Fast Track Troubleshooting

Model:
RF28HD

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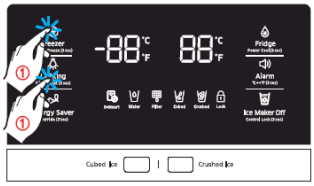
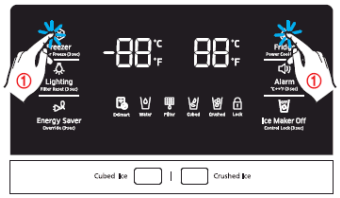
Bulletins:

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



Sales Mode: No Heating or Cooling. No compressor Operation. Press Freezer and Lighting 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 **"O-FF"** Removing power will not cancel this mode.

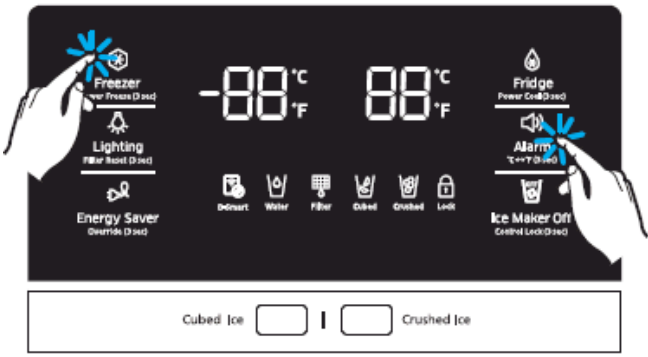


Self Diagnosis: Press Freezer and Fridge buttons simultaneously for 8-12 seconds, until the display quits blinking and beeps, then release the buttons and read Fault codes. (Note: there will be no sound when both buttons are pressed at the same time)
This will also cancel the fault code being displayed at start up if any.

(Refer to page 3 for Error code diagnosis)

Force Mode:

Press the Freezer and Alarm buttons simultaneously for 8-12 Seconds, until the display beeps and goes blank (Note: there will be no sound when both buttons are pressed at the same time)



Wait 5 Seconds between button pushes

Compulsion working : 3600RPM

Press any button one time at the forced mode to force compressor on High Speed Run. Measure fan & compressor voltage at main PCB.

Press any button one more time to Force Defrost of the Fridge & Freezer. Measure defrost voltage at main PCB.

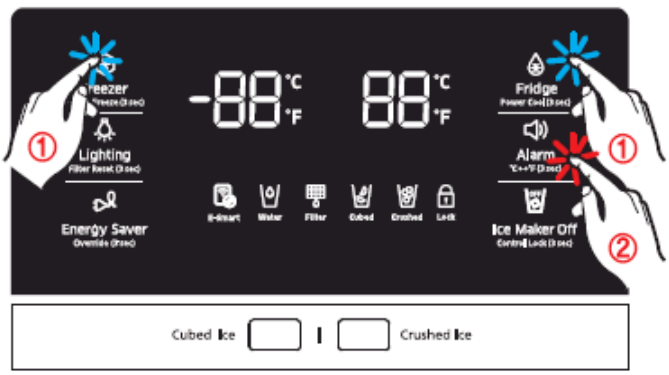
Press any button a 3rd time until blank screen appears or wait 30secs to exit

Load Mode

① If Freezer Key + Fridge Key are pressed simultaneously for 6 seconds, ALL ON/OFF will blink with 0.5interval for 4 seconds.

② If take the finger off from above keys and press Alarm, load condition mode will be started.

3) Load condition display function will maintain for 30 seconds and then normal condition will be returned automatically. (Refer to page 6 for Load Mode checklist)



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.

