



# Fast Track Troubleshooting

**Model:**  
**RF31FMES**

**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 # DrRF31FM Production Date 5/24/13

## Bulletins:

### Support Information:

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

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

GSPN: [http://service.samsungportal.com/EP/web/portal/jsp/EP\\_Default1.jsp](http://service.samsungportal.com/EP/web/portal/jsp/EP_Default1.jsp)

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

**JM 10/11/13**

## Force Mode



Hold Energy Saver and Fridge buttons together until you see a blank screen, press any button to start 1<sup>st</sup> process



The following will run during each mode:

1. **FF** - Compressor and Fan will run
2. **OF** - Compressor will run but no fan



3. **Rd** will put the Fresh food area of your fridge into Defrost
4. **FD** will put the full fridge into defrost and all heaters will be on.
5. Blank Screen wait 30 seconds to exit

## Error Check



Hold Energy saver and Lighting buttons together - let go when screen blinks

If you have an error it will be displayed on the screen ( Refer to error chart page 5,6 )

Blank screen means no errors

## Demo Mode



Enter Demo: hold Energy Saver and Freezer buttons together until O-FF is displayed. Repeat the same procedure to exit.

O- FF will indicate Demo Mode is on

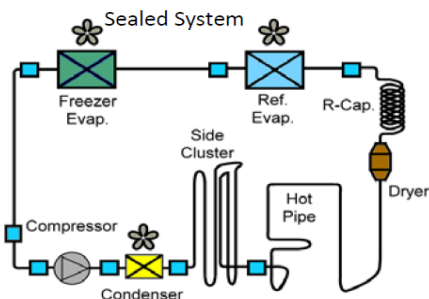
In demo mode no heating or cooling elements will operate

## Check Sparkling Valve



With the door open press energy saver for 5 seconds ( Confirm the sound of the Valve )

Sound = Good Valve ( Check CO2 or Display board )  
No Sound = Bad Valve ( Replace Soda Assy Kit )



Refrigerant Charge R134a 5.64 oz

### 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°F for more than 5 seconds, the ice production process is complete. 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 that 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 Switch for at least 1.5 sec. and the harvest function will start. If the Ice Maker thermistor is below 0°F, the Ice Maker heater turns on for about two minutes. If the temperature exceeds 0°F, the Ice Maker heater turns on for 30 seconds. After the Ice Maker heater turns on for 30 seconds, the heater turns off and the Ice Maker harvest motor turns on. The motor will rotate in right direction for about 3 minutes, then the water supply valve is energized and then de-energized and the test mode is complete. If the above operation is not carried out within 6 minutes, the Ice Maker will go into a fault mode.

## FREEZER TEMPERATURE CONTROL BY THE ICE MAKER

Interior Temperature of the freezer will be set to -14°F until the ice bucket is full. When the ice bucket is full, the freezer will maintain original set temperature. Also, whenever some ice is used, the freezer will again set to -14°F. Selecting "Ice Off" will allow the freezer to be controlled by the set temperature. **\*\*\*NOTE\*\*\*** If water is not hooked up, the freezer will always be at -14°F 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 |

- **Sparkling Water Dispensing**  
 : If sparkling water is weak or you have no carbonated taste replace the CO2 Cylinder with a new one.
- : When you dispense the sparkling water and the water stream is unstable or broken a bit, this is to compensate the inside pressure of the Sparkling Water Production Tank . This is normal not a defect.
- : When the Water Hose is kinked or water does not come out properly, the Carbonation Level of the Sparkling Water will be high.  
 (This occurs because the same amount of the carbonation comes out regardless of the amount of the water in the Tank – There is not enough water.)
- **Water Dripping**  
 : Dripping may happen -sparkling water drops may be left behind and may fall down the dispenser, this is normal.

