SECTION 8

TROUBLESHOOTING GUIDES

TROUBLESHOOTING GUIDES

This section of the manual contains:

- The Error Code Table and the Error Code Troubleshooting Guide.
- The General Troubleshooting Guide, which covers all problems that a 700-3 Series Base unit may experience.
- The Sealed System Diagnostic Tables.
- The Membrane Switch/Ribbon Cable Test Procedures, used to determine if a control panel assembly is defective.

HOW TO USE ERROR CODE TROUBLESHOOTING GUIDE

Error Codes indicate problems registered by specific components. If error codes are registered, they will appear before temperature readings while in Diagnostic Mode.

NOTE: *If Error Codes appear with a flashing "SERVICE" indicator prior to initiating Diagnostic Mode, the unit experienced temperature problems that may or may not be associated with the Error Codes displayed.*

To initiate Diagnostic Mode, press and hold either COLDER key, then press the UNIT ON/OFF key, then release both keys. Now, check to see if Error Codes are displayed, being sure to toggle through all error and temperature readings by pressing either COLDER key or either WARMER key. (See Error Code Table Below)

If Error Codes appear during Diagnostic Mode, follow the Error Code Troubleshooting Guide on the following pages. The left column lists the error codes. The right column explains what tests to perform and/or what action to take to correct the error.

NOTE: *If error codes are observed in diagnostic mode, a non-flashing SERVICE indicator will appear on the LCD when Diagnostic Mode ends, indicating error codes are stored. Error Codes must be manually cleared from the electronic control memory. To clear the non-flashing SERVICE indicator and the error codes, the problem must be corrected and the unit must be ON. Then, press and hold the Door Ajar Alarm Bell ON/OFF key for 15 seconds. The control will emit a short "beep" when the SERVICE indicator and error codes are cleared.*

Error Code Table	
CODE	**INDICATION**
05	***Refrig. Cabinet Thermistor read open or shorted for 10+ seconds, or repeatedly read erratic temp's***
06	***Refrig. Evaporator Thermistor read open or shorted for 10+ seconds, or repeatedly read erratic temp's***
07	***Freezer Cabinet Thermistor read open or shorted for 10+ seconds, or repeatedly read erratic temp's***
08	***Freezer Evaporator Thermistor read open or shorted for 10+ seconds, or repeatedly read erratic temp's***
20	***Defrost Under-heat with No Voltage Feedback Through Gray/White Wire at Defrost Start***
21	***Defrost Overheat***
22	***No Voltage Feedback Through Gray/White Wire at Defrost Start***
23	***Defrost Overheat with No Voltage Feedback through Gray/White Wire at Defrost Start***
24	***Defrost Under-heat***
30	***Excessive Icemaker Water Valve Solenoid Activation (Exceeded 15 Seconds, 5 Times)***
40	***Excessive Freezer Compressor Run***
50	***Excessive Refrigerator Compressor Run***

ERROR CODE TROUBLESHOOTING GUIDE

ERROR CODE	TEST / ACTION
05	a. Check refrigerator compartment thermistor electrical connections and continuity from thermistor to J1 on control board. Reconnect / repair connections. b. Check resistance of refrigerator compartment thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
06	a. Check refrigerator evaporator thermistor electrical connections and continuity from thermistor to J1 on control board. Reconnect / repair connections. b. Check resistance of refrigerator evaporator thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
07	a. Check freezer compartment thermistor electrical connections and continuity from thermistor to J1 on control board. Reconnect / repair connections. b. Check resistance of freezer compartment thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
08	a. Check freezer evaporator thermistor electrical connections and continuity from thermistor to J1 on control board. Reconnect / repair connections. b. Check resistance of freezer evaporator thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
20	a. With a cold evaporator (< 10°F/ < -12°C), initiate Manual Defrost. If compressor starts 5 minutes after defrost is initiated, check Grey/White wire connections and continuity from defrost heater to J4-4 on control board. Reconnect / repair Grey/White wire &/or electrical connections. b. Check for proper ohm readings of defrost heater. Replace heater if defective. c. Check defrost terminator and its electrical connections, Reconnect / repair bad connections or replace terminator if defective. d. Initiate Manual Defrost, check for 115V AC at E2 on control board. If no voltage, replace board. e. Initiate Manual Defrost, check for 115V AC from E2 (Blue Wire) on control board to defrost terminator. Reconnect / repair blue wire &/or electrical connections. f. Reference wiring diagram to identify components in same White wire circuit as defrost heater. Check all White wire electrical connections and continuity from defrost heater to J7-8 on control board.
21	a. Check for proper mounting and location of freezer evaporator thermistor and defrost heater. Remount correctly. b. Check for correct wire connection at control board, Blue wire at E2 on control board. If connected to wrong pin, reconnect correctly. c Check for electrical short of Blue wire to another circuit. Repair Blue wire &/or electrical connections. d. Check for proper operation of defrost terminator: Cut-in 30°F(-1°C) / Cut-out 55°F (13°C). For model 601F-2 ONLY: Cut-in 30°F (-1°C) / Cut-out 70°F (21°C). Replace if defective.
22	a. Initiate Manual Defrost. If compressor starts 5 minutes after defrost is initiated, check Grey/White wire connections and continuity from defrost heater to J4-4 on control board. Reconnect / repair Grey/White wire &/or electrical connections.
23	a. Check for proper mounting and location of freezer evaporator thermistor and defrost heater. Remount correctly. b. Check for correct wire connection at control board, Blue wire at E2 on control board. If connected to wrong pin, reconnect correctly. c Check for electrical short of Blue wire to another circuit. Repair Blue wire &/or electrical connections. d. Initiate Manual Defrost. If compressor starts 5 minutes after defrost is initiated, check Grey/White wire connections and continuity from defrost heater to J4-4 on control board. Reconnect / repair Grey/White wire &/or electrical connections.
24	a. Check for proper ohm readings of defrost heater. Replace heater if defective. b. Check for proper mounting and location of freezer evaporator thermistor and defrost heater. Remount correctly.

