

Inside the Sub-Zero 700 refrigerator/freezer

by Jim Johnson

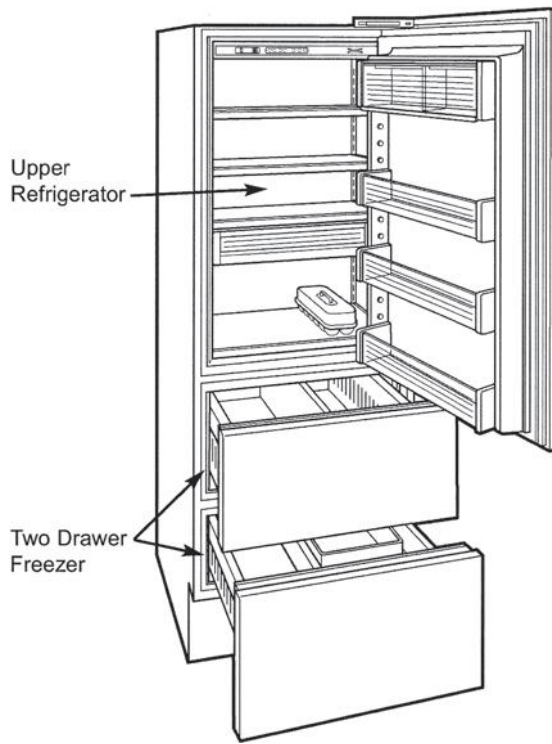


Figure 1

While servicing Sub-Zero refrigerators often means you're dealing either with large-capacity side-by-sides (such as the 690 series) or all-refrigerator and all-freezer units that make up an independently operating side-by-side set, one model, the 700TCI-2, is a combo unit that features a two-drawer freezer and refrigerator in a 27-inch-wide cabinet (see **Figure 1**).

As you might expect with a 2005-vintage unit, this model employs an electronic control system to monitor and control the two-compressor system and related air flow and defrost system components. The printed circuit board is the heart of the system, containing the microprocessor, as well as the system relays that provide the switching circuits for the operation of the evaporator and condenser fan motors, defrost heater for the freezer evaporator, and sealed system components. The control board components are non-replaceable individually, and, as shown in **Figure 2**, a membrane switch is employed to allow input operations such as temperature adjustment, unit off and on, and icemaker off and on, as well as diagnostic procedures.

There are thermistors that monitor the temperature of both in-cabinet refrigeration system coils (freezer in the lower cabinet and refrigerator in the upper cabinet) and another pair that monitor the freezer and fresh-food compartment temperatures. Accessing the control board located in the upper compartment requires removal of the light diffuser first, before removing the screws that hold the control enclosure that is fastened to the ceiling of the compart-

