

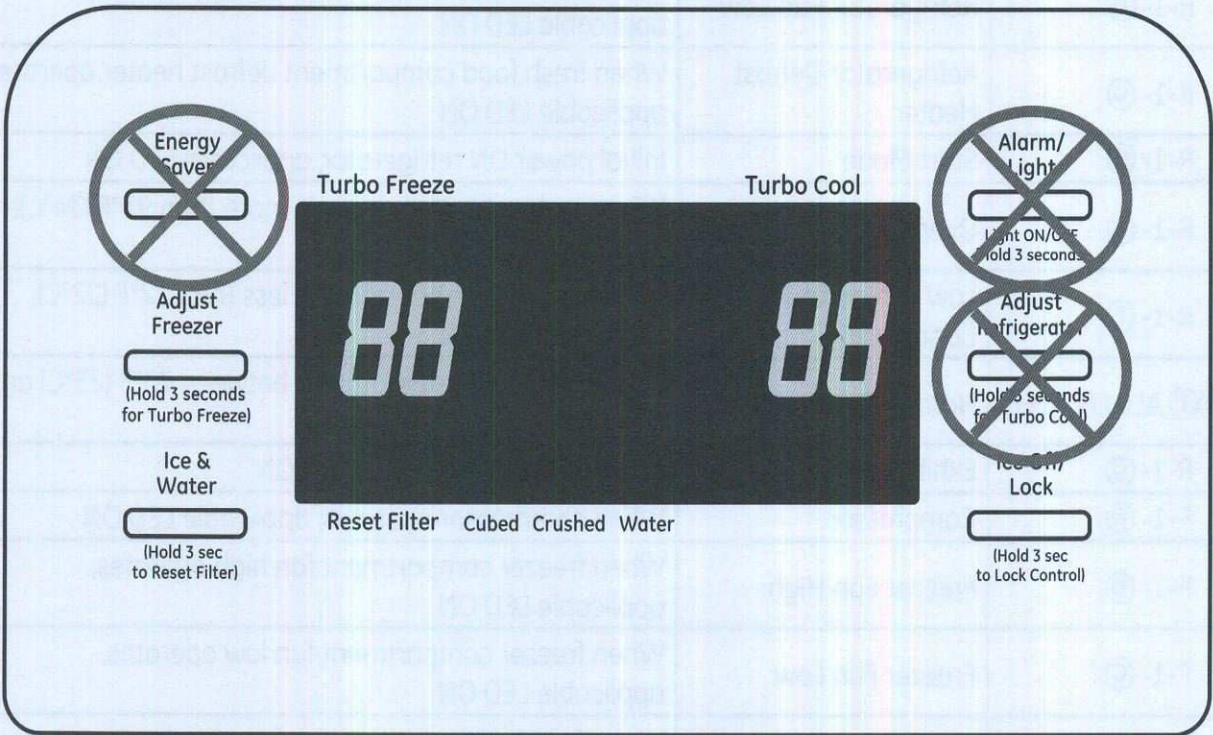
Failure Condition Display Code Table

NO	Trouble Item	Display LED	Trouble Contents
1	Icemaker Sensor Error	R-1-Ⓐ	Icemaker Sensor part error
2	Refrigerator Sensor Error	R-1-Ⓑ	Refrigerator Sensor part error
3	Refrigerator Defrost Sensor Error	R-1-Ⓒ	Refrigerator Defrost Sensor part error
4	Refrigerator Fan Error	R-1-Ⓓ	Refrigerator inner part error
5	Icemaker error	R-1-Ⓔ	Icemaker operation error
6	Refrigerator Defrost Heater Error	R-1-Ⓢ	Refrigerator defrost part error
7	Ambient Sensor Error	F-1-Ⓐ	External Sensor part error
8	Freezer Sensor Error	F-1-Ⓑ	Freezer Sensor part error
9	Freezer Defrost Sensor Error	F-1-Ⓒ	Freezer Defrost Sensor part error
10	Freezer Fan Error	F-1-Ⓓ	Freezer inner fan motor part error
11	Condenser Fan Error	F-1-Ⓔ	Machine room fan motor part error
12	Ice Room Sensor Error	F-1-Ⓕ	Ice Room Sensor part error
13	Freezer Defrost Heater Error	F-1-Ⓢ	Freezer Defrost part error
14	Ice Room Fan Error	F-10-Ⓑ	Ice Room inner fan motor part error
15	Pantry Damper Heater Error	R-10-Ⓐ	Damper Heater open/wire error
16	Pantry Sensor Error	R-10-Ⓑ	Pantry Room Sensor part error
17	Panel-Main Micom Error	F-10-Ⓢ	Panel-Main Micom communication error
18	L-M Communication Error	F-10-Ⓕ	LOAD-Main Micom communication error
19	Water Tank Heater Error	R-10-Ⓢ	Water Tank Heater open/wire error



