

# Trouble shooting guide

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# 1. The phenomena from main component failure

## The phenomena from main component failure

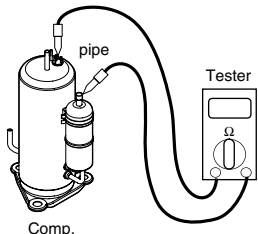
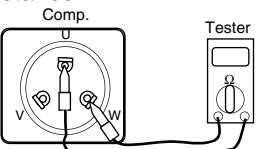
Component	Phenomenon	Cause	Check method and Trouble shooting
<b>Compressor</b>	Not operating	Motor insulation broken	Check resistance between terminals and chassis
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Loud noise during running	Phase sequence fault	Check wiring(R, S, T) sequence, or inter change last two phase connection.
<b>Outdoor fan</b>	High pressure error at cooling	Motor failure, bad ventilation around outdoor heat exchanger	Check the outdoor fan operation after being turned the outdoor units off for some time. Remove obstacles around the outdoor units
<b>Outdoor LEV</b>	Heating failure, frequent defrosting	Bad connector contact	Check connector
	No operating sound at applying power	Coil failure	Check resistance between terminals
	Heating failure, frozen outdoor heat exchanger part	LEV clogged	Service necessary
	Low pressure error or discharge temperature error	LEV clogged	Service necessary

When system fault occurs, the error code is displayed at indoor unit display or remote control display, the trouble shooting guide is in the service manual

## 2. Checking Method for Key Component

### 2.1 Compressor

Check and ensure in following order when error related with the compressor or error related with power occurs during operation:

No.	Checking Item	Symptom	Countermeasure
1	Is how long power on during operation?	1) Power on for 12 hours or more	* Go to No.2.
		2) Power on for 12 hours or less	* Go to No.2 after applying power for designated time (12 hours).
2	Does failure appears again when starting operation? Method to measure insulation resistance  Figure 1. Method to measure coil resistance  Figure 2.	1) The compressor stops and same error appears again.	* Check IMP may fail.
		2) If output voltage of the inverter is stable *1	* Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor. * Insulation resistor: 2MW or more Coil resistor: U-V: 1.083Ω V-W: 1.123Ω W-U: 1.096Ω
		3) If output voltage of the inverter is unstable or it is 0V. (When incapable of using a digital tester)	* Check the IPM. If the IPM is normal, replace the inverter board. * Check coil resistor and insulation resistor.

#### [Cautions when measuring voltage and current of inverter power circuit]

Measuring values may differ depending on measuring tools and measuring circuits since voltage, current in the power supply or output side of the inverter has no sine waveform.

Especially, output voltage changes when output voltage of the inverter has a pattern of pulse wave.

In addition, measuring values appear largely differently depending on measuring tools.

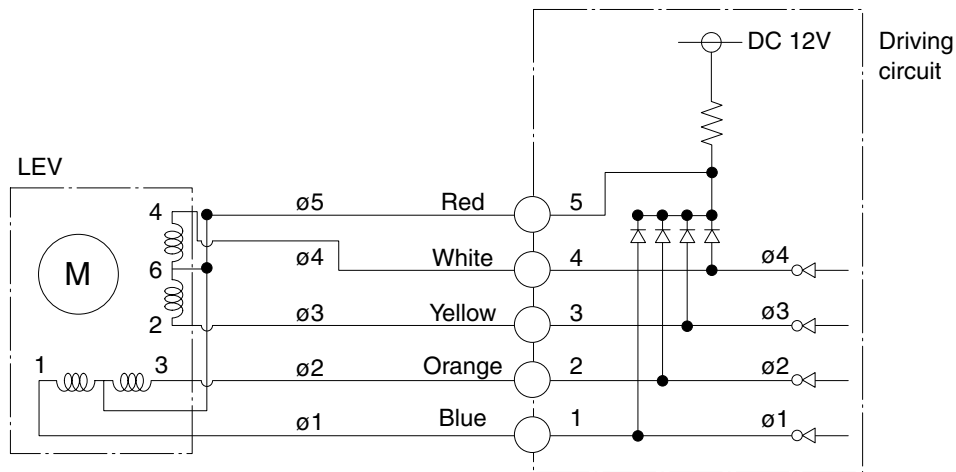
- 1) If using a movable tester when checking that output voltage of the inverter is constant (when comparing relative voltage between lines), always use an analog tester. Especially exercise particular caution if the output frequency of the inverter is low, when using a movable tester, where change of measured voltage values is large between other lines, when virtually same values appear actually or where there is danger to determine that failure of the inverter occurred.
- 2) You can use rectification voltmeter (→+) if using commercial frequency tester when measuring output values of the inverter (when measuring absolute values). Accurate measuring values cannot be obtained with a general movable tester (For analog and digital mode).



## 2.2 Fan Motor

Checking Item	Symptom	Countermeasure
<p>(1) The fan motor does not operate. Does failure appears again when starting operation?</p> <p>(2) Vibration of the fan motor is large.</p>	1) When power supply is abnormal	<p>* Modify connection status in front of or at the rear of the breaker, or if the power terminal console is at frosting condition.</p> <p>* Modify the power supply voltage is beyond specified scope.</p>
	2) For wrong wiring	<p>* For following wiring.</p> <ol style="list-style-type: none"> <li>1. Check connection status.</li> <li>2. Check contact of the connector.</li> <li>3. Check that parts are firmly secured by tightening screws.</li> <li>4. Check connection of polarity.</li> <li>5. Check short circuit and grounding.</li> </ol>
	3) For failure of motor	<p>* Measure winding resistance of the motor coils. 8.9Ω ±5%(75°C)</p>
	4) For defective fuse 5) For failure of circuit board	<p>* Replace the fuse if there is defect (Fuse 800V 30A). Replace the circuit board in following procedures if problems occur again when powering on and if there are no matters equivalent to items as specified in above 1) through 4). (Carefully check both connector and grounding wires when replacing the circuit board.)</p> <ol style="list-style-type: none"> <li>1. Replace only fan control boards. If starting is done, it means that the fan control board has defect.</li> <li>2. Replace both fan control board and the main board. If starting is done, it means that the main board has defect.</li> <li>3. If problems continue to occur even after countermeasure of No.1 and No.2, it means that both boards has defect.</li> </ol>

## 2.3 Linear Empansion Valve



### • Pulse signal output value and valve operation

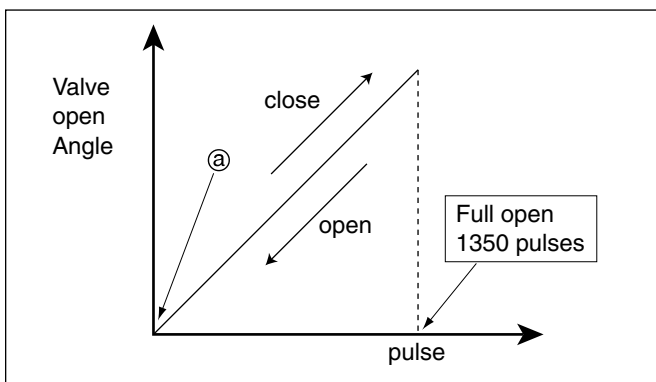
Output(ø) No.	Output state							
	1	2	3	4	5	6	7	8
ø1	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
ø2	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
ø3	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
ø4	OFF	OFF	OFF	OFF	ON	ON	ON	OFF

### • Output pulse sequence

- In valve close state: 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 1
- In valve open state: 8 → 7 → 6 → 5 → 4 → 3 → 2 → 1 → 8

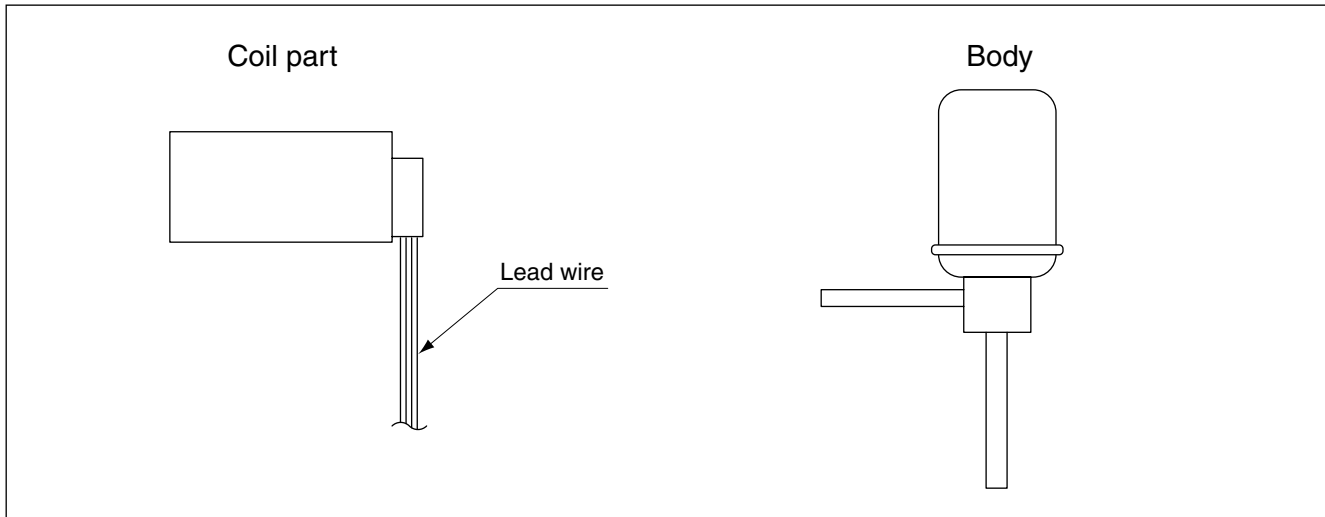
- \* 1. If LEV open angle is not changed, all of output phase will be OFF
- 2. If output phase is different or continuously in the ON state, motor will not operate smoothly and start vibrating.

### • LEV valve operation

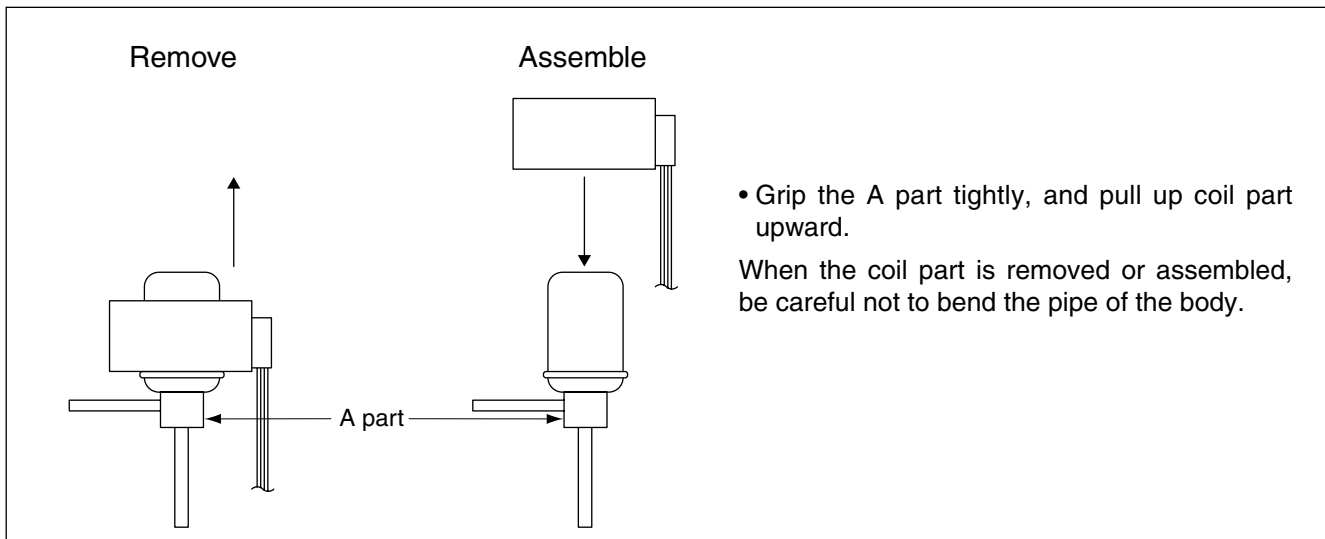


- At power ON, open angle signal of 1400 pulses output and valve position is set to @  
If valve is operated smoothly, no noise and vibration is occurred and if valve is closed. noise occurs.
- If you contact screw driver to LEV, and contact your ear to driver hand grip. you can confirm the noise from LEV.
- If liquid refrigerant is in LEV, the noise is lower.

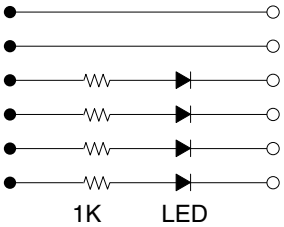
• LEV Coil and body(Outdoor unit)



• Remove and assemble the coil

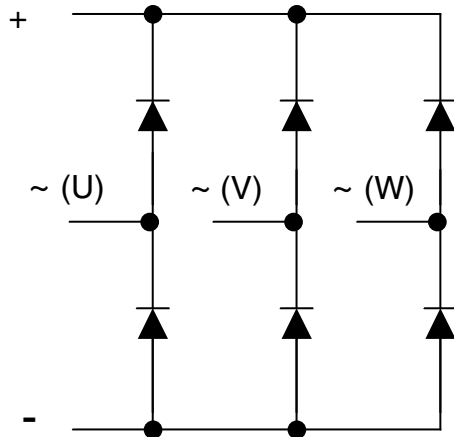


• LEV failure check method

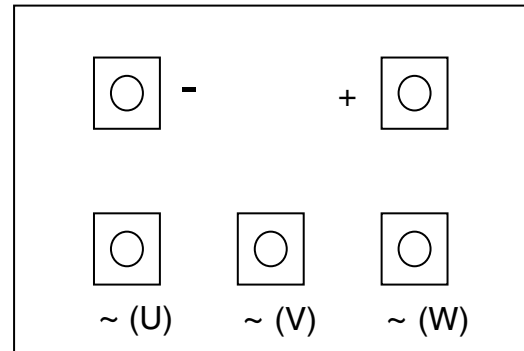
Failure mode	Diagnosis	Repair process	Unit
Microcomputer Driving circuit failure	<p>1. Disconnect the LEV connector form control board and connect testing LED</p>  <p style="text-align: center;">1K      LED</p> <p>2. Main power ON, pulse signal is out from LEV for 17 sec. If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal</p>	Check and replace Indoor unit control board	Indoor unit
LEV locking	1. If LEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace LEV	Indoor / Outdoor unit
LEV Motor coil short or misconnection	<p>1. Check the resistance between coil terminal (red-white, red-yellow, red-orange, red-blue)</p> <p>2. If the estimated resistance value is in <math>52 \pm 3\Omega</math> then the LEV is normal</p>	Replace LEV	Outdoor unit
	<p>1. Check the resistance between coil terminal (brown-white, brown-yellow, brown-orange, brown-blue)</p> <p>2. If the estimated resistance value is in <math>150 \pm 10\Omega</math> then the LEV is normal</p>	Replace LEV	Indoor unit
Full closing (valve leakage)	<p>1. Operate indoor unit with FAN mode and operate another indoor unit with COOLING mode</p> <p>2. Check indoor unit(FAN mode) liquid pipe temperature (from operation monitor of outdoor unit control board)</p> <p>3. When fan rotate and LEV is fully closed, if there is any leakage, then the temperature is down</p> <p>If estimated temperature is very low in comparison with suction temperature which is displayed at remote controller then the valve is not fully closed</p>	If the amount of leakage is much, Replace LEV	Indoor unit

## 2.4 3Phase Bridge Diode

### Internal circuit diagram



### Appearance



1. Unplug the + terminal of electrolytic capacitor from the + terminal of 3phase bridge diode
2. Set the multi meter to resistance mode  
Check and estimate the resistance between each pair of terminal (+, -), (+, ~ (U)), (+, ~ (V)), (+, ~ (W)), (~ (U), -), (~ (V), -), (~ (W), -), the estimated value should be large enough to Mega Ohm unit.
3. Set the multi meter to diode mode, and estimate between each pair of terminal (~ (U), +), (~ (V), +), (~ (W), +), (-, ~ (U)), (-, ~ (V)), (-, ~ (W)), the estimated value should be stable and be in between 0 to 1. (ex: 0.35, 0.46 etc.)