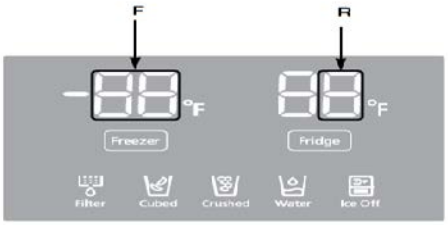
FREEZER TEMPERATURE CONTROL BY THE ICE MAKER

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

✻ Self-diagnosis checklist



LED		Item	Trouble contents	Diagnostic method
F	R			
1	E	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)	When measuring the voltage between the Main PCB CN30 3PIN - 7PIN, it should read between 4.5V~1.0V.
2		R-Sensor Error		When measuring the voltage between the Main PCB CN30 5PIN - 7PIN, it should read between 4.6V~1.0V.
4		F-DEF-Sensor Error		The voltage of MAIN PCB CN30 4PIN - 7PIN shall be between 4.5V~1.0V
6		Ambient-Sensor Error		The voltage of MAIN PCB CN30 11PIN - 7PIN shall be between 4.5V~1.0V
8		Ice Maker 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 3PIN - 9PIN Shall be between 4.5v ~ 1.0v
13		Humidity-Sensor Error	Separation of sensor housing part, contact error, disconnection, short circuit	When measuring the voltage between the Main PCB CN30 12PIN - 7PIN, it should read between 4.5V~1.0V.
21		F-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 CN74 4PIN - 1PIN shall be between 7V~12V

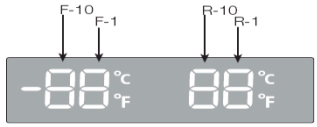
LED		Item	Trouble contents	Diagnostic method
F	R			
23	E	C-FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error, motor wire separation, motor error	The voltage of MAIN PCB CN74 2PIN - 1PIN shall be between 7V~12V
24		F-DEF Error	Separation of freezer 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 100 minutes.	After separating Main PCB CN70& SMPS CN01 wire from PCB, Resistance value between CN70 9PIN – SMPS CN01 3PIN 7%.(Resistance value is varied by input power) 0 ohm : heater short, ∞ohm : wire/bimetal open (Must power off)
26		Ice Maker 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.
27		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 CN75 wire from PCB, resistance value between CN74 1PIN - 2PIN wire shall be 135 ohm± 7%. 0 ohm : heater short, ∞ Ohm : wire / bimetal Open.
41		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.

LED		Item	Trouble contents	Diagnostic method
F	R			
44	E	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.
46		I/O Expander Communication Error	Display 46Er in the panel : I/O Expander ↔ Main MICOM communication error.	It is desirable to replace Main PCB.
71		The F compartment abnormal hightemperature indicator blinks	When the freezer temperature is abnormally high or the freezer door is open for a certain period of time and the freezer temperature increases, the freezer display blinks.	The temperature has been abnormally increased. Check if the door has been open for a long time or if hot food has been stored in the compartment. If the reason for the error is removed, the error code disappears after a predetermined period of time.
72		The R compartment abnormal hightemperature indicator blinks	When the freezer temperature is abnormally high or the fridge door is open for a certain period of time and the fridge temperature increases, the fridge display blinks.	Check if door has been open for a long time or if hot food has been stored in the compartment. If the reason for the error is removed, the error code disappears after a pre-determined period of time.
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] Check if there is a short between IPM Pins [#1~33] Check the Compressor and the Cycle
82		IPM Fanlt Error	When there is a IPM Fault error	

LED		Item	Trouble contents	Diagnostic method
F	R			
83	E	Comp Abnormal current Detection Error	When there is abnormal current detected at the Compressor	Check the Compressor connections Check the voltage of Resistance of R308 [0.09Ohm] 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]

Load Mode Checklist

Load condition display is as below. Only the load control LED will blink with 0.5interval in "Display LED"