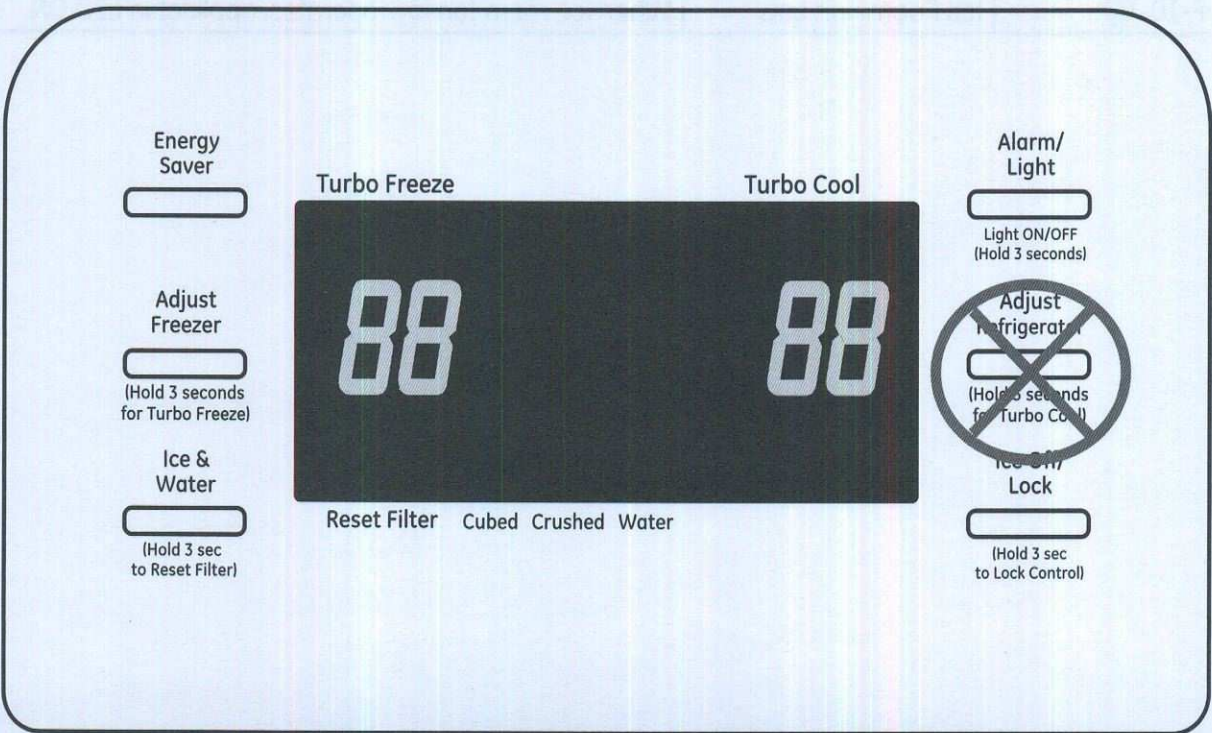
Load Condition Displays

To access the load condition display, press ENERGY SAVER and ALARM/LIGHT pads simultaneously for 6 seconds. The display will beep and start to flash. Immediately remove fingers from previous pads and press the ADJUST REFRIGERATOR pad. The load condition mode will then be energized.



Segments of the figure "8"s will blink on and off corresponding to the loads that the main board has energized.

**Note:** Just because the board has a load energized does not mean that the component is functioning.





Load Condition Display Code Table

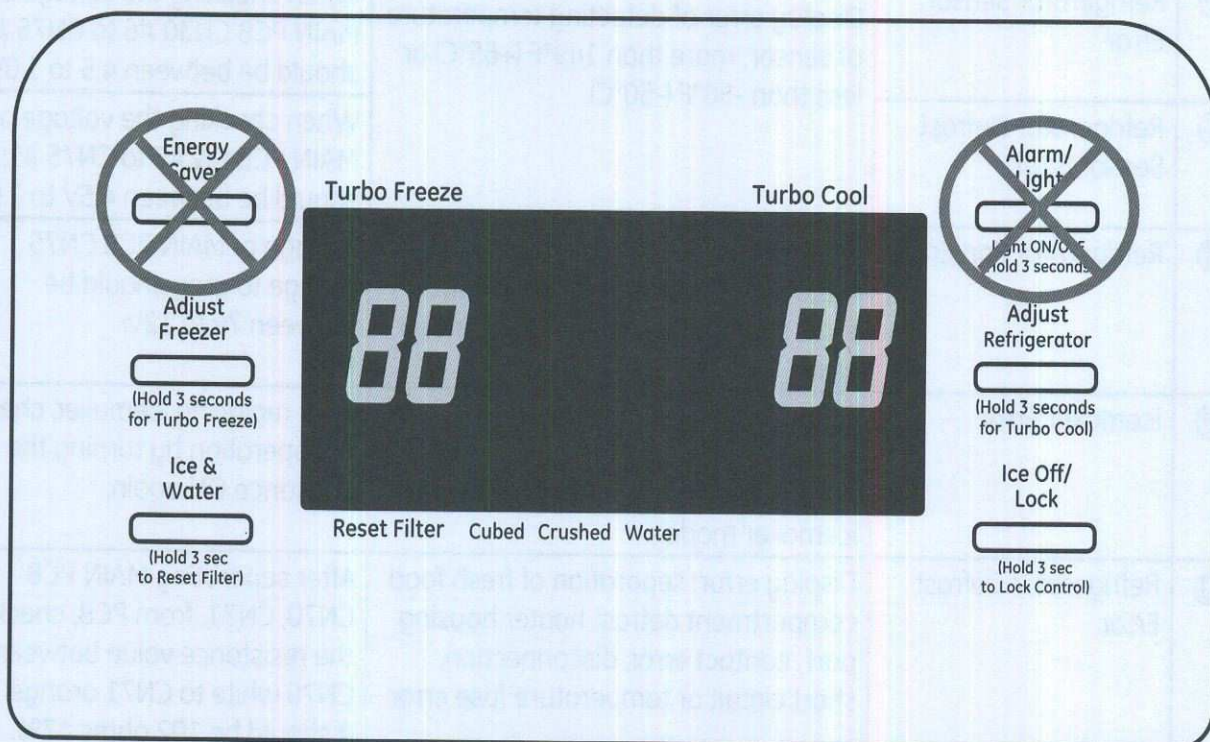
Display LED	Display Contents	Operation Contents
R-1- ㊸	Refrigerator Fan High	When fresh food compartment fan high operates, applicable LED ON
R-1- ㊹	Refrigerator Fan Low	When fresh food compartment fan low operates, applicable LED ON
R-1- ㊺	Refrigerator Defrost Heater	When fresh food compartment defrost heater operates, applicable LED ON
R-1- ㊻	Start Mode	Initial power ON refrigerator, applicable LED ON
R-1- ㊼	Overload Condition	When ambient temperature is more than 93°F (34°C), applicable LED ON
R-1- ㊽	Low Temperature Condition	When ambient temperature is less than 72°F (22°C), applicable LED ON
F-1- ㊾㊿ ALL LED OFF	Normal Condition	When ambient temperature is between 73°F (23°C) and 91°F (33°C), applicable LED ON
R-1- ㊿	Exhibition Mode	Display mode, applicable LED ON
F-1- ㊸	Compressor	When compressor operates, applicable LED ON
F-1- ㊹	Freezer Fan High	When freezer compartment fan high operates, applicable LED ON
F-1- ㊺	Freezer Fan Low	When freezer compartment fan low operates, applicable LED ON
F-1- ㊻	Freezer Defrost Heater	When freezer compartment defrost heater operates, applicable LED ON
R-10- ㊼	Condenser Fan High	When condenser fan high operates, applicable LED ON
R-10- ㊽	Condenser Fan Low	When condenser fan low operates, applicable LED ON
F-10- ㊿	French Heater	When french heater operates, applicable LED ON
F-1- ㊸	Dispenser Heater	When dispenser heater operates, applicable LED ON
F-10- ㊸	Water Tank Heater	When water tank heater operates, applicable LED ON
F-10- ㊹	Ice Room Fan High Ice	When ice room fan high operates, applicable LED ON
F-10- ㊺	Ice Room Fan Low	When ice room fan low operates, applicable LED ON



