



Fast Track Trouble shooting

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.

Model: RF23HC



Support Information:

HELP: 1-888-751-4086 (Tech Sup. – ASC/SSD)

1-866-894-0637 (Tech Sup. - FE/ME)

GSPN: <http://gspn3.samsungcsportal.com/main.jsp>

PLUS ONE: <http://my.plus1solutions.net/clientPortals/samsung>

Production Date: 12/31/14 JW

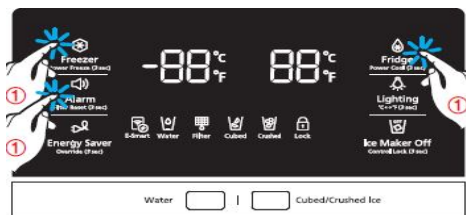
Bulletins

ASC20140703001

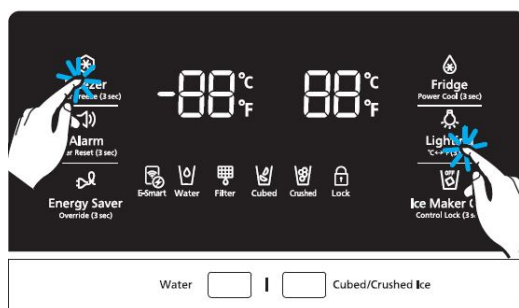
ASC20141022001

ASC20140818002

Demo Mode

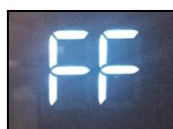


Force Mode



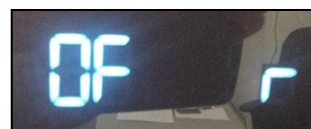
Freezer + Lighting Keys pressed together for 8 seconds

Display will go blank press any key to advance



Meaning: **Force Freeze**

☐ Compressor and Fans will Operate during this mode



Meaning: **Refrigerator Off (Off Ref)**

☐ Units with Step Valves when entering this mode the Fresh Food section will be Switched off.

If no step valve this feature may operate the same as FF. On some units the Fans will be turned off but condenser fan Will still operate.



Meaning: **Refrigerator Defrost**

☐ The Refrigerator section will be put into defrost.



Meaning: **Full Defrost**

☐ The heater in all sections will be turned on and all sections will enter defrost

① If Freezer Key + Fridge Key + Alarm Key are pressed for 5 seconds, Cooling Off mode will be started.

1) If Freezer Key + Fridge Key + Alarm Key are pressed simultaneously for 5 seconds during normal operation, Cooling Off mode will be started with buzzer sound(ding-dong).

2) If above Freezer Key + Fridge Key + Alarm Key are pressed one more time, Cooling Off mode will be canceled.

3) If Cooling Off mode is selected, blinks "O-FF" on the temperature setting display of the panel and it indicates the refrigerator has entered the Cooling Off mode.

4) During Cooling Off mode, if fresh food and freezer compartments sensors are higher than 149°F (65°C) Cooling Off mode will be canceled automatically and freezing operation will be returned.

(There is no buzzer sound when the Cooling Off mode is canceled by the temperature)

5) Operation contents of Cooling Off mode

- Display, Fan motor and etc operate normally, not to operate compressor, French Heater and Door Open Alarm.

- Defrost is not operated. (including french heater)

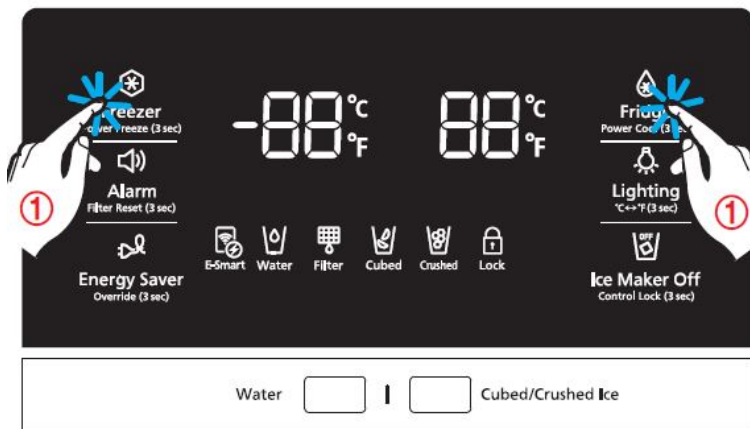
- Display function of the initial real temperature is finished.