NOTE: *After repairs, always clear Error Codes by pressing Bell ON/OFF key for 15 seconds.*

ERROR CODE TROUBLESHOOTING GUIDE

ERROR CODE	TEST / ACTION
30	A. Check for jammed cube in icemaker. B. Reference wiring diagram to identify components in same White wire circuit as water valve solenoid. Check all White wire electrical connections and continuity from water valve solenoid to J7-8 on control board.
40	A. If Error Code 07, 20, 21, 22, 23, or 24 is also displayed during Diagnostic Mode, see Test/Actions under that code. B. Check for obstructions to freezer door/drawer closing. Remove obstruction. C. Check cleanliness of condenser. Clean if needed. D. Check for obstruction to condenser fan blade or loose fan blade. Remove obstruction/Tighten Blade. E. Check evaporator fan blade position and for obstructions. Reposition if incorrect/Remove obstruction. F. Check resistance of freezer compartment thermistor - 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective. G. With unit on, check to see if lights shut off when light switch is depressed. Repair defective wiring or replace defective switch. H. With freezer compressor running: 1. (Model 601F-2 only) Check for 115 V AC from compressor to condenser fan. Repair defective wiring or replace defective motor. 2. (All models except 601R-2, 601RG-2, 601F-2) check for 115 V AC from control board to condenser fan. Repair defective wiring, or replace defective motor, or replace defective board. I. (All models) With freezer compressor running and fan switches depressed, check for 115 V AC from compressor to evaporator fan motor. Repair wiring, or replace defective switch, or replace defective fan motor. J. Check sealed system for leaks, restrictions or inefficient compressor.
50	A. If Error Code 05, or 06 is also displayed during Diagnostic Mode, see Test/Actions under that code. B. Check for obstructions to refrigerator door closing. Remove obstruction. C. Check cleanliness of condenser. Clean if needed. D. Check for obstruction to condenser fan blade or loose fan blade. Remove obstruction/Tighten Blade. E. Check evaporator fan blade position and for obstructions. Reposition if incorrect/Remove obstruction. F. Check resistance of refrigerator compartment thermistor - 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective. G. With unit on, check to see if lights shut off when light switch is depressed. Repair defective wiring or replace defective switch. H. With refrigerator compressor running: 1. (Models 601R-2 and 601RG-2 only) Check for 115 V AC from compressor to condenser fan. Repair defective wiring or replace defective motor. 2. (All models except 601R-2, 601RG-2, 601F-2) check for 115 V AC from control board to condenser fan. Repair defective wiring, or replace defective motor, or replace defective board. I. (All models) With refrigerator compressor running and fan switches depressed, check for 115 V AC from compressor to evaporator fan motor. Repair wiring, or replace defective switch, or replace defective fan motor. J. Check sealed system for leaks, restrictions or inefficient compressor.

NOTE: *After repairs, always clear Error Codes by pressing Bell ON/OFF key for 15 seconds.*

HOW TO USE GENERAL TROUBLESHOOTING GUIDE

The General Troubleshooting Guide Table of Contents on the following page indicates how the General Trouble Shooting Guide is arranged. Match the description of the problem the unit is experiencing with those in the table. To the left of the problem description is a letter. Locate that letter in the left column of the Troubleshooting Guide. The information in the center column of the Troubleshooting Guide identifies possible causes for the problem. The information in the right column explains the tests to perform and/or what action to take to correct the problem.

For Problems "A" through "H":

1. Begin troubleshooting by observing the compartment set points.
2. If the set-points are normal, initiate Diagnostic Mode by pressing and holding either COLDER key, then press the UNIT ON/OFF key, then release both keys.
3. When Diagnostic Mode is initiated, check to see if "Error Codes" are present, being sure to toggle through all the error and temperature readings by pressing either COLDER key or either WARMER key. (See Thermistor Location Code Tables below.)
4. If Error Codes are present, refer to Error Code Troubleshooting Guide on previous pages.
5. If there are no Error Codes, initiate Manual Component Activation Mode (which lasts for 5 minutes) by pressing and holding the desired compartment COLDER and UNIT ON/OFF keys for 10 seconds, then observe the evaporator temperatures.

   NOTE: *Verify that the compressor is operating before observing evaporator temperatures. If the problem is in the refrigerator section, the refrigerator door must be left open for 5 minutes with the compressor running.*
6. After observing the evaporator temperatures as instructed above, take note of the *"Pointers"* in the first column of the troubleshooting guide under problems "A" through "D". The *"Pointers"* list what possible causes to check based on the evaporator temperatures observed.

Thermistor Location Code Tables

ALL MODELS EXCEPT 601's	
THERMISTOR LOCATION	CODE
Freezer Compartment	*F*
Refrigerator Compartment	*r*
Freezer Evaporator	*FE*
Refrigerator Evaporator	*rE*

MODEL 601R & 601RG	
THERMISTOR LOCATION	CODE
Refrigerator Compartment	*r*
Refrigerator Evaporator	*rE*

MODEL 601F	
THERMISTOR LOCATION	CODE
Freezer Compartment	*F*
Freezer Evaporator	*FE*

For All Problems:

If the unit's temperature history is needed to help diagnose the problem, initiate Temperature Log Recall Mode as described below. This allows the preceding fourteen days of the unit's temperature history to be observed.

a. *To View Compartment Temperature History Only:* Begin with the unit ON. Now, press and hold the desired compartment WARMER key, then press the UNIT ON/OFF key, then release both keys.

b. *To View Compartment or Evaporator Temperature History:* Begin with the unit on and in Diagnostic Mode. While in Diagnostic Mode, toggle through the readings until the desired thermistor temperature is displayed on the LCD. Now, press the WARMER key for that compartment and the UNIT ON/OFF key simultaneously.