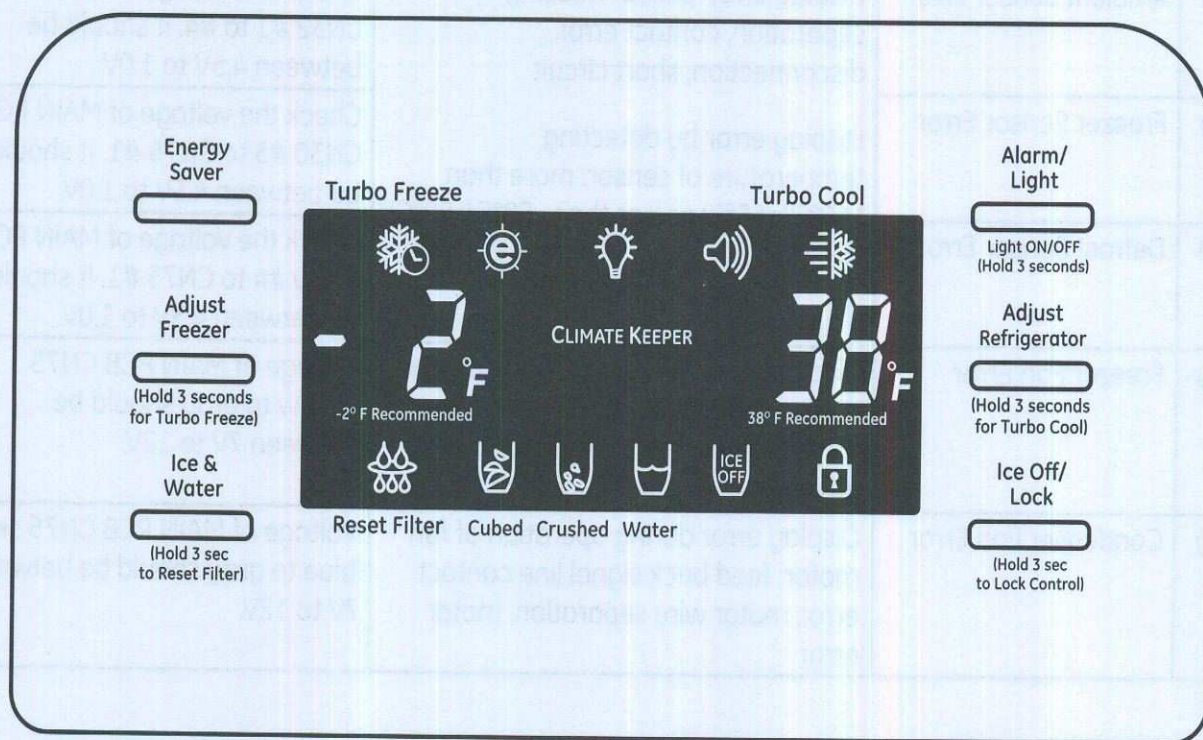
## Self Diagnostics – During Normal Operation

To enter self diagnostics during normal operation of the refrigerator, press the ENERGY SAVER and ALARM/LIGHT pads for 6 seconds. The display will beep and flash. Continue to press both pads for an addition 2 seconds to enter the self diagnostic mode.

If any failure functions are present, those segments will now begin to flash.



The self diagnostics mode will be displayed for 30 seconds, then the panel will return to normal display.





Self Diagnostics – During Normal Operation Table

LED	Item	Trouble Contents	Diagnostic Method
R-1-Ⓐ	Icemaker Sensor Error	Display error: separation of sensor housing part, contact error, disconnection, short circuit	When checking the voltage of MAIN PCB CN90 #3 to CN90 #4: should be between 4.5 to 1.0V.
R-1-Ⓑ	Refrigerator Sensor Error	Display error of detecting temperature of sensor: more than 149°F (+65°C) or less than -58°F (-50°C)	When checking the voltage of MAIN PCB CN30 #6 to CN75 #1: should be between 4.5 to 1.0V.
R-1-Ⓒ	Refrigerator Defrost Sensor Error		When checking the voltage of MAIN PCB CN #7 to CN75 #1: should be between 4.5V to 1.0V.
R-1-Ⓓ	Refrigerator Fan Error	Display error during operation of fan motor: feed back signal line contact error, separation of motor wire, motor error	Voltage of MAIN PCB CN75 orange to gray should be between 7v to 12V.
R-1-Ⓔ	Icemaker Error	Display error: ice making kit is harvested more than 3 times and level error. Note: Apply to the applicable icemaker model.	After replacing icemaker, check the operation by turning the appliance ON again.
R-1-Ⓘ	Refrigerator Defrost Error	Display error: separation of fresh food compartment defrost heater housing part, contact error, disconnection, short circuit or temperature fuse error  Display error: the fresh food compartment defrosting does not finish. Defrost is heating continuously for more than 80 minutes.	After separating MAIN PCB CN70, CN71, from PCB, check the resistance value between CN70 white to CN71 orange. It should be 102 ohms ±7%. (Resistance value is varied by the input power.) Check 0 ohm: heater short, ∞ ohm: wire/ bimetal open.
F-1-Ⓐ	Ambient Sensor Error	Display error: sensor housing separation, contact error, disconnection, short circuit	Check the voltage of MAIN PCB CN32 #1 to #4. It should be between 4.5V to 1.0V.
F-1-Ⓑ	Freezer Sensor Error	Display error by detecting temperature of sensor: more than 149°F (+65°C) or less than -58°F (-50°C)	Check the voltage of MAIN PCB CN30 #3 to CN75 #1. It should be between 4.5V to 1.0V.
F-1-Ⓒ	Defrost Sensor Error		Check the voltage of MAIN PCB CN30 #4 to CN75 #1. It should be between 4.5V to 1.0V.
F-1-Ⓓ	Freezer Fan Error	Display error during operation of fan motor: feed back signal line contact error, motor wire separation, motor error	Voltage of MAIN PCB CN75 yellow to gray should be between 7V to 12V.
F-1-Ⓔ	Condenser Fan Error	Display error during operation of fan motor: feed back signal line contact error, motor wire separation, motor error	Voltage of MAIN PCB CN75 sky blue to gray should be between 7V to 12V.

