



Fast Track Troubleshooting

Publication # APRF323TED Revision Date 5/21/12

Models Covered:

RF323TEDBBC/AA
RF323TEDBSR/AA
RF323TEDBWW/AA
French Door Refrigeration

IMPORTANT SAFETY NOTICE – “For Technicians Only” This service data sheet is intended for use by persons having electrical, electronic, and mechanical experience and knowledge at a level generally considered acceptable in the appliance repair trade. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible, nor assume any liability for injury or damage of any kind arising from the use of this data sheet.

Self Diagnosis: Press both buttons (Energy Saver– Lighting) *simultaneously* (No sound when both buttons are pressed at the same time) 'til the display quits blinking and beeps, 8-12 seconds, then release and read Fault Codes.

This will also cancel the Fault Mode created by self-diagnosis at power up.

Forced Mode: Press both buttons (Energy Saver– Fridge) *simultaneously* until unit beeps and display goes blank, 8-12 seconds. Then press any button to cycle through the mode.



Wait 5 seconds between button pushes

3600 RPM



3600 RPM



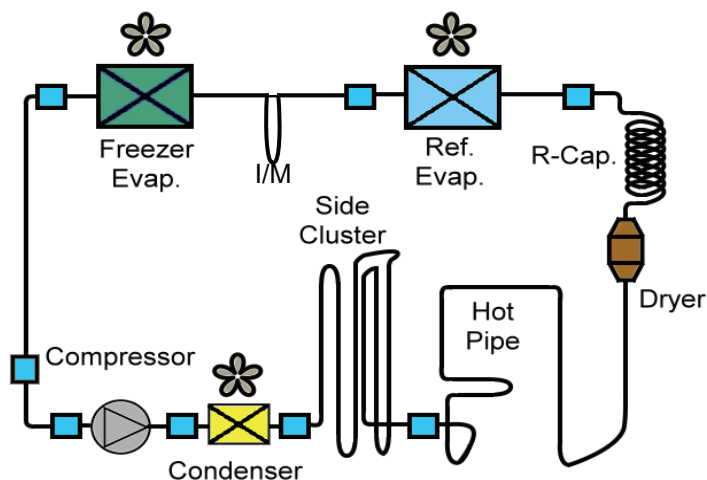
Press any button at the Test Mode to Force Compressor High Speed Run, measure fan and Compressor voltages at main PCB.

Press any button a fourth time to Force Defrost of Fridge & Freezer, measure defrost voltage at main PCB.

Sealed System

Refrigerant Charge: R134a, 5.29 oz.

Compressor → Condenser → Hot Pipe → Back Cluster Pipe → Dryer → Capillary Tube → Refrigerator Evaporator → Pipe Direct Ice → Freezer Evaporator → Suction Pipe → Compressor



Sales Mode: {No Compressor Operation}

Press Energy Saver & Freezer buttons simultaneously for 3 sec (you will hear a “Ding Dong”) to remove or put into Sales Mode. When in the Sales Mode the Display will show “OF- OF”

Removing power will not cancel this mode.

Component Value Chart

Component	Resistance	Wattage	Voltage
Freezer Defrost Heater	62.6Ω	230	120vac
Fridge Defrost Heater	120Ω	120	120vac
French Mullion Heater	2057Ω	7	120vac
Ice Duct Heater	2057Ω	7	120vac
Dispenser Heater	9000Ω	1.6	120vac
Damper	144Ω	1	12vdc
Sensors	2.5kΩ-89kΩ	N/A	1~4.5vdc
Fans	N/A	N/A	7~12vdc

DC FAN MOTORS

Brushless DC Fan motors are used to save energy. The fans operate at two speeds. Fan speed information is read by the Main PCB. If the fan speed exceeds 600 RPM or the speed is too slow, or stopped the fan drive circuit is disabled, After 10 seconds the circuit tries again with 3 seconds of DC voltage. If the fan continues this activity for 5 cycles, 10 seconds off 3 seconds on, the fan drive circuit is disabled for 10 minutes.

TO TEST THE FAN CIRCUIT VOLTAGE.

Power off and back on to check the DC voltage to the motor, wait from 10 to 60 seconds for the fan voltage to kick in, and then check fan voltage, the average reading is 9 VDC. If you get 3 seconds of voltage every 10 seconds for the 5 fan power up cycles, then the Main PCB is good.

NOTE: You may need to put unit in FORCED FREEZE mode to activate the fans/compressor.

If the fan blade is blocked by ice, then defrost and check the motor again, after removing power from the unit.