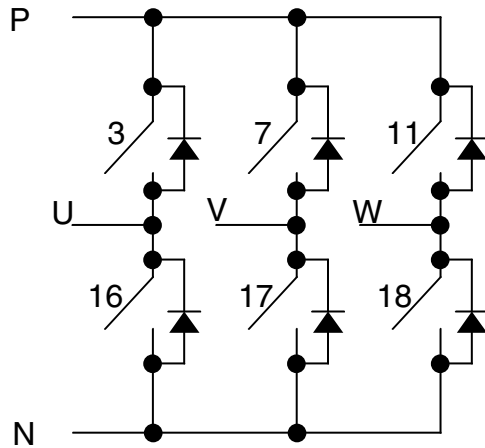
If one of the above articles is not satisfied, bridge diode must be inferior and to be replaced

### Caution

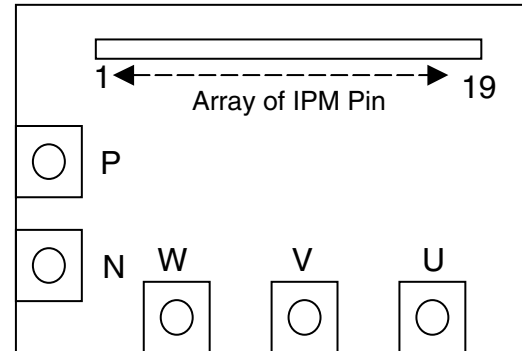
In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01Y (in inverter board, refer to page 172) turned off (wait 3 minutes after main power OFF), otherwise it may cause electrical shock.

## 2.5 IPM(Integrated Power Module)

### Internal circuit diagram



### Appearance



1. Unplug the +, - terminal of electrolytic capacitor from the P and N terminal of IPM
2. Set the multi meter to resistance mode  
Check and estimate the resistance between each pair of terminal **(P, N), (P, U), (P, V), (P, W), (U, N), (V, N), (W, N)**, the estimated value should be large enough to Mega Ohm unit.
3. Set the multi meter to resistance mode  
Check and estimate the resistance between each pair of terminal **(3, U), (7, V), (11, W), (16, N), (17, N), (18, N)**, the estimated value should be large enough to Mega Ohm unit.  
the check point is inside of the screw hole **(U, V, W, N)**, if check points are plate face of the terminal, then estimated values are gate resistance.
4. Set the multi meter to diode mode, and estimate between each pair of terminal **(U, P), (V, P), (W, P), (N, U), (N, V), (N, W)**, the estimated value should be stable and be in between 0 to 1. (ex: 0.35, 0.46 etc.)



*If one of the above articles is not satisfied,  
IPM must be inferior and is to be replaced*

### Caution

In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01Y (in inverter board, refer to page 172) turned off (wait 3 minutes after main power OFF), otherwise it may cause electrical shock.

## 2.6 Other

### Electrolytic capacitor and resistor for voltage distribution

- 1) Disconnect an terminal of voltage distribution resistor from each DC link electrolytic capacitor
- 2) Set the multi meter to resistance mode, connect the probe to +,- terminal of the capacitor. If the estimated resistance value is increase continuously without short(value is 0), then the resistor is normal
- 3) Set the multi meter to resistance mode, confirm that the resistance value of the resistor is around 270 kOhm



*Check and replace inferior components*

#### **Caution**

In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01Y turned off (wait 3 minutes after main power OFF), otherwise it may cause electrical shock.

## 3. Self-diagnosis function

### Self-Diagnosis Function

#### Error Indicator

- This function indicates types of failure in self-diagnosis and occurrence of failure for air condition.
- Error mark is displayed on display window of indoor units and wired remote controller, and 7-segment LED of outdoor unit control board as shown in the table.
- If more than two troubles occur simultaneously, lower number of error code is first displayed.
- After error occurrence, if error is released, error LED is also released simultaneously.

	Display		Title	Cause of Error
Indoor unit related error	0	1	Air temperature sensor of indoor unit	Air temperature sensor of indoor unit is open or short
	0	2	Inlet pipe temperature sensor of indoor unit	Inlet pipe temperature sensor of indoor unit is open or short
	0	3	Transmission error : wired remote controller ↔ indoor unit	Failing to receive wired remote controller signal at indoor unit PCB
	0	4	Drain pump	Malfunction of drain pump
	0	5	Transmission error : outdoor unit ↔ indoor unit	Failing to receive outdoor unit signal at indoor unit PCB
	0	6	Outlet pipe temperature sensor of indoor unit	Outlet pipe temperature sensor of indoor unit is open or short
	0	7	Different operation mode	Operation mode between indoor unit and outdoor unit is different
	0	8	Indoor LEV	Malfunction of indoor LEV
	0	9	Serial No.	In the case that the serial number marked on EEPROM of indoor unit is 0 or FFFFFF
	1	0	Poor fan moto operation	Disconnecting the fan motor connector/Failure or indoor fan motor lock.
	1	1	Transmission error : indoor unit → main PCB of outdoor.	When the addressing signal doesn't come out for 3mins. suddenly, while the indoor unit gets the calling signal coming from the outdoor unit.
Power related error	2	1	DC peak	IPM fault or overcurrent to compressor
	2	2	Overcurrent of inverter comp.	Overcurrent flows to inverter compressor
	2	3	Poor voltage charge for driving INV compressor	DC charging is not performed after starting relay turn on
	2	4	High pressure switch	System is off by high pressure switch
	2	5	Low/Over voltage	Input voltage is out of tolerable range.
Compressor related error	3	2	Discharge temperature (INV compressor A)	System is off due to rising of INV compressor A discharge temperature
	3	3	Discharge temperature (INV compressor B)	System is off due to rising of INV compressor B discharge temperature
	3	4	High pressure	System is off by excessive increase of high pressure
	3	5	Low pressure	System is off by excessive decrease of low pressure



	Display		Title	Cause of Error
Outdoor unit related error	4	0	Current sensor of inverter compressor	Current sensor of inverter compressor is open or short
	4	1	Discharge temperature sensor of inverter compressor A	Discharge temperature sensor of inverter compressor A is open or short
	4	2	Low pressure sensor	Low pressure sensor is open or short
	4	3	High pressure sensor	High pressure sensor is open or short
	4	4	Air temperature sensor	Air temperature sensor is open or short
	4	5	Temperature sensor of Upper-part heat exchanger	Temperature sensor of Upper-part heat exchanger is open or short
	4	6	Suction temperature sensor of main outdoor unit	Suction temperature sensor of main outdoor unit is open or short
	4	7	Discharge temperature sensor of inverter compressor B	Discharge temperature sensor of inverter compressor B is open or short.
	4	8	Temperature sensor of Lower-part heat exchanger	Temperature sensor of Lower-part heat exchanger is open or short
	4	9	Outdoor voltage sensing error	1. Abnormal input voltage 2. Outdoor line fuse damage 3. Defective outdoor main PCB
Transmission related error	5	1	Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of outdoor unit
	5	2	Transmission error : inverter PCB → main PCB	Failing to receive inverter signal at main PCB
	5	3	Transmission error : indoor unit → main PCB of outdoor unit	Failing to receive indoor unit signal at main PCB of outdoor unit
	5	4	Reverse connection of R, S, T power of main outdoor unit	Reverse connection or omitting connection of R, S, T power of main outdoor unit
	5	7	Transmission error : main PCB → inverter PCB	Failing to receive main PCB signal at inverter PCB
Outdoor unit related error	6	2	Overheat of inverter heatsink	Overheat of inverter heatsink
	6	5	Temperature sensor of heatsink	Temperature sensor of heatsink is open or short

## Self-diagnosis function

	Display			Title	Cause of Error
Transmission related error	1	0	5	Transmission error : fan PCB → main PCB	Failing to receive fan signal at main PCB
	1	0	6	Over-current of fan motor (IPM fault)	Over-current of fan motor (IPM fault)
	1	0	7	Low voltage of fan motor driver	Low voltage of fan motor driver
	1	0	8	Transmission error : main PCB → fan PCB	Failing to receive main signal at fan PCB
Outdoor unit related error	1	1	3	Liquid pipe temperature sensor	Liquid pipe temperature sensor is open or short
	1	1	4	Subcooling inlet temperature sensor	Subcooling inlet temperature sensor is open or short
	1	1	5	Subcooling outlet temperature sensor	Subcooling outlet temperature sensor is open or short
	1	5	1	Failure of operation mode conversion	Pressure unbalance between outdoor units

■ Please refer to trouble shooting guide in service manual for each error title



### CAUTION

In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01M (Refer to next page) turned off (wait 3 minutes after main power OFF), otherwise, it may cause electrical shock.

Error Code	Error Contents	Meaning	Main Causes	Error display position
01	Indoor Unit room temp.sensor error	Indoor Unit sensor open or short	1. Sensor wrong connection 2. Sensor open/Short 3. Defective Indoor Unit PCB 4. Defective Sensor	Concerned Remote controller Panel Display
02	Unit inlet pipe temp.sensor error (Indoor Unit)			
06	Outlet pipe temp. sensor error (Indoor Unit)			

■ Defect inspection method :

- 1) Check the connecting point of the sensor with the PCB (Sensor's Connector).  
Is the sensor connecting condition correct ? Otherwise, reconnect the sensor at the correct position.
  - 2) Remove the sensor and measure its resistance with a tester.  
Room temp sensor : 10°C = 20.7kΩ : 25°C = 10kΩ : 50°C = 3.4kΩ  
Pipe temp sensor : 10°C = 10kΩ : 25°C= 5kΩ : 50°C = 1.8kΩ
  - 3) Replace the sensor if it is not having a correct resistance value.
  - 4) If there is no problem with the sensor and the sensor connection then replace the Indoor Unit PCB.
- Panel Display indication method : Error code and the LED blinking counts are indication.

Error Code	Error Contents	Meaning	Main Causes	Error display position
03	Communication error between Indoor Unit and the Wired Remote Controller	In case the wired Remote Controller cant receive the signal from the Indoor Unit	1. Defective wired Remote controller. 2. Defective Indoor Unit PCB . 3. Defective Connector connection 4. Defective wire of the Wired Remote Controller	Concerned Remote Controller Panel Display

■ Defect inspection method :

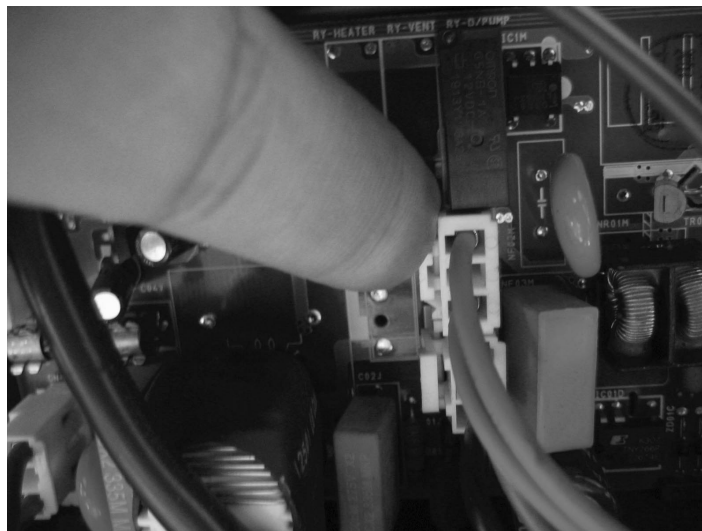
- 1) Check the connection point of the Wired Remote Controller (Connecting Connector).
- 2) In case the Wired Remote Controller's cable is installed near the AC power line, then they must be separated by distance of at least 30cm.
- 3) In case the replaced Remote Controller has no defect, then the originally installed Remote Controller is defective.
- 4) In case the error code exists even after the replacement of the Remote Controller, then the Remote Controller is not defective and hence only Indoor Unit PCB should be replaced.
- 5) In case error code exists even after the replacement of the Wired Remote Controller and the Indoor Unit PCB, then replace the cable connecting the Wired Remote Controller and Indoor Unit.

## Troubleshooting Guide

Error Code	Error Contents	Meaning	Main Causes	Error display position
04	Indoor Unit drain pump error	In case of the Indoor Unit drain pump defect the condensed water level rises and float switch (sensor) detects the error .	1. Defective drain pump / float switch 2. Defective drain (hose chocked / improper inclination ) 3. Defective PCB in the Indoor Unit	Concerned Remote controller  Panel Display

### ■ Defect inspection method :

- 1) Check the proper functioning of the drain pump in case of any drain water? (Functioning sound / check the water flowing)
- 2) In case the drain pump is not working properly, then check the 220V power supply at the drain pump terminal with a tester.  
In case the drain pump do not function properly after power supply to the to the PCB, then replace the drain pump.
- 3) In case of no power at the PCB terminal, then replace the Indoor Unit PCB.
- 4) In case the drain pump is OK, then check whether the hose is chocked or the drain pipe is improper and make sure to correct the drain flow error if any.
- 5) In case the drain pump is OK and there is no drain water in drain pan and still the error code is displayed? Then check whether the float sensor is touching the chassis. In case the float switch sensor is not touching the chassis and still the error code exists, then the float switch has the error. In such a case, the drain pump assembly must be replaced.



Drain Pump connector

Error Code	Error Contents	Meaning	Main Causes	Error display position
05	Communication error between the Outdoor and Indoor Unit	In case the Indoor Unit does not receive any signal from the Outdoor Unit .	<ol style="list-style-type: none"> <li>1. Defective "Auto-Addressing"</li> <li>2. Defective communication connections between Indoor and Outdoor Unit</li> <li>3. Communication cable is open or short</li> <li>4. Defective Indoor Unit communication circuit</li> <li>5. Defective outdoor unit communication circuit</li> <li>6. Insufficient distance between the power line and the communication cable</li> <li>7. Outdoor main power Line Fuse damage.</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p>

■ Defect inspection method :

**[In case all Indoor Units display 'ch05' error code ]**

- 1) Check whether the "Auto-Addressing" was in operation or not.
- 2) Check whether the Outdoor Unit power is off .  
If the Outdoor Unit power is Off then check the cause and put the power On. (Cause : Comp electric leakage or damage, ELB (breaker) defect, electric short between the power line etc )
- 3) Check whether the outdoor control box communication wire is connected properly at the terminal
- 4) Check whether the communication wire is open or short , in such a case remove the defect cause.(Wire open confirmation : After power Off, short the communication wire with each other and measure the resistance of the communication wire by a tester › In case the resistance is above 5Ω, then the wire is open (Wire short confirmation : After power Off, separate the communication wire and measure the resistance of the communication wire by a tester › In case the resistance is below 5Ω, then the the wire is short )
- 5) In case the causes mentioned in clause 1)~3) does not exists, then all communication wire of the Indoor Unit must be separated and the all Indoor Unit communication wire by connecting to the Outdoor Unit one by one . (Defective Indoor Unit PCB connection can cause the communication error ) › Replace the concerned Indoor Unit PCB.