(Continued next page)



LED	Item	Trouble Contents	Diagnostic Method
F-1-①	Ice Room Sensor Error	Display error: sensor housing separation, contact error, disconnection, short circuit  Display error by detecting temperature of sensor: more than 149°F (+65°C) or less than -58°F (-50°C)	Check the voltage of MAIN PCB CN32 #3 to CN75 #1. It should be between 4.5V to 1.0V.
F-1-⑨	Freezer Defrost Error	Display error: separation of freezer compartment defrost heater housing part, contact error, disconnection, short circuit, or temperature fuse error  Display error: The defrosting does not finish through fresh food compartment. Compartment defrost is heating continuously for more than 70 minutes.	After separating MAIN PCB CN70 and CN71 from PCB, check the resistant value between CN70 brown to CN71 orange. It should be 102 ohms $\pm 7\%$ . (Resistance value is varied by the input power.) Check 0 ohm: heater short, $\infty$ ohm: wire/ bimetal open.
F-10-⑤	Ice Room Fan Error	Display error during operation of fan motor: feedback signal line contact error, motor wire separation, motor error	Voltage of MAIN PCB CN76 black to CN75 gray should be between 6V to 12V.
R-10-③	Pantry Damper Heater Error	Display error: when open error is detected by damper heater: separation of damper heater housing part, contact error, disconnection, short circuit	After separating MAIN PCB CN91 from PCB, check the resistant value between black to brown wire. It should be 145 ohms $\pm 7\%$ . Check 0 ohm: heater short, $\infty$ ohm: wire/ bimetal open.
R-10-⑥	Pantry Sensor Error	Display error: separation of sensor housing, contact error, disconnection, short circuit  Display error by detecting temperature of sensor: more than 149°F (+65°C) or less than -58°F (-50°C)	Check the voltage of MAIN PCB CN30 #8 to #9. It should be between 4.5V to 1.0V.
R-10-⑨	Water Tank Heater Error	Display error when open error is detected by water tank heater: separation of water tank heater housing part, contact error, disconnection, short circuit	After separating MAIN PCB CN78 from PCB, check the resistant value between black to brown wire. It should be 45 ohms $\pm 7\%$ . Check 0 ohm: heater short, $\infty$ ohm: wire/ bimetal open.
F-10-⑨	Panel to Main Communication Error	Display of Pc/Lc Er in the panel with alarm:	It is desirable to recheck the condition with the oscilloscope after replacing Main and Panel PCBs
F-10-①	Load to Main Communication Error	MICOM MAIN to LOAD communication error MICOM MAIN to PANEL communication error	