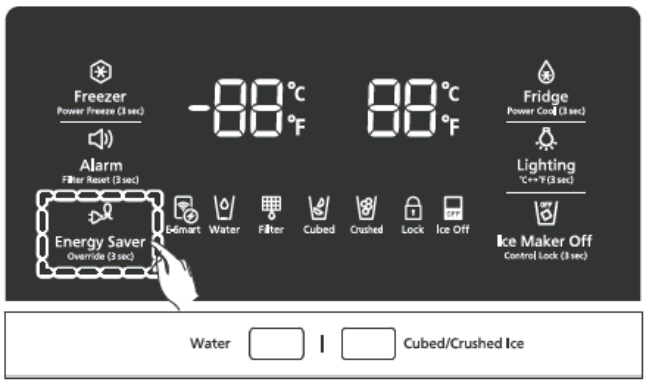
Display LED	Display contents	Operation contents
R-1-ⓔ	Overload condition	When ambient temperature is more than 93°F(34°C), LED blinks
R-1-ⓕ	Low temperature condition	When ambient temperature is less than 72°F(22°C), LED blinks
R-1-ⓔ,ⓕ (ALL LED On)	Normal Condition	When ambient temperature is between 73°F(23°C) and 91°F(33°C)
R-1-ⓖ	Exhibition Mode	LED blinks at the display mode.
F-1-ⓐ	COMP.	When COMP operates, applicable LED blinks.
F-1-ⓑ	F-FAN High	When FZ compartment FAN operates with high speed, applicable LED blinks.
F-1-ⓒ	F-FAN Low	When FZ compartment FAN operates with low speed, applicable LED blinks.
F-1-ⓓ	F-DEF Heater	When FZ compartment defrost heater operates, LED blinks
F-1-ⓔ	C-FAN High	When compressor FAN operates with high speed, applicable LED blinks.
F-1-ⓕ	C-FAN Low	When compressor FAN operates with low speed, applicable LED blinks.
F-1-ⓖ	Homebar(Door) Heater	When Homebar(Door) heater operates, applicable LED blinks.
R-10-ⓐ	Pantry Room Damper Open	When damper open, applicable LED blinks
R-10-ⓓ	Ice maker full	When the Ice Maker's Bucket is full, applicable LED blinks
F-10-ⓔ	Dispenser Heater	When Dispenser heater operates, applicable LED blinks.
F-10-ⓖ	Damper Open	When damper open, applicable LED blinks.

Smart Grid Override Mode

When you want the refrigerator to ignore the SMART GRID (Demand Response) signal from the Utility Company, you can activate OVERRIDE mode. When you activate OVERRIDE mode, the refrigerator ignores the SMART GRID (Demand Response) signal and is not controlled by the Utility Company.

Activating and deactivating Override mode

1. Press and hold the [Energy Saver] button for 3 seconds.



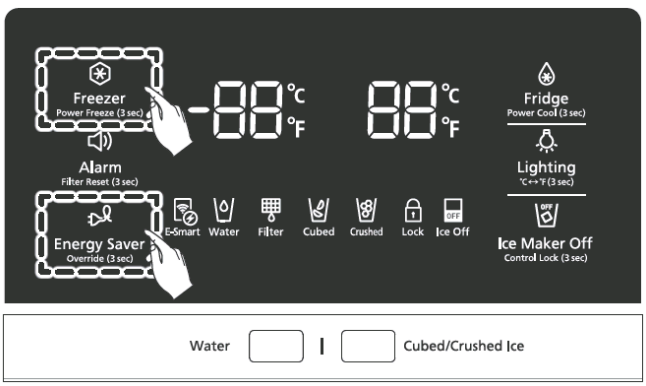
Cover-Display & Water-Dispenser

Part name	Work sequence	Remarks
Cover-Display	Remove a screw under the display cover.	
	Remove the display cover by pulling it up.	
	Disengage the housing connect of display cover.	

MAC Address Display Mode

This function displays the MAC address of the Wi-Fi module on the refrigerator display. The refrigerator displays the MAC address of the Wi-Fi module for 1 minute.

1. Press and hold the Freezer and Energy Saver buttons at the same time for 3 seconds.



2. A Buzzer sounds. Four of the twelve Mac address of the Wi-Fi module are displayed in turns in the freezer and fridge temperature displays for 1 minute. For example, if the Wi-Fi module's MAC address is "11-22-33-44-55-66", the MAC address is displayed as follows: "11 22" → "33 44" → "55 66" → ---- → "11 22" for 1 minute.