If the evaporator is ice blocked and thus blocking the air flow, the fan will over RPM and is stopped. Remove ice and check the motor again. If everything is clear around the fan blade then the motor would be at fault. Continuous fan errors will be displayed on the front panel display. **PLEASE NOTE:** The door switches control the evaporator fan motors. Have them closed to test the motors. Delay time 10 – 60 seconds.

Heat Release Ice Makers

Heat Release Ice production Explanation

38 minutes after the water fill is complete, the control board will check the temperature of the eject Thermistor, on the Ice Maker Head, if the Thermistor reads a temperature lower than 18.5 degrees for more than 5 seconds, then the ice production process is completed. The Ice maker will harvest if the ice bucket is not sensed as full. If a Fault Mode is detected with the Ice Maker operation, the Ice Maker stops working for 3 hours. Which means, the Ice Maker checks the operation every 3 hours until it works properly.

Heat Release I/M Test Mode

Press and hold the ICE TEST S/W for at least 1.5sec, the harvest function will start. If the ice maker Thermistor is below 0 degrees the Ice maker heater turns on for about 2 minutes. If the temperature exceeds 0 degrees, Ice maker heater turns on for 30 seconds. After the Ice maker heater turns on for 30 seconds, the heater turns off and then Ice maker harvest motor turns on. The motor will rotate in right direction for about 3 minutes, after this, water supply valve is turned on, then the valve is turned off, the test mode is completed. If the above operation is not carried out within 6 minutes, it will go into a fault mode.

FREEZER TEMPERATURE CONTROL BY THE ICE MAKER

Interior Temperature of the freezer will be set to -14 degrees Fahrenheit until the ice bucket is full. When the ice bucket is full, the freezer will maintain original set temperature. Also, whenever the ice is used, the freezer will again set to -14 degrees Fahrenheit. Selecting "Ice Off" will allow the freezer to be controlled by the set temperature. If water is not hooked up, the freezer will always be at -14 unless "Ice Off" is selected.

Temperature/Resistance/Voltage Chart for Samsung Refrigerators Sensors

Temp.	(Ω)	Volts	Temp.	(Ω)	Volts	Temp.	(Ω)	Volts	Temp.	(Ω)	Volts
-29.2°F	64227	4.326	1.4°F	28021	3.685	32.0°F	13290	2.853	62.6°F	6771	2.019
-27.4°F	61012	4.296	3.2°F	26760	3.64	33.8°F	12749	2.802	64.4°F	6521	1.974
-25.6°F	57977	4.264	5.0°F	25562	3.594	35.6 °F	12233	2.751	66.2°F	6281	1.929
-23.8°F	55112	4.232	6.8°F	24425	3.548	37.4 °F	11741	2.7	68.0°F	6052	1.885
-22.0°F	52406	4.199	8.6°F	23345	3.501	39.2 °F	11271	2.649	69.8°F	5832	1.842
-20.2°F	49848	4.165	10.4°F	22320	3.453	41.0°F	10823	2.599	71.6°F	5621	1.799
-18.4°F	47431	4.129	12.2°F	21345	3.405	42.8°F	10395	2.548	75.2°F	5225	1.716
-16.6°F	45146	4.093	14.0°F	20418	3.356	44.6°F	9986	2.498	77.0°F	5000	1.675
-14.8°F	42984	4.056	15.8°F	19537	3.307	46.4°F	9596	2.449	78.8°F	4861	1.636
-13.0°F	40938	4.018	17.6°F	18698	3.258	48.2°F	9223	2.399	80.6°F	4690	1.596
-11.2°F	39002	3.98	19.4°F	17901	3.208	50.0°F	8867	2.35	86.0°F	4218	1.483
-9.4°F	37169	3.94	21.2°F	17142	3.158	51.8°F	8526	2.301	87.8°F	4072	1.447
-7.6°F	35433	3.899	23.0°F	16419	3.107	53.6°F	8200	2.253	89.6°F	3933	1.412
-5.8°F	33788	3.858	24.8°F	15731	3.057	55.4°F	7888	2.205	91.4°F	3799	1.377
-4.0°F	32230	3.816	26.6°F	15076	3.006	57.2°F	7590	2.158	95.0°F	3547	1.309
-2.2°F	30752	3.773	28.4°F	14452	2.955	59.0°F	7305	2.111	96.8°F	3428	1.277
-0.4°F	29350	3.729	30.2°F	13857	2.904	60.8°F	7032	2.064	100.4°F	3204	1.213