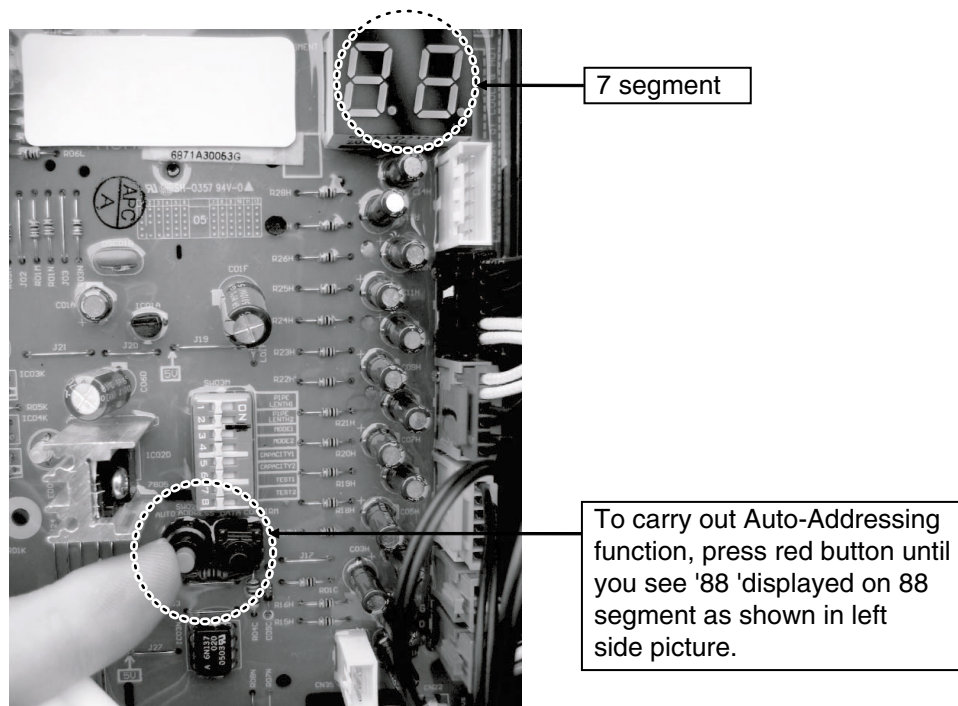
## Troubleshooting Guide

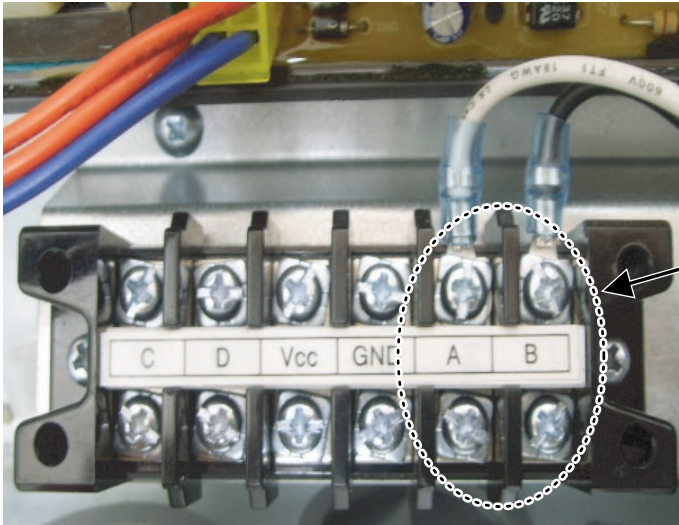
### [In case only one Indoor Unit or only few Indoor Units display 'ch05' error ]

- 1) Re-operate the Auto-Addressing function and then confirm the Auto-Addressing in all Indoor Units. Auto-Addressing can be confirmed at the Wired Remote Controller.  
In case of the Indoor Units not having the Wired Remote Controller, check the blinking counts of the Indoor Unit panel (Auto-Addressing must be operated after minimum 1 minute of power On ) › Check the Indoor Unit not having Auto-Addressing and replace the concerned unit PCB if required.
- 2) Make sure to separate the communication wire and the power line (AC220/380V ) by a distance of minimum 30 cm.

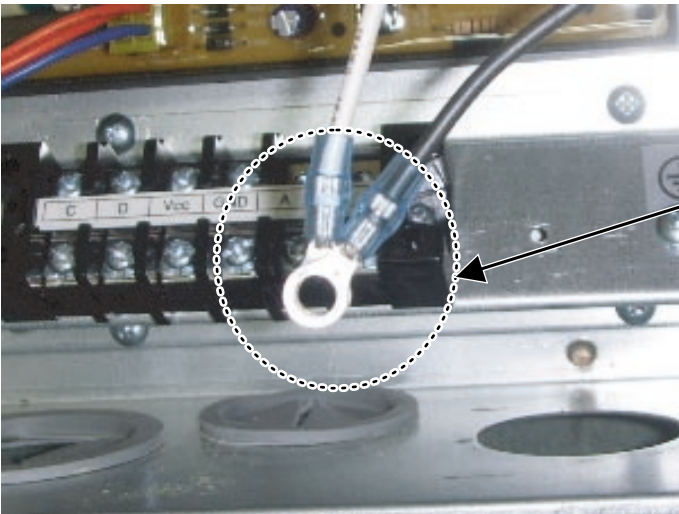
### CAUTION

- In case you replace the communication wire by power 220V line, then the connected PCB gets damaged or burnt.





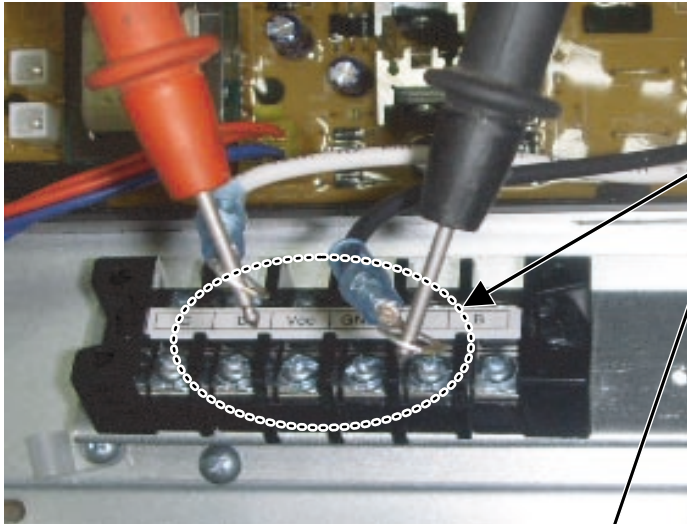
Terminal A, B :  
- Communication terminal between outdoor & indoor



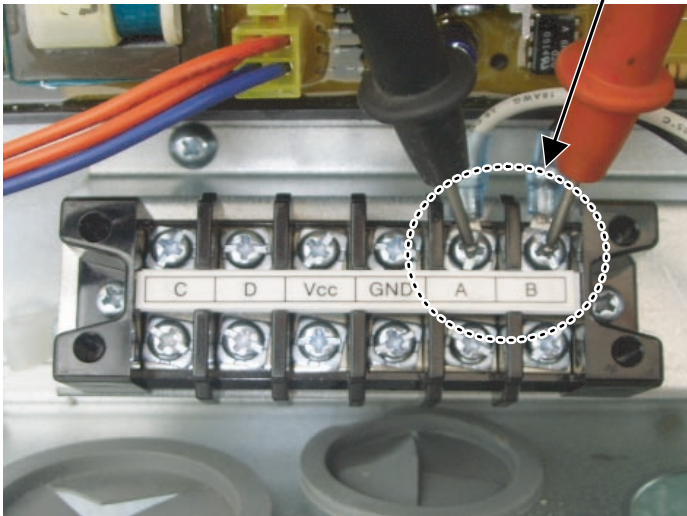
Short the communication wire with each other



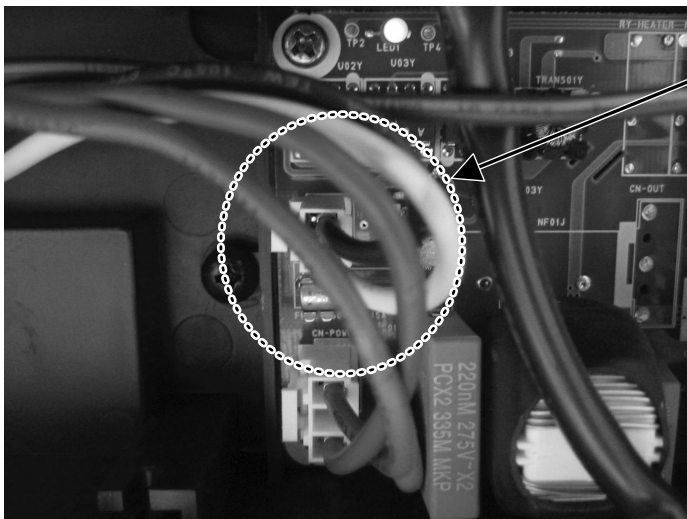
► Communication wire & terminal in the outdoor



Measure resistance



► Communication wire & terminal in the indoor



Communication terminal  
In the indoor.



Error Code	Error Contents	Meaning	Main Causes	Error display position
06	Indoor Unit outlet pipe temp. sensor error	Indoor Unit sensor open or short		Refer to CH01

Error Code	Error Contents	Meaning	Main Causes	Error display position
07	All Indoor Units are not running in the same mode(All units must run either in heating or cooling mode )	The Indoor Unit later started is in different mode than the unit started at first .	<ol style="list-style-type: none"> <li>1. The Indoor Units are in a different operation mode.</li> <li>2. The error display will be in the Wired Remote Controller of the unit started later.</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p>

■ Defect inspection method :

- 1) Error removal method : Press the On/Off button on the Wired Remote controller. The error code will be removed automatically after a few seconds.
- 2) Immediately change the operation mode after the pressing the On/Off button. (The same operation mode as in the original Indoor Unit started at first (other than the defective unit mode) (heating /cooling )

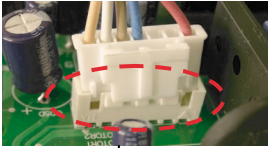
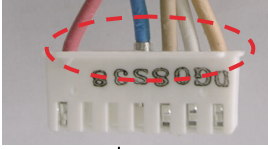
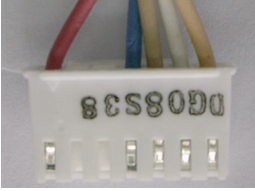
Error Code	Error Contents	Meaning	Main Causes	Error display position
09	Indoor Unit EEPROM error	Problem developed in the EEPROM inside the PCB of the Indoor Unit	<ol style="list-style-type: none"> <li>1. Error developed in communication between the Microprocessor and the EEPROM on the surface of the PCB.</li> <li>2. ERROR due to the EEPROM damage</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p>

■ Defect inspection method :

- 1) Check whether there is some stains at the EEPROM PIN (Lead remnants) .  
Remove this unwanted material and re-operate the "Auto-Addressing".
- 2) Replace the Indoor Unit PCB.

## Troubleshooting Guide

Error Code	Error Contents	Meaning	Main Causes	Error display position
10	Indoor unit related error	Failure of the fan motor operation	Disconnecting the fan motor connector / failure	Concerned Remote controller Panel Display

Cause of problem	Checking method	Measures																								
<p>■ The fan is locked by an interference with another object.</p> <p>↓</p> <p>1) Remove motor connector</p>  <p>↓</p> <p>2) Remove housing terminal</p>  <p>↓</p> <p>3) Disconnected or crushed wired</p> <p>↓</p> <p>■ Burn out of PCB within the motor etc.</p>  <p>↓</p> <p>■ Failure capacitor part (TD chassis)</p> <p>↓</p> <p>■ PCB indoor unit</p>	<p>■ Turn the fan with hand and check whether it is locked</p> <p>1) Check with naked eye</p> <p>2) Check with naked eye</p> <p>3) Check with naked eye</p> <p>■ Check the resistance value of each terminal with the tester</p> <table border="1"> <thead> <tr> <th colspan="2">Tester</th> <th colspan="2">Normal resistance (<math>\pm 10\%</math>)</th> </tr> <tr> <th>+</th> <th>-</th> <th>TH chassis</th> <th>TD chassis</th> </tr> </thead> <tbody> <tr> <td>①</td> <td>④</td> <td><math>\infty</math></td> <td><math>\infty</math></td> </tr> <tr> <td>⑤</td> <td>④</td> <td>102k<math>\Omega</math></td> <td>5M<math>\Omega</math> ~ 30M<math>\Omega</math></td> </tr> <tr> <td>⑥</td> <td>④</td> <td><math>\infty</math></td> <td><math>\infty</math></td> </tr> <tr> <td>⑦</td> <td>④</td> <td>235k<math>\Omega</math></td> <td>251k<math>\Omega</math></td> </tr> </tbody> </table> <p>■ Check the resistance of both ends of the capacitor (Normal : <math>\infty</math>)</p>	Tester		Normal resistance ( $\pm 10\%$ )		+	-	TH chassis	TD chassis	①	④	$\infty$	$\infty$	⑤	④	102k $\Omega$	5M $\Omega$ ~ 30M $\Omega$	⑥	④	$\infty$	$\infty$	⑦	④	235k $\Omega$	251k $\Omega$	<p>■ Unlock by reassembling etc.</p> <p>■ Repair or exchange motor</p> <p>■ Exchange motor</p> <p>■ Exchange capacitor</p> <p>■ Exchange capacitor</p>
Tester		Normal resistance ( $\pm 10\%$ )																								
+	-	TH chassis	TD chassis																							
①	④	$\infty$	$\infty$																							
⑤	④	102k $\Omega$	5M $\Omega$ ~ 30M $\Omega$																							
⑥	④	$\infty$	$\infty$																							
⑦	④	235k $\Omega$	251k $\Omega$																							

<b>Error Code</b>	<b>Error Contents</b>	<b>Meaning</b>	<b>Main Causes</b>	<b>Error display position</b>
11	Indoor unit related error	Outdoor unit cannot recognize the indoor unit	Auto addressing does not work after exchanging to new PCB	Concerned Remote controller  Panel Display

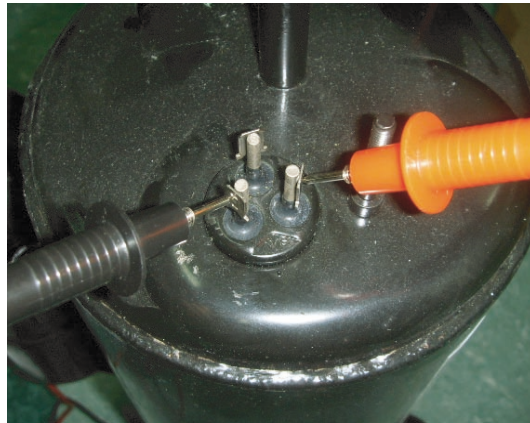
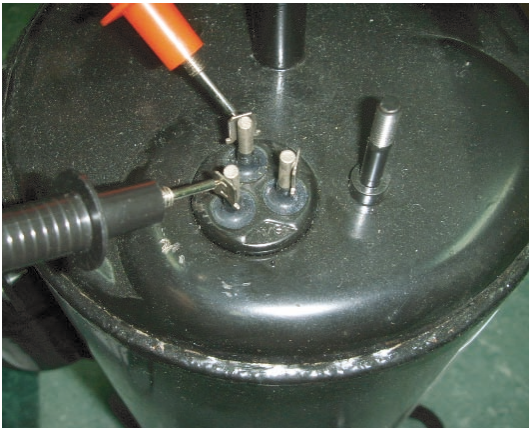
■ **Auto addressing for outdoor unit**