Sensor Resistance / Voltage Checks Table

°C	°F	Voltage	Ohms	°C	°F	Voltage	Ohms	°C	°F	Voltage	Ohms
-50	-58	4.694	153319	-5	23	3.107	16419	40	104	1.153	2997
-49	-56.2	4.677	144794	-4	24.8	3.057	15731	41	105.8	1.124	2899
-48	-54.4	4.659	136798	-3	26.6	3.006	15076	42	107.6	1.095	2805
-47	-52.6	4.641	129294	-2	28.4	2.955	14452	43	109.4	1.068	2714
-46	-50.8	4.622	122248	-1	30.2	2.904	13857	44	111.2	1.040	2627
-45	-49	4.602	115631	0	32	2.853	13290	45	113	1.014	2543
-44	-47.2	4.581	109413	1	33.8	2.802	12749	46	114.8	0.988	2462
-43	-45.4	4.560	103569	2	35.6	2.751	12233	47	116.6	0.963	2384
-42	-43.6	4.537	98073	3	37.4	2.700	11741	48	118.4	0.938	2309
-41	-41.8	4.514	92903	4	39.2	2.649	11271	49	120.2	0.914	2237
-40	-40	4.490	88037	5	41	2.599	10823	50	122	0.891	2167
-39	-38.2	4.465	83456	6	42.8	2.548	10395	51	123.8	0.868	2100
-38	-36.4	4.439	79142	7	44.6	2.498	9986	52	125.6	0.846	2036
-37	-34.6	4.412	75077	8	46.4	2.449	9596	53	127.4	0.824	1973
-36	-32.8	4.385	71246	9	48.2	2.399	9223	54	129.2	0.803	1913
-35	-31	4.356	67634	10	50	2.350	8867	55	131	0.783	1855
-34	-29.2	4.326	64227	11	51.8	2.301	8526	56	132.8	0.762	1799
-33	-27.4	4.296	61012	12	53.6	2.253	8200	57	134.6	0.743	1745
-32	-25.6	4.264	57977	13	55.4	2.205	7888	58	136.4	0.724	1693
-31	-23.8	4.232	55112	14	57.2	2.158	7590	59	138.2	0.706	1642
-30	-22	4.199	52406	15	59	2.111	7305	60	140	0.688	1594
-29	-20.2	4.165	49848	16	60.8	2.064	7032	61	141.8	0.670	1547
-28	-18.4	4.129	47431	17	62.6	2.019	6771	62	143.6	0.653	1502
-27	-16.6	4.093	45146	18	64.4	1.974	6521	63	145.4	0.636	1458
-26	-14.8	4.056	42984	19	66.2	1.929	6281	64	147.2	0.620	1416
-25	-13	4.018	40938	20	68	1.885	6052	65	149	0.604	1375
-24	-11.2	3.980	39002	21	69.8	1.842	5832	66	150.8	0.589	1335
-23	-9.4	3.940	37169	22	71.6	1.799	5621	67	152.6	0.574	1297
-22	-7.6	3.899	35433	23	73.4	1.757	5419	68	154.4	0.560	1260
-21	-5.8	3.858	33788	24	75.2	1.716	5225	69	156.2	0.546	1225
-20	-4	3.816	32230	25	77	1.675	5039	70	158	0.532	1190
-19	-2.2	3.773	30752	26	78.8	1.636	4861	71	159.8	0.519	1157
-18	-0.4	3.729	29350	27	80.6	1.596	4690	72	161.6	0.506	1125
-17	1.4	3.685	28021	28	82.4	1.558	4526	73	163.4	0.493	1093
-16	3.2	3.640	26760	29	84.2	1.520	4369	74	165.2	0.481	1063
-15	5	3.594	25562	30	86	1.483	4218	75	167	0.469	1034
-14	6.8	3.548	24425	31	87.8	1.447	4072	76	168.8	0.457	1006
-13	8.6	3.501	23345	32	89.6	1.412	3933	77	170.6	0.446	978
-12	10.4	3.453	22320	33	91.4	1.377	3799	78	172.4	0.435	952
-11	12.2	3.405	21345	34	93.2	1.343	3670	79	174.2	0.424	926
-10	14	3.356	20418	35	95	1.309	3547	80	176	0.414	902
-9	15.8	3.307	19537	36	96.8	1.277	3428	81	177.8	0.404	877
-8	17.6	3.258	18698	37	98.6	1.253	3344	82	179.6	0.394	854
-7	19.4	3.208	17901	38	100.4	1.213	3204	83	181.4	0.384	832
-6	21.2	3.158	17142	39	102.2	1.183	3098	84	183.2	0.375	810



**Note:** When performing diagnostic checks, verify connector and pin numbers on the diagram packed with the unit.

**Sensor Resistance / Voltage Checks**

**Ice Maker Sensor**

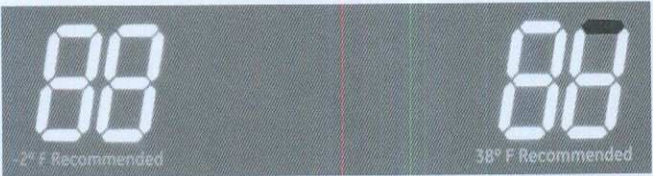
Resistance Check (CN90 Unplugged)

CN90 Pin# 4 to Pin# 8

Voltage Check (CN90 Connected)

CN90 Pin# 4 to CN10 Pin# 3

**Ice Maker Sensor Error Code**



**Refrigerator Sensor**

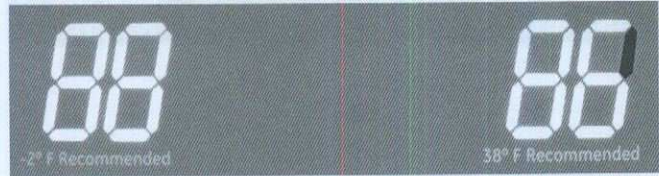
Resistance Check (CN30 Unplugged)

CN30 Pin# 6 to CN10 Pin# 3

Voltage Check (CN30 Connected)

CN30 Pin# 6 to CN10 Pin# 3

**Refrigerator Sensor Error Code**



**Refrigerator Defrost Sensor**

Resistance Check (CN30 Unplugged)

CN30 Pin# 7 to CN10 Pin# 3

Voltage Check (CN30 Connected)

CN30 Pin# 7 to CN10 Pin# 3

**Refrigerator Defrost Sensor Error Code**



**Ambient Sensor**

Resistance Check (CN32 Unplugged)

CN32 Pin# 1 to CN32 Pin# 4

Voltage Check (CN32 Connected)

CN32 Pin# 1 to CN10 Pin# 3

**Ambient Sensor Error Code**





**Freezer Sensor**

Resistance Check (CN30 Unplugged)

CN30 Pin# 3 to CN10 Pin# 3

Voltage Check (CN30 Connected)

CN30 Pin# 3 to CN10 Pin# 3

**Freezer Sensor Error Code**



**Ice Room Sensor**

Resistance Check (CN32 Unplugged)

CN32 Pin# 3 to CN10 Pin# 3

Voltage Check (CN32 Connected)

CN32 Pin# 3 to CN10 Pin# 3

**Ice Room Sensor Error Code**



**Freezer Defrost Sensor**

Resistance Check (CN30 Unplugged)

CN30 Pin# 4 to CN10 Pin# 3

Voltage Check (CN32 Connected)

CN30 Pin# 4 to CN10 Pin# 3

**Freezer Defrost Sensor Error Code**



**Pantry Sensor**

Resistance Check (CN30 Unplugged)

CN30 Pin# 8 to CN30 Pin# 9

Voltage Check (CN30 Connected)

CN30 Pin# 8 to CN10 Pin# 3

**Pantry Sensor Error Code**





## Operational Fan Checks

**Note:** All fan voltage checks are from CN10 Pin# 3.

Check voltage to fans:

Freezer Fan – CN75 Pin#2 7 to 12 VDC

Refrigerator Fan – CN75 Pin#3 7 to 12 VDC

Condenser Fan – CN75 Pin#4 7 to 12 VDC

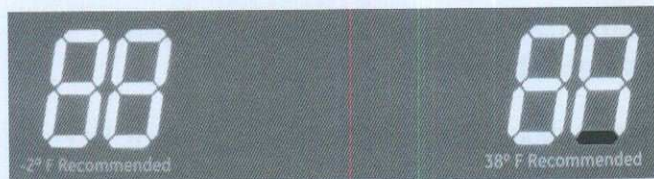
Check voltage from fans (indicates fans are turning):