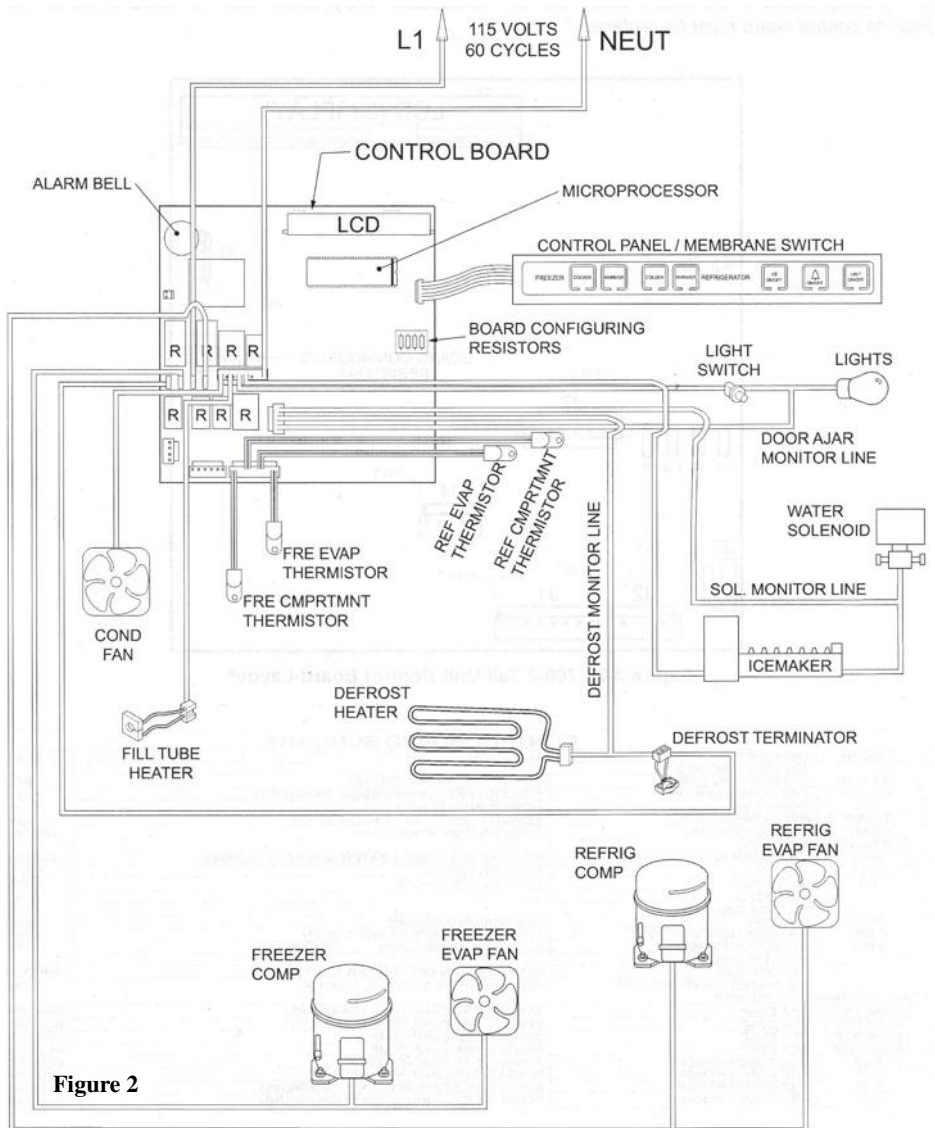


Figure 2

ment. Removal of the light diffuser in the upper cabinet is also the first step in accessing the two thermistors there after the upper evaporator cover is removed (see **Figure 3**) as well as the ceiling mounted evaporator fan motor assembly shown in **Figure 4**.

Accessing the thermistors and the evaporator fan motor mounted to the rear of the cabinet in the lower compartment requires removal of the evaporator cover. In the case of both the lower and upper fan motors, the adjustment of the fan blade spacing is critical. If the position of the blade is not correct, it will affect the overall air flow in the compartments. When the blade is properly positioned on the shaft of the motor, you should measure a distance of 7/8-in. from the fan bracket to the front of the fan blade. **Figure 5** shows the distance measurements that apply to both the refrigerator and freezer compartment fan motors.

As for air flow on the condenser side of this model, accessing the condenser fan motor is accomplished through the front by removing the kick-plate, and then freeing up the bottom unit tray that holds the two compressors and condensers. With the appropriate screws removed, you can grab