GENERAL TROUBLESHOOTING GUIDE TABLE OF CONTENTS

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
A. Error Codes & "SERVICE" Flashing	**Unit Experienced Temperature Problems**	See Error Code Troubleshooting Guide
B. "EE" Displayed in Place of Freezer Temperature with "SERVICE" Flashing	**Freezer Compartment Thermistor Disconnected, Shorted, or Misread**	Check wiring from thermistor to control board. Reconnect/repair connections. Resistance of thermistor = 30,000-33,000 ohms at 32°F/0°C. Replace if defective.
C. "EE" Displayed in place of Refrigerator Temperature with "SERVICE" Flashing	**Refrigerator Compartment Thermistor Disconnected, Shorted, or Misread**	Check wiring from thermistor to control board. Reconnect/repair connections. Resistance of thermistor = 30,000-33,000 ohms at 32°F/0°C. Replace if defective.
D. Warm or Normal Temp's Displayed with "SERVICE" Alone Flashing	**Unit Experienced Temperature Problems**	See Error Code Troubleshooting Guide
	Refrigerator Evaporator Thermistor Disconnected, Shorted, or Misread	Check wiring from thermistor to control board. Reconnect/repair connections. Resistance of thermistor = 30,000-33,000 ohms at 32°F/0°C. Replace if defective.
E. Warm or Normal Temperatures Displayed with non-flashing "SERVICE" Displayed	**Error Codes Observed in Diagnostic Mode, but not Cleared from Memory**	Enter diagnostic mode to observe error codes. See Error Code Troubleshooting Guide. Verify unit was repaired for error codes displayed. Press and hold alarm key for 15 seconds to clear error codes.
F. Erratic Temperatures with or without "SERVICE" Flashing	**Control Board Configured for Wrong Model**	*If possible, reconfigure to correct model. If not possible, replace control board.*
G. Warm Freezer Temperature with "SERVICE" Flashing ***Pointers:*** *1. Evap Temp -20°F (-29°C) or lower, see:* • *Door ajar* • *Lights ON w/door closed* • *Evaporator fan fault* • *Compartment thermistor mis-read* • *Evaporator heavily frosted* • *Sealed system fault: leak or partial restriction* *2. Evap Temp between -19°F (-28°C) and 0°F (-17°C), see:* • *Condenser Air Flow* • *Compartment thermistor mis-read* • *Sealed system fault: leak* *3. Evaporator Temp 0°F (-17°C) or higher, see:* • *Power to compressor fault* • *Sealed system Fault: leak, restriction, inefficient compressor* *(Continued)* *(See **NOTES** on next page)*	**Door Ajar** a. Food product obstruction b. Door/cabinet hinge problem	 a. Move obstruction. b. Check and replace hinge if defective.
	Condenser Air Flow a. Dirty condenser b. Condenser fan blade obstructed or blade is loose c. Condenser fan motor disconnected d. Condenser fan motor defective e. No power from control board to condenser fan (Does not apply to single compressor models) *(**NOTE:** A compressor must be running)*	 a. Clean condenser. b. Remove obstruction or tighten nut on motor shaft. c. Check electrical connections from motor to J7-1 on control board, or from motor to compressor on single compressor models. Reconnect / repair connections. d. Check for 115V AC to motor, replace motor if defective. e. Check for 115V AC at J7-1 on control board (with compressor running). Replace board if defective.

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
(Continued) **G. Warm Freezer Temperature with "SERVICE" Flashing** ***Pointers:*** 1. *Evap Temp -20°F (-29°C) or lower, see:* • *Door ajar* • *Lights ON w/door closed* • *Evaporator fan fault* • *Compartment thermistor misread* • *Evaporator heavily frosted* • *Sealed system fault: leak or partial restriction* 2. *Evap Temp between -19°F (-28°C) and 0°F (-17°C), see:* • *Condenser Air Flow* • *Compartment thermistor misread* • *Sealed system fault: leak* 3. *Evaporator Temp 0°F (-17°C) or higher, see:* • *Power to compressor fault* • *Sealed system Fault: leak, restriction, inefficient compressor* ***NOTE:*** *"Pointers" do not apply to cabinet initial pulldown from ambient temperatures.* ***NOTE:*** *To clear flashing SERVICE indicator after repairs, power OFF, then back ON.* ***NOTE:*** *To clear non-flashing SERVICE indicator after repairs, press door ajar alarm bell ON/OFF key for 15 seconds.*	**Light ON with Door Closed** a. Switch depressor missing or bent, not depressing light switch b. Faulty light switch	 a. Replace/straighten switch depressor. b. Check operation of light switches, lights off when switch is depressed. Replace switch if defective.
	Evaporator Fan Fault a. Switch depressor missing or bent, not depressing fan switch b. Fan blade obstructed or out of position c. Faulty fan switch *(**NOTE:** A compressor must be running)* d. Evaporator fan motor disconnected e. Evaporator fan motor defective *(**NOTE:** Compressor must be running)*	 a. Replace/straighten switch depressor. b. Move obstruction or reposition blade. c. Check for 115V AC to fan switch, depress fan switch and check for 115V AC from switch to motor. Replace switch if defective. d. Check electrical connections of motor. Reconnect / repair bad connections. e. Check for 115V AC at fan motor with fan switch depressed. Replace motor if defective.
	Compartment Thermistor Misread	Check resistance of compartment thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
	Evaporator Heavily Frosted a. Door ajar b. Evaporator fan fault c. Compartment thermistor misread d. Defrost heater or drain trough heater disconnected or faulty e. Defrost terminator disconnected or faulty. f. Defrost sense line disconnected. g. No power from control board to defrost circuit	 a. See Door Ajar on previous page. b. See Evaporator Fan Fault on previous page. c. See Compartment Thermistor Misread on previous page. d. Check electrical connections of heaters. Reconnect / repair bad connections. Check resistance of heaters, replace if defective. e. Check electrical connections, Reconnect / repair bad connections or replace terminator if defective. f. Look for Error Codes 20, 22 or 23 or Manually initiate defrost by pressing ICE key for 5 seconds. If defrost lasts exactly 5 minutes, check all connections of gray/white wire from terminator to J4-4 on control board. Reconnect / repair bad connections. g. Manually initiate defrost by pressing ICE key for 5 seconds. Check for 115V AC at E2 on control board. Replace control board if defective.
	Power to Compressor Fault	Initiate Manual Component Activation Mode and check for 115V AC at E7 on control board. Replace control board if defective.
	Sealed System Fault • Sealed System Leak • Sealed System Restriction • Inefficient Compressor	See Sealed System Diagnostic Tables at back of Troubleshooting Guide