3 OFF

Sparkling

Cubed / Crushed

Hold 3 sec for Sparkling Off

Sparkling

ON

•Holding the Cubed/Crushed button will turn on or off the sparkling water

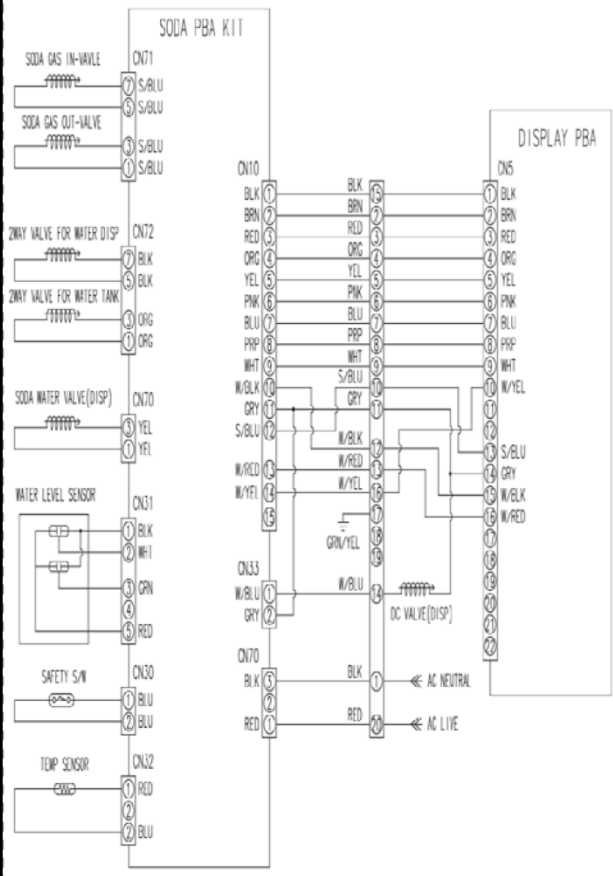
- Charging occurs when the internal storage tank is emptied or CO2 is replaced.
- The charge will also start over if you shut off the sparkling water and turn it back on.
- Opening the door will pause the charge process

During charging of the Sparkling Water the numbers 1,2 and 3 will blink until charging is complete.

**Sparkling Water Production Time**

Depending on the Carbonation Level you set (See Setting the Carbonation Level), the amount of time it takes the refrigerator to complete the sparkling water production process changes. The table below lists the production times by Carbonation Level. The refrigerator is pre-set at the factory to Level 2.

| Carbonation Level | Level 3 – Hi       | Level 2 –Med       | Level 1 – Low      |
|-------------------|--------------------|--------------------|--------------------|
| Production Time   | About 30 minutes   | About 20 minutes   | About 10 minutes   |
| Capacity          | 1,16 quarts (1,1ℓ) | 1,16 quarts (1,1ℓ) | 1,16 quarts (1,1ℓ) |



The Soda Assy Kit is independent from the Main PCB that is normally located in the back of the Refrigerator. The Soda Assy Kit has its own PCB included inside the Soda Assy Kit behind the water valves.

AC Power supplied directly to Soda Assy PCB from the outlet. You can check for 120V AC at the wiring harness.

Display board sends commands directly to the Soda kit board for operation.

When Removing or installing the doors make sure you remove them past 90 degrees. The door closing mechanism, might lock if incorrectly removed or installed.

# RF31FMES Inverter Compressor Control

## 2013 Samsung RF31FM O/L Relay Check (HA)

The Over Load (O/L) Relay found on the 2013 Samsung RF31M refrigerator protects the compressor by opening if an excessive amount of current is detected.

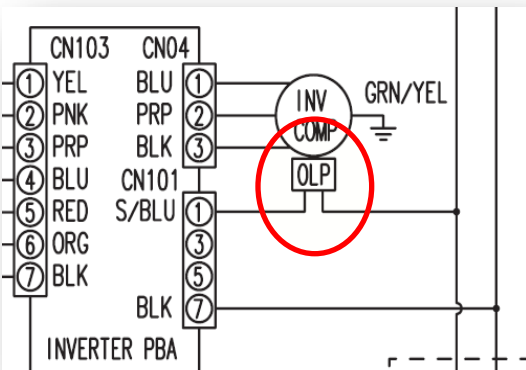
Unfortunately, the line it opens will prevent L1 from reaching the refrigerator's Inverter Driver PCB. Should you ever come across a completely "dead" RF31FM, first verify the outlet is wired correctly and that it is supplying 120V AC. If the outlet is ok, check the O/L Relay and make sure it is not open. This may be done by simply checking continuity between the L1 post on the power connector, and the output of the fuse located on the inverter driver PCB. By checking at these two points, you will also verify the fuse is good.