Error Code	Error Contents	Meaning	Main Causes	Error display position
21	Protection of Inverter compressor from over current (Detection of over 80A per 1.8ms IPM )	Defective inverter compressor, Inverter element (IPM) defect	1. Over current detection at the inverter compressor (U,V,W) 2. IPM Overheating . 3. Insulation damage of the compressor / motor damage 5. Low input voltage at the outdoor 6. Inverter compressor terminal disconnected or loose . 7. Inverter PCB/IPM PCB defect	Concerned Remote controller Panel Display Outdoor unit

■ Defect inspection method :

- 1) Check whether the insulation of the compressor, motor coil resistance is normal ? Otherwise, replace the compressor .
  - Motor Coil resistance normalcy : Resistance between each terminal of Inverter compressor =  $1.33\Omega \pm 7\%$  , Resistance between the each terminal of the constant speed compressor =  $1.83\Omega \pm 7\%$  (The 3 measured value must be similar)
  - Insulation normalcy : Resistance between the compressor terminal and the product body = Above  $2M\Omega$  (Measured within specified time after the compressor stop )
- 2) Check whether the IPM/3 phase rectification Diode is normal ? Otherwise, replace the IPM/ Diode .
  - Tester : After setting the Diode mode , test with the tester probe in + , - sequence.
  - IPM:'U-P/V-P/W-P' measurement : 0.3~0.6 V, Reverse polarity measurement : Above 2.6 V  
 'N-U/N-V/N-W' measurement : 0.3~0.6 V, Reverse polarity measurement : Above 2.6 V
  - 3 phase rectification diode : ~ & + / ~ & + / ~ & + ' sequential measurement : 0.3~0.6 V, Reverse polarity measurement : Above 2.6V
- 3) Check whether the input voltage is 360V~410V(AC).
- 4) Check the balance between each phase at the main breaker of the building (phase distribution ) (Below 5~10V).
- 5) Check whether the terminal connection is normal ?  
(Comp connecting terminal, IPM connecting terminal, diode connecting terminal, capacitor connecting terminal)
- 6) Check whether the IPM Pin connecting to PCB soldering is normal ?  
(Dismantle the PCB and check the soldering at the back side of the PCB .)  
In case if any abnormality please replace the IPM PCB.
- 7) Check whether the Outdoor Unit fan is working ? In case of any abnormality please check the outdoor fan (Refer to CH105~CH108)
- 8) Check whether the supplied power is normal or insufficient.
- 9) After the inspection, check whether the input power to the IPM during the trial run is 450V~560V(DC).  
(Set the tester at the DC mode)  
Check the IPM terminal connecting condition.  
(Comp connecting terminal, IPM connecting terminal, diode connecting terminal, capacitor connecting terminal )
- 10) Measure the current at each phase (U,V,W) of the inverter compressor during the trial run after the completion of the inspection.  
In case the deviation between the current in each phase is above 1.5A then replace the PCB .

► Resistance measure between phases of compressor



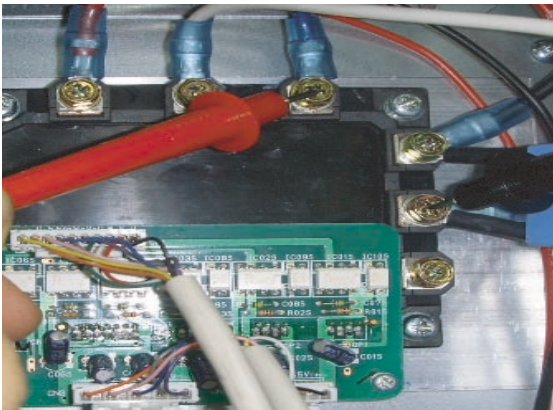
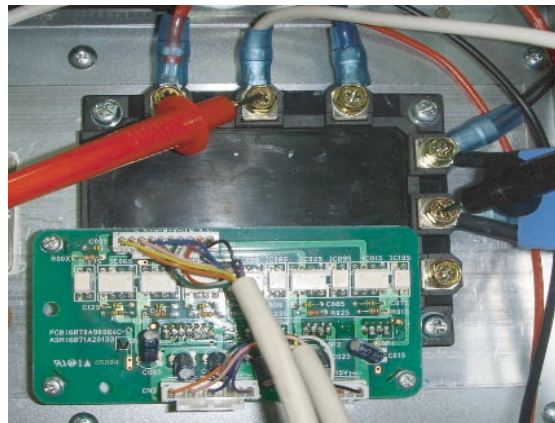
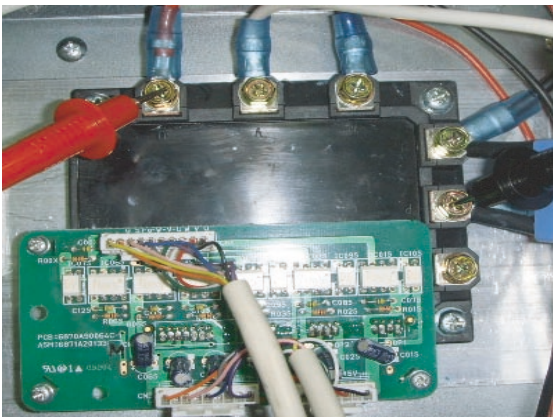


## Troubleshooting Guide

### ► Resistance measure between phase and body of compressor

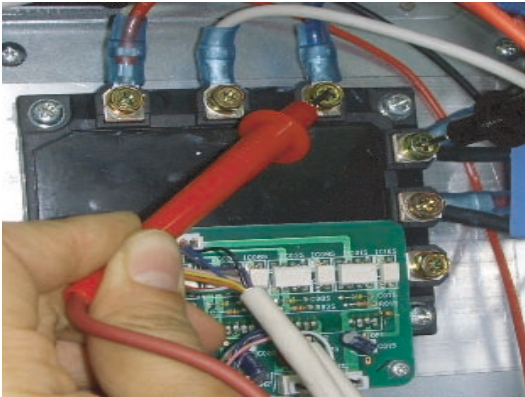
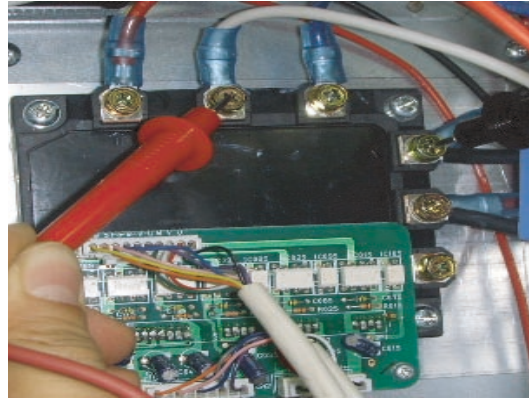
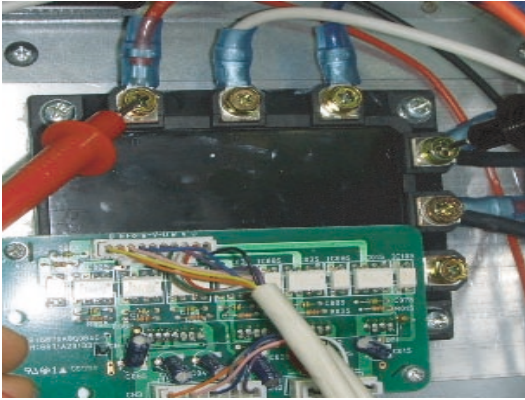


### ► Check IPM/3 phase rectification Diode : P-U/V/W

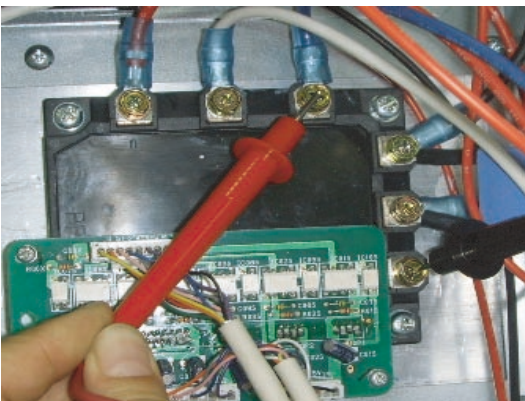
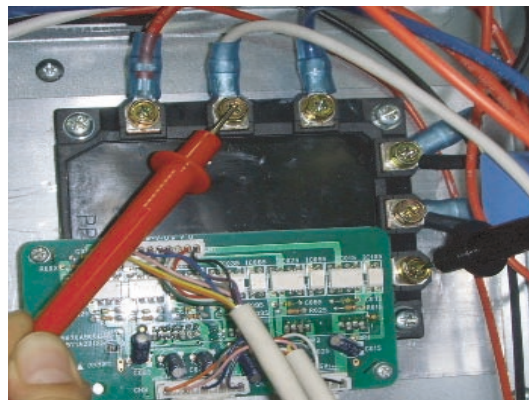
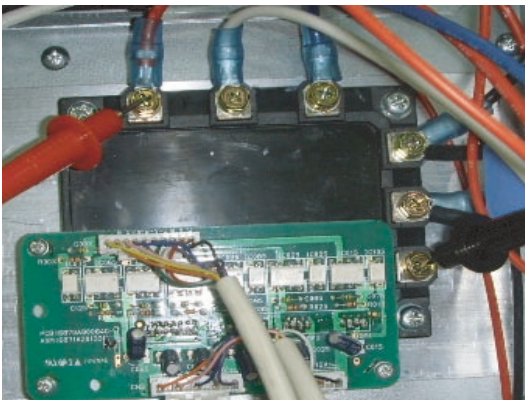




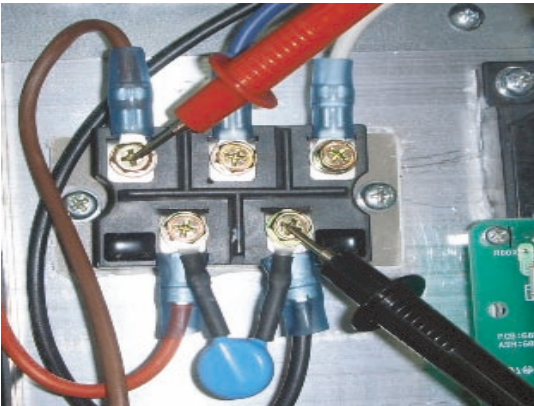
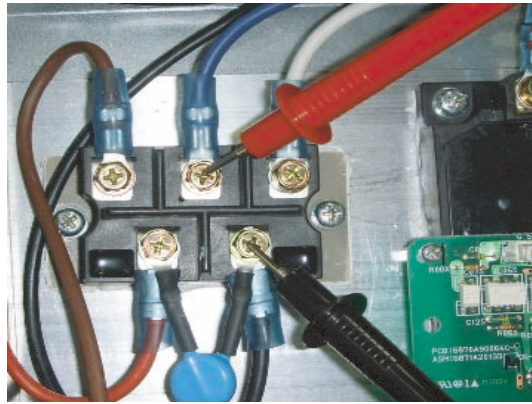
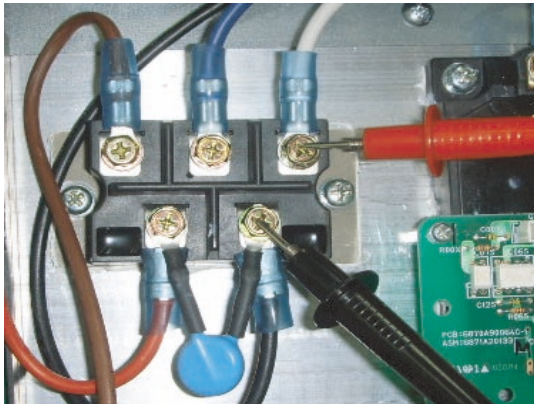
► Check IPM/3 phase rectification Diode : U/V/W-N



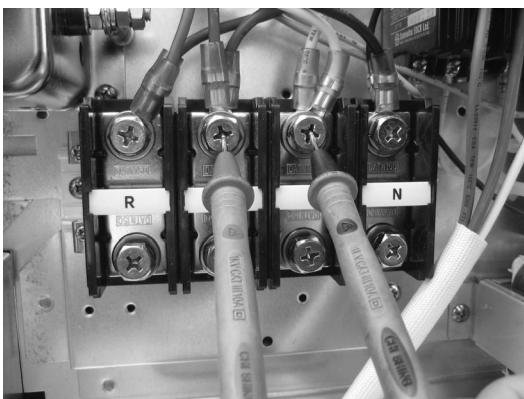
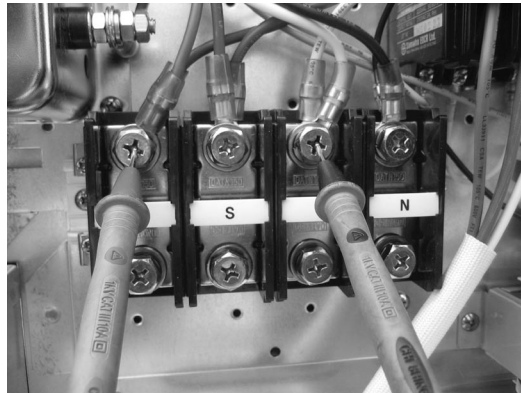
► Check 3 phase rectification diode : ~+~



► Check 3 phase rectification diode : ---

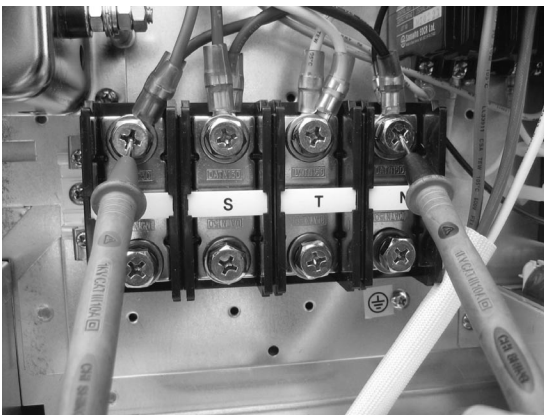
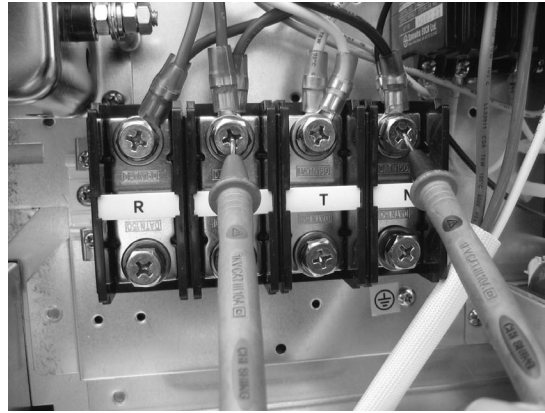
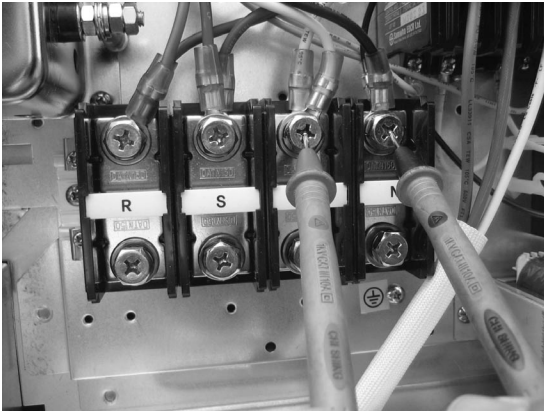


► Measure input power between phases (R-S, R-T, S-T)