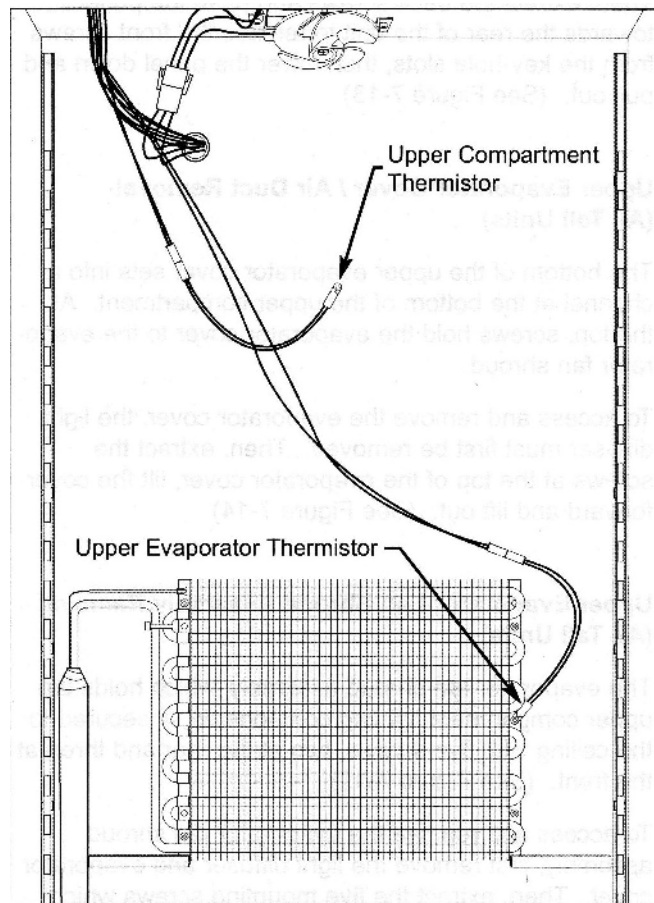


Figure 3

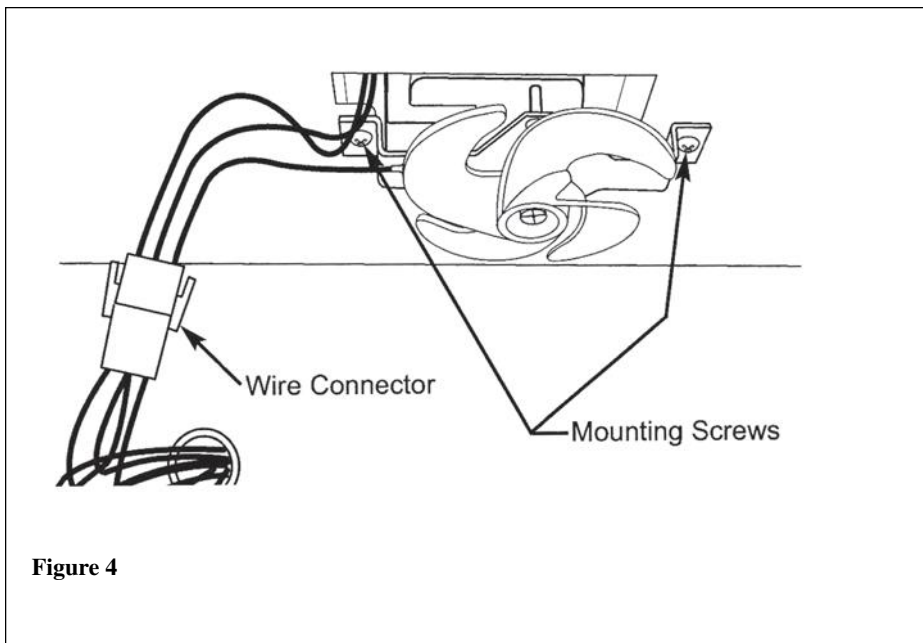


Figure 4

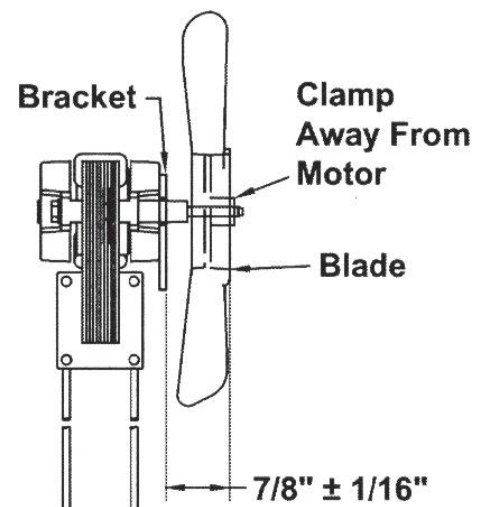


Figure 5

onto the front flange and slide the tray out from under the cabinet, being careful of connecting sealed system tubing. With the tray safely removed into access position, you'll be able to disconnect the compressor electrical leads so you can pull the tray out far enough to get to the condenser fan motor itself after you remove the accompanying fan shroud.

Statistics for this 700 series model are as follows:

- Defrost method: Off cycle defrost in the refrigerator section; adaptive defrost system that initiates defrost at intervals according to unit operation and customer use. There is a five-minute delay of the compressor start after each defrost.

- Defrost termination thermostat: Cut-in temp, 30°F, and cut-out temp, 70°F.

- Defrost heater: 400 watts, 3.48 amps, 30 to 38 ohms resistance.

- Drain trough heater: 80 watts, 0.70 amps, 155 to 175 ohms resistance.

- Fill tube heater: 5.1 watts, .044 amps, 2300 to 2900 ohms resistance.

- Thermistors: 30,000 to 33,000 ohms resistance at 32°F.

- Compressor: Refrigerator, 4201880 Embraco, 1.2 amps. Freezer, 4201860 Embraco, 1.2 amps.

- Compressor start components: External overload protection, current relay (run capacitor when used).