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
H. Warm Freezer Temperatures <u>without</u> "SERVICE" Flashing ***Pointers:*** *1. "Sr" appears during Diagnostic Mode, see:* • *Unit in Showroom Mode* *2. Evap Temp -20°F (-29°C) or lower, see:* • *Door ajar* • *Lights ON w/door closed* • *Evaporator fan fault* • *Compartment thermistor mis-read* • *Evaporator heavily frosted* • *Sealed system fault: leak or partial restriction* *3. Evap Temp between -19°F (-28°C) and 0°F (-17°C), see:* • *Warm food load* • *High room ambient* • *Door ajar* • *Condenser Air Flow* • *Compartment thermistor mis-read* • *Sealed system fault: leak* *4. Evaporator Temp 0°F (-17°C) or higher, see:* • *Power to compressor fault* • *Sealed system Fault: leak, restriction, inefficient compressor* ***NOTE:** "Pointers" do not apply to cabinet initial pulldown from ambient temperatures.* ***NOTE:** To clear non-flashing SERVICE indicator after repairs, press door ajar alarm bell ON/OFF key for 15 seconds.* *(Continued)*	**No Power to Unit**	Check power to unit, plug unit in or switch supply circuit breaker ON.
	Unit Switched OFF	Check for "OFF" displayed at LCD. If off, press UNIT ON/OFF key.
	Unit in Showroom Mode	Press UNIT ON/OFF key to OFF, then press and hold WARMER & COLDER keys, and press UNIT ON/OFF key.
	Control Set Too High	Check set-point. If high, adjust.
	Warm Food Load	Check contents of freezer for warm food load. Instruct customer.
	High Room Ambient	Instruct customer unit performs best between 60°F(16°C) and 90°F(32°C).
	Door Ajar a. Food product obstruction b. Door/cabinet hinge problem	 a. Move obstruction. b. Check and replace hinge if defective.
	Condenser Air Flow a. Dirty condenser b. Condenser fan blade obstructed or blade is loose c. Condenser fan motor disconnected d. Condenser fan motor defective e. No power from control board to condenser fan (Does not apply to single compressor models) *(**NOTE:** A compressor must be running)*	 a. Clean condenser. b. Remove obstruction or tighten nut on motor shaft. c. Check electrical connections from motor to J7-1 on control board, or from motor to compressor on single compressor models. Reconnect / repair connections. d. Check for 115V AC to motor, replace motor if defective. e. Check for 115V AC at J7-1 on control board (with compressor running). Replace board if defective.
	Light ON with Door Closed a. Switch depressor missing or bent, not depressing light switch b. Faulty light switch	 a. Replace/straighten switch depressor. b. Check operation of light switches, lights off when switch is depressed. Replace switch if defective.

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
(Continued) **H. Warm Freezer Temperatures <u>without</u> "SERVICE" Flashing** ***Pointers:*** *1. "Sr" appears during Diagnostic Mode, see:* • *Unit in Showroom Mode* *2. Evap Temp -20°F (-29°C) or lower, see:* • *Door ajar* • *Lights ON w/door closed* • *Evaporator fan fault* • *Compartment thermistor misread* • *Evaporator heavily frosted* • *Sealed system fault: leak or partial restriction* *3. Evap Temp between -19°F (-28°C) and 0°F (-17°C), see:* • *Warm food load* • *High room ambient* • *Door ajar* • *Condenser Air Flow* • *Compartment thermistor misread* • *Sealed system fault: leak* *4. Evaporator Temp 0°F (-17°C) or higher, see:* • *Power to compressor fault* • *Sealed system Fault: leak, restriction, inefficient compressor* ***NOTE:** "Pointers" do not apply to cabinet initial pulldown from ambient temperatures.* ***NOTE:** To clear non-flashing SERVICE indicator after repairs, press door ajar alarm bell ON/OFF key for 15 seconds.*	**Evaporator Fan Fault** a. Switch depressor missing or bent, not depressing fan switch b. Fan blade obstructed or out of position c. Faulty fan switch *(**NOTE:** A compressor must be running)* d. Evaporator fan motor disconnected e. Evaporator fan motor defective *(**NOTE:** Compressor must be running)*	 a. Replace/straighten switch depressor. b. Move obstruction or reposition blade. c. Check for 115V AC to fan switch, depress fan switch and check for 115V AC from switch to motor. Replace switch if defective. d. Check electrical connections of motor. Reconnect / repair bad connections. e. Check for 115V AC at fan motor with fan switch depressed. Replace motor if defective.
	Compartment Thermistor Misread	Check resistance of compartment thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
	Evaporator Heavily Frosted a. Door ajar b. Evaporator fan fault c. Compartment thermistor misread d. Defrost heater or drain trough heater disconnected or faulty e. Defrost terminator disconnected or faulty. f. Defrost sense line disconnected. g. No power from control board to defrost circuit	 a. See Door Ajar on previous page. b. See Evaporator Fan Fault on previous page. c. See Compartment Thermistor Misread on previous page. d. Check electrical connections of heaters. Reconnect / repair bad connections. Check resistance of heaters, replace if defective. e. Check electrical connections, Reconnect / repair bad connections or replace terminator if defective. f. Look for Error Codes 20, 22 or 23 or Manually initiate defrost by pressing ICE key for 5 seconds. If defrost lasts exactly 5 minutes, check all connections of gray/white wire from terminator to J4-4 on control board. Reconnect / repair bad connections. g. Manually initiate defrost by pressing ICE key for 5 seconds. Check for 115V AC at E2 on control board. Replace control board if defective.
	Power to Compressor Fault	Initiate Manual Component Activation Mode and check for 115V AC at E7 on control board. Replace control board if defective.
	Sealed System Fault • Sealed System Leak • Sealed System Restriction • Inefficient Compressor	See Sealed System Diagnostic Tables at back of Troubleshooting Guide