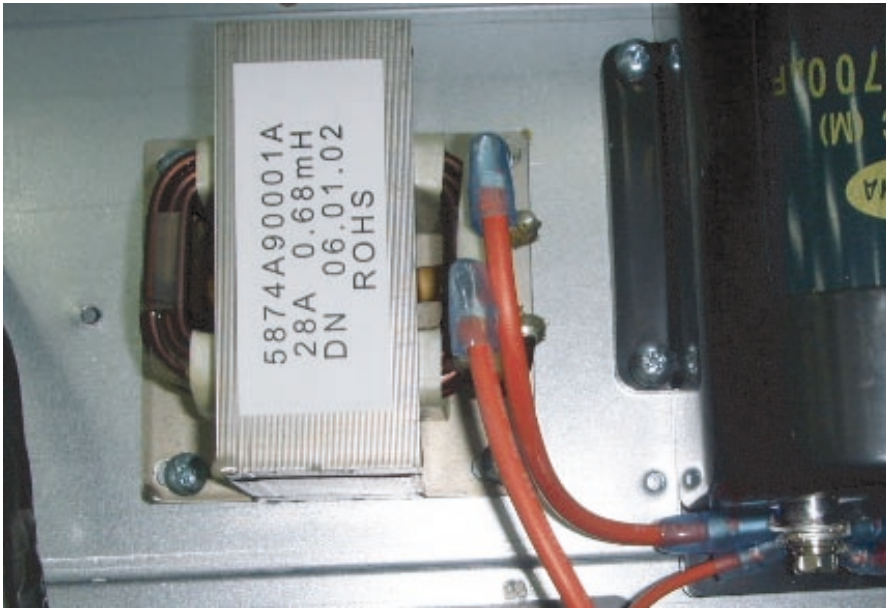
► Measure input power of one phase(R, S, T)



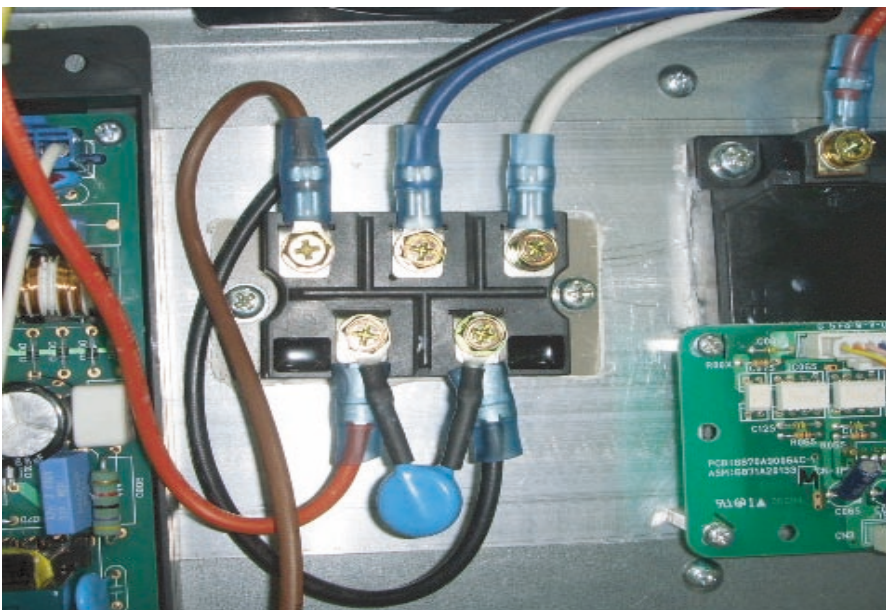
► Connector of compressor



► Connector of reactor



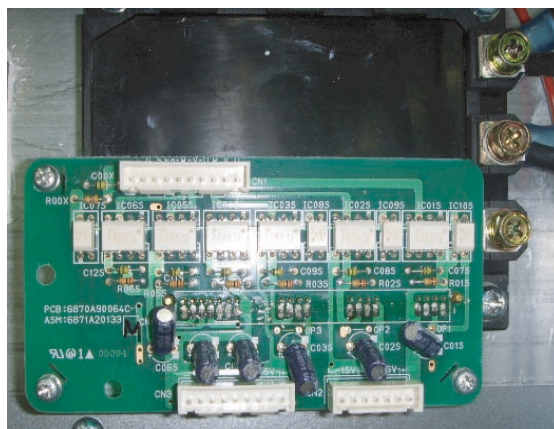
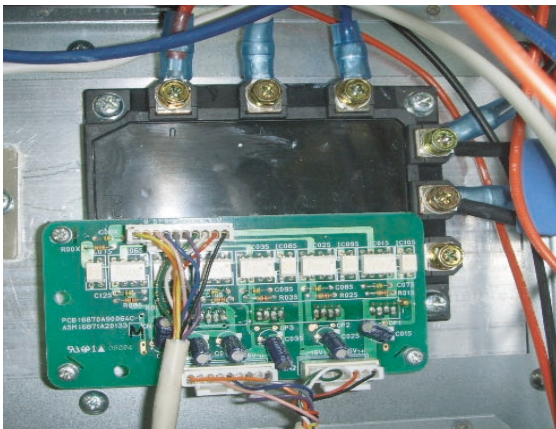
► Connectors of 3phase diode



► Connectors of capacitor

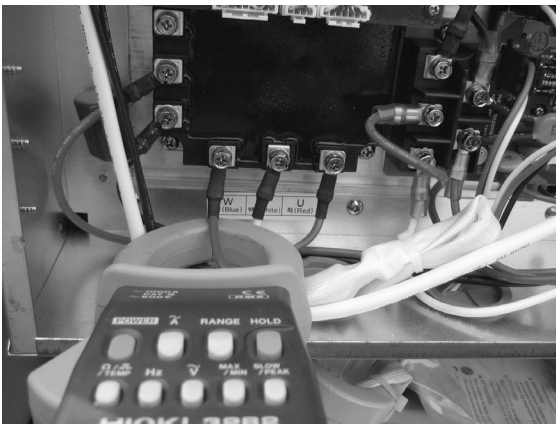
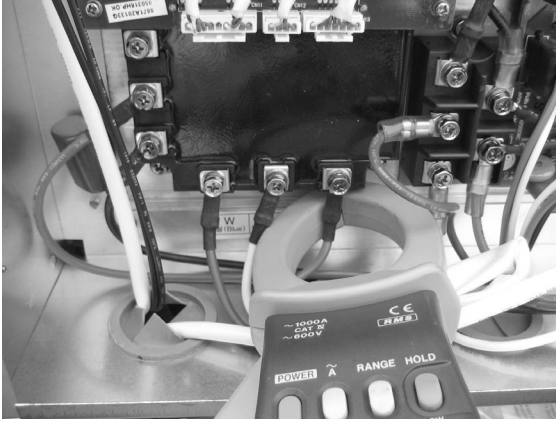


► Check IPM PCB

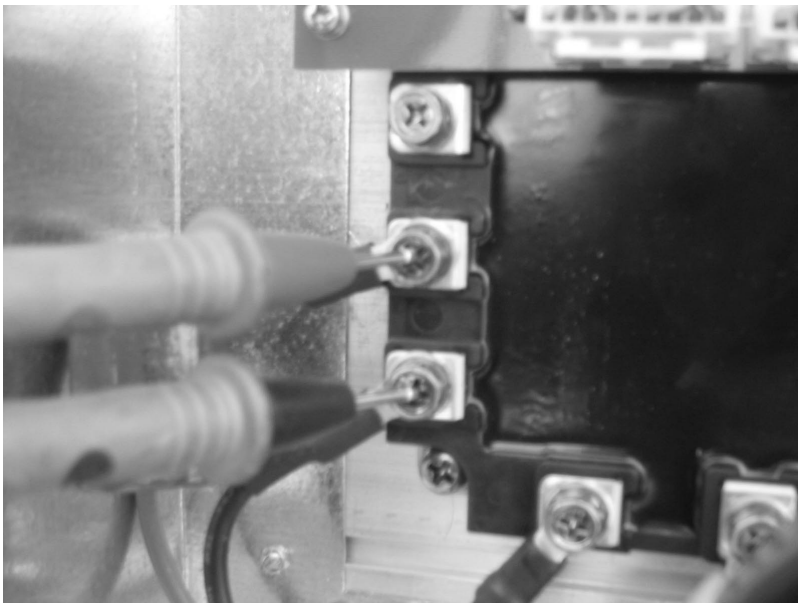




► Measure current of IPM U-V-W



► Measure voltage of IPM P-N

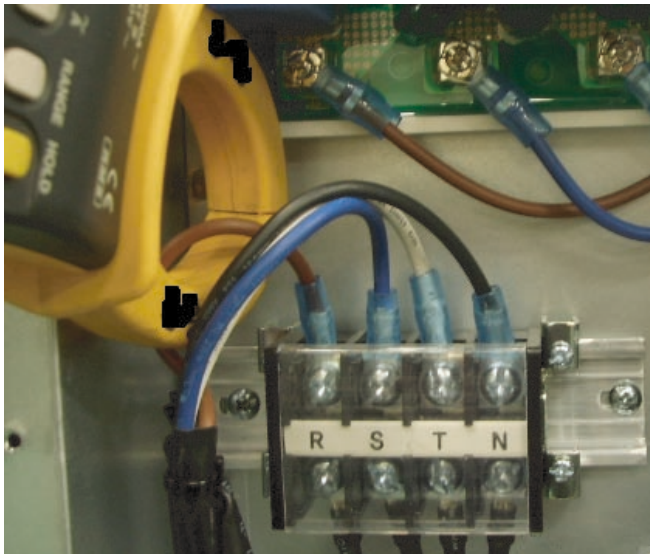


Error Code	Error Contents	Meaning	Main Causes	Error display position
22	Maximum over current (MAX CT)	The current flowing at the CT sensing circuit should be more than the maximum value of the current tolerance for the product .	<ol style="list-style-type: none"> <li>1. Comp. damage</li> <li>2. Current sensing sensor damage (CT)</li> <li>3. Low input voltage</li> <li>4. Comp. terminal is disconnected or loose .</li> <li>5. Abnormality at the Outdoor /Indoor Unit fan</li> <li>6. Defective inverter PCB/IPM PCB .</li> <li>7. Cover or chocking (Outdoor Unit covering during cooling mode / Filter chocked at the Indoor during heating mode )</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p> <p>Outdoor unit</p>

**Defect inspection method : Refer error code 21**

- 1) Check whether the current measured at the R phase during operation is above 18~20A ?  
In case the current measurement is normal (During compressor operation :3~16A), Replace the inverter PCB.
- 2) In case the current is above 18~20A, check the comp. insulation and the motor coil resistance (Refer error code 21) → In case the resistance is abnormal, then replace the comp.
- 3) Check whether the Main input power is 360Vac~410Vac.  
Check whether a deviation exists between the main power voltage of each phase (Below 5~10V)?  
In case there is a deviation in the required power supply in each phase or the abnormality of the input voltage, then please request the building electricity in charge to change the power supply accordingly.
- 4) Please remove any obstacle in path of the outdoor heat exchange and also clean the Indoor filter.
- 5) Check whether the IPM Pin connecting PCB soldering is normal ?  
(Check the PCB soldering at the back side of PCB after dismantling the PCB)  
In case of any abnormality, then please replace the IPM PCB .
- 6) Measure the current between each phase of the inverter comp (U,V,W) during the trial run after the inspection .  
In case of current deviation between each phase is above 1.5A, then replace the inverter PCB.

**Measure current of Phase 'R'**

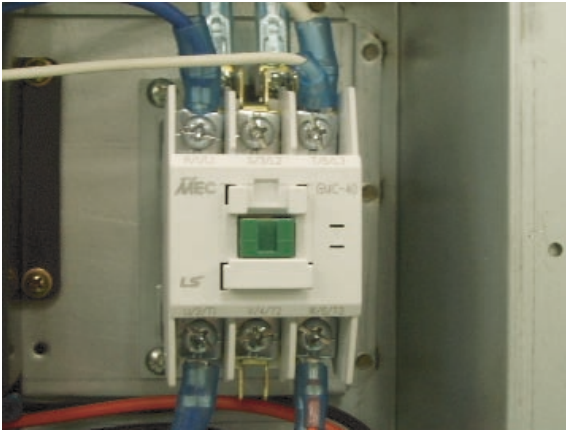


Error Code	Error Contents	Meaning	Main Causes	Error display position
23	Inverter comp. driving voltage charging defect	Problem in DC charging voltage after operating relay On	1. Looseness of DC link terminal . 2. Damage operating relay 3. Capacitor damage 4. Three phase current diode damage 5. Abnormal power voltage 6. IPM damage 7. Defective sensing circuit of the invert PCB	Concerned Remote controller  Panel Display  Outdoor unit

■ Defect inspection method : Refer error code 21

- 1) Check whether the starting relay / magnetic contactor at the control box are normal ?  
(After about 30 seconds of operation the voltage at the IPM P/N terminal should be above 450Vdc)
- 2) In case the voltage is below 450Vdc,
  - Make sure that the outdoor main input voltage is (360Vac~410Vac),
  - Make sure that the magnetic contactor coil resistance (400~700Ω) when the power is Off and also check the connecting conditions,
  - Check whether the comp capacitor connection and the outer shape is normal.  
(In case of any abnormality there is a shape change or expansion of the capacitor outer body )
- 3) Compressor insulation and the coil resistance and 3 phase rectification diode should also be checked.  
(Refer error code 21).
- 4) In case the error code is still displayed after solving the issue from clause 1)~3), then replace the inverter PCB.

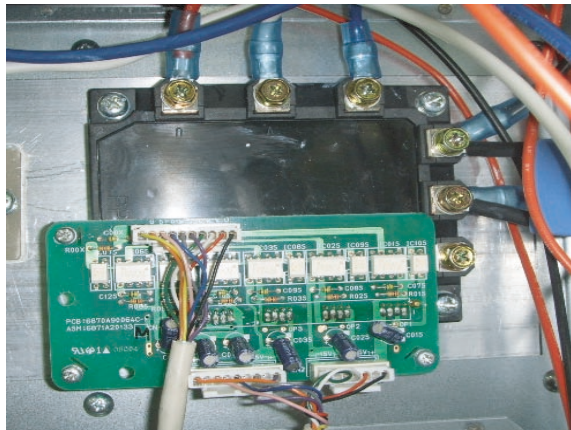
► Measure resistance of magnetic contactor coil



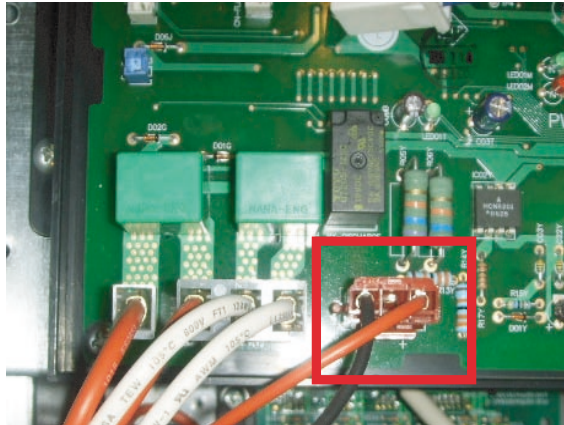
► Capacitor of compressor



► Inverter IPM



► P-N connector of IPM



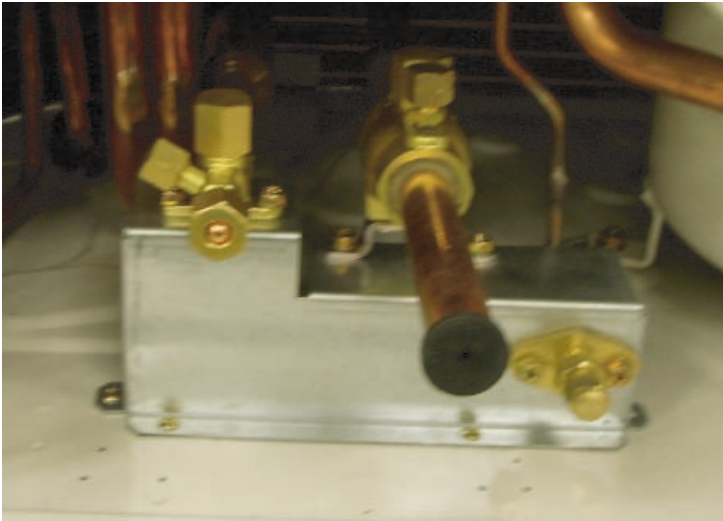
Error Code	Error Contents	Meaning	Main Causes	Error display position
24	Excessive rise in outdoor high pressure	Compressor Off due to the high pressure switch in outdoor unit	<ol style="list-style-type: none"> <li>1. Defective high pressure switch</li> <li>2. Defective Indoor or Outdoor fan</li> <li>3. Chocked compressor check valve</li> <li>4. Pipe chocked due to the pipe damage</li> <li>5. Refrigerant overcharge</li> <li>6. Defective LEV at the Indoor or Outdoor Unit .</li> <li>7. Covering or chocking (Outdoor covering during the cooling mode / Indoor Unit filter chocking during the heating mode)</li> <li>8. SVC valve chocking</li> <li>9. Defective Outdoor PCB</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p> <p>Outdoor unit</p>