OLP= Over Load Protector



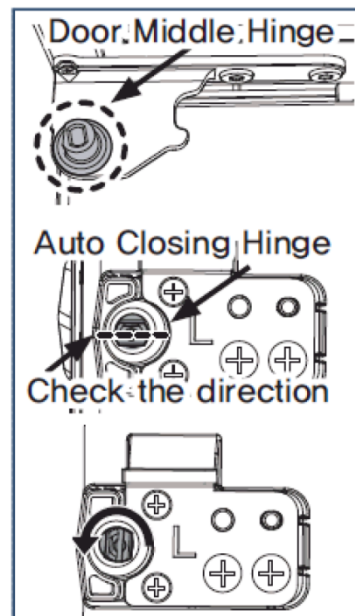
Continuity between  
the 2 points means  
(Fuse and OLP OK)



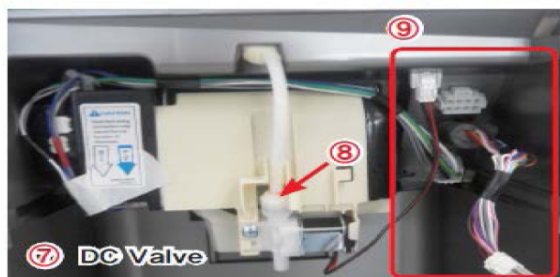
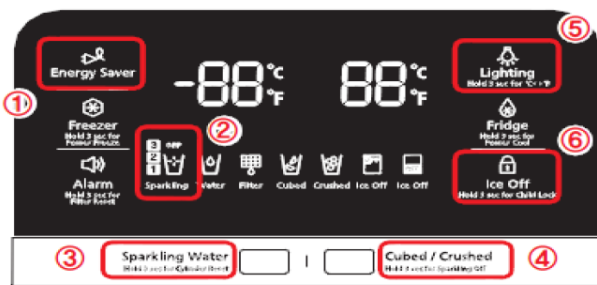
### Door Removal:

❑ Lift the door straightly up to remove while opening the door more than 90°.

❑ Do not use a flat head screwdriver to align the Auto close Hinge. It may get damaged. Use the Door middle Hinge instead.



## NEW Errors for Sparkling Water unit



|     |                               |  |
|-----|-------------------------------|--|
| 93E | Sparkling tank overflow error |  |
|-----|-------------------------------|--|

If you notice the word OFF blinking above the Sparkling Icon during normal operation, this will indicate an overflow error.

If you enter Diagnostic mode it will give you the 93E error, if so check for any leaks around the over flow sensor

Replace Display PCB if no water leak is present and OFF is still blinking during normal operation.

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|     |                                      |  |
|-----|--------------------------------------|--|
| 94E | Water supply to sparkling tank error |  |
|-----|--------------------------------------|--|

94E error will indicate a sparkling water tank error.

Replace the Display PCB if you have a 94E Error

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Remove the Hose from the DC Valve (8) and press the dispenser. If nothing dispenses, replace the DC Valve.



|     |                        |  |
|-----|------------------------|--|
| 17E | Sparkling-Sensor Error |  |
|-----|------------------------|--|

The Voltage of the Soda Assy kit PCB – connector CN32 pin 1 and CN32 Pin 3: should be between 4.5VDC and 1.0VDC