Freezer Fan – CN75 Pin#5 2 to 3 VDC

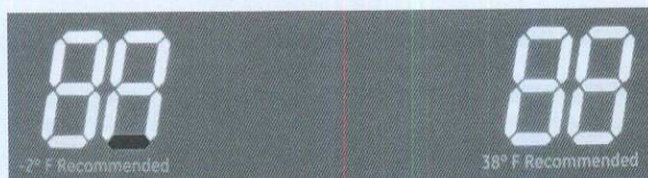
Refrigerator Fan – CN75 Pin#6 2 to 3 VDC

Condenser Fan – CN75 Pin#7 2 to 3 VDC

### Refrigerator Fan Error Code



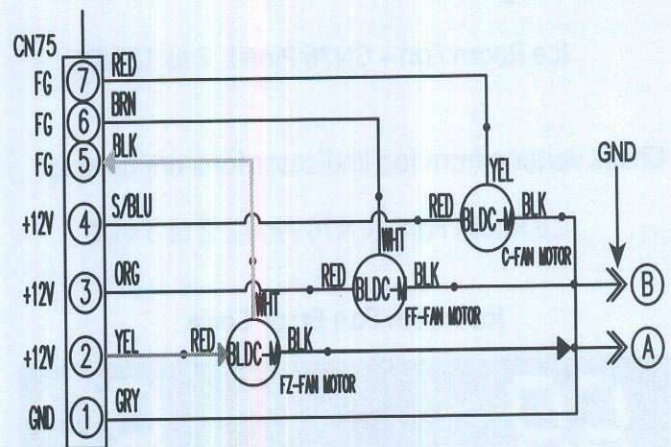
### Freezer Fan Error Code



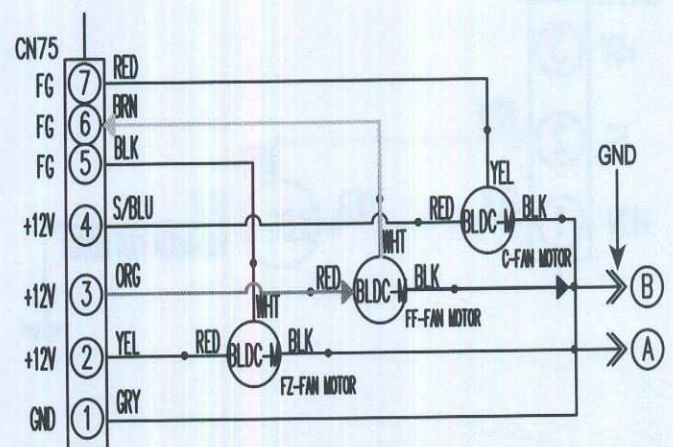
### Condenser Fan Error Code



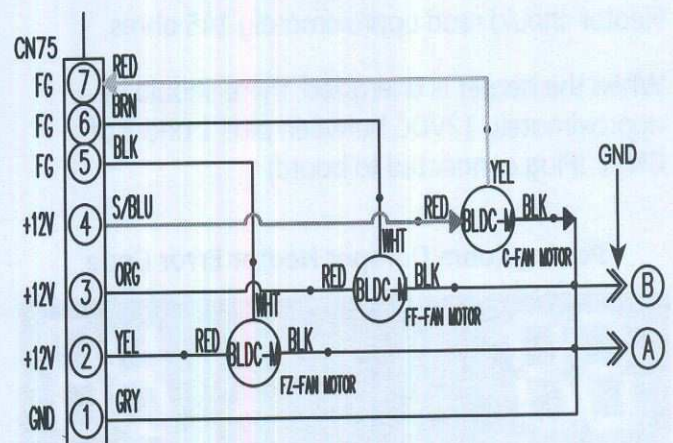
### Freezer Fan Strip Circuit



### Refrigerator Fan Strip Circuit



### Condenser Fan Strip Circuit





## Ice Room Fan Checks

**Note:** All fan voltage checks are from CN10 Pin# 3

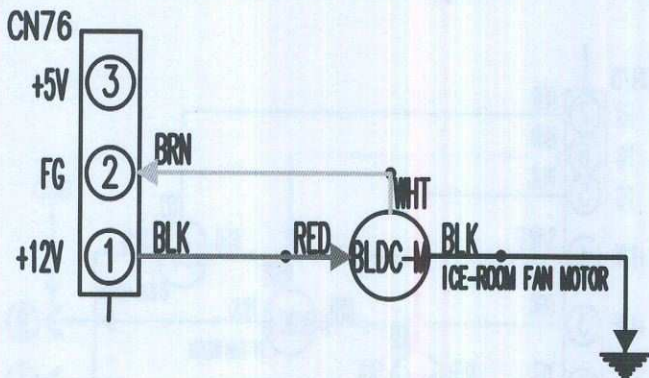
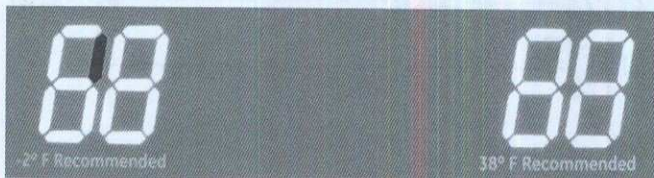
Check voltage to fan:

Ice Room Fan – CN76 Pin#1 7 to 12 VDC

Check voltage from fan (indicates fans are turning):

Ice Room Fan – CN76 Pin#2 2 to 3 VDC

## Ice Room Fan Error Code



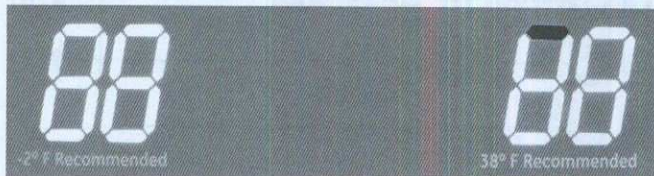
## Pantry Room Damper Heater

With CN91 unplugged from the board, read resistance between pins 1 and 2 of plug.

