



Fast Track Troubleshooting

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Models Covered:
RFG298HDSR/XAA
RFG298HDPN/XAA
RFG298HDWP/XAA
RFG298HDBP/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.

Self Diagnosis: Press Energy Saver and Lighting buttons *simultaneously* for 8-12 seconds, (No sound when both buttons are pressed at the same time) until the display quits blinking and beeps, then release the buttons and read Fault Codes. This will also cancel the Fault Mode created by self-diagnosis at power up.

Forced Mode: Press Energy Saver and 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. Release buttons.

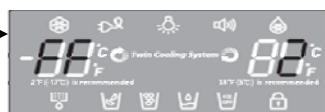
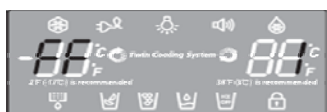
Wait 5 seconds between button pushes



3600RPM

2450RPM

2200RPM

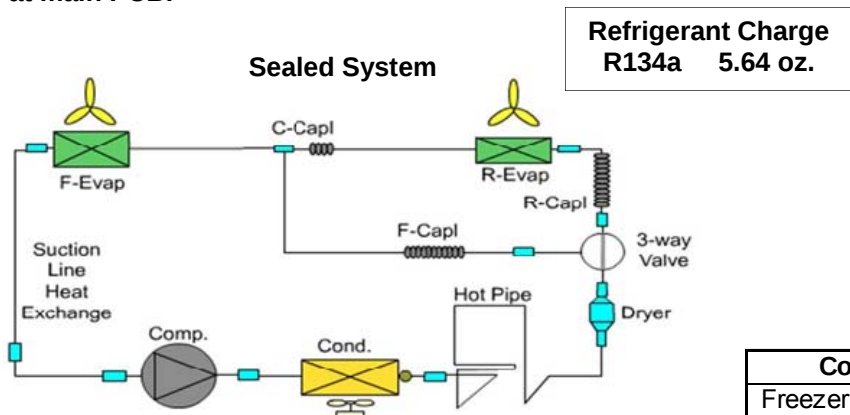


Press Freezer button one time at the Forced Mode to Force Compressor High Speed Run. Measure fan and compressor voltages at main PCB.

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.



Sales Mode, No Compressor Operation
Press Energy Saver and Freezer buttons *simultaneously* for 3 seconds (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	60Ω	240	120vac
Fridge Defrost Heater	120Ω	120	120vac
French Mullion Heater	1800Ω	8	120vac
Ice Duct Heater	3600Ω	4	120vac
Dispenser Heater	7200Ω	2	120vac
Water Tank Heater	72Ω	2	12vdc
Sensors	2.5k-89kΩ	N/A	1~4.5vdc
Fans	N/A	N/A	7~12vdc

SUPPORT INFORMATION

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

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 it 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.

Sensors

Defrost – The sensor voltage tells the Main PCB to turn off the Defrost Heater At 50° in Freezer, 63° in Fridge

Compartment Temp – The sensor controls fan/compressor on/off to maintain temp

Ice Production – harvests when the I/M sensor reads 1.5 degrees for 5 minutes, Flex Tray Only.

If the door is opened during that 5 minutes harvest is delayed.

Ambient Sensor

Fan Speeds – Below 60 degrees condenser fan is off

Defrost Timing – The warmer the room the more often the defrost

How to Check Sensor Resistances Accurately

Make ice slurry. To do this, fill a cup with ice (preferably crushed), then add water and a teaspoon of salt to make a slush. Mix thoroughly and allow to sit for 2 to 3 minutes. This will give you a 32°F reference. Now, lower the sensor into the mixture and leave for about 1 minute, then check the resistance. It should be very close to 13,300 ohms. Before reinstalling the sensor, be sure to rinse it with fresh water and dry it.

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

	Defrost Cycle Timing	
<u>First Defrost Cycle, Both Fridge & Freezer</u>	Defrost Cycle Fridge only	Defrost Cycle Fridge & Freezer
13 hrs, Pause Time 10 minutes	6~11 hrs (varies according to conditions)	12~22 hrs (varies according to conditions)

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.

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.

FLEX TRAY Ice Makers

FLEX TRAY Ice Makers

When the initial power is applied, the ice tray will stand by for 2 hours. After the 2-hour standby time, the Ice Maker Sensor will check the temperature, when it is lower than 1.5°F for more than 5 minutes, it will do a harvest, with or without ice in the tray, then fill with water. 58 minutes after water is supplied to the Ice Tray, the Ice Maker Sensor temperature will be checked. When the Ice Maker Sensor maintains lower than 1.5°F for 5 minutes, it completes the harvest (if the ice bin is not sensed as full).