※ R Self-diagnostics check list

LED		Item	Trouble contents	Diagnostic method
F	R			
88	88	FZ-Sensor Error		When measuring the voltage between the Main PCB CN30-"4" → CN76-"1", it should read between 4.5V~1.0V.
88		FF-Sensor Error		When measuring the voltage between the Main PCB CN30-"5" → CN76-"1", it should read between 4.5V~1.0V.
84		FZ-DEF-Sensor Error	Display error : separation of sensor housing part, contact error, disconnection, short circuit.	The voltage of MAIN PCB CN30- "5" → N76-"1": shall be between 4.5V~1.0V
89		FF-DEF-Sensor Error	Display error of detecting temperature of sensor : more than 149°F(+65°C) or less than -58°F(-50°C)	When measuring the voltage between the Main PCB CN30-"8" → CN76-"1", it should read between 4.5V~1.0V.
88		Ambient-Sensor Error		The voltage of MAIN PCB CN78- "8" → CN78-"12": shall be between 4.5V~1.0V
88		PANTRY-Sensor Error		The voltage of MAIN PCB CN78- "9" → CN76-"1": shall be between 4.5V~1.0V
88		Ice Maker(F) Sensor Error	Display error : separation of sensor housing part, contact error, disconnection, short circuit Display error of detecting temperature of sensor: more than 149°F(+65°C) or less than -58°F(-50°C)	The Voltage of MAIN PCB CN90 #8(-)→#9: Shall be between 4.5v ~ 1.0v
83		Humidity-Sensor Error	Separation of sensor housing part, contact error, disconnection, short circuit	When measuring the voltage between the Main PCB CN30-"3" → CN76-"1", it should read between 4.5V~1.0V.
84		Ice Maker(FF) Sensor Error	Display error : separation of sensor housing part, contact error, disconnection, short circuit.	The voltage of MAIN PCB CN90- "1" → CN90-"7": shall be between 4.5V~1.0V
89		Ice Room Sensor Error	Display error of detecting temperature of sensor : more than 149°F(+65°C) or less than -58°F(-50°C)	When measuring the voltage between the Main PCB CN78-"10" → CN78-"12", it should read between 4.5V~1.0V.
28		FZ-FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error, motor wire separation, motor error	The voltage of MAIN PCB CN76- "3"(Yellow) → CN76-"1"(Gray): shall be between 7V~12V
28		FF-FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error, motor wire separation, motor error	The voltage of MAIN PCB CN76- "4"(Orange) → CN76-"1"(Gray): shall be between 7V~12V
28		C-FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error, motor wire separation, motor error	The voltage of MAIN PCB CN76- "5"(Sky-blue) → CN76-"1"(Gray): shall be between 7V~12V
24		FZ-DEF 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 though freezer compartment defrost is heating continuously for more than 80 minutes.	After separating MAIN PCB CN70 wire from PCB, resistance value between CN70 Brown → CN70 Gray shall be 63(230) ohm ± 7%. (Resistance value is varied by input power) 0 ohm : heater short, ∞ ohm : wire/bimetal open (Must power off)
29		FF-DEF Error	Separation of fresh food compartment defrost heater housing part, contact error, disconnection, short circuit or temperature fuse error. Display error : the defrosting does not finish though fresh food compartment defrost is heating continuously for more than 80 minutes.	After separating MAIN PCB CN70 wire from PCB, resistance value between CN70 White → CN70 Gray shall be 120(440) ohm ± 7%. (Resistance value is varied by input power) 0 ohm : heater short, ∞ ohm : wire/bimetal open (Must power off)
28		Ice Maker(FZ) Function Error	When the Freezer Ice Maker error occurs more than 3 times, the error will be displayed.	After replacing the Ice Maker, check if it operates normal.