- Refrigerant charge: R-134a, 5.5 oz. refrigerator, 9 oz. freezer.

When it comes to electronic control troubleshooting and diagnostics on the 700 model line, initiating the diagnostic mode and getting real-time temperature readings is accomplished by pressing and holding either of the "Colder" keys on the control, then pressing the "Unit Off/On" key, and then releasing both keys simultaneously. This procedure is accomplished with the unit on. **Figure 6** provides a view of the control keys and the procedure for entering

the diagnostic mode. ("F" indicates freezer compartment and the real-time temperature of the compartment thermistor being read is shown at left of the illustration.)

With diagnostic mode entry accomplished, you can toggle through temperature readings and thermistor location identifiers by pressing either "Colder" key. In **Figure 7**, toggling shows "r" representing the refrigerator compartment thermistor and its temperature at 40°F.

In **Figure 8**, toggling again, the display now shows "FE" for the freezer evaporator coil thermistor at 12°F, and in **Figure 9**, we're showing "rE" indicating the refrigerator evaporator coil thermistor and its temperature at 29°F.

When in the diagnostic mode, the indicator "EE" showing in place of the thermistor temperature indicates that the thermistor in that location is open or shorted, or that there is a break in the thermistor wiring. Ω

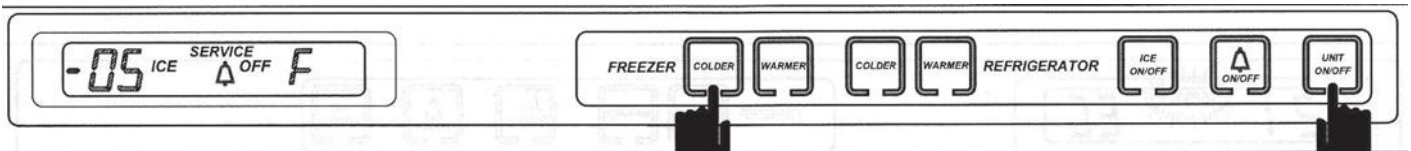


Figure 6

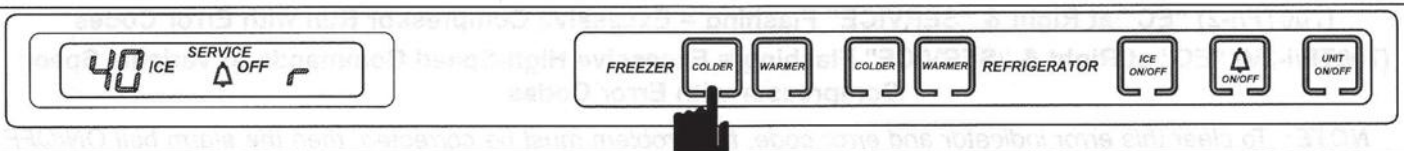


Figure 7

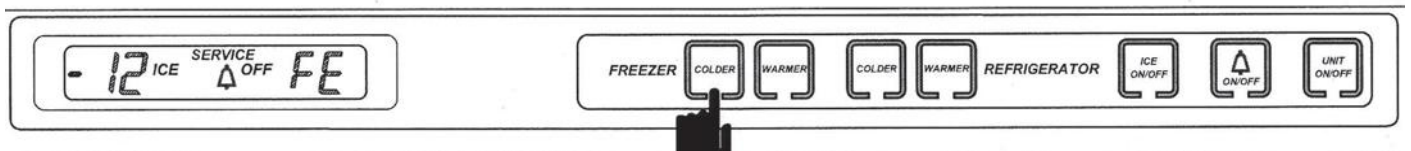


Figure 8

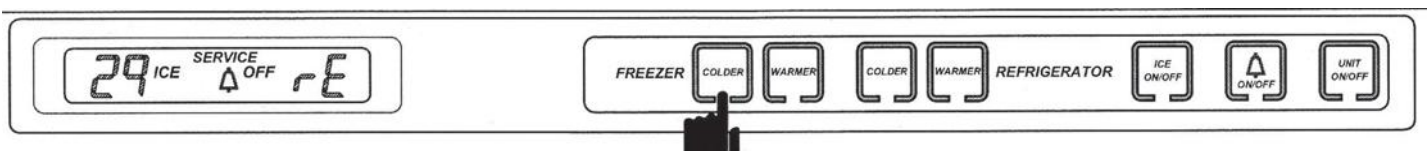


Figure 9