voltmeter lead into the DC(-) test harness lead. Refer to Table 1 for expected DC bus voltage. If voltage corresponds to Table 1, DC bus voltage is correct and HV DC fuse on the Soft-Start Board is intact. If voltage reads zero, go to step 17. If voltage is within expected limits, this implies that the Soft-Start Board and SCRs are functioning correctly; go to step 19.

Table 1: Compressor Voltage Ranges

Compressor Nameplate AC Voltage	Acceptable AC Voltage Range	Expected DC Bus Voltage
575 VAC	518 - 632 VAC	632 - 900 VDC
460 VAC	414 - 506 VAC	550 - 720 VDC
400 VAC	360 - 440 VAC	485 - 625 VDC
380 VAC	342 - 418 VAC	460 - 595 VDC

17. Leaving the DC(-) test lead in place, relocate the positive (+) test lead to DC(+). If DC voltage is consistent with Table 1, the HV DC fuse on the Soft-Start Board is blown. Refer to the Service Manual to verify the HV DC-DC Converter.
 18. Reset multimeter scaling to read 15VAC and connect to the 15VAC lead in the DC Bus Test Harness. If the reading is zero, isolate the three-phase supply in accordance with steps 1-7. When access is safe, remove the four screws that hold the Soft-Start Board in position, and check fuses F2 and F3 for continuity. (These fuses are located between the transformers on the underside of the Soft-Start Board.) Fuse F4 (or external inline), as appropriate, should also be checked for continuity. If fuses are found to be blown, replace them and return to step 14. If voltage is present but outside spec, go to step 19.
 - NOTE: Fuse F2 (.25A) protects an output of transformer T1, which supplies 15VAC to the HV DC-DC Converter. Fuse F3 (.75A) protects a separate output of T1, which powers the Soft-Start Board. The cooling fan is powered by transformer T2 and is unfused. Fuse F4, or external inline fuse, protects the incoming AC to the Soft-Start Board.
 19. Measure the 15VAC from the Soft-Start Board. If the 15VAC is not within spec +10 percent, replace the Soft-Start Board (refer to the Service Manual). If the 15VAC is correct, proceed to the next step.
 20. Verify the SCR gate terminals (refer to the Service Manual). If the SCR gate terminals are not within spec, replace the SCRs (refer to the Service Manual). If the gate terminals are OK, proceed to the next step.
 21. Verify the SCRs (refer to the Service Manual). If the SCRs are not within spec, replace them (refer to the Service Manual). If the SCRs are OK, replace the Soft-Start Board (refer to the Service Manual).
- ⚠ The DC Bus Test Harness is not designed to be left in the Compressor during normal operation. When checks are complete, disconnect and remove the Test Harness.

ORIGINAL CONNECTIONS



**CONNECTIONS WITH
DC BUS TEST HARNESS**

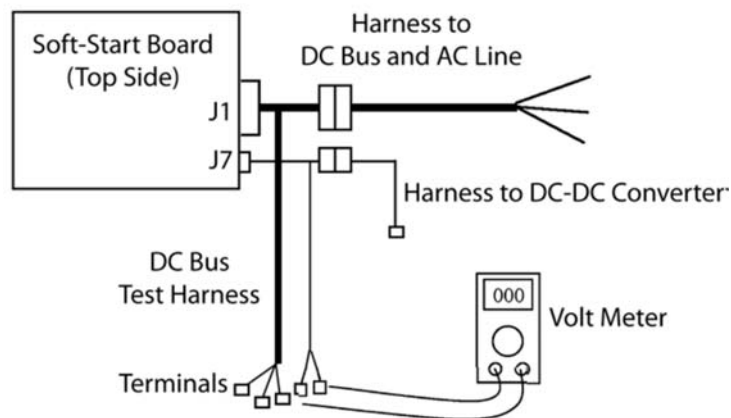



Figure 8 Connection Diagram

Kit numbers	Compressor models
100326	All FIE Models

QTY	Part(s) Description	Picture(s)
1	DC BUS TEST HARNESS KIT (FULLY-INTEGRATED)	

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