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
I. Warm Refrigerator Temperatures with "SERVICE" Flashing ***Pointers:*** *Refrigerator door must be open and compressor running for <u>five minutes</u>.* *1. "EE" appears in place of refrigerator evap. temperature, see:* • *Evaporator thermistor disconnected or shorted* *2. Evaporator Temp 15°F (-9°C) or lower within 5 minutes w/door open, see:* • *Door ajar* • *Lights stay ON* • *Evaporator fan fault* • *Compartment or evaporator thermistor misread* • *Evaporator heavily frosted* • *Sealed system fault: leak or partial restriction* *3. Evaporator Temp cannot pull below 30°F (-1°C) within 5 minutes w/door open, see:* • *Condenser Air Flow* • *Compartment or evaporator thermistor misread* • *Sealed system fault: leak or inefficient compressor* 4. Evaporator Temp 35°F (2°C) or higher after 5 minutes w/door open, see: • *Condenser Air Flow* • *Power to compressor fault* • *Sealed system fault: leak, restriction or inefficient compressor* ***NOTE:*** *"Pointers" do not apply to cabinet initial pulldown from ambient temperatures.* ***NOTE:*** *To clear flashing SERVICE indicator after repairs, power OFF, then back ON.* ***NOTE:*** *To clear non-flashing SERVICE indicator after repairs, press door ajar alarm bell ON/OFF key for 15 seconds.* *(Continued)*	**Door Ajar** a. Food product obstruction b. Door/cabinet hinge problem	 a. Move obstruction. b. Check and replace hinge if defective.
	Condenser Air Flow a. Dirty condenser b. Condenser fan blade obstructed or blade is loose c. Condenser fan motor disconnected d. Condenser fan motor defective e. No power from control board to condenser fan (Does not apply to single compressor models) *(**NOTE:** A compressor must be running)*	 a. Clean condenser. b. Remove obstruction or tighten nut on motor shaft. c. Check electrical connections from motor to J7-1 on control board, or from motor to compressor on single compressor models. Reconnect / repair connections. d. Check for 115V AC to motor, replace motor if defective. e. Check for 115V AC at J7-1 on control board (with compressor running). Replace board if defective.
	Light ON with Door Closed a. Switch depressor missing or bent, not depressing light switch b. Faulty light switch	 a. Replace/straighten switch depressor. b. Check operation of light switches, lights off when switch is depressed. Replace switch if defective.
	Evaporator Fan Fault a. Switch depressor missing or bent, not depressing fan switch b. Fan blade obstructed or out of position c. Faulty fan switch *(**NOTE:** A compressor must be running)* d. Evaporator. fan motor disconnected e. Evaporator fan motor defective *(**NOTE:** Compressor must be running)*	 a. Replace/straighten switch depressor. b. Move obstruction or reposition blade. c. Check for 115V AC to fan switch, depress fan switch and check for 115V AC from switch to motor. Replace switch if defective. d. Check electrical connections of motor. Reconnect / repair bad connections. e. Check for 115V AC at fan motor with fan switch depressed. Replace motor if defective.
	Evaporator Thermistor Disconnected or Shorted	Check for "EE" & "rE" in diagnostic mode. Check refrigerator evaporator thermistor electrical connections from thermistor to J1 on control board. Reconnect / repair connections. Check resistance of refrigerator evaporator thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
	Compartment or Evaporator Thermistor Misread	Check resistance of refrigerator compartment and evaporator thermistors for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
	Evaporator Heavily Frosted a. Door or drawer ajar b. Evaporator fan fault c. Thermistor misread	 a. See Door Ajar above. b. See Evaporator Fan Fault above. c. See Thermistor Misread above.