■ Defect inspection method

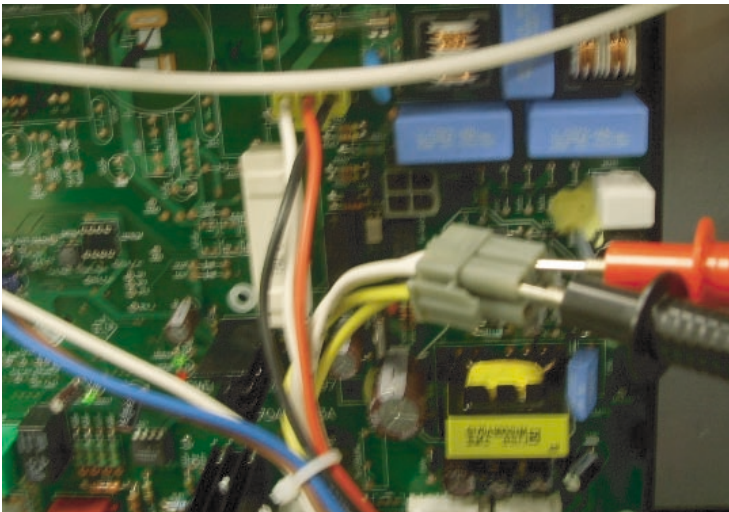
- 1) In case the Indoor / Outdoor Unit fan is not working normally, please check and replace them if required. (Refer to CH105~CH108)
- 2) Check whether Indoor / Outdoor Unit heat exchange is being accomplished successfully. Otherwise, check and modify the installation condition as per the required heat exchange. In case of heat exchanger covering please remove the outdoor condenser covering and also check the Indoor Unit filter.
- 3) Is the actual pressure reached high enough for the high pressure switch to be operational. Connect the manifold gauge at the high pressure service valve and compare the value of the high pressure sensor.
- 4) Check whether the SVC valve is open and other conditions(fold, dent etc) .
- 5) In case the pressure is not high enough for the high pressure switch to come into action, then please check the high pressure switch. In case, after temporary shorting of the pressure switch of the inverter and constant speed compressor on one by one if there is no error code display, then please replace the concerned high pressure switch. In case the error code is displayed after shorting the high pressure switch, then please replace the concerned PCB.
- 6) Required refrigerant re-calculation and check the refrigerant recharging condition.
- 7) Check whether the temperature of the both ends of the check valve are similar ? In case a temperature difference is sensed, then please replace the check valve.



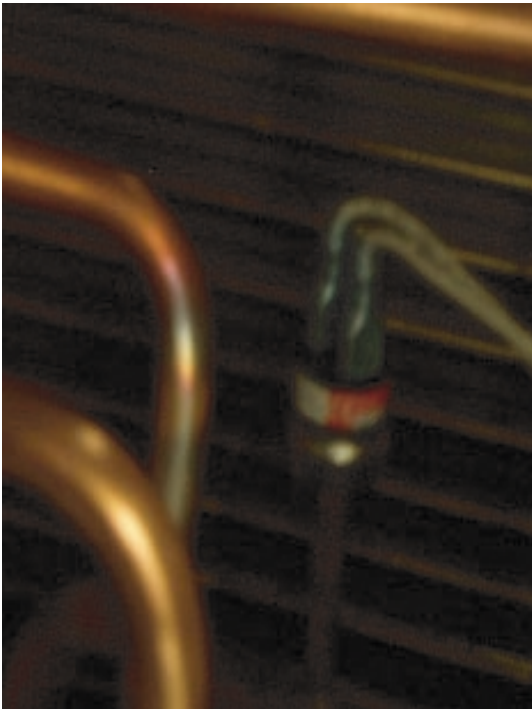
► SVC valve



► Measure resistance on the pressure switch connector



► Pressure switch



► CHECK VALVE



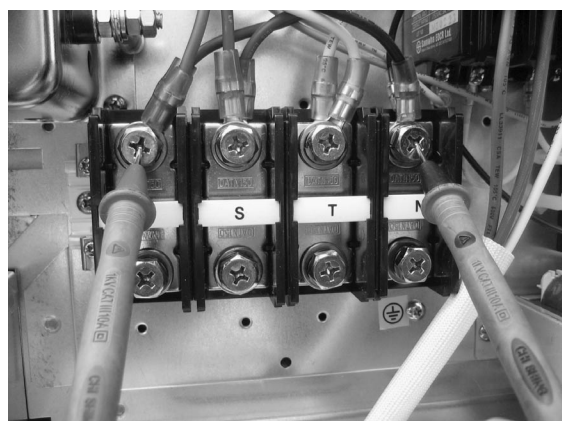
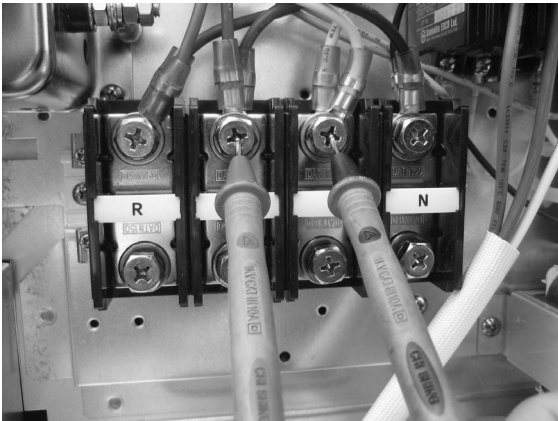
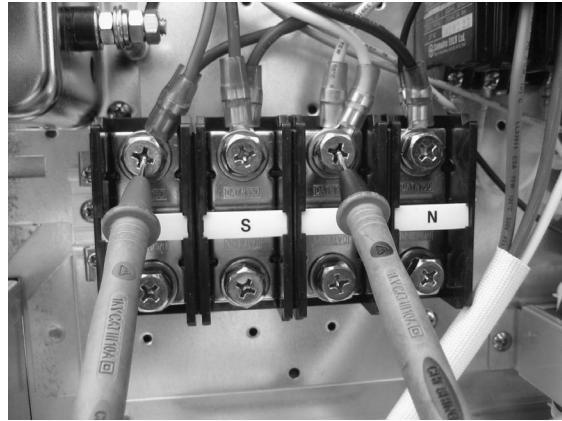
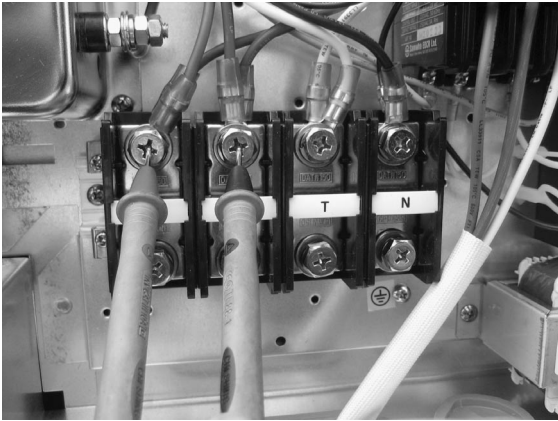
Error Code	Error Contents	Meaning	Main Causes	Error display position
25	Low voltage / High voltage	1. Input voltage in the installation region= 3 phase 380-10%, 415+10% 2. Single phase = 220-10%, 240+10%	1. Abnormality of the input voltage 2. Outdoor Unit main line fuse damage 3. Outdoor Unit main PCB defect	Concerned Remote controller  Panel Display  Outdoor unit

■ Defect inspection method

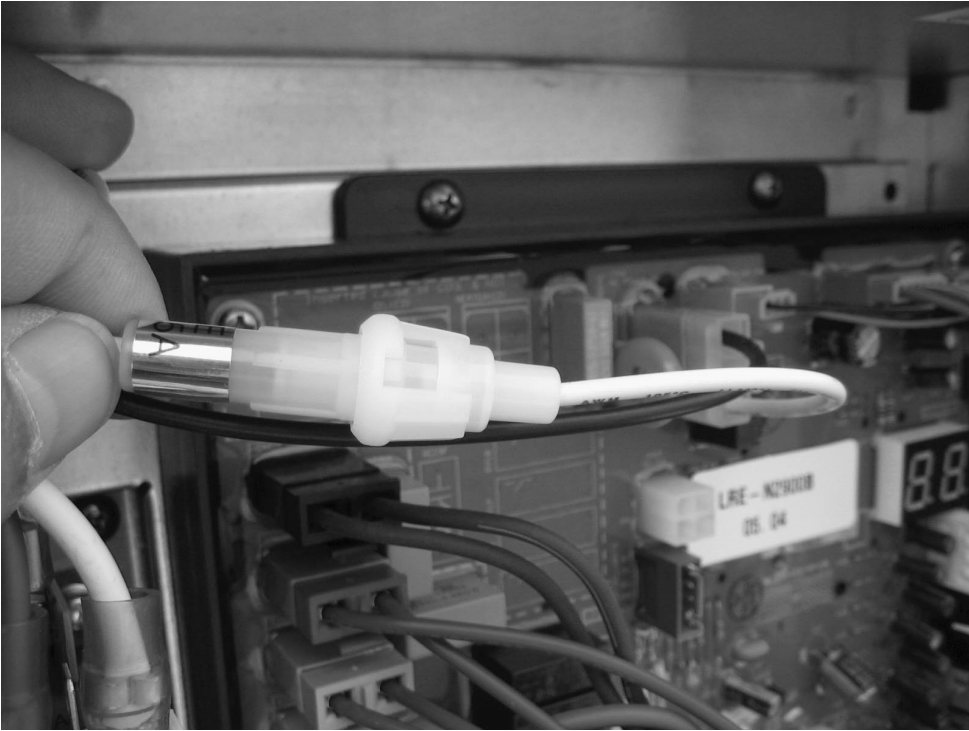
- 1) Check whether the input power (3 phase = 380V-10% ~ 415+10% single phase = 220V-10% ~ 240+10%). In case there is a deviation from the required power in each phase or is not the rated voltage, then please request the building electricity in charge to supply the required power.
- 2) Check whether the Outdoor Unit PCB power input is 220V-10%, 240+10%. Otherwise, Outdoor Unit line fuse be installed and required input voltage should be supplied.
- 3) In case the Outdoor Unit PCB power input is normal then replace the PCB.



► Measure power input of outdoor unit



▶ Measure power input of outdoor unit



Error Code	Error Contents	Meaning	Main Causes	Error display position
32	Excessive rise of the inverter comp.(A) discharge temp .	Inverter comp. Off due to the excessive rise in discharge temp	1. Inverter comp. discharge temp. sensor defect 2. Refrigerant shortage / leakage 3. Defective LEV 4. Defective Liquid Injection Valve 5. Defective Hot Gas Bypass Valve	Concerned Remote controller  Panel Display  Outdoor unit

■ Defect inspection method :

- 1) In case there is no actual rise of the discharge temp of the inverter comp.(A) but the sensor shows abnormal rise of the temp, then please replace the discharge pipe sensor
  - Discharge temp sensor 10°C = 362kΩ, 25°C = 200kΩ,  
50°C = 82kΩ, 100°C = 18.5kΩ

In case there is no actual rise of the discharge temp of the inverter comp.(A), then please replace the outdoor MAIN PCB.
- 2) Check the indoor / outdoor LEV / Hot gas / Liquid Injection valve connector connecting condition.

Error Code	Error Contents	Meaning	Main Causes	Error display position
33	Excessive rise of the inverter comp.(B) discharge temp .	Inverter comp. Off due to the excessive rise in discharge temp	1. Inverter comp. discharge temp. sensor defect 2. Refrigerant shortage / leakage 3. Defective LEV 4. Defective Liquid Injection Valve 5. Defective Hot Gas Bypass Valve	Concerned Remote controller  Panel Display  Outdoor unit

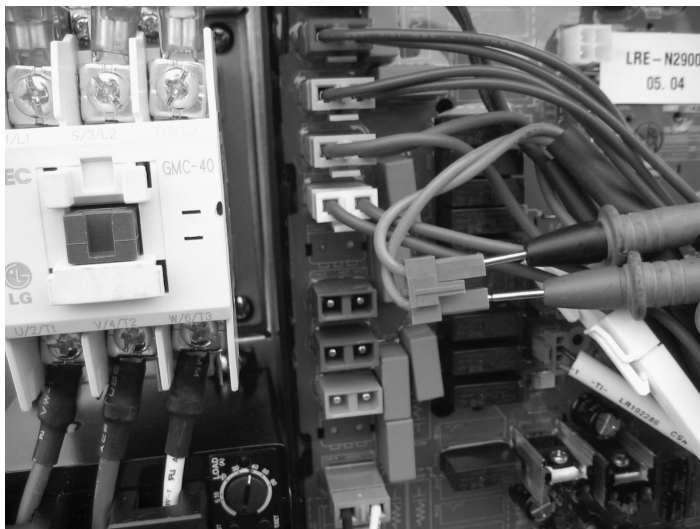
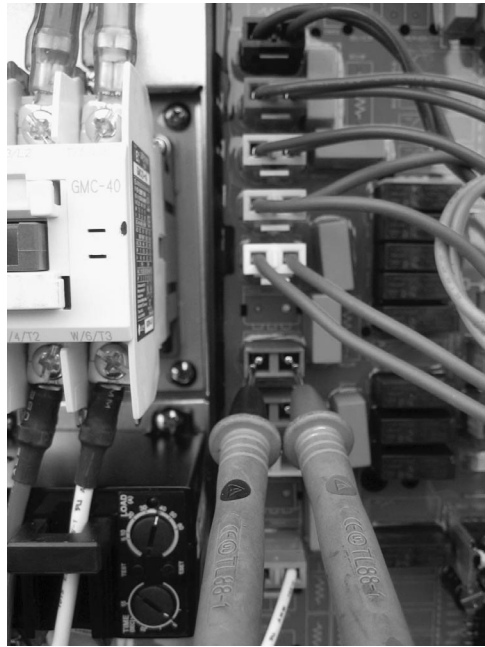
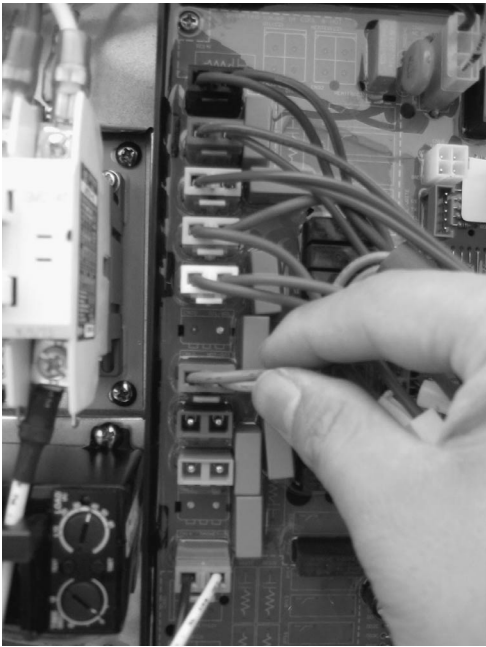
■ Defect inspection method :

- 1) In case there is no actual rise of the discharge temp of the inverter comp.(B) but the sensor shows abnormal rise of the temp, then please replace the discharge pipe sensor
  - Discharge temp sensor 10°C = 362kΩ, 25°C = 200kΩ,  
50°C = 82kΩ, 100°C = 18.5kΩ

In case there is no actual rise of the discharge temp of the inverter comp.(B), then please replace the outdoor MAIN PCB.
- 2) Check the indoor / outdoor LEV / Hot gas / Liquid Injection valve connector connecting condition.