※ R Self-diagnostics check list

LED		Item	Trouble contents	Diagnostic method
F	R			
20	88	"Flex Zone-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 CN77 wire from PCB, resistance value between Black ↔ Brown wire shall be $135\ \Omega \pm 7\%$. 0 Ω : heater short, ∞ Ω : wire / bimetal Open.
23		FZ-Ice Pipe Heater Error	The error occurs when there is a wire connector slip-out of the Water Supply Pipe Heater, a contact error or a breakage in the wiring.	When measuring the resistance of the Main PCB CN79 Yellow-Pink wires, it should be within $102\ \Omega \pm 7\%$. 0 Ω : heater short, ∞ Ω : Check for Wire Open or Connector Slip-out
39		Ice Maker(FF) Function Error	Display error when open error is detected by Heater : separation of Ice Pipe Heater housing part, contact error, disconnection, short circuit.	After changing the Ice Maker(R), plug the refrigerator power code again, and check the operation.
40		Ice Room-FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error r motor wire separation motor error.	When measuring the voltage between the Main PCB CN76-"5" ↔ CN76-"1", it should read between 7.0V~12V.
43		Panel ↔ Main Communication Error	Display pc - Er in the panel with alarm : MICOM MAIN ↔ PANEL communication error.	Actually, If there is not a problem, it is desirable to replace Main and Panel PCB With the oscilloscope after a cable problem confirming.
68		FF Ice Duct Heater Error	The Error will be displayed when the Ice Duct Heater is detected as being open due to the followings. - Ice Maker Duct Heater Connector Slip-Out, Contact Defect or Wire-Breakage	The resistance between CN79 ORG and CN51 BRN on the Main PCB shall be within $135\ \Omega \pm 7\%$. And, when the resistance reads 0 Ω or ∞ Ω , check the followings. 0 Ω : Heater Short ∞ Ω : Wire-Breakage or Wire Slip-Out
69		FF Ice Bucket Heater Error	The Error will be displayed when the Ice Bucket Heater is detected as being open due to the followings. Ice Bucket Heater Connector Slip-Out, Contact Defect or Wire-Breakage.	The resistance between CN79 ORG and BRN on the Main PCB shall be within $135\ \Omega \pm 7\%$. And, when the resistance reads 0 Ω or ∞ Ω , check the followings. 0 Ω : Heater Short ∞ Ω : Wire-Breakage or Wire Slip-Out
81		Comp starting Failure Error	When the Compressor fails starting	Check if there is a short between compressor terminals. Check IPM Voltage [Under 13.5V]
82		IPM Fanlt Error	When there is a IPM Fault error	Check if there is a short between IPM Pins [#1~33] Check the Compressor and the Cycle
83		Comp Abnormal current Detection Error	When ther is abnormal crrent detected at the Compressor	Check the Compressor connections Check the voltage of Resistance of R308 [0.090 Ω] Check the Compressor and the Cycle
84		Motor Locked Over RPM Error	When there is a Compressor restriction error	Check the voltage of Resistance of R308 [Short/Open] Check the voltage of both of C103 terminals [Unstable Voltage] Check the Compressor and the Cycle
85		Comp under voltage Error	When there is a low voltage error	Check the voltage of Resistance of R513 [Short/Open]
86		Comp over voltage Error	When there is a over voltage error	Check the voltage of Resistance of R501, R505, R509 [Short/Open]

SUPPORT INFORMATION

Training — Plus One<http://my.plus1solutions.net/clientPortals/samsung/>
 Help — GSPN
<http://service.samsungportal.com/>

CN70 - AC LOAD

- ① : FF-DEF-HEATER
- ② : FZ-DEF-HEATER
- ③ : ICE DUCT HEATER
- ④ : COMMON2 LINE(L)
- ⑤ : COMMON1 LINE(N)

CN70_1 - AC LOAD

- ① : Open
- ② : ICE MAKER HEATER(FF)
- ③ : FRENCH-HEATER
- ④ : DISPENSER-HEATER

CN72 - AC LOAD

- ① : ICE WATER
- ② : SOLENOIDE VALVE(FZ)
- ③ : COMMON1 LINE(N)

CN73_1 - AC LOAD

- ① : ICE WATER
- ② : SOLENOIDE VALVE(FF)
- ③ : ICE COVER ROUTE
- ④ : Open
- ⑤ : Open

CN73 - AC LOAD

- ① : CUBE SOLENOIDE VALVE
- ② : AUGER MOTOR
- ③ : WATER SOLENOIDE VALVE

CN78 - LAMP(LED)/Sensor

- ① : FZ LAMP(LED)
- ② : GND
- ③ : FF LAMP(LED)
- ④ : Open
- ⑤ : GND
- ⑥ : Open
- ⑦ : Open
- ⑧ : AMBIENT Sensor
- ⑨ : Open
- ⑩ : ICE ROOM Sensor
- ⑪ : +5V
- ⑫ : GND
- ⑬ : +12V

CN75 - Inverter

- ① : COMP. SIGNAL INPUT
- ② : +5V
- ③ : GND
- ④ : COMP. SIGNAL OUTPUT

CN50

- ① : LED PANEL TX
- ② : LED PANEL RX
- ③ : +12V
- ④ : +5V
- ⑤ : GND
- ⑥ : GND
- ⑦ : ICE Switch
- ⑧ : WATER Switch
- ⑨ : ICE Route Switch 1
- ⑩ : ICE Route Switch 2

CN30 - Sensor

- ① : GND
- ② : +5V
- ③ : Humidity
- ④ : FZ-Sensor
- ⑤ : FZ-DEF-Sensor
- ⑥ : FF-Sensor
- ⑦ : IR-Sensor
- ⑧ : FF-DEF-Sensor
- ⑨ : Pantry Room-Sensor