3. After 1 minute, the display returns to the normal state and the Buzzer sounds again.

- **If the Mac addresses are not available or there is no Wi-Fi module, `----' is displayed on the freezer and fridge temperature displays.**

Connector Layout with part position (Main Board)

CN70 - AC LOAD
① : FF-DEF-HEATER
③ : FZ-DEF-HEATER
ICE DUCT HEATER
⑤ : COMMON2 LINE(L)
⑦ : COMMON1 LINE(N)

CN70_1 - AC LOAD
① : Main Valve
③ : ICE MAKER HEATER(FF)
⑤ : FRENCH-HEATER
DISPENSER-HEATER

CN72 - AC LOAD
① : OPEN
③ : COMMON1 LINE(N)

CN73_1 - AC LOAD
① : ICE WATER
SOLENOIDE VALVE(FF)
③ : ICE COVER ROUTE
⑤ : Open
⑦ : Open

CN73 - AC LOAD
① : CUBE SOLENOIDE
VALVE
③ : AUGER MOTOR
⑤ : 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, 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 : Mid DRAWER-DOOR Switch
⑭ : Open
⑮ : Open

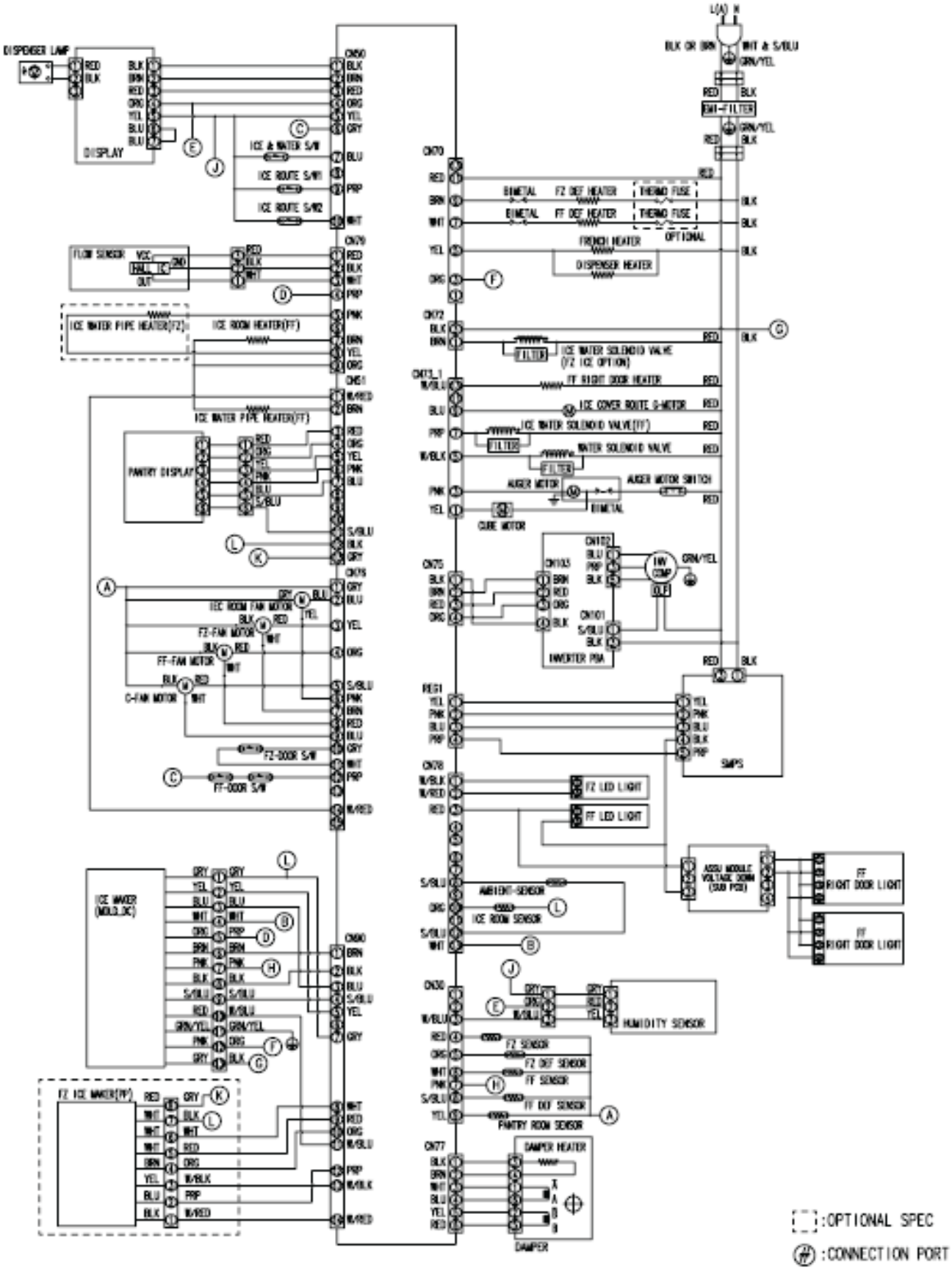
CN51 - MID DRAWER ROOM DISPLAY
① : ICE Pipe Heater(FF) F/B
② : ICE Water Pipe Heater (FF)
③~⑦ : Mid Drawer Room LED Driver
⑧~⑩ : OPEN
⑪ : Mid Drawer Room Switch
⑫ : OPEN
⑬ : OPEN