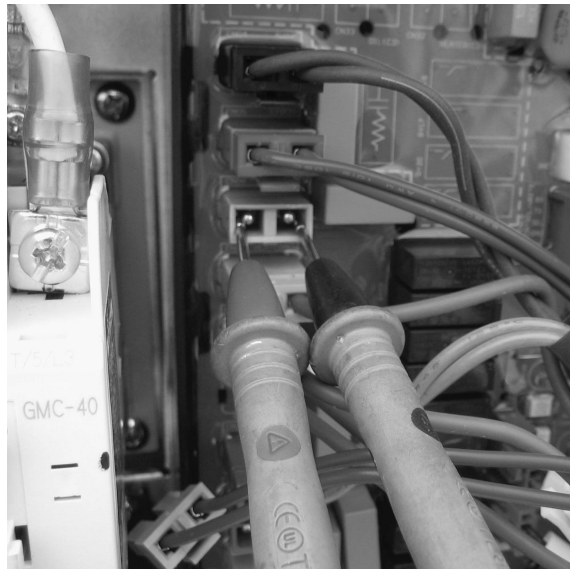
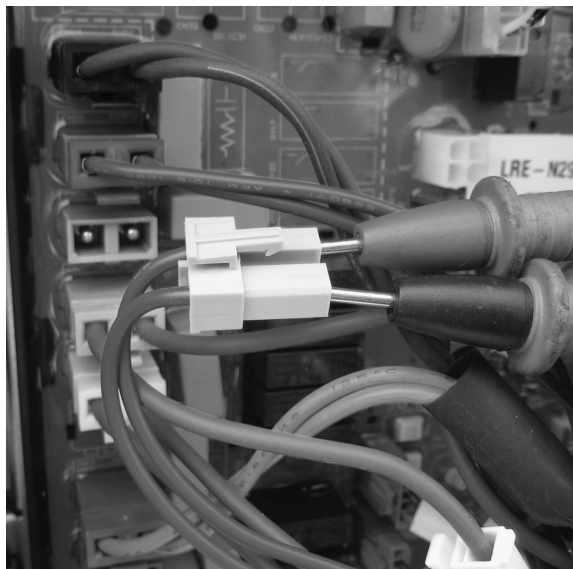
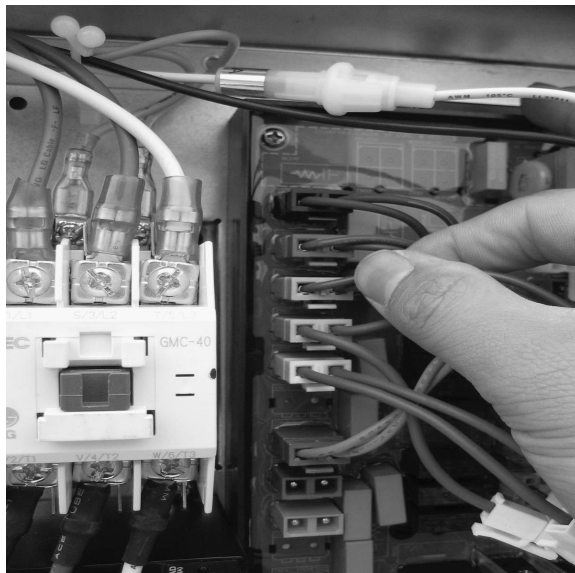
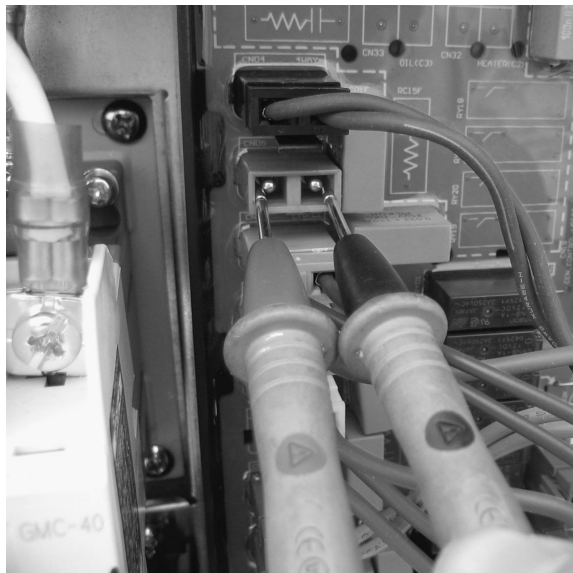
- 3) Check the LEV/Hot gas / Liquid Injection valve's coil resistance.  
LEV normalcy : Resistance between each terminal of the LEV 45~90Ω  
hot gas :  
liquid injection :  
In case the coil R is normal, then please check LEV/ Hot Gas /Liquid Injection Bypass Valve.
- 4) Recalculate the amount of refrigerant to be charged and check the charging condition.

► Hot gas by pass connector



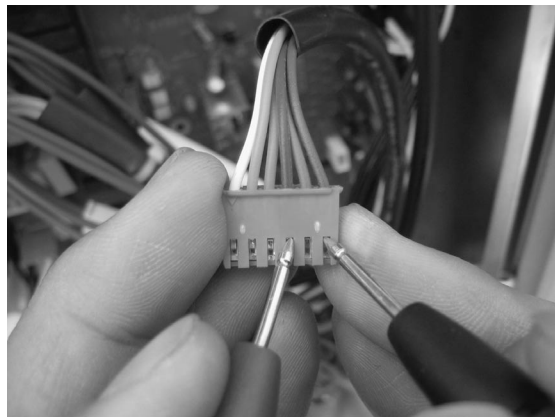
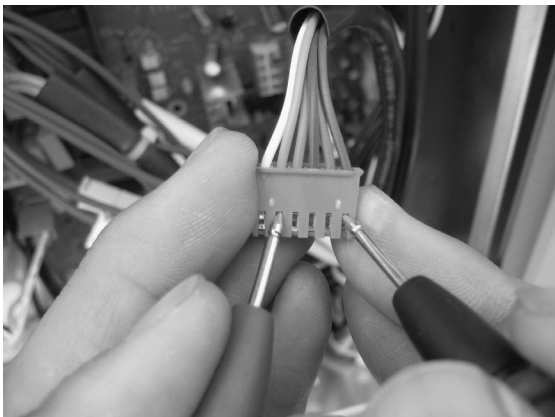
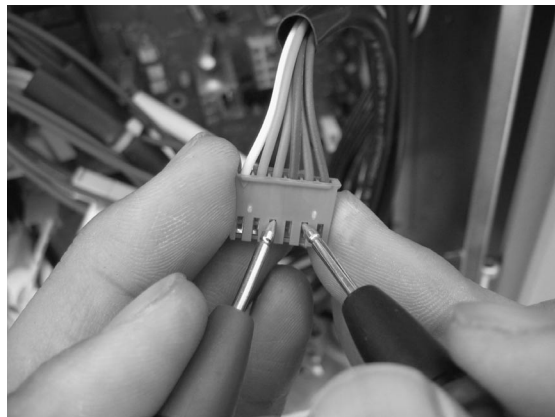
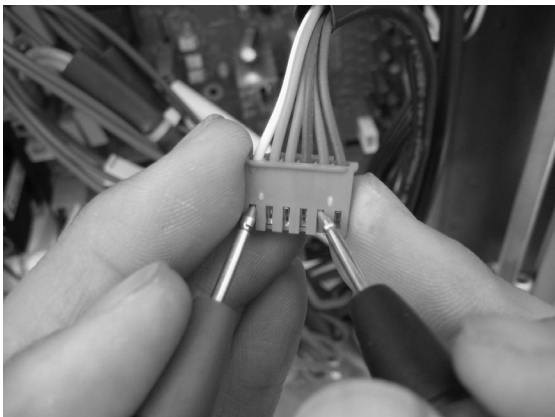
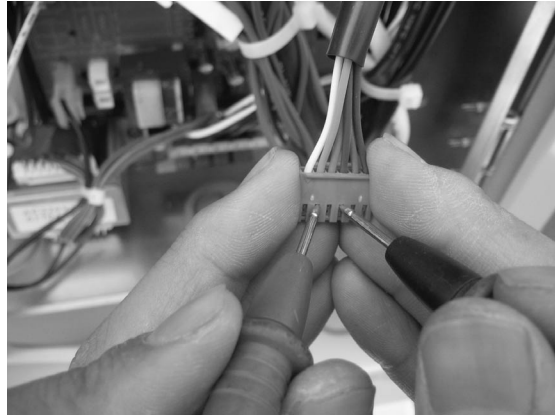


► Liquid injection by pass valve

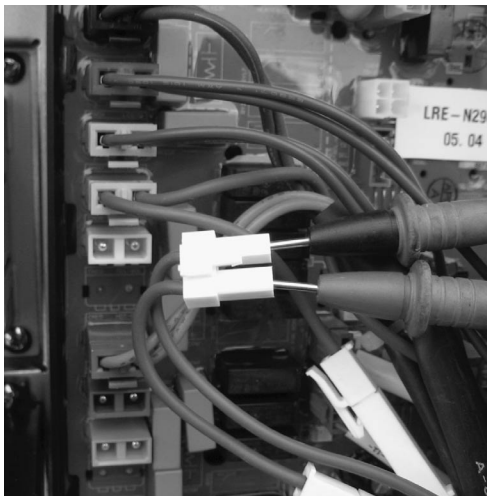
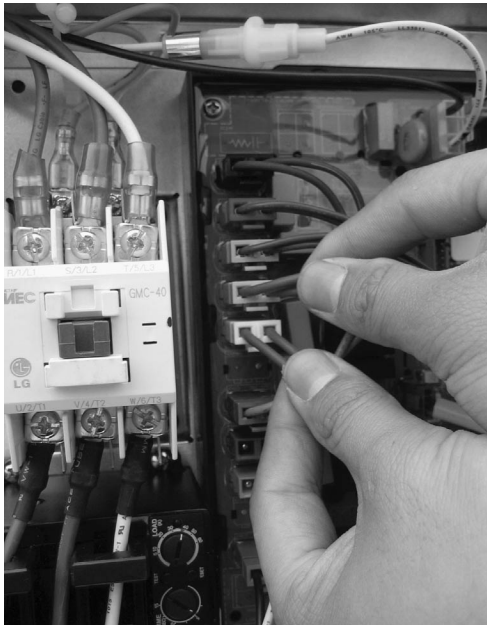
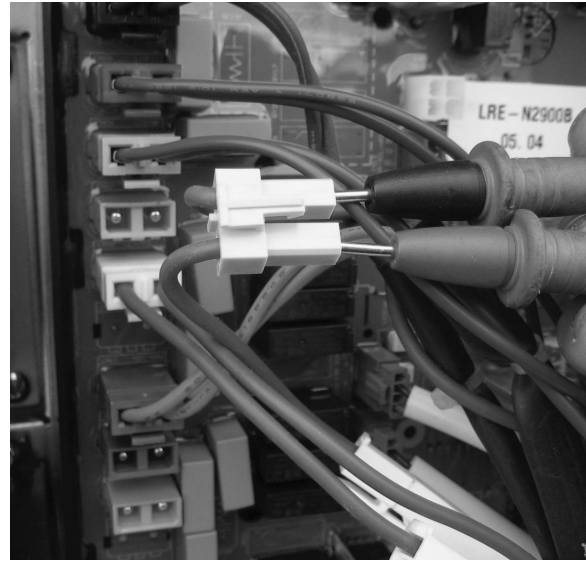
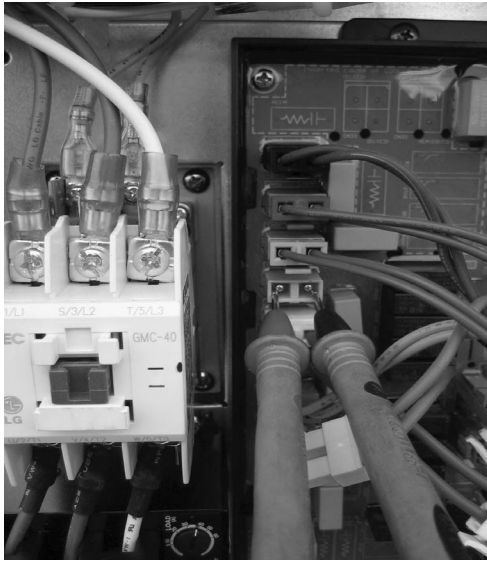




► Measure resistance of LEV coil



► Heater



Error Code	Error Contents	Meaning	Main Causes	Error display position
34	Excessive rise in high pressure	Com. Off due to the high pressure sensor	<ol style="list-style-type: none"> <li>1. Defective high pressure sensor</li> <li>2. Defective Indoor / Outdoor Unit fan</li> <li>3. Change in shape of pipe due to the damage</li> <li>4. Excessive refrigerant charging</li> <li>5. Defective Indoor / Outdoor Unit LEV</li> <li>6. Covering or chocking (Outdoor covering during the cooling mode / Indoor filter chocking during the heating mode )</li> <li>7. SVC valve chocked .</li> <li>8. Defective outdoor PCB</li> <li>9. Defective Indoor Unit pipe temp. sensor</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p> <p>Outdoor unit</p>

**Defect inspection method**

- 1) Check the Indoor and Outdoor Unit fan and replace if required. (Refer to CH105~CH108)
  - 2) Check if the proper heat exchange is obtained in Indoor and Outdoor Unit  
 Otherwise, modify the installation condition to get the proper heat exchange. Remove the outdoor cover (by dust etc) if any and also check the Indoor Unit filter also.
  - 3) Check the SVC valve Open and pipe condition (bent, dent etc) .
  - 4) Check whether the actual discharge pressure is high .  
 Connect the manifold gauge to the svc valve and compare the high pressure reading .
  - 5) Check the Indoor / Outdoor Unit LEV connector connecting condition.
  - 6) Check the LEV / Hot gas valve's coil resistance .  
 LEV : Resistance between each terminal of the LEV 45~90Ω  
 hot gas :  
 liquid injection :
- In case the coil resistance is normal then please check the LEV/ Hot Gas Valve. (Refer to Check!!)
- 7) Recalculate the refrigerant charging and Check the charging condition .
  - 8) Check the Indoor Unit pipe temp sensor connecting condition and temp sensor resistance.  
 (Resistance measurement method : Refer to CH02/CH06)
  - 9) In case the above given contents are normal, then please replace the Outdoor Unit PCB.
  - 10) In case a similar error code exists even after the replacement of the PCB, then replace the high pressure sensor.