CN76 - BLDC Motor & door Switch

- ① : GND
- ② : Ice Room-FAN operation signal
- ③ : FZ-FAN operation signal
- ④ : FF-FAN operation signal
- ⑤ : C-FAN operation signal
- ⑥ : Ice Room-FAN signal input volt
- ⑦ : FZ-FAN signal input volt
- ⑧ : FF-FAN signal input volt
- ⑨ : C-FAN signal input volt
- ⑩ : GND
- ⑪ : FZ-Door Switch
- ⑫ : FF-Door Switch
- ⑬ : Open
- ⑭ : Open
- ⑮ : Open

CN51 - PANTRY ROOM Display

- ① : Open
- ② : Ice Water Pipe Heater(FF)
- ③ : Pantry Room LED Driver
- ④ : Open
- ⑤ : Open
- ⑥ : Pantry Room Switch
- ⑦ : ICE MAKER(FZ) MOTOR CCW
- ⑧ : ICE MAKER(FZ) MOTOR CW

CN79

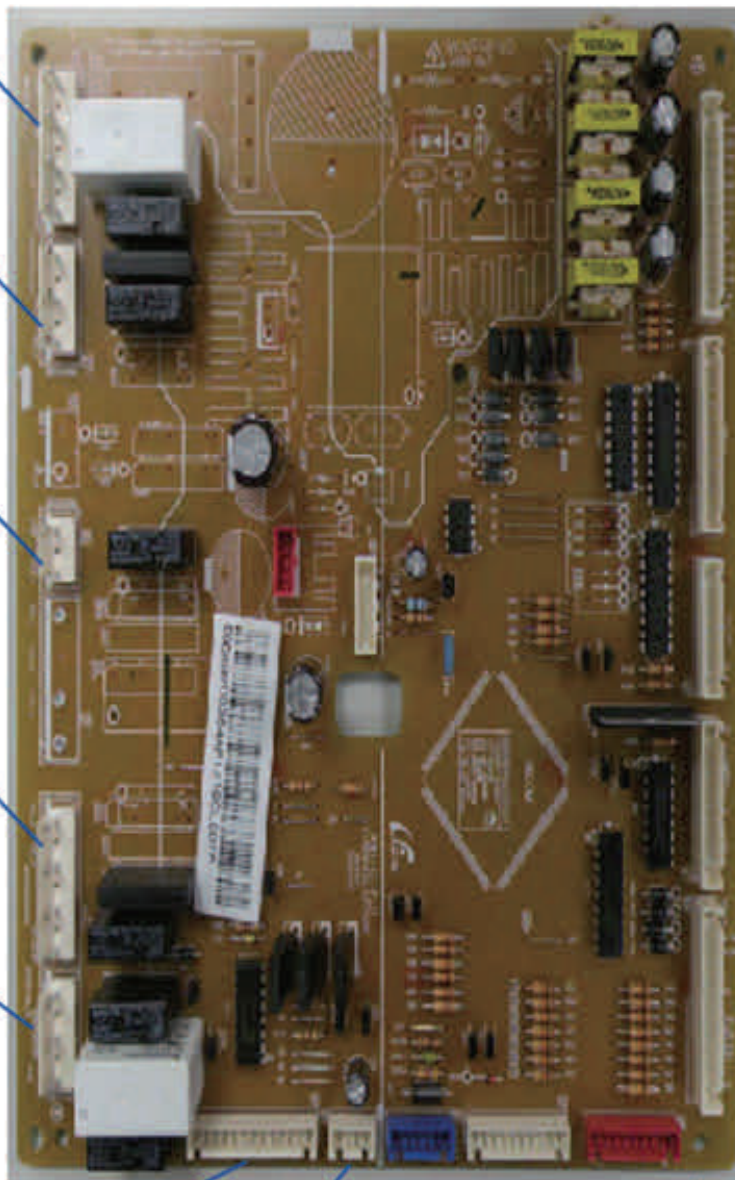
- ① : +5V
- ② : GND
- ③ : Flow Sensor Out
- ④ : Test Switch(FF)
- ⑤ : Ice Water Pipe Heater(FZ)
- ⑥ : Open
- ⑦ : Open
- ⑧ : +12V
- ⑨ : +12V