- Under the condition of Cooling Off mode, Cooling Off mode will be operated when Power On after Power OFF.

During the simultaneous defrosting of fresh food and freezer compartments, if the display panel change to the test mode and test button is pressed one more time, defrosting of fresh food and freezer compartments will be canceled and the unit will return to the normal operation.

Or, all test functions will be canceled by turning main power ON and OFF.

Diagnostics Mode



② If Freezer Key + Fridge Key are pressed simultaneously for 8 seconds, the self-diagnosis function will be selected.

- 2-1) If Freezer Key + Fridge Key are pressed simultaneously for 6 seconds during normal operation, the temperature setting display will operate for 2 seconds (ON/OFF 0.5sec each).
If Freezer Key + Fridge Key are pressed simultaneously for 8 seconds (including above 2 seconds), self-diagnostic function will be selected.
- 2-2) At this moment, self-diagnostic function will be returned with buzzer sound 'ding-dong'.
If there is an error, display of error will be operated for 60 seconds and then return to normal condition whether problem is corrected or not.
(Refer to self-diagnosis CHECK LIST)
- 2-3) Input by button is not accepted during self-diagnostic function.

Fault Codes

LED		Item	Trouble contents	Diagnostic method
F	R			
88		FZ-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)	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-"6" ↔ CN76-"1", it should read between 4.6V~1.0V.
88		FZ-DEF-Sensor Error		The voltage of MAIN PCB CN30- "5" ↔ N76-"1": shall be between 4.5V~1.0V
88		FF-DEF-Sensor Error		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 CN30- "9" ↔ CN76-"1": shall be between 4.5V~1.0V
88		Ice Maker(FZ) 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
88		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.
88	88	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
88		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.

Fault Codes

F

R

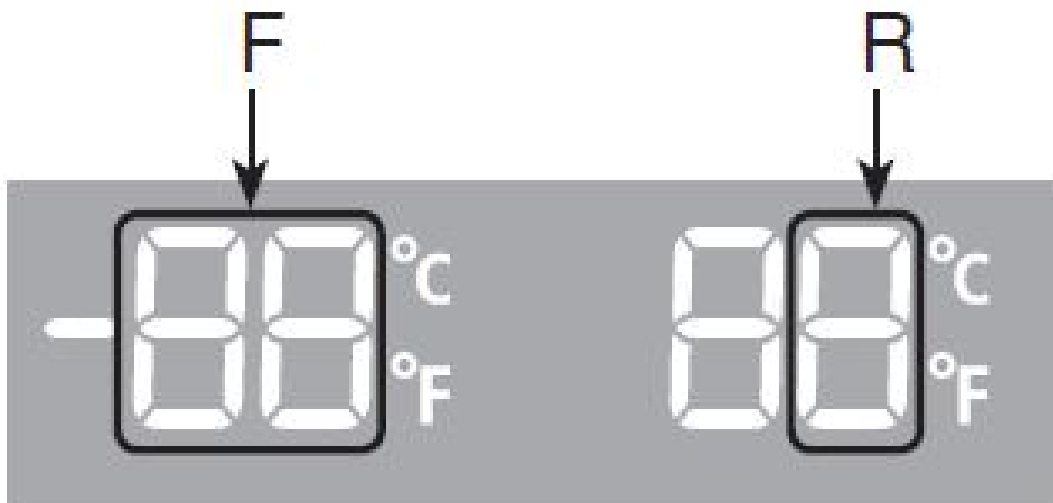
88	FZ-FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error, motor wire separation, motor error	The voltage of MAIN PCB CN76- "3"(Yellow) ↔ CN76-"1"(Gray): shall be between 7V~12V
88	FF-FAN Error	Display error during operation of applicable fan motor : 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
88	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
88	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 ↔ CN72 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)
88	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)
88	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.
88	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 CN77 wire from PCB, resistance value between Black ↔ Brown wire shall be 135 ohm± 7%. 0 ohm : heater short, ∞ Ohm : wire / bimetal Open.
88	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 102Ω ±7%. 0Ω : heater short, ∞ Ω : Check for Wire Open or Connector Slip-out
88	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.
88	Ice Room-FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error, motor wire separation, motor error.	When measuring the voltage between the Main PCB CN76-"2" ↔ CN76-"1", it should read between 7.0V~12V.
88	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.
88	Main - Inverter Communication Error	Display 44Er in the panel : Inverter MICOM ↔ Main MICOM communication error.	Actually, If there is not a problem, it is desirable to replace Main and Inverter PCB With the oscilloscope after a cable problem confirming.
88	I/O Expander Communication Error	Display 46Er in the panel : I/O Expander↔ Main MICOM communication error.	It is desirable to replace Main PCB.
88	FF Ice Pipe Heater Error	The Error will be displayed when the FF Ice Pipe Heater is detected as being open due to the followings. - Ice Maker Pipe Heater Connector Slip-Out, Contact Defect or Wire-Breakage	The resistance between CN79 ORG and CN51 BRN on the Main PCB shall be within 135Ω ± 7%. And, when the resistance reads 0Ω or ∞ Ω, check the followings. 0Ω : Heater Short ∞ Ω : Wire-Breakage or Wire Slip-Out

