Service Notes - Danfoss BD35F and BD50F – R-134a systems

Voltage Test of power supply

The electronics are very voltage sensitive and it is important to minimize any loss, or voltage drop in the power supply wiring. When measured using a voltmeter the voltage may appear to be good but if there are any loose terminals, an old breaker, corroded fuse holder, poor ground connections, splices, or corroded wiring the circuit may not be able to deliver sufficient current to the system.

Attached is a simple set up to test the power supply wiring. If the voltage drop is greater than .5 V Both the positive and negative conductors must be tested end to end.

Danfoss Compressor –Advanced Troubleshooting

Danfoss has a built in Error code system that can be helpful in diagnosing a specific problem.

To display the error code an LED (light emitting diode) must be connected between the + and D terminals on the Danfoss electronic module. The exact error is determined by counting the number of times the LED blinks ***See the attached sheet for details***.

The Danfoss Compressor electronics have additional system protection features built in. Knowing how these features operated can help diagnose problems. Protection is provided for the following:

(1) Low voltage. To prevent the batteries from being totally discharged, the compressor will be stopped if the voltage at the terminals on the Module falls below 10.6 volts (23.4), & will not re-start until the voltage rises above 11.7 (24.0) volts.

(2) High voltage. If the voltage exceeds 17v, the Module stops the compressor & switches into 24v mode, but will not attempt to start the compressor until the voltage reaches 24v.

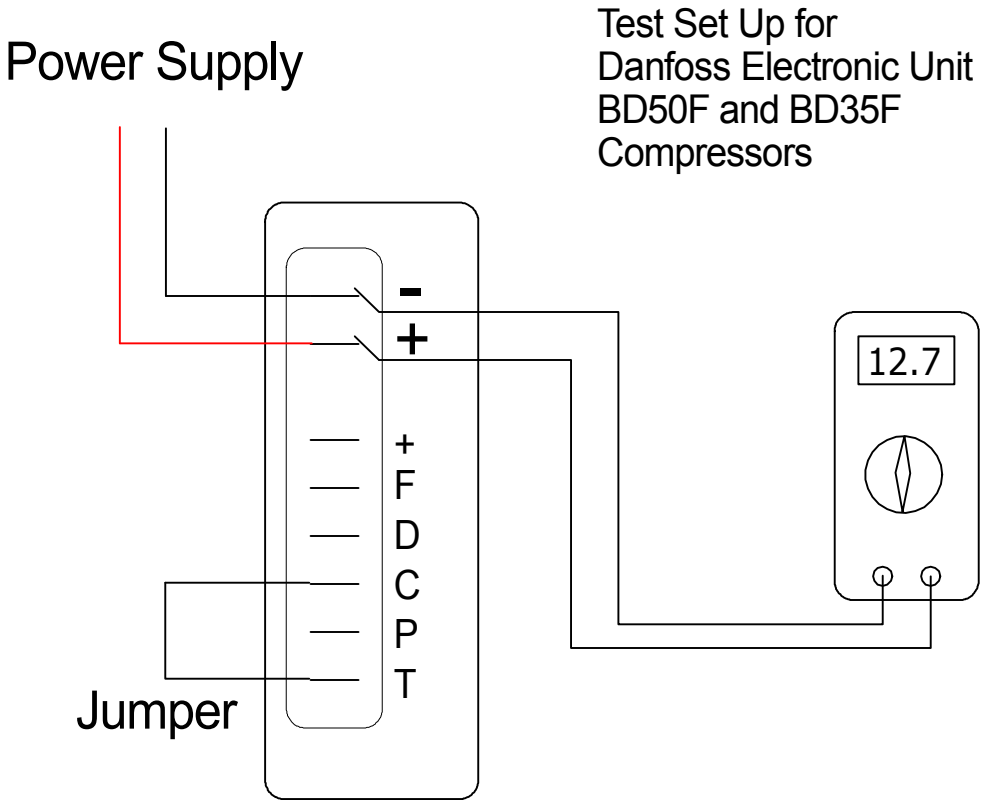
(3) Compressor non-start. If the compressor does not start, the Module will stop the starting process, & attempt a re-start every 60 seconds.

(4) Compressor speed too low. If the compressor speed falls below 1900 RPM the Module will stop the compressor.

(5) Fan (pump) protection. If the current draw across the fan terminals exceeds 0.7 amps 12v dc, the compressor will be stopped & a re-start attempted every 60 seconds.

(6) Module overheat. If the heat sink on the module exceeds a preset temperature, the compressor will be stopped & will be re-started when normal operating temperatures are resumed.

Test Set Up for Danfoss Electronic Unit BD50F and BD35F Compressors



This drawing shows how to connect directly to the Danfoss electronic unit for testing.

The compressor should run continuously at low speed when terminals T and C are connected.

This will confirm that the electronic module is OK and that the power supply is adequate for low speed operation.

If the compressor does not run or runs intermittently, starting and stopping after a few seconds this may be caused by a poor power supply or a faulty electronic unit.

To test the power supply use a Digital Voltmeter. Measure the voltage at the electronic unit with the compressor off and note the voltage.

Measure the voltage again with the compressor starting or running - the voltage should drop no more than .5 volts - If there is more than .5 V drop check all terminals and connections carefully for good contact, tightness and signs of corrosion.

It can be helpful to connect a separate test power supply wire. Run separate wires (both positive and negative) directly to the batteries and re-test the power supply.

In general a minimum 10 gauge wire should be used for runs up to 20 ft and 8 gauge for longer runs.

Danfoss Error Codes – Red LED	
Number of Blinks	**Error**
5	**Thermal cut-out of electronic unit** The system is overloaded or the ambient temperature is too high. Temp overload set at 131° F (55° C)
4	**Minimum motor speed error** System is too heavily loaded. Motor cannot maintain minimum speed of 1850 rpm
3	**Motor start error** The rotor is blocked or I pressure in the refrigeration system is too high. More than 73 psi (5 bar) .
2	**Fan over-current cut-out** Fan current exceeds 1A maximum at terminals F & +
1	**Battery Protection cut out activated** Supply voltage low – 10.6V (22.4 on 24V systems)