Error Code	Error Contents	Meaning	Main Causes	Error display position
35	Excessive low pressure drop	Comp. off due to the low pressure sensor	1. Defective low pressure sensor 2. Defective Indoor / Outdoor Unit fan 3. Refrigerant shortage or leakage 4. Pipe shape change due the damage 5. Defective indoor outdoor LEV 6. Covering or chocking (Outdoor covering during the cooling mode / Indoor filter chocking during the heating mode) 7. SVC valve chocking 8. Defective outdoor PCB 9. Defective indoor pipe temp. sensor	Concerned Remote controller  Panel Display  Outdoor unit

■ Defect inspection method

- 1) Check the indoor and outdoor fan and replace if required. (Refer to CH105~CH108)
- 2) Check if the proper heat exchange is obtained in Indoor and Outdoor Unit  
 Otherwise, modify the installation condition to get the proper heat exchange.  
 Remove the outdoor cover (by dust etc) if any and also check the Indoor Unit filter also.
- 3) Check the SVC valve open and pipe condition (bent, dent etc) .
- 4) Check whether the actual low pressure is excessively low.  
 Connect the manifold gauge to the svc valve and compare the low pressure reading.
- 5) Check the Indoor / Outdoor Unit LEV connector connecting condition .
- 6) Check the LEV / Hot gas valve's coil resistance  
 LEV : Resistance between each terminal of the LEV 45~90Ω  
 hot gas :  
 liquid injection :

In case the coil resistance is normal, then please check the LEV / Hot Gas Valve.  
 (Refer to Check!!)

- 7) Recalculate the refrigerant charging and check the charging condition.
- 8) Check the Indoor Unit pipe temp. sensor connecting condition and temp. sensor resistance.  
 (Resistance measurement method : Refer to CH02/CH06)
- 9) In case the above given contents are normal, then please replace the outdoor PCB.
- 10) In case a similar error code exists even after the replacement of the PCB, then replace the high pressure sensor.

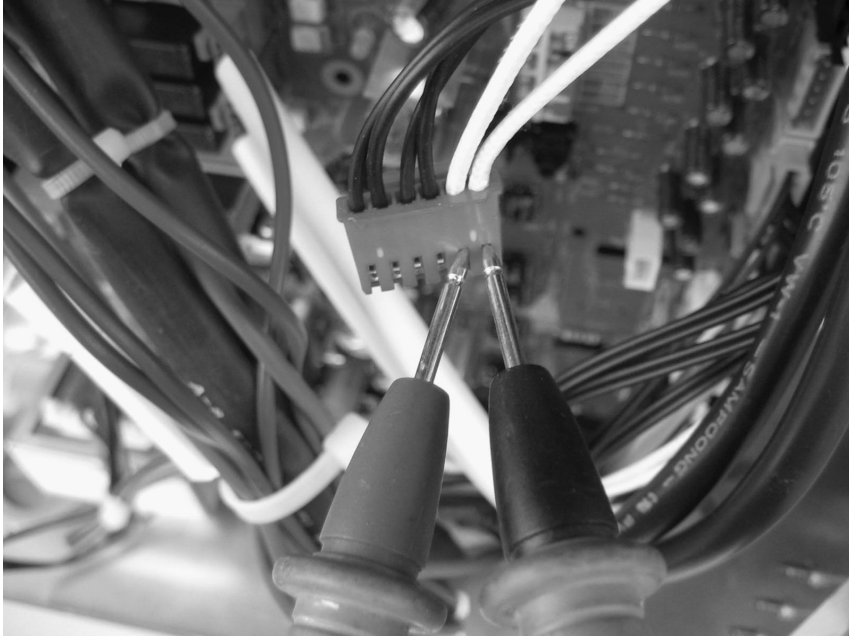
Error Code	Error Contents	Meaning	Main Causes	Error display position
41	Comp. discharge pipe temp. sensor error	Sensor measurement value is abnormal (Open / Short)	<ol style="list-style-type: none"> <li>1. Defective connection of the comp. discharge pipe temp. sensor</li> <li>2. Defective discharge pipe temp. sensor of the comp (Open/Short)</li> <li>3. Defective outdoor PCB</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p> <p>Outdoor unit</p>

**■ Defect inspection method**

- 1) Check the comp. discharge pipe temp. sensor and the lead wire connecting condition.
- 2) Check whether the sensor resistance value is normal ? Otherwise, replace the sensor.
  - Comp. discharge pipe temp. sensor : 10°C = 362kΩ, 25°C = 200kΩ, 50°C = 82kΩ, 100°C = 18.5kΩ
- 3) In case the sensor connecting condition and the resistance value are normal, then please replace the outdoor PCB.
- 4) If "n1" is displayed at the 7 segment, check comp A  
 If "n2" is displayed at the 7 segment, check comp B



- ▶ Check discharge temp sensor of inverter compressor



- ▶ Check discharge temp sensor of constant compressor



Error Code	Error Contents	Meaning	Main Causes	Error display position
42	Low pressure sensor error	Sensor measured value is not normal (Open / Short)	<ol style="list-style-type: none"> <li>1. Defective low pressure sensor connector</li> <li>2. Defective low pressure sensor (Open/Short)</li> <li>3. Defective outdoor PCB</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p> <p>Outdoor unit</p>

Error Code	Error Contents	Meaning	Main Causes	Error display position
43	High pressure sensor error	Sensor measured value is not normal (Open/Short)	<ol style="list-style-type: none"> <li>1. Defective high pressure sensor connector</li> <li>2. Defective high pressure sensor error (Open/Short)</li> <li>3. Outdoor PCB defect</li> </ol>	<p>Concerned Remote controller</p> <p>Panel Display</p> <p>Outdoor unit</p>

■ Defect inspection method

- 1) Check the pressure sensor connecting condition and lead wire connecting condition.
- 2) In case the above condition is normal then replace the outdoor PCB .
- 3) If the error code persists even after the replacement of PCB then replace the concerned pressure sensor





Error Code	Error Contents	Meaning	Main Causes	Error display position
44	Outdoor Unit air temperature sensor error	Sensor measured value is not normal (Open/Short)	1. Defective connection of the temp. sensor 2. Defective temp. sensor (Open / Short) 3. Defective Outdoor Unit PCB	Concerned Remote controller  Panel Display  Outdoor unit

Error Code	Error Contents	Meaning	Main Causes	Error display position
45(Heat exchanger Upper parts) 48 (Heat exchanger Lower parts)	The pipe sensor error of the Outdoor Unit's heat exchanger	Sensor measured value is not normal (Open / Short)	1. Defective connection of the temp. sensor 2. Defective temp. sensor (Open / Short) 3. Defective Outdoor Unit PCB	Concerned Remote controller  Panel Display  Outdoor unit

Error Code	Error Contents	Meaning	Main Causes	Error display position
46	Comp. suction temp. sensor error	Sensor measured value is not normal (Open/Short)	1. Defective connection of the temp. sensor 2. Defective temp. sensor (Open / Short) 3. Defective Outdoor Unit PCB	Concerned Remote controller  Panel Display  Outdoor unit

■ Defect inspection method s

- 1) Check the temp. sensor connecting condition and also the lead wire connecting condition.
- 2) Check whether the temp. sensor resistance value is normal ? Otherwise, replace the sensor.
  - Air temp. sensor : 10°C = 20.7kΩ, 25°C = 10kΩ, 50°C = 3.4kΩ
  - Pipe temp. sensor : 10°C = 10kΩ, 25°C = 5kΩ, 50°C = 1.8kΩ
- 3) In case the sensor connection and the resistance value is normal, then please replace the outdoor PCB .

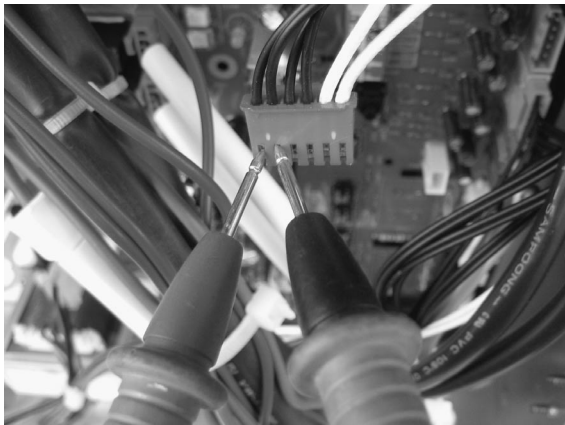
- ▶ Measure resistance of outdoor air temperature sensor



- ▶ Measure resistance of outdoor air temperature sensor



- ▶ Measure resistance of outdoor HEX(A) temperature sensor



- ▶ Measure resistance of outdoor HEX(B) temperature sensor



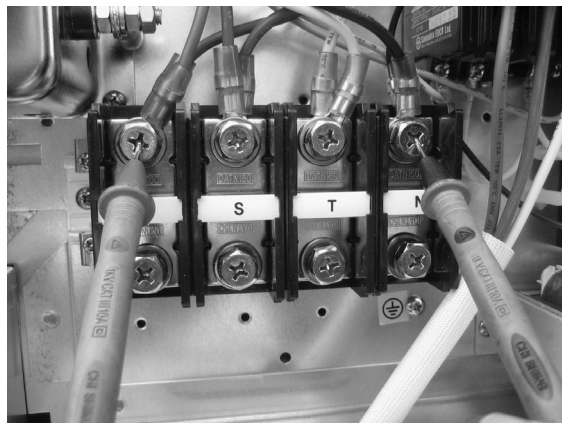
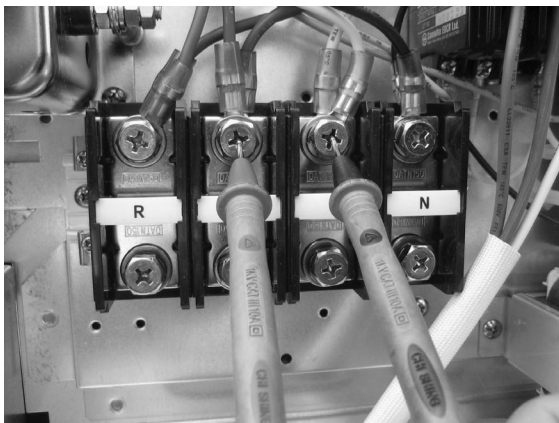
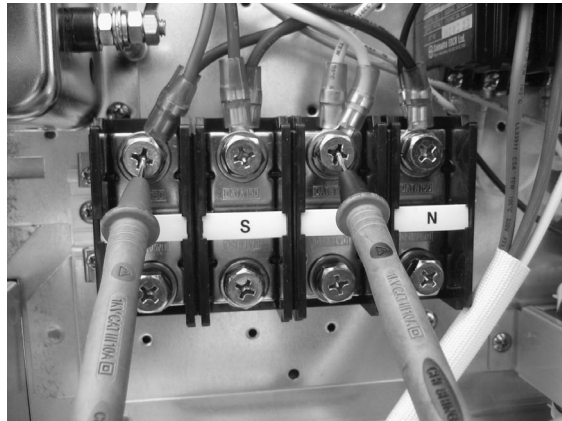
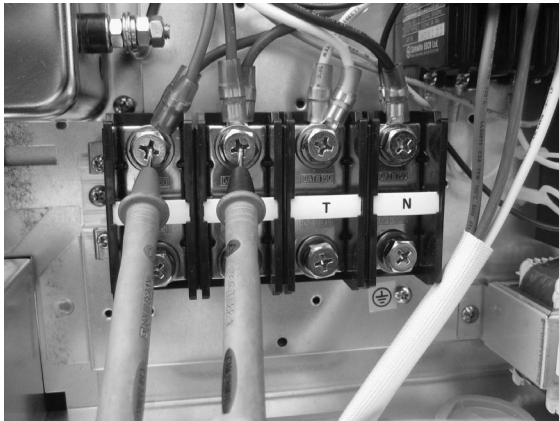
Error Code	Error Contents	Meaning	Main Causes	Error display position
48 (Heat exchanger B)	Outdoor heat exchanger (A,B) Pipe temp sensor error	The measured value of the sensor is not normal (Open/Short)		Refer to CH45

Error Code	Error Contents	Meaning	Main Causes	Error display position
49	Outdoor voltage sensing error	The measured value of the sensor is not normal (Open/Short)	1. Abnormal input voltage 2. Outdoor line fuse damage 3. Defective outdoor main PCB	Concerned Remote Controller

■ Defect inspection method

- 1) Check whether the input power (3 phase =380-10%, 415+10% single phase = 220-10%, 240+10%) is normal. In case of any deviation in supplied power or the rated power please request the the electric in charge of the building to supply the suitable power.
- 2) Is the power input to the the outdoor PCB 220-10%, 240+10%.  
Otherwise, a outdoor line fuse or the required input power to be formed.
- 3) In case the the power input to the outdoor PCB is normal then please replace the PCB because PCB may be causing the voltage sensing error in the outdoor unit.

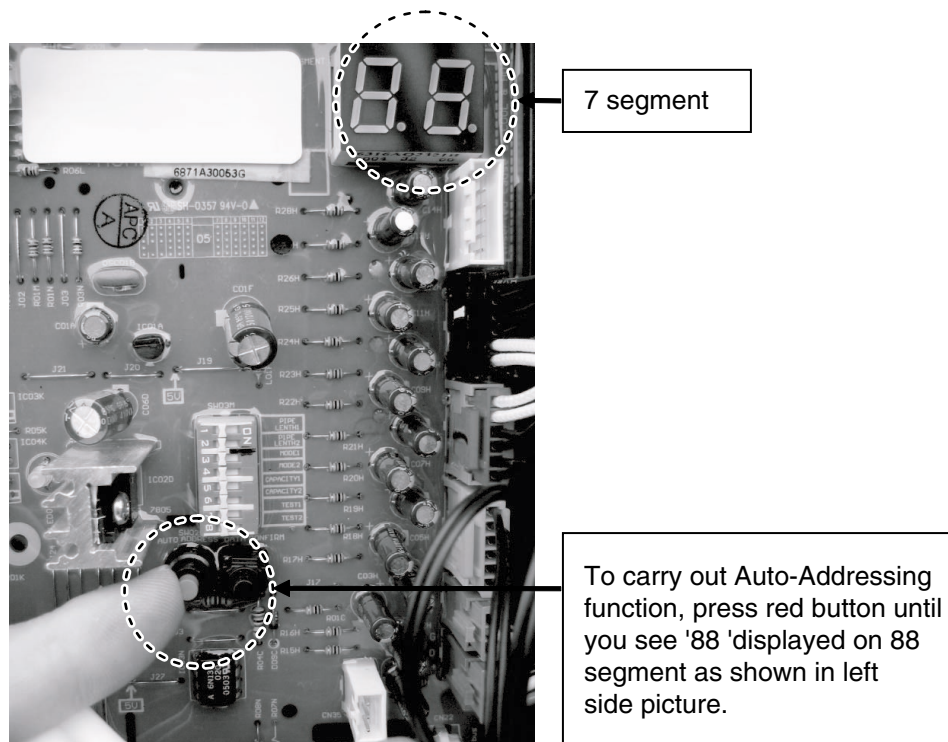
► Measure input power of outdoor unit



Error Code	Error Contents	Meaning	Main Causes	Error display position
51	Excessive capacity (Indoor capacity is in excess)	The combined spec of the indoor units exceed the capacity of the outdoor unit	<ol style="list-style-type: none"> <li>1. Excess of indoor capacities more than 130% of the outdoor unit</li> <li>2. Auto-Addressing is not in operation</li> <li>3. The communication cable connection error ie the indoor unit connected to some other outdoor unit has the communication cable mixed up or confused</li> </ol>	Concerned Remote Controller Outdoor unit

**Defect inspection method**

- 1) Check the total capacity of the all indoor units and compare it with the 130% of the capacity of the outdoor unit .
- 2) Check whether the communication cable of some of the indoor unit is connected to some other outdoor unit (Refer to CH05)
- 3) Please operate the Auto-Addressing.
- 4) In case the error code is still in display even when the above given contents are normal then please replace the PCB .
- 5) In case the error code exists even after the outdoor PCB is replaced then please check the indoor PCBs one by one