Thermistor senses temperature to determine water fill on newer units

Filling the tray

After the water fill is completed, the ice maker sensor will evaluate the water volume one and a half minutes later. When it detects no or low water level, it will add more water. First supply time will be 1.5 sec, next one will be 1 sec and the last will be 2 sec.

Shattered Ice – Flex Tray

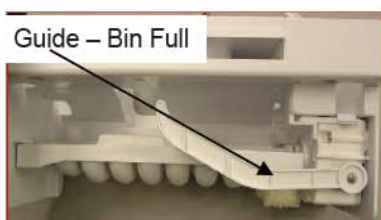
When all ice shatters, it's because of a bad tray or ice cube temp that is too cold (lower than -5 degrees). In some areas, there are water issues that can also cause shattered cubes. The temp in the freezer should not have any effect on this issue, as long as it's below 1.5 degrees F, as a properly installed sensor will not read the freezer temp, only the water/ice temp.

Check the Ice tray for defects in the plastic. Ice that is too cold will shatter during harvest. This can be from the (1) sensor not reading the correct temp (2) or the sensor not mounted correctly (3). By programming the icemaker offset value to a lower number (4), the board not understanding the reading.

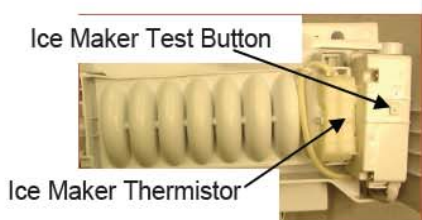
To check the sensor, you must check the tray temp (not air temp) and compare it to the sensor reading. The sensor should read 3.7 volts at the main board connector when the cube temperature is 1 degree. After the fill, the sensor will read water temp 1.5 to 2.2 volts.

To clear offsets, put unit into Diagnostics mode.

Please note, some shattering is normal for a flex tray icemaker.



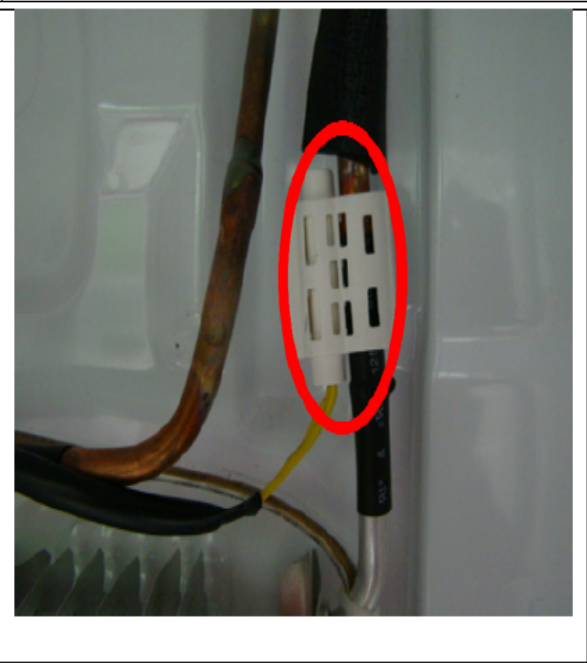
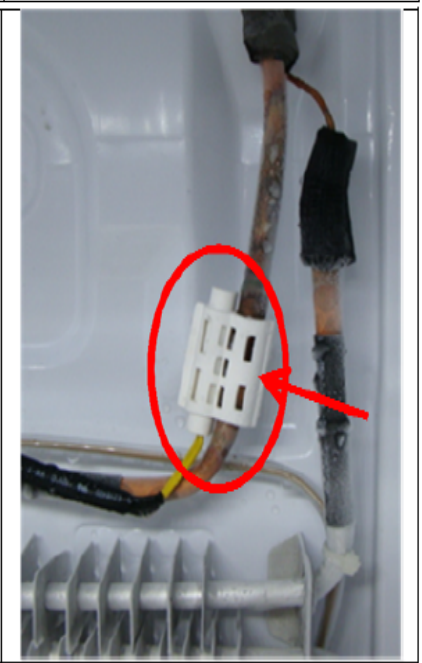
Guide – Bin Full