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
(Continued) **I. Warm Refrigerator Temperatures with "SERVICE" Flashing** *(See Pointers on previous page)*	**Power to Compressor Fault**	Check for 115V AC E6 on control board. Replace control board if defective.
	Sealed System Fault • Sealed System Leak • Sealed System Restriction • Inefficient Compressor	See Sealed System Diagnostic Tables at back of Troubleshooting Guide
J. Warm Refrigerator Temperatures <u>without</u> "SERVICE" Flashing ***Pointers:*** *Refrigerator door must be open and compressor running for <u>five minutes</u>.* *1. "Sr" appears during Diagnostic Mode, see:* • *Unit in Showroom Mode* *2. Evaporator Temp 15°F (-9°C) or lower within 5 minutes w/door open, see:* • *Door ajar* • *Lights stay ON* • *Evaporator fan fault* • *Compartment or evaporator thermistor misread* • *Evaporator heavily frosted* • *Sealed system fault: leak or partial restriction* *3. Evaporator Temp cannot pull below 30°F (-1°C) within 5 minutes w/door open, see:* • *Warm food load* • *High room ambient* • *Door ajar* • *Condenser Air Flow* • *Compartment or evaporator thermistor misread* • *Sealed system fault: leak or inefficient compressor* 4. Evaporator Temp 35°F (2°C) or higher after 5 minutes w/door open, see: • *Condenser Air Flow* • *Power to compressor fault* • *Sealed system fault: leak, restriction or inefficient compressor* ***NOTE:** "Pointers" do not apply to cabinet initial pulldown from ambient temperatures.* ***NOTE:** To clear non-flashing SERVICE indicator after repairs, press door ajar alarm bell ON/OFF key for 15 seconds.* *(Continued)*	**No Power to Unit**	Check power to unit, plug unit in or switch supply circuit breaker ON.
	Unit Switched OFF	Check for "OFF" displayed at LCD. If off, press UNIT ON/OFF key.
	Unit in Showroom Mode	Press UNIT ON/OFF key to OFF, then press and hold WARMER & COLDER keys, and press UNIT ON/OFF key.
	Control Set Too High	Check set-point. If high, adjust.
	Warm Food Load	Check contents of refrigerator for warm food load. Instruct customer.
	High Room Ambient	Instruct customer unit performs best between 60°F(16°C) and 90°F(32°C).
	Door Ajar a. Food product obstruction b. Door/cabinet hinge problem	a. Move obstruction. b. Check and replace hinge if defective.
	Condenser Air Flow a. Dirty condenser b. Condenser fan blade obstructed or blade is loose c. Condenser fan motor disconnected d. Condenser fan motor defective e. No power from control board to condenser fan (Does not apply to single compressor models) ***(NOTE:** A compressor must be running)*	a. Clean condenser. b. Remove obstruction or tighten nut on motor shaft. c. Check electrical connections from motor to J7-1 on control board, or from motor to compressor on single compressor models. Reconnect / repair connections. d. Check for 115V AC to motor, replace motor if defective. e. Check for 115V AC at J7-1 on control board (with compressor running). Replace board if defective.
	Light ON with Door Closed a. Switch depressor missing or bent, not depressing light switch b. Faulty light switch	a. Replace/straighten switch depressor. b. Check operation of light switches, lights off when switch is depressed. Replace switch if defective.

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
(Continued) **J. Warm Refrigerator Temperatures <u>without</u> "SERVICE" Flashing** *(See Pointers on previous page)*	**Evaporator Fan Fault** a. Switch depressor missing or bent, not depressing fan switch b. Fan blade obstructed or out of position c. Faulty fan switch *(**NOTE:** A compressor must be running)* d. Evaporator fan motor disconnected e. Evaporator fan motor defective *(**NOTE:** Compressor must be running)*	 a. Replace/straighten switch depressor. b. Move obstruction or reposition blade. c. Check for 115V AC to fan switch, depress fan switch and check for 115V AC from switch to motor. Replace switch if defective. d. Check electrical connections of motor. Reconnect / repair bad connections. e. Check for 115V AC at fan motor with fan switch depressed. Replace motor if defective.
	Compartment or Evaporator Thermistor Misread	Check resistance of refrigerator compartment and evaporator thermistors for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
	Evaporator Heavily Frosted a. Door or drawer ajar b. Evaporator fan fault c. Thermistor misread	 a. See Door Ajar on previous page. b. See Evaporator Fan Fault above. c. See Thermistor Misread above.
	Power to Compressor Fault	Check for 115V AC E6 on control board. Replace control board if defective.
	Sealed System Fault • Sealed System Leak • Sealed System Restriction • Inefficient Compressor	See Sealed System Diagnostic Tables at back of Troubleshooting Guide
K. Warm or Normal Temperatures in Both Compartments with "SERVICE" Flashing	**High Room Ambient**	Instruct customer unit performs best between 60°F(16°C) and 90°F(32°C).
	Condenser Air Flow a. Dirty condenser b. Condenser fan blade obstructed or blade is loose c. Condenser fan motor disconnected d. Condenser fan motor defective e. No power from control board to condenser fan (Does not apply to single compressor models) *(**NOTE:** A compressor must be running)*	 a. Clean condenser. b. Remove obstruction or tighten nut on motor shaft. c. Check electrical connections from motor to J7-1 on control board, or from motor to compressor on single compressor models. Reconnect / repair connections. d. Check for 115V AC to motor, replace motor if defective. e. Check for 115V AC at J7-1 on control board (with compressor running). Replace board if defective.
	Refrigerator Evaporator Thermistor Disconnected or Shorted	Check for "EE" & "rE" in diagnostic mode. Check refrigerator evaporator thermistor electrical connections from thermistor to control board. Reconnect / repair connections. Check resistance of refrigerator evaporator thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
L. Warm Temperatures in Both Compartments without "SERVICE" Flashing	**No Power to Unit**	Check power to unit, plug unit in or switch supply circuit breaker ON.
	Unit Switched OFF	Check for "OFF" displayed at LCD. If off, press UNIT ON/OFF key.
	Unit in Showroom Mode	Press UNIT ON/OFF key to OFF, then press and hold WARMER& COLDER keys, and press UNIT ON/OFF key.
	Control Set Too High	Check set-point. If high, adjust.
	Warm Food Load	Check contents of freezer for warm food load. Instruct customer.
	High Room Ambient	Instruct customer unit performs best between 60°F(16°C) and 90°F(32°C).
	Door Ajar a. Food product obstruction b. Door/cabinet hinge problem	 a. Move obstruction. b. Check and replace hinge if defective.
	Condenser Air Flow a. Dirty condenser b. Condenser fan blade obstructed or blade is loose c. Condenser fan motor disconnected d. Condenser fan motor defective e. No power from control board to condenser fan (Does not apply to single compressor models) *(**NOTE:** A compressor must be running)*	 a. Clean condenser. b. Remove obstruction or tighten nut on motor shaft. c. Check electrical connections from motor to J7-1 on control board, or from motor to compressor on single compressor models. Reconnect / repair connections. d. Check for 115V AC to motor, replace motor if defective. e. Check for 115V AC at J7-1 on control board (with compressor running). Replace board if defective.
M. Product Temperature 10° or More Colder than Displayed Temperature	**Compartment Thermistor Misread**	Check resistance of compartment thermistor for 30,000 to 33,000 ohms at 32°F (0°C). Replace if defective.
N. 1. "Extremely" Cold Temperatures Displayed ***(1° to 7° in Refrigerator and -21° to -15° in Freezer)*** **2. If outside US - "Extremely" Warm Temperatures Displayed** ***(34° to 45° in Refrigerator and -5° to 5° in Freezer)***	**1. Control Set to Display Celsius but Customer Thought it Was Fahrenheit** **2. If Outside US - Control Set to Display Fahrenheit but Customer Thought it Was Celsius**	1. Switch unit OFF, then ON, then press & hold Bell key and UNIT ON/OFF key for 10 seconds. 2. Switch unit OFF, then ON, then press & hold Bell key and UNIT ON/OFF key for 10 seconds.