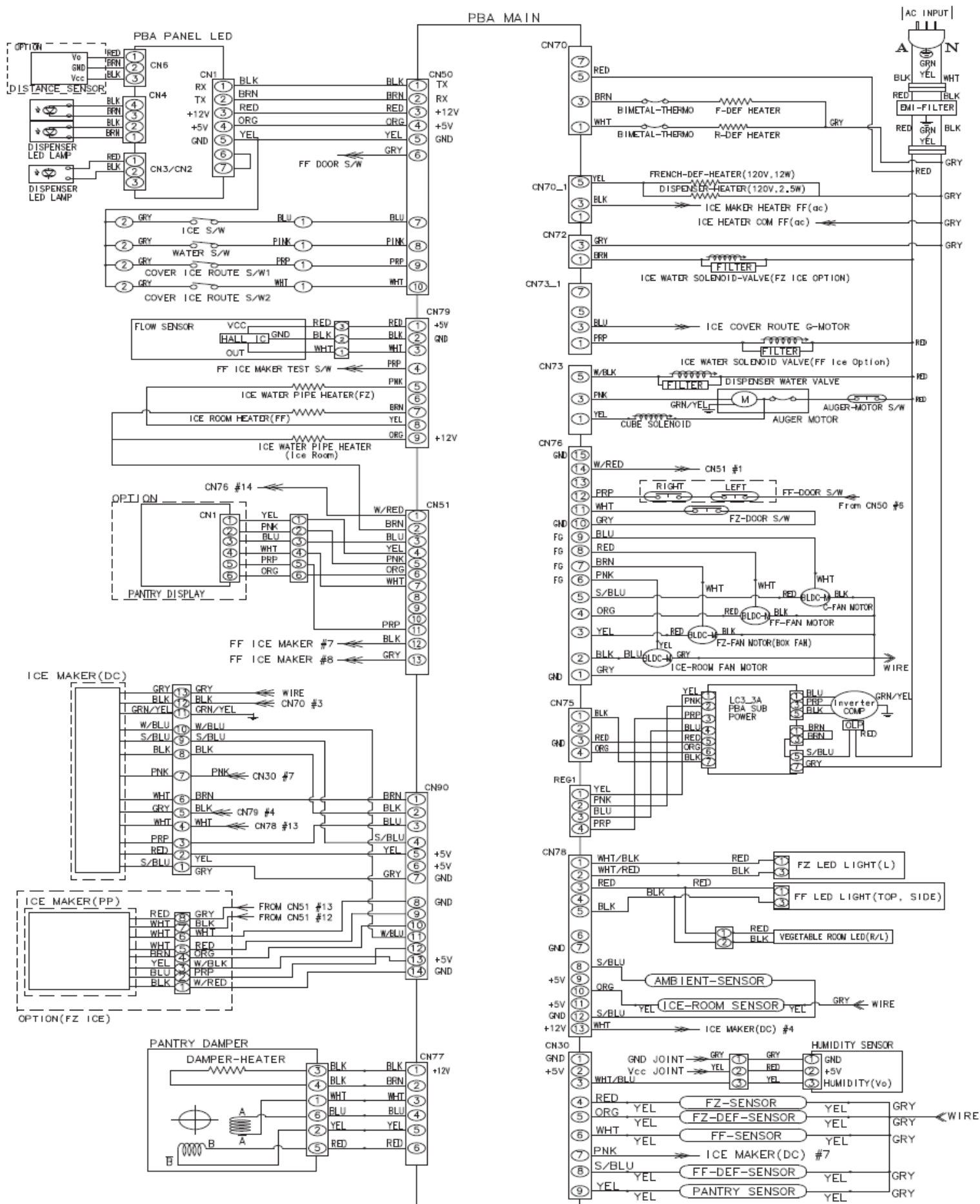
CN77 - Damper & Valve

- ①-② : Damper Heater
- ③-④ : Damper Motor
- ⑤ : +12V
- ⑥-⑦ : Step Valve

CN90 - Ice Maker

- ① : Sensor(FF)
- ② : Motor Driver INB
- ③ : Horizontal Switch
- ④ : Motor Driver Vs2B
- ⑤ : +5V
- ⑥ : Open
- ⑦ : GND
- ⑧ : GND
- ⑨ : Sensor(FZ)
- ⑩ : Test Switch(FZ)
- ⑪ : Motor Driver INA
- ⑫ : Hall IC Output
- ⑬ : +5V
- ⑭ : GND