Ice Maker Test Button

Ice Maker Thermistor

Refrigerator Evaporator Ice Build-up

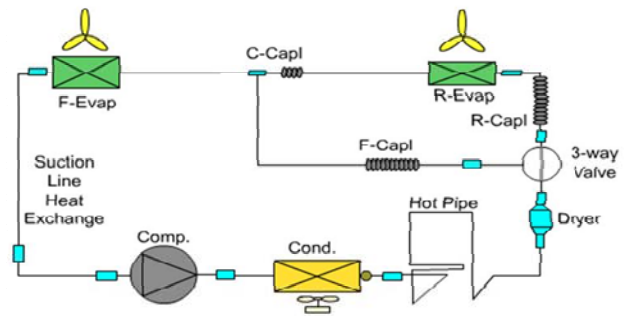
Symptom:	Ice buildup on the Refrigerator Evaporator			
Solution:				
Step 1 of 5	Defrost the unit			
Step 2 of 5	Verify the refrigerator defrost sensor is not open or shorted, also measure the voltage at the main PCB. The voltage should be between 2.3V and 2.8V (assuming room temperature).			
Step 3 of 5	Move the defrost sensor	Original location: inlet line to the evaporator	New location: outlet side of the evaporator	
	from the inlet side of the refrigerator evaporator to the outlet side.			
Step 4 of 5	Make sure the wiring is routed properly and the sensor is firmly adhered to the evaporator line.			
Step 5 of 5	If the evaporator cover has been cracked or split by the ice buildup the cover must be replaced. If it is not damaged, make sure to firmly seat the cover against the rear wall with no gaps.			

LED		Item	LED		Item
F	R		F	R	
88	88	FZ-Sensor Error	88	88	FF-DEF Error
88		FF-Sensor Error			
84		FZ-DEF-Sensor Error			
88		FF-DEF-Sensor Error	88		Ice Maker(FF) Function Error
88		Ambient-Sensor Error			
88		PANTRY-Sensor Error			
88		Humidity-Sensor Error	88		Ice Room- FAN Error
84		Ice Maker(FF) Sensor Error			
88		Ice Room Sensor Error			
88			88		Panel ↔ Main Communication Error
88		FZ-FAN Error			
88		FF-FAN Error			
88		C-FAN Error	88		Comp starting Failure
84		FZ-DEF Error			
	88			Comp Abnormal current Detection	
			84		Motor Locked Over RPM
88		Comp under voltage			
	88			Comp over voltage	

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 falls in the all evaporator mode, it should work properly, using slightly more energy. If it falls 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.



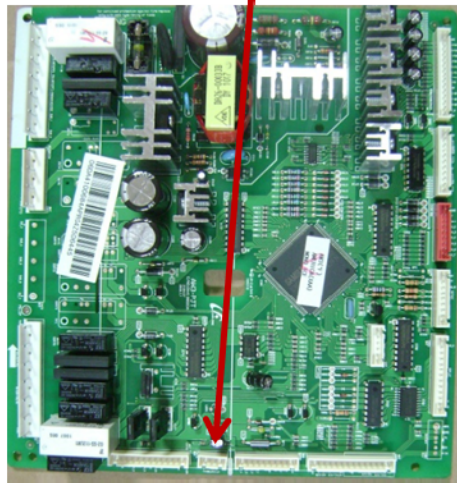
TEST BEFORE INTERPRETING LED BLINKING FREQUENCY

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. Aproximately 10 ohms. If not correct, inspect wire harness. If OK replace compressor.
4. Disconnect CN02 (SMPS PCB), check resistance to Overload. If open replace overload.



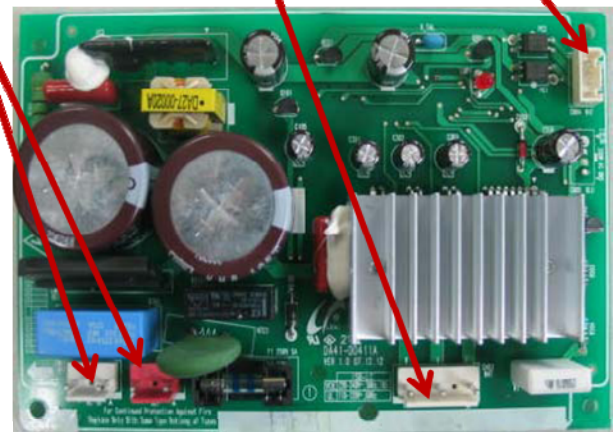
CN75 To Comp Inverter Board
2- (CN76-1) (Brn-Gry) 5vdc
4- (CN76-1) Comp control (Org-Gry) 2.5vdc