PROBLEM	POSSIBLE CAUSE	TEST / ACTION
O. "ICE" and "SERVICE" Flashing on LCD	**Water Valve Energized Longer then Fifteen Seconds**	Check icemaker area for jammed ice cube, clear jam if present. Check levelness of ice-maker, level if needed. Check position of fill cup. Reposition if in ice path. Check water supply pressure; must be constant 20-100 PSI. If not, instruct customer. Check water valve operation, opens when 115V AC is applied, closes completely when 115V AC is removed. Water valve Ohms = 160. Replace if defective.

SEALED SYSTEM DIAGNOSTICS TABLES

Before entering sealed system, see General Troubleshooting Guide starting on page 8-5, specifically problems "A" - "D", referencing "Pointers" in first column. By initiating Diagnostic Mode and observing evaporator temperatures, you may find it unnecessary to enter the sealed system. The table on following page also provides a quick reference for temperature/pressure correlation.

NOTE: *Always use solder-on process valves. Do NOT use bolt-on process valves as they are prone to leak.*

NOTE: *Whenever servicing the sealed system, the high-side filter-drier must be replaced.*

NORMAL OPERATING PRESSURES			
Model		Normal Low-Side Pressures	Normal High-Side Pressures
601R-2	Refrigerator	5-12 psi to 35-42 psi	90 psi to 100 psi
601RG-2	Refrigerator	5-12 psi to 35-42 psi	90 psi to 100 psi
601F-2	Freezer	1-3" vacuum to 8-15 psi	90 psi to 100 psi
611-2	Refrigerator	5-12 psi to 35-42 psi	90 psi to 100 psi
	Freezer	1-3" vacuum to 8-15 psi	90 psi to 100 psi
611G-2	Refrigerator	5-12 psi to 35-42 psi	90 psi to 100 psi
	Freezer	1-3" vacuum to 8-15 psi	90 psi to 100 psi
632-2	Refrigerator	0-10 psi to 30-38 psi	110 psi to 130 psi
	Freezer	1-3" vacuum to 6-12 psi	110 psi to 130 psi
642-2	Refrigerator	0-10 psi to 30-38 psi	85 psi to 100 psi
	Freezer	1-3" vacuum to 6-12 psi	75 psi to 90 psi
650-2	Refrigerator	5-12 psi to 30-38 psi	85 psi to 100 psi
	Freezer	1-3" vacuum to 6-12 psi	75 psi to 90 psi
650G-2	Refrigerator	5-12 psi to 30-38 psi	85 psi to 100 psi
	Freezer	1-3" vacuum to 6-12 psi	75 psi to 90 psi
661-2	Refrigerator	5-12 psi to 35-42 psi	90 psi to 100 psi
	Freezer	0-3" vacuum to 8-15 psi	75 psi to 90 psi
685-2	Refrigerator	5-12 psi to 35-42 psi	90 psi to 100 psi
	Freezer	0-5" vacuum to 8-15 psi	75 psi to 90 psi
695-2	Refrigerator	5-12 psi to 35-42 psi	90 psi to 100 psi
	Freezer	0-5" vacuum to 8-15 psi	75 psi to 90 psi

EVAPORATOR TEMPERATURE / SEALED SYSTEM LOW-SIDE PRESSURE CORRELATION

NOTE: *The temperature/pressure table at right is for reference only. A unit's temperature/pressure correlation may differ from those listed due to: variations in evaporator thermistor location, set-points, where the sealed system is in the refrigeration cycle, ambient temperature, etc.*
If a unit is experiencing temperature problems, it is recommended that you reference the General Troubleshooting Guide before accessing the sealed system. After all mechanical and electrical components have been ruled out, sealed system pressures can be checked by applying solder-on process valves and referencing the preceding page. Do NOT use bolt-on process valves as they are prone to leak.
This table should only be used as a last quick check before entering the sealed system.