CN79
① : +5V
② : GND
③ : Flow Sensor Out
④ : Test Switch(FF)
⑤ : Ice Water Pipe Heater(FZ)
⑥ : Open
⑦ : Ice Room Heater
⑧ : +12V
⑨ : +12V

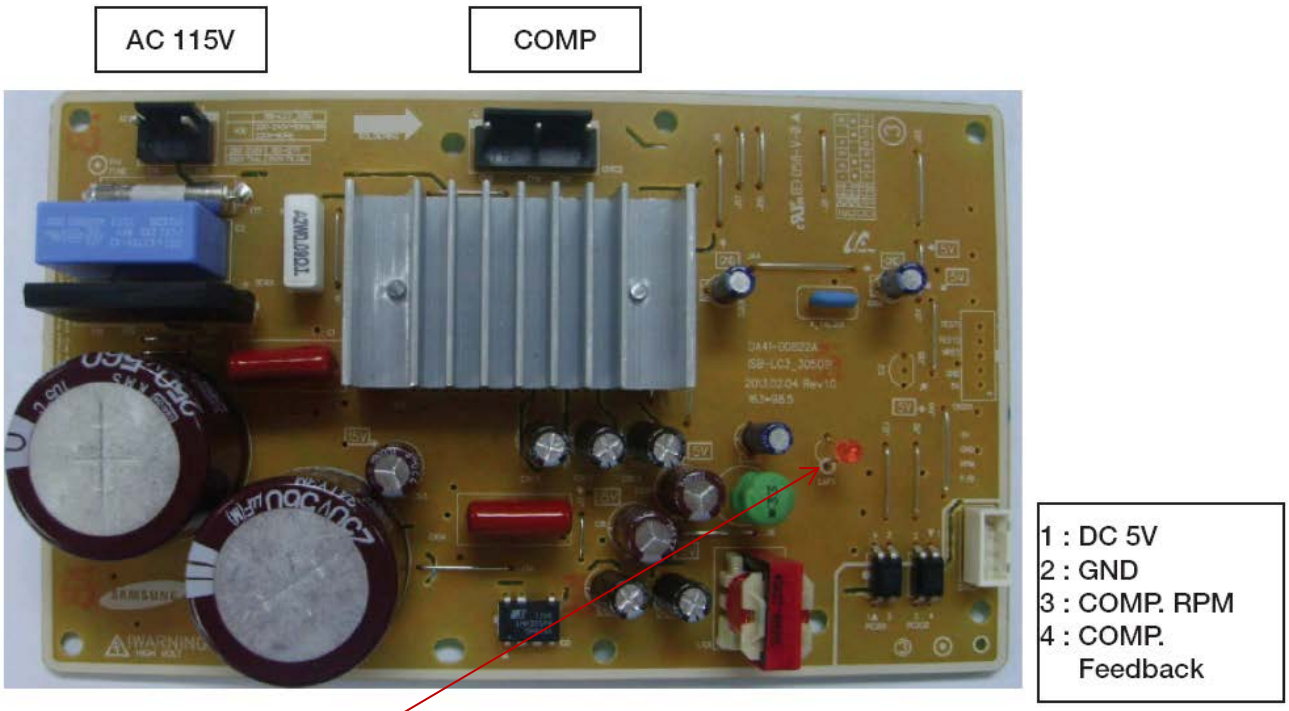
CN77 - Damper & Valve
①~② : Damper Heater
③~⑥ : Damper Motor
⑦ : +12V
⑧~⑪ : Step Valve (Option)

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

Model : RF28HD



Connector Layout with part position (Inverter Board)



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