If the connector is ok, you should replace the Assy Case Basket Up DA97-13741A

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| LED |   | Item                       | Trouble contents                                                                                                                                                                                                                                                                | Diagnostic method                                                                                                                                                                                                                      |
|-----|---|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F   | R |                            |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                        |
|     |   | FZ-Sensor Error            | Display error : separation of sensor housing part, contact error, disconnection, short circuit,<br>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 CN30- "3" N76-"1": shall be between 4.5V~1.0V                                                                                                                                                                  |
|     |   | FF-Sensor Error            |                                                                                                                                                                                                                                                                                 | The voltage of MAIN PCB CN30- "6" N76-"1": shall be between 4.5V~1.0V                                                                                                                                                                  |
|     |   | FZ-DEF-Sensor Error        |                                                                                                                                                                                                                                                                                 | The voltage of MAIN PCB CN30- "5" N76-"1": shall be between 4.5V~1.0V                                                                                                                                                                  |
|     |   | FF-DEF-Sensor Error        |                                                                                                                                                                                                                                                                                 | The voltage of MAIN PCB CN30- "8" N76-"1": shall be between 4.5V~1.0V                                                                                                                                                                  |
|     |   | Ambient-Sensor Error       |                                                                                                                                                                                                                                                                                 | The voltage of MAIN PCB CN78- "8" CN78-"12": shall be between 4.5V~1.0V                                                                                                                                                                |
|     |   | Flex room-Sensor Error     |                                                                                                                                                                                                                                                                                 | The voltage of MAIN PCB CN78- "9" CN76-"1": shall be between 4.5V~1.0V                                                                                                                                                                 |
|     |   | Humidity-Sensor Error      | Separation of sensor housing part, contact error, disconnection, short circuit                                                                                                                                                                                                  | The voltage of MAIN PCB CN30- "1" CN30-"7": shall be between 4.5V~1.0V                                                                                                                                                                 |
|     |   | 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                                                                                                                                                                |
|     |   | Ice Room Sensor Error      | 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 CN78- "10" CN78-"1": shall be between 4.5V~1.0V                                                                                                                                                                |
|     |   | Sparkling-Sensor Error     | Display error : separation of sensor housing part, contact error, disconnection, short circuit,<br>Display error of detecting temperature of sensor : more than 149°F(+65°C) or less than -58°F(-50°C)                                                                          | The voltage of ASSY KIT PCB CN32- "1" CN32-"3": shall be between 4.5V~1.0V                                                                                                                                                             |
|     |   | 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                                                                                                                                                    |
|     |   | 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                                                                                                                                                    |
|     |   | 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                                                                                                                                                  |
|     |   | 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 70 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)  |
|     |   | 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) |

| LED |   | Item                                     | Trouble contents                                                                                                                                                                               | Diagnostic method                                                                                                                                                                                                                        |
|-----|---|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F   | R |                                          |                                                                                                                                                                                                |                                                                                                                                                                                                                                          |
|     |   | 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 ohm± 7%.<br>0 ohm : heater short, ∞ Ohm : wire / bimetal Open.                                                                    |
|     |   | 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.                                                                                                                                        |
|     |   | Ice Room–FAN Error                       | Display error when the Ice Maker(FZ) kit operate moving ice over 3 times or it is not leveled.                                                                                                 | The voltage of MAIN PCB CN76–"2"(Black) ↔ CN76–"1" (Gray): shall be between 7V~12V                                                                                                                                                       |
|     |   | Display ↔ Main Mycom Communication Error | Main mycom ↔ Display "41–E" message and make a buzzing sound when the communication between displays does not work.                                                                            | Actually, If there is not a problem, it is desirable to replace Main and Panel PCB With the oscilloscope after a cable problem confirming.                                                                                               |
|     |   | Ice Duct Heater Error                    | Display error when open error is detected by ice duct heater : separation of Ice Duct Heater housing part, contact error, disconnection, short circuit,                                        | After separating MAIN PCB CN70 wire from PCB, resistance value between CN70 Brown ↔ CN70 Gray shall be 63(230) ohm ± 7%.<br>(Resistance value is varied by input power) 0 ohm : heater short, ∞ ohm : wire/bimetal open (Must power off) |
|     |   | Ice Room Bucket Heater Error             | Display error when open error is detected by ice room bucket heater : separation of Ice Room Bucket Heater housing part, contact error, disconnection, short circuit,                          | After separating MAIN PCB CN79 wire from PCB, resistance value between Yellow ↔ Pink wire shall be 135 ohm± 7%.<br>0 ohm : heater short, ∞ Ohm : wire / bimetal Open.                                                                    |
|     |   | Comp starting Failure Error              | When the Compressor fails starting                                                                                                                                                             | Check if there is a short between compressor terminals. Check IPM Voltage [Under 13.5V]                                                                                                                                                  |
|     |   | IPM Fault 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                                                                                                                                                    |
|     |   | 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 [0.090hm]<br>Check the Compressor and the Cycle                                                                                                                 |
|     |   | 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                                                                                   |
|     |   | Comp under voltage Error                 | When there is a low voltage error                                                                                                                                                              | Check the voltage of Resistance of R513 [Short/Open]                                                                                                                                                                                     |
|     |   | Comp over voltage Error                  | When there is a over voltage error                                                                                                                                                             | Check the voltage of Resistance of R501, R505, R509 [Short/Open]                                                                                                                                                                         |
|     |   | Sparkling Tank Overflow                  | Display error when open error is detected by sparkling tank overflow : separation of Sparkling Tank Overflow Sensor housing part, contact error, disconnection, short circuit,                 | The voltage of ASSY PCB KIT CN30– "1" CN30–"2": shall be over 4.5V                                                                                                                                                                       |
|     |   | Water Supply to Sparkling Tank Error     | Display error when open error is detected by water supply to sparkling tank error : seperation of Sparkling Tank Water Level Sensor housing part, contact error, disconnection, short circuit, | The voltage of ASSY PCB KIT CN31– "1" CN31–"2": shall be over 4.5V                                                                                                                                                                       |