Temperature	Pressure
-30°F (-34°C)	10" Vac
-25°F (-32°C)	7" Vac
-20°F (-29°C)	4" Vac
-15°F (-26°C)	0" Vac
-10°F (-23°C)	2 Psi
-5°F (-21°C)	4 Psi
0°F (-18°C)	7 Psi
5°F (-15°C)	9 Psi
10°F (-12°C)	12 Psi
15°F (-9°C)	15 Psi
20°F (-7°C)	18 Psi
25°F (-4°C)	22 Psi
30°F (-1°C)	26 Psi
35°F (2°C)	30 Psi
40°F (4°C)	35 Psi
45°F (7°C)	40 Psi
50°F (10°C)	45 Psi
55°F (13°C)	51 Psi
60°F (16°C)	57 Psi
65°F (18°C)	64 Psi
70°F (21°C)	71 Psi
75°F (24°C)	78 Psi

PRESSURE INDICATIONS		
If low side pressure is	***& high side pressure is***	***possible problem is***
NORMAL	*NORMAL*	*MECHANICAL (see General Troubleshooting Guide)*
LOW	*LOW*	*LEAK*
LOW	*HIGH*	*RESTRICTION*
HIGH	*LOW*	*INEFFICIENT COMPRESSOR*
HIGH	*HIGH*	*OVER CHARGE*

CONTROL PANEL MEMBRANE SWITCH / RIBBON CABLE TEST

If integrity of control panel assembly is suspect, perform continuity tests at membrane switch ribbon cable terminal housing. Begin by disconnecting ribbon cable from control board. Disengage control board from control panel. Remove control panel assembly from unit and place it on solid surface.

Pin 1 Identification Procedure

The ribbon cable wires are exposed at back of terminal housing (see Figure 8-1). If Pin 1 is not labeled on ribbon cable or terminal housing tag, follow guidelines below to identify Pin 1:

1. If terminal housing is BLUE, then Pin 1 is closest to arrow on housing.
2. If terminal housing is BLACK, check for continuity between first two pins at each end of housing while pushing UNIT ON/OFF key. If there is continuity, then Pin 1 is at that end.

Continuity Test Procedure

1. Identify model number being serviced in left column of table below.
2. Press key listed at top of table.
3. Corresponding numbers to right of model number and below key being pressed are the pin numbers on terminal housing that should have continuity.

   NOTE: *If any continuity tests show failure, replace entire control panel assembly.*

MODEL	UNIT ON/OFF KEY	ALARM (🔔) ON/OFF KEY	ICE ON/OFF KEY	REFRIG WARMER KEY	REFRIG COLDER KEY	FREEZER WARMER KEY	FREEZER COLDER KEY	BULK ICE KEY	LIGHTS ON/OFF KEY
601R-2	1 - 2	2 - 5	NA	3 - 4	4 - 5	NA	NA	NA	NA
601RG-2	1 - 2	2 - 5	NA	3 - 4	4 - 5	NA	NA	NA	2 - 3
601F-2	1 - 2	2 - 5	2 - 3	NA	NA	3 - 4	4 - 5	NA	NA
611-2	1 - 2	2 - 5	2 - 3	1 - 6	5 - 6	3 - 4	4 - 5	NA	NA
611G-2	1 - 2	2 - 3	2 - 5	3 - 4	4 - 5	1 - 6	5 - 6	NA	1 - 4
632-2	1 - 2	2 - 5	2 - 3	1 - 6	5 - 6	3 - 4	4 - 5	NA	NA
642-2	1 - 2	2 - 5	2 - 3	1 - 6	5 - 6	3 - 4	4 - 5	NA	NA
650-2	1 - 2	2 - 5	2 - 3	1 - 6	5 - 6	3 - 4	4 - 5	NA	NA
650G-2	1 - 2	2 - 3	2 - 5	3 - 4	4 - 5	1 - 6	5 - 6	NA	1 - 4
661-2	1 - 2	2 - 5	2 - 3	1 - 6	5 - 6	3 - 4	4 - 5	NA	NA
685-2	1 - 2	2 - 3	2 - 5	3 - 4	4 - 5	1 - 6	5 - 6	1 - 4	NA
695-2	1 - 2	2 - 3	2 - 5	3 - 4	4 - 5	1 - 6	5 - 6	1 - 4	NA

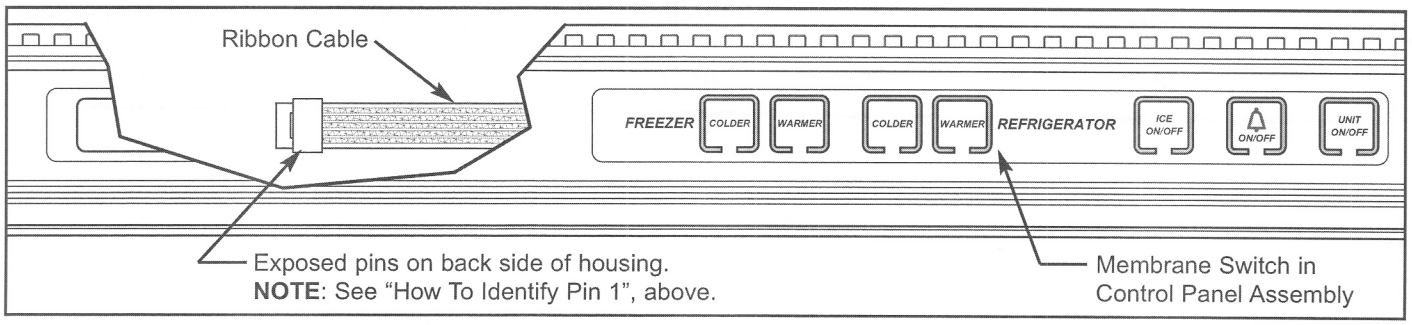

Figure 8-1. Control Panel Assy with Cut-Away View to Show Ribbon Cable *(Model 632 Control Panel Shown)*