Inverter Board Troubleshooting

AC 115V

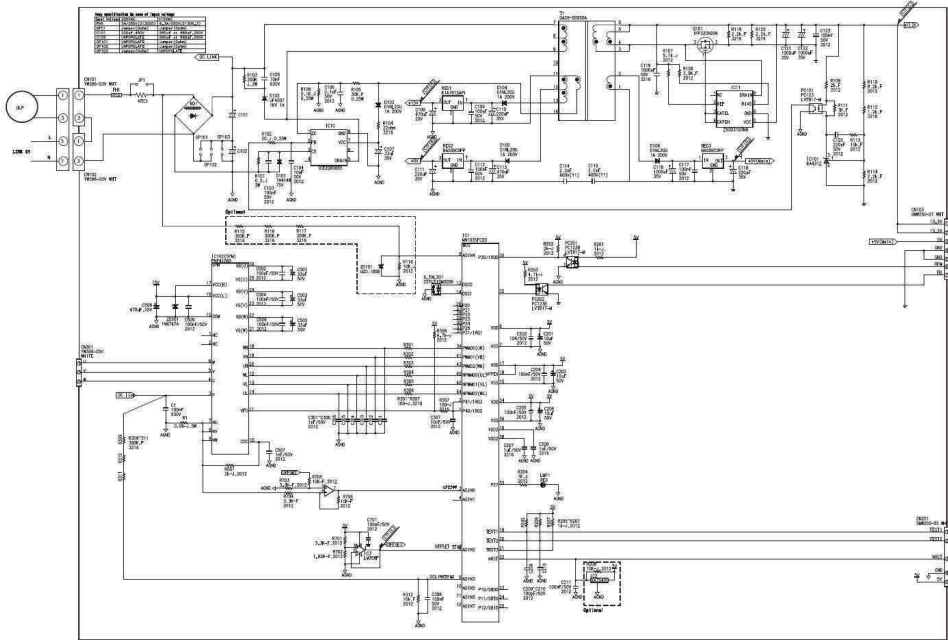
①② 13.2V ③ 5V
④⑤ GND ⑥ RPM ⑦FB



POWER(115V)

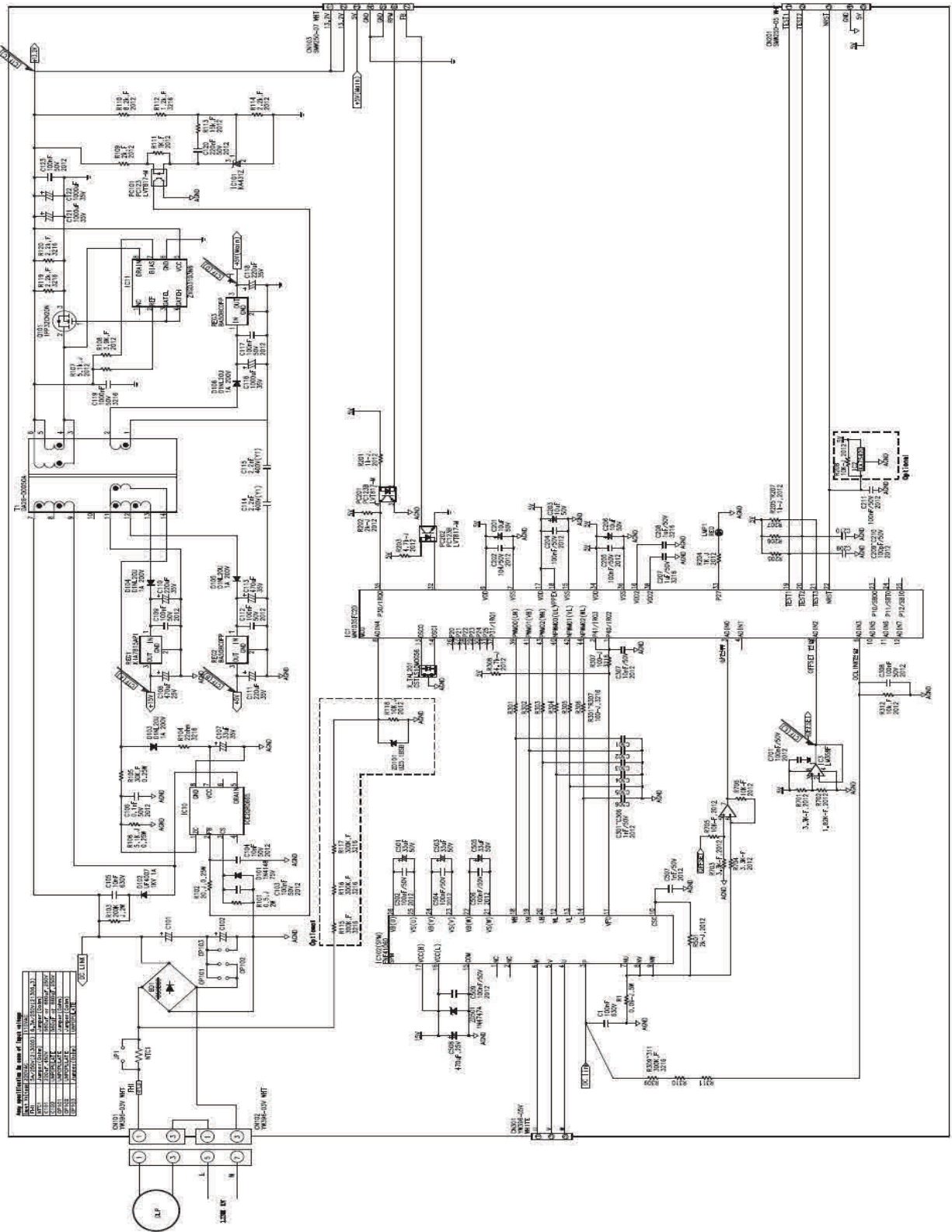
OLP

⑤W ③V ①U



LED Blinking Frequency	Protecting Functions	Remarks
	Normal Operation	N/A
	Starting Failure	1. Short between COMP U.V. and W phase(CN04) 2. Short among IPM Pins(No. #1 ~ 26) 3. Drop the IPM operating Voltage under DC 13.5V 4. Other cases, check the COMP, cycle, etc.
	SPM Fault	1. Open the COMP wire(CN04) 2. Bad condition of R1(ex. Bad soldering.) 3. Other cases, check the COMP, cycle, etc.
	Abnormal Current Detection	1. Operating the locked rotor COMP within 5 second. 2. Operating the COMP under 1000 RPM more than 5 second. 3. Short the shunt resistor(R1) between leads. 4. Occur the huge change of input voltage in a moment 5. Other cases, check the COMP, cycle, etc.
	Motor Locked / Over RPM	1. Drop the input voltage under AC 53V 2. Short resistor R312(DC link resistor)
	Under Voltage	1. Increase the input voltage over AC 155V 2. Short resistor among R309, R310 and R311(DC link resistor)
	Over Voltage	

Inverter Board Troubleshooting



Display Cover Removal/Install

1. Remove a screw under the display cover.



2. Remove the display cover by pulling it up.



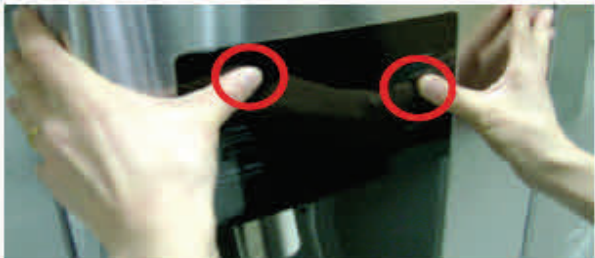
3. Disengage the housing connector of display cover.



4. When assembling Cover-Display, first insert it from leftside and then assemble to rightside.
Otherwise, the hook can be broken.



New “Direct Cool” Ice Maker Removal

How To Do	Descriptive Picture
1. When pressing the Energy-Saver and the Fridge buttons on the Display together for 8 seconds at the same time, it will convert to the Test Mode and the entire Display function will be off.	
2. When pressing any button within 15 seconds after it is shifted to the Test Mode, its function will change in the following order. Manual operation1(FF) Manual operation2(0F→r) → manual defrost of fresh food compartments(rd) → manual defrost of fresh and freezer compartments(fd) → cancel(Display all off). ● Set unit to Fd for 5 minutes. This will allow for easy removal of the ice maker.	
3. While pressing the tab on the top right side, lift up the Ice Bucket and pull it out	
4. Remove the screw from the Wire Housing Cover.	
5. Remove the Wire Housing Cover.	
6. Disconnect the Ice Maker Housing Connector.	

New "Direct Cool" Ice Maker Removal (Con' t.)

7. Remove the screw from the Duct Tray-ice.



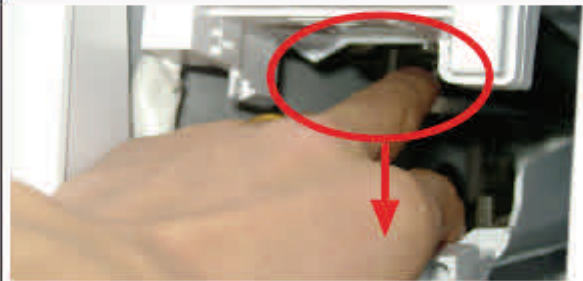
8. With a flat blade screwdriver, push the duct to the right and remove it from the locking tab. (Refer to the image.)



9. With a flat blade screwdriver, pry down on the refrigerant tube to separate it from the bottom of the ice maker. (Refer to the image.)



10. Push down the refrigerant pipe slightly and separate the refrigerant pipe and the Ice Maker Assembly completely.



11. While pressing the Hook, pull out the Ice Maker.



12. While pushing down the Duct-Tray-Ice, pull out the Ice Maker carefully and remove it.
 ※ When removing the ice maker, be careful not to damage the grommets on the tray or the refrigerant tube. (Refer to the dotted parts on the right side photo.)