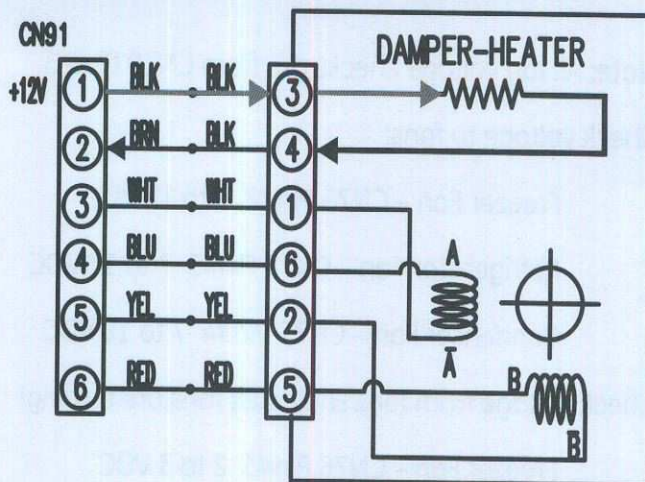
Heater should read approximately 145 ohms.

When the heater is energized, there should be approximately 12VDC between pins 1 and 2 of CN91. (Plug connected to board)

## Pantry Room Damper Heater Error Code



## PANTRY ROOM DAMPER

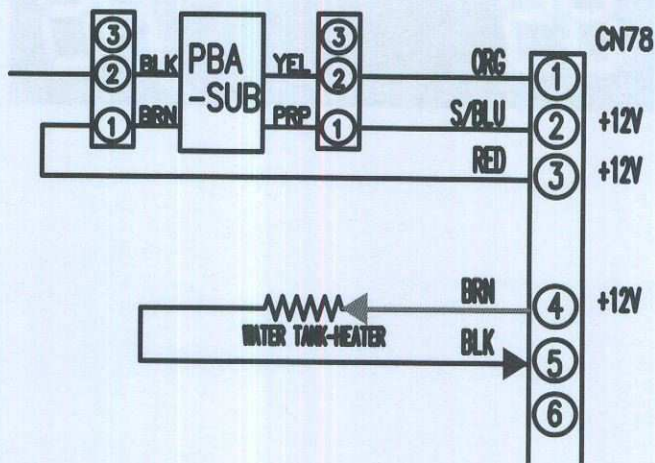
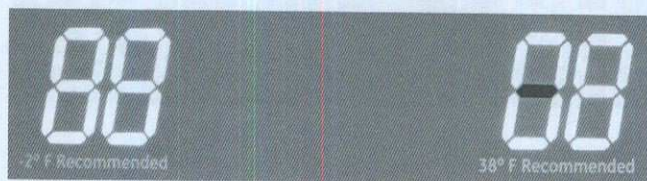


## Water Tank Heater

With CN78 unplugged from the board, read resistance between pins 4 and 5 of plug.

Heater should read approximately 75 ohms. When heater is energized, there should be approximately 12VDC between pins 4 and 5 of CN78. (Plug connected to board)

## Water Tank Heater Error Code





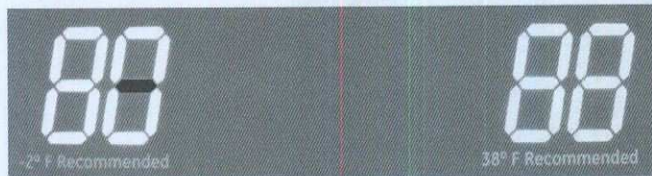
## Defrost Heaters

### Freezer Defrost Heater

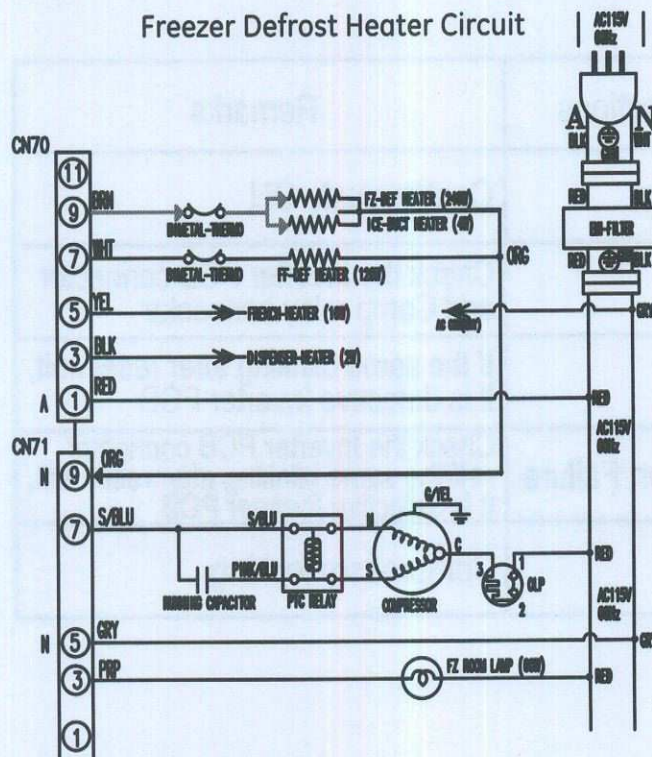
The Freezer Defrost Heater has a resistance value of approximately  $56\ \Omega$  and is in a parallel circuit with the duct heater. (See *Duct Heater*.)

Disconnect CN70 from the board. Check for a combined resistance of  $55\ \Omega$  between pin 9 to CN71 pin 9, when the defrost safety thermostat is closed. A reading of approximately  $3.18K\ \Omega$  will indicate an open freezer defrost heater, wiring, or connection.