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

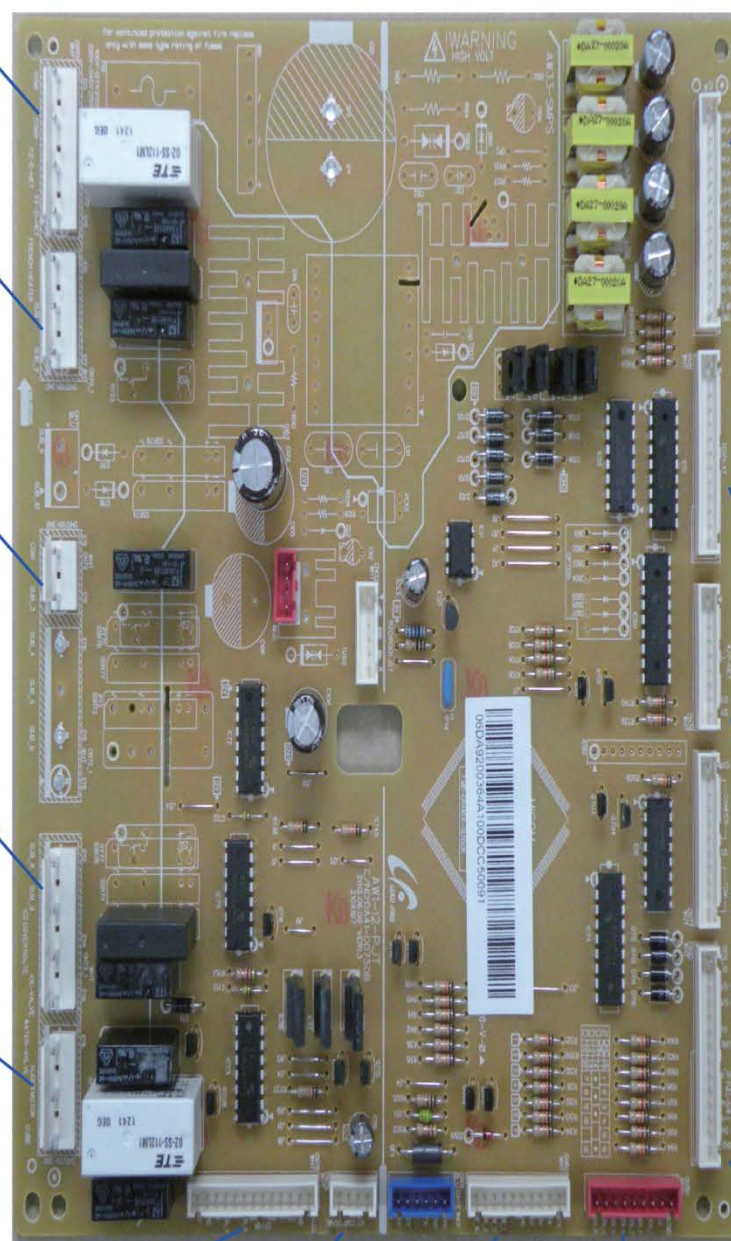
- CN70\_1 - AC LOAD**
- ① : Main Valve
  - ③ : ICE MAKER HEATER(FF)
  - ⑤ : FRENCH-HEATER
  - DISPENSER-HEATER

- 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

- 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

