



Fast Track Troubleshooting

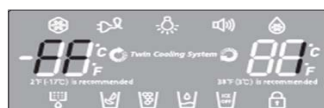
Models Covered:
RFG293HABP/XAA
RFG293HAPN/XAA
RFG293HARS/XAA
RFG293HAWP/XAA
French Door Refrigeration

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.

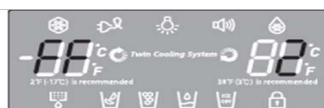
Publication # **tsRFG293HA** Creation Date 08/05/2010

Self Diagnosis: Press the Pwr Freeze—Pwr Cool buttons simultaneously for 8-12 seconds (No sound when both buttons are pressed at the same time) until the display quits blinking. Release the buttons and read Fault Codes. This will also cancel the Fault Mode created by self-diagnosis at power up.

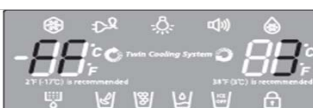
Forced Mode: Press the Pwr Freeze– Fridge buttons simultaneously for 8-12 seconds (No sound when both buttons are pressed at the same time) until the display beeps and goes blank.



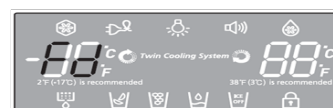
Press Freezer button one time at the Test Mode to Force Compressor High Speed Run, measure fan and Compressor voltages at main PCB



Press Freezer button a second time to Force Mid Speed Run



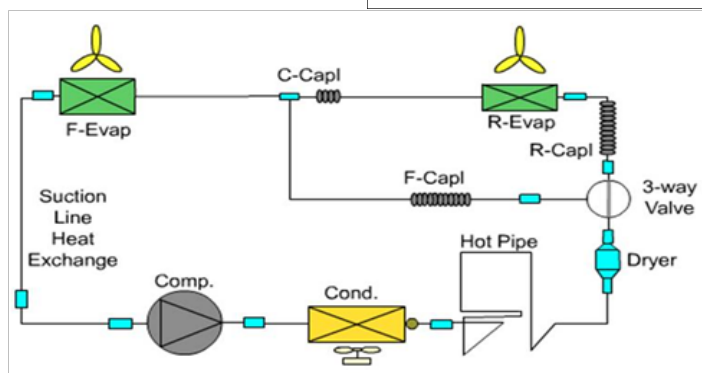
Press Freezer button a third time to Force Low Speed Run



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

Sealed System

Refrigerant Charge
R134a 5.64 oz.



1. Compressor → Sub-condenser → Hot Pipe → Back Cluster Pipe → Dryer → R Capillary Tube → Refrigerator Evaporator → Connected Capillary → Freezer Evaporator → Suction Pipe → Compressor

2. Compressor → Sub-condenser → Hot Pipe → Back Cluster Pipe → Dryer → F Capillary Tube → Freezer Evaporator → Suction Pipe → Compressor

Component Value Chart

Component	Resistance	Wattage	Voltage
Freezer Defrost Heater	63Ω	230	120vac
Fridge Defrost Heater	120Ω	120	120vac
French Mullion Heater	1800Ω	8	120vac
Fill Tube Heater	72Ω	2	12vdc
Sensors	2.5kΩ-89kΩ	N/A	1~4.5vdc
Fans	N/A	N/A	7~12vdc

Installation Note:

2" space required top, back & 3 3/4" space required sides

Sales Mode, No Compressor Operation

Press Power Freeze & Freezer temp 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.

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 will be 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

* Self-diagnosis CHECK LIST

Display		Trouble item	Trouble contents
F	R		
88	88	FZ-Sensor Error	Senser system in FZ compartment errors
82		FF-Sensor Error	Sensor system in FF compartment errors
84		FZ-DEF-Sensor Error	Defrost Sensor system in FZ compartment errors
85		FF-DEF-Sensor Error	Defrost Sensor system in FF compartment errors
86		Ambient-Sensor Error	Snesor external system errors
87		Flex room Error	Sensor system in Pantry Room compartment errors
88		I/M-Sensor Error(R)	Sensor system in ICE maker(R) errors
83		HUMIDITY-Sensor Error	Sensor system in Humidity Sensor error
84		I/M-Sensor Error(FF)	Sensor system in Ice maker(FF) errors
85		ICE ROOM-SENSOR ERROR	Sensor system in Ice Room errors
87		FZ-FAN Error	Fan motor system in FZ compartment errors
88	88	FZ-DEF-HEATER ERROR	DEFROST SYSTEM IN FZ COMPARTMENT ERRORS
83		FF-DEF-HEATER ERROR	DEFROST SYSTEM IN FF COMPARTMENT ERRORS
84		ICE/MAKER FUNCTION ERROR	ICE MAKER IN FZ FUNCTION ERRORS
85		FLEX ZONE DAMPER HEATER ERROR	DAMPER HEATER OPEN/BAD WIRE
86		ICE/MAKER FUNCTION ERROR(FZ)	ICE MAKER IN FZ FUNCTION ERRORS
87		FLEX ZONE DAMPER HEATER ERROR	DAMPER HEATER OPEN/BAD WIRE
83		ICE PIPE HEATER ERROR(FZ)	ICE PIPE HEATER IN FZ COMPARTMENT ERRORS
83		ICE MAKER FUNCTION ERROR(FF)	SENSOR SYSTEM IN HUMIDITY SENSOR ERRORS
80		ICE ROOM-FAN ERROR	FAN MOTOR SYSTEM IN ICE ROOM ERRORS
88		PANEL ↔ MAIN MICOM COMMUNICATION ERROR	PANEL < > MAIN MICOM COMMUNICATION ERRORS
88		ICE DUCT-HEATER ERROR(FF)	HEATER SYSTEM IN ICE DUCT(FF) ERRORS

CN76 F, R, C Fans

3-1 F Fan (Yel-Gry) 7-11vdc
 4-1 R Fan (Org-Gry) 7-11vdc
 5-1 C Fan (S/Blu-Gry) 7-11vdc
 7 F Fan FG(Brn)
 8 R Fan FG(Red)
 9 C Fan FG(Blu)

CN70 All 120vac

1-11 I/M Heater (Blk-Gry)
 3-11 French Heater (Yel-Gry)
 5-(CN71-9) R Defrost (Wht-Org)
 7- (CN71-9) F Defrost/ (Brn-Org)
 9- L1 (Red)
 11- N (Gry)

CN71 All 120vac

5-N (Gry)
 9-Def Htr Common (Org)

CN30 Sensors & Switches

1-5 Fz Dr Sw (Blk-Gry)
 2-(CN50-7) R Dr Sw (Prp-Gry)
 3-(CN76-1) Fz Sensor (Red-Gry) 3.5~4.2vdc
 4-(CN76-1) F Def Sensor (Org-Gry) 2.3~4.2vdc
 6-(CN76-1) R Sensor (Wht-Gry) 2.4~2.8vdc
 7-(CN50-7) Humidity Sensor (Brn-Gry)
 8-(CN76-1) R Def Sensor (S/Blu-Gry) 2~4.2vdc
 9- (CN76-1) Pantry Sensor (W/Blk-Gry) 2.6~2.8vdc

CN50 Display

4-6 +13vdc (Org-Pnk)
 7 R Door Sw Gnd (Gry)

CN79

10-5 Fill Tube Htr (Wht-Bly) 13vdc

CN75 To Comp Inverter Board

2-(CN76-1) (Brn-Gry) 5vdc
 4-3 Comp control (Org-Red) 2.5vdc

CN32 Flow Sensor (I/M)
 3-2 (Red-Blk) 5vdc

CN91

1-2 Damper Htr (Blk-Brn) 12vdc

CN90 Ice Maker

4-8 Sensor I/M eject (Wht-S/Blu) 2.3~3.3vdc
 5-8 Test Sw (Gry-S/Blu) 5vdc
 6 Full Hall IC out (Blu)
 7 Horiz Hall IC out (Prp)

CN77 Stepper Motor

1-(CN76-1) +13vdc (Red-Gry)

CN31 All 120vac

1-4 Ambient Sensor (Yel-Yel)
 2-(CN76-1) 5vdc I/M (Red-Gry)

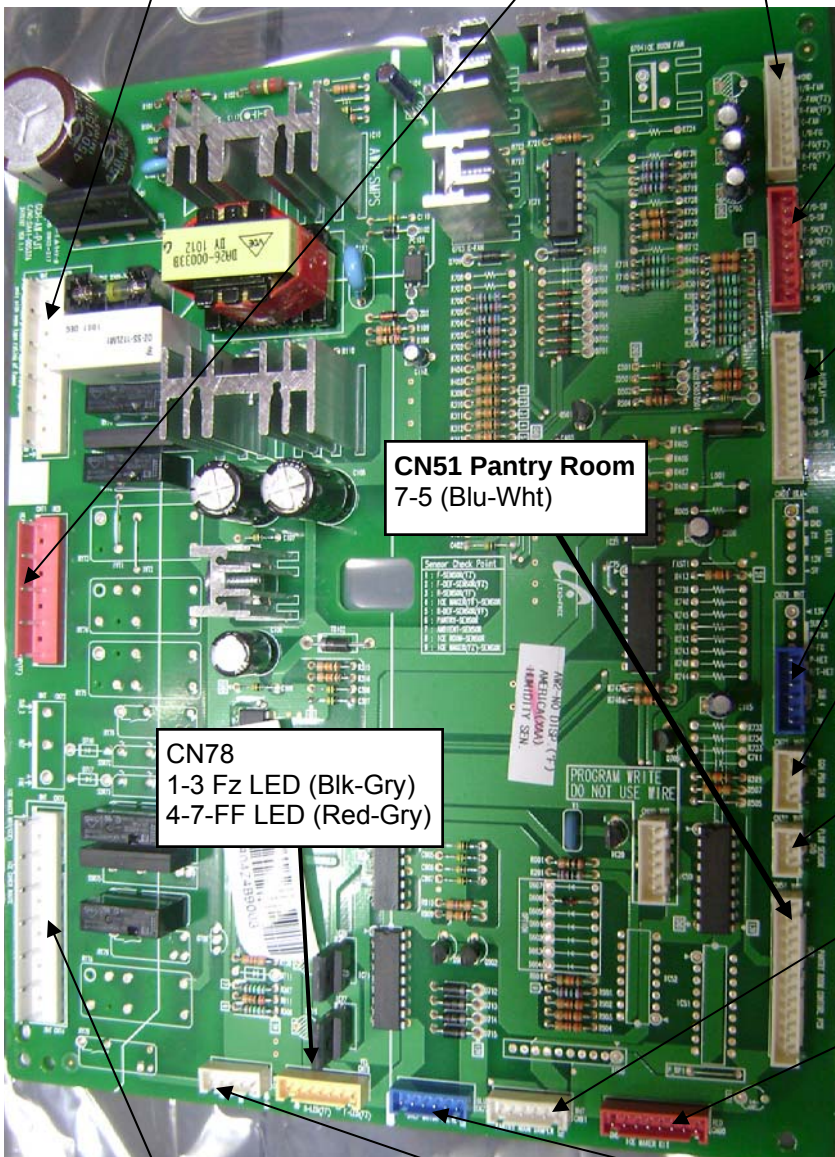
CN73 All 120vac

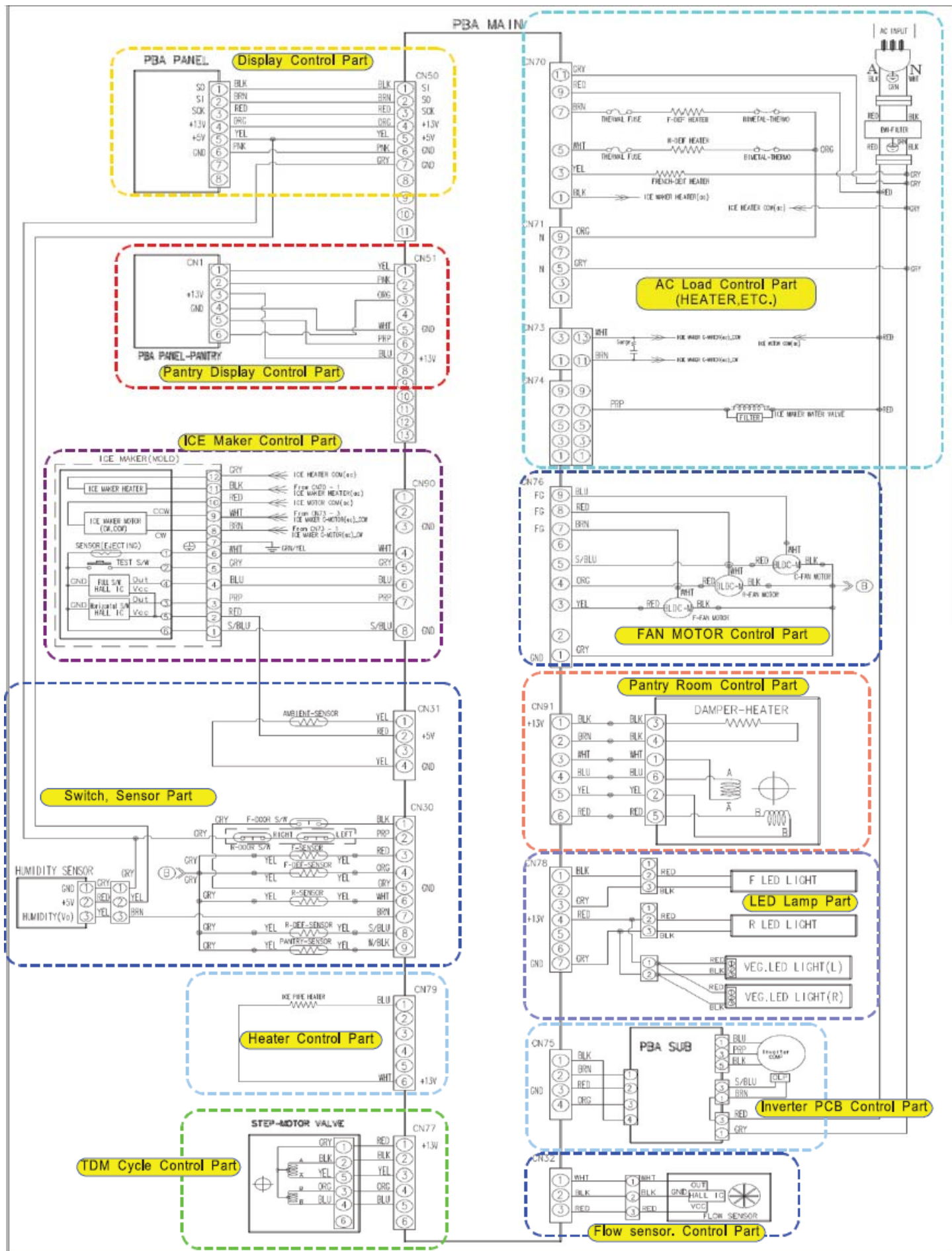
7-(CN70-9) I/M Valve Fridge (Prp-Red)
 11-(CN70-9) I/M Motor CW (R) (Brn-Red)
 13-(CN70-9) I/M Motor CCW (R) (Wht-Red)

CN78

1-3 Fz LED (Blk-Gry)
 4-7-FF LED (Red-Gry)

CN51 Pantry Room
 7-5 (Blu-Wht)

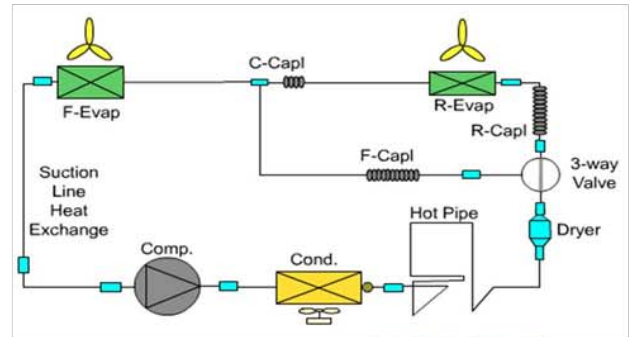




Compressor & System Operation Testing

The Time Divided Multi-cycle (TDM) System (Stepper Valve) is used to switch refrigerant flow. This improves temperature control and energy efficiency.

If it fails in the all evaporator mode, it should work properly, using slightly more energy. If it fails in the Freezer evaporator only mode, there will be a Fridge no cool Force on the Fridge with the "Power Cool" option. Monitor the Fridge evaporator(s) temp by using the Defrost Sensor(s). If the temp doesn't decrease, then suspect the Main PCB is not supplying signal to switch the diverter valve.



TEST BEFORE INTERPRETING LED BLINKING FREQUENCY

Compressor not running

1. Activate Forced Compressor Operation, wait 2 minutes (in case of high head pressure)
2. If compressor doesn't start, check CN75 for 2.5vdc (if not there replace Main PCB)
3. If voltage is OK, remove power, disconnect CN03 (Inverter PCB) and check resistance to the windings. Aproxamety10 ohms. If not correct, inspect wire harness, if OK replace compressor.
4. Disconnect CN02 (SMPS PCB), check resistance to Overload, if open replace overload.



CN75 To Comp Inverter Board
 2- (CN76-1) (Brn-Gry) 5vdc
 4- (CN76-1) Comp control (Org-Gry) 2.5vdc

CN02
 Overload &
 A/C Line
 1 OLP (Brn)
 3 OLP (S/Blu)
 3 L (Red)
 1 N (Gry)

CN04 Compressor Control
 1-(CN76-1) +13vdc (Blk-Gry)
 2-(CN76-1) 5vdc (Brn-Gry)
 4 Comp Signal (Org)

CN03 Compressor Windings
 1 Compressor (Blue)
 3 Compressor (Prp)
 5 Compressor (Wht)



Protection Functions	LED Blinking Frequency	Test	Replace
Starting Failure	●	Check the Inverter PCB & Comp Relay Connectors	Connectors OK,replace Inverter PCB, if same, replace compressor
SPM Fault	● ●	If blinking after reset,	Check System for restriction & refrigerant, if OK replace Inverter, if same, replace compressor
Detecting Position Failure	● ● ●	Check Inverter Connectors,	Connectors measure OK, replace compressor, if same, replace Inverter PCB
Motor Locked	● ● ● ●	Compressor Locking	Compressor
Low Voltage	● ● ● ● ●	Compressor Locking, check input voltage	Replace Inverter PCB, if same, replace Compressor
Over Voltage	● ● ● ● ● ●	Compressor Locking, check input voltage	Replace Inverter PCB, if same, replace Compressor