Fault Codes

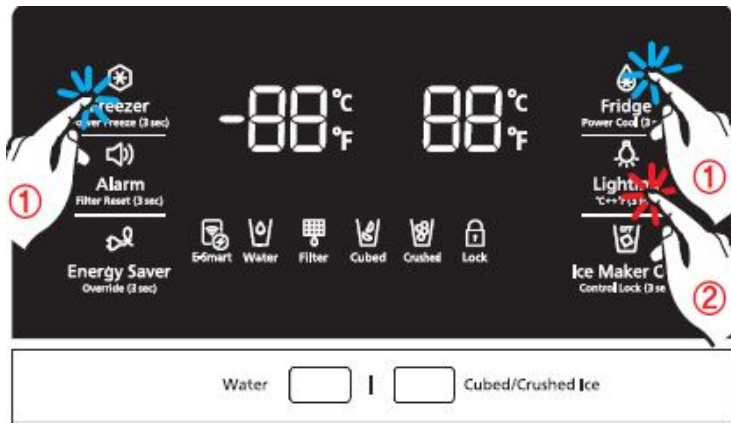
F

R

FF	FF	FF Ice Pipe Heater Error	The Error will be displayed when the FF Ice Pipe Heater is detected as being open due to the followings. – Ice Maker Pipe 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 0Ω or $\infty\Omega$, check the followings. 0Ω : Heater Short $\infty\Omega$: Wire-Breakage or Wire Slip-Out
RR		FF Ice Room Heater Error	The Error will be displayed when the Ice Room Heater is detected as being open due to the followings. Ice Room 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 0Ω or $\infty\Omega$, check the followings. 0Ω : Heater Short $\infty\Omega$: Wire-Breakage or Wire Slip-Out
EE		Comp starting Failure Error	When the Compressor fails starting	Check if there is a short between compressor terminals. Check IPM Voltage [Under 13.5V]
EE		IPM FanIt 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
EE		Comp Abnormal current Detection Error	When ther is abnormal crрут detected at the Compressor	Check the Compressor connections Check the voltage of Resistance of R308 [0.090hm] Check the Compressor and the Cycle
EE		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
EE		Comp under voltage Error	When there is a low voltage error	Check the voltage of Resistance of R513 [Short/Open]
EE		Comp over voltage Error	When there is a over voltage error	Check the voltage of Resistance of R501, R505, R509 [Short/Open]

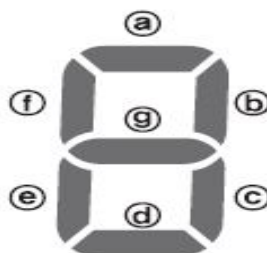


Load Mode



- ① If Freezer Key + Fridge Key are pressed simultaneously for 6 seconds, ALL ON/OFF will blink with 0.5 interval for 4 seconds.
- ② If take the finger off from above keys and press Lighting, load condition mode will be started.

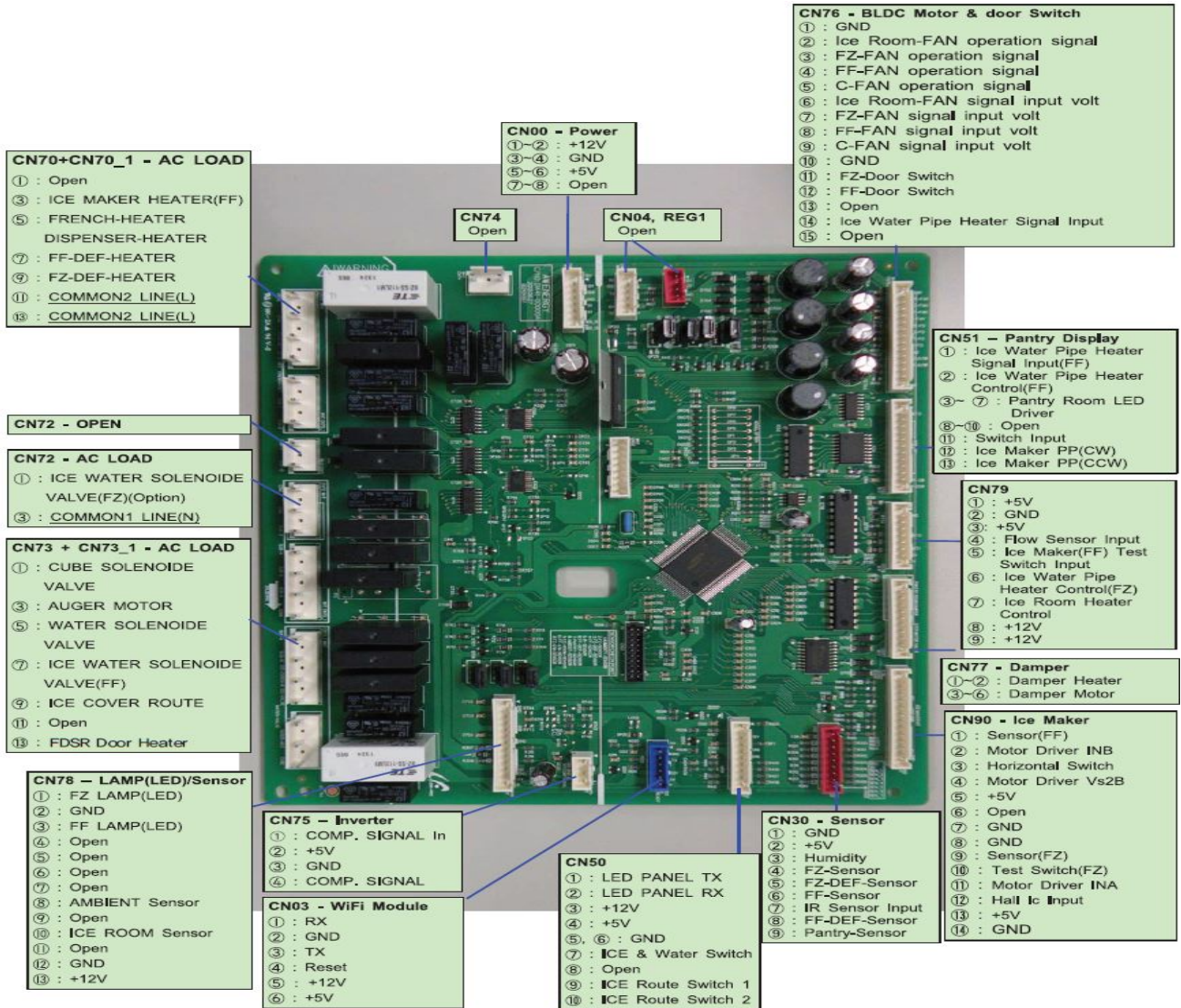
- 1) If Freezer Key + Fridge Key are pressed simultaneously for 6 seconds during normal operation, the temperature setting display of fresh food and freezer compartments will blink ALL ON/OFF with 0.5 for 4 seconds.
- 2) At this moment, If Lighting Key after Freezer Key + Fridge Key is pressed, load condition display mode will be returned with alarm. At LED all on state, only load condition display will blink ON/OFF with 0.5 seconds interval.
- 3) Load condition display mode shows the load that micom signal is outputting. However, It means that micom signal is outputting, it does not mean whether load is operating or not. That is to say that though load operation is displayed, load could not be operated by actual load error or PCB relay error etc. (This function would be applied at A/S.)
- 4) Load condition display function will maintain for 30 seconds and then normal condition will be returned automatically.
- 5) Load condition display is as below. Only the load control LED will blink with 0.5 interval in "Display LED"



Load Mode Display Chart

Display LED	Display contents	Operation contents
R-1-①	R-FAN High	When FF compartment FAN operates with high speed, applicable LED ON
R-1-②	R-FAN Low	When FF compartment FAN operates with low speed, applicable LED ON
R-1-③	R-DEF Heater	When FF compartment defrost heater operates, LED ON
R-1-④	Showcase Door Heater	When Showcase Door heater operates, applicable LED ON
R-1-⑤	Overload condition	When ambient temperature is more than 93°F(34°C), LED ON
R-1-⑥	Low temperature condition	When ambient temperature is less than 72°F(22°C), LED ON
R-1-⑤,⑥ (ALL LED Off)	Normal Condition	When ambient temperature is between 73°F(23°C) and 91°F(33°C)
R-1-⑨	Exhibition Mode	LED ON at the display mode.
F-1-①	COMP.	When COMP operates, applicable LED ON.
F-1-②	F-FAN High	When FZ compartment FAN operates with high speed, applicable LED ON.
F-1-③	F-FAN Low	When FZ compartment FAN operates with low speed, applicable LED ON.
F-1-④	F-DEF Heater	When FZ compartment defrost heater operates, LED ON
F-1-⑤	C-FAN High	When compressor FAN operates with high speed, applicable LED ON.
F-1-⑥	C-FAN Low	When compressor FAN operates with low speed, applicable LED ON.
R-10-①	Pantry Room Damper Open	When damper open, applicable LED ON
R-10-④	Ice maker full(FF)	When the Ice Maker's Bucket is full, applicable LED ON in FF-room
R-10-⑤	Ice maker full(FZ)	When the Ice Maker's Bucket is full, applicable LED ON in FZ-room
R-10-⑥	More Heater (F Pipe water heater)	Add to Assy Water Pipe Heater in FZ-room
F-10-④	Ice Room-FAN High	When Ice Room-FAN operates with high speed, applicable LED ON.
F-10-⑤	Ice Room-FAN Low	When Ice Room-FAN operates with low speed, applicable LED ON.
F-10-⑨	French Heater	When French heater operates, applicable LED ON

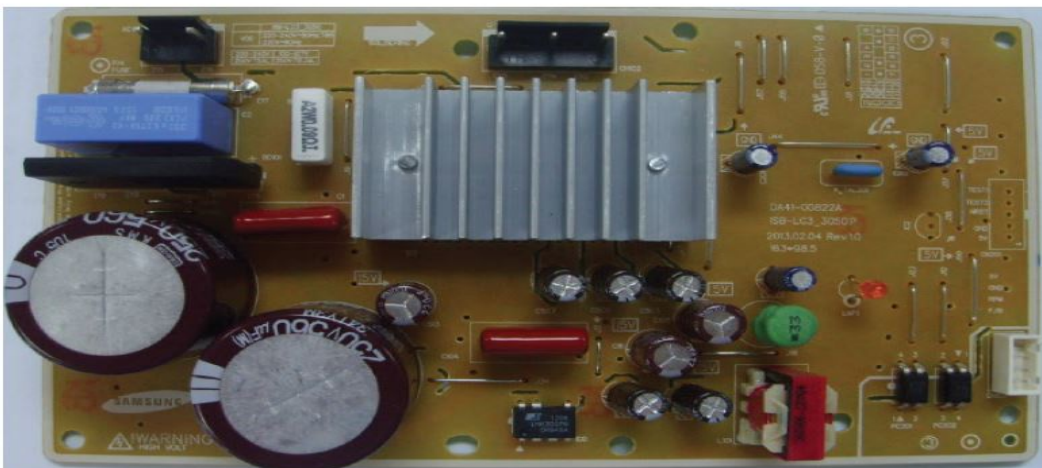
Main PCB



Inverter

AC 115V

COMP



Thermistor voltage & resistances

°C	°F	Voltage	Resistance	°C	°F	Voltage	Resistance	°C	°F	Voltage	Resistance
-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

Wiring Diagram