### Freezer Defrost Heater Error Code



### Freezer Defrost Heater Circuit



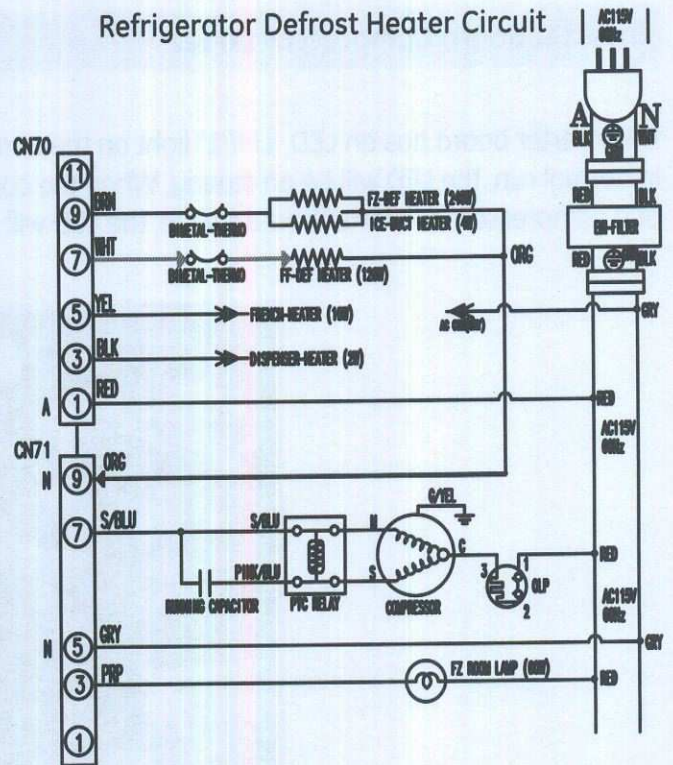
### Refrigerator Defrost Heater

With CN70 unplugged from the board, read resistance between pin 7 to CN71 pin 9. Refrigerator Defrost Heater should read approximately 120 ohms.

### Refrigerator Defrost Heater Error Code



### Refrigerator Defrost Heater Circuit



**Note:** To functionally test the defrost heaters, energize the heaters by using the test mode. (See *Test Mode Operation*.)

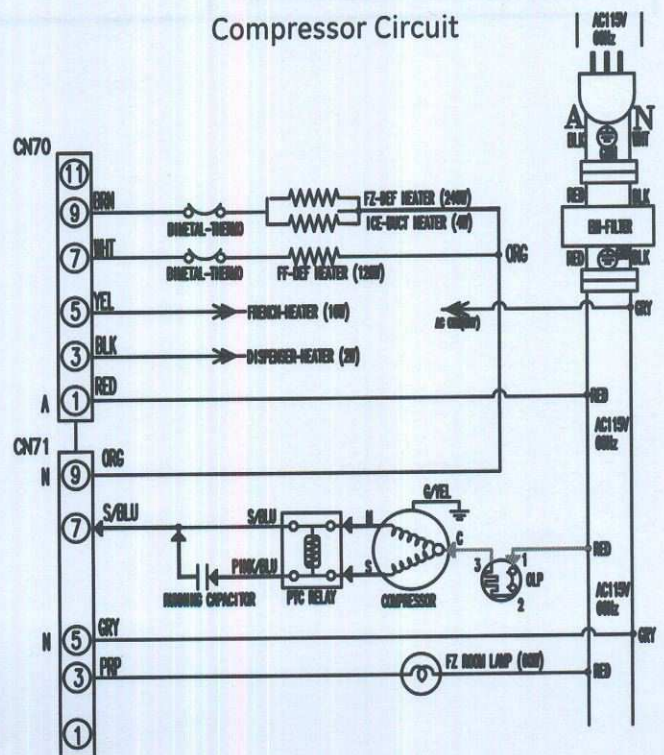
### Compressor

**Note:** There is a 5-minute delay start with a cold cabinet.

The compressor utilizes a "Switched Neutral" circuit. The L1 side is always "hot".

Read between CN1 pin# 1 (L1) on power supply board to CN71 pin# 7. Test will show 0 VAC, if board wants compressor to run.

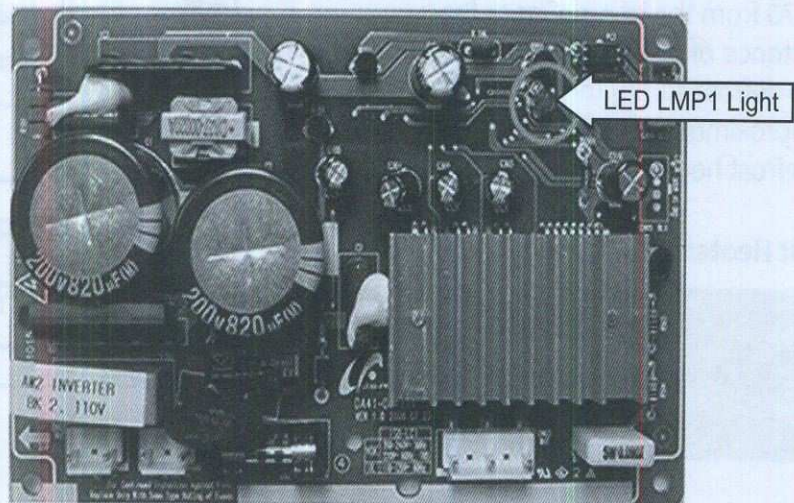
### Compressor Circuit


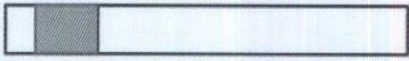







Inverter Board Compressor Codes

The inverter board has an LED "LMP1" light on the board. This LED is the status of the compressor operation. In normal run, the LED will be on steady. When the compressor turns off, this light will be off also. In the event of a compressor or inverter board failure, the LED will blink providing you with the failure code.



LED Blinking Frequency	Protecting Functions	Remarks
	Normal Operation	Continuously ON
	Starting Failure	Check the Inverter PCB connector and Comp relay connector
	SPM Fault	If the same blinking after reset unit, It is defective Inverter PCB
	Detecting Position Failure	Check the Inverter PCB connector →If the same blinking after reset unit, It is defective Inverter PCB
	Motor locked	Compressor locking