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

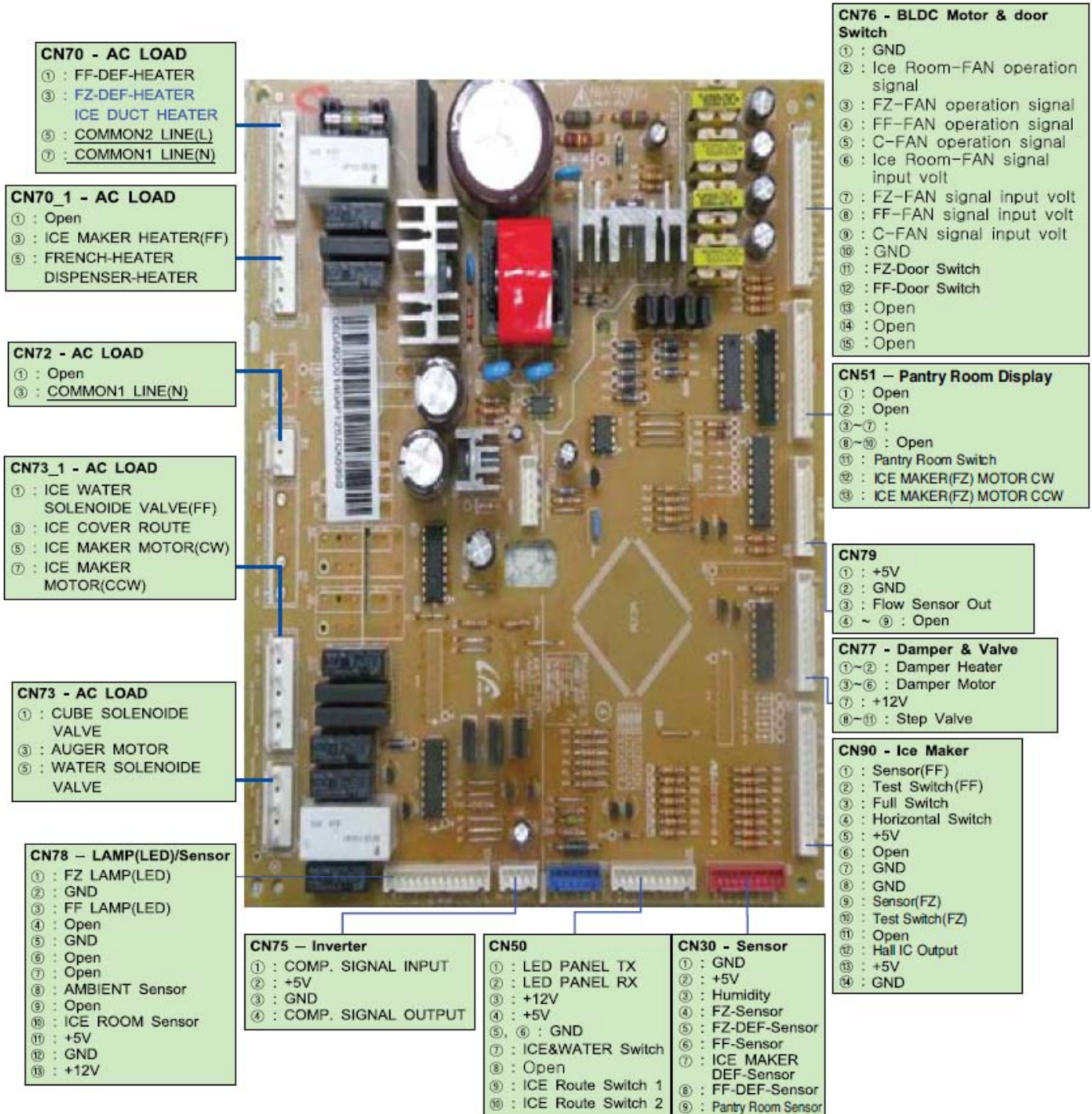
CN04 Compressor Control
1-(CN76-1) +13vdc (Blk-Gry)
2-(CN76-1) 5vdc (Brn-Gry)
4 Comp Signal (Org)

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

RFG298HD**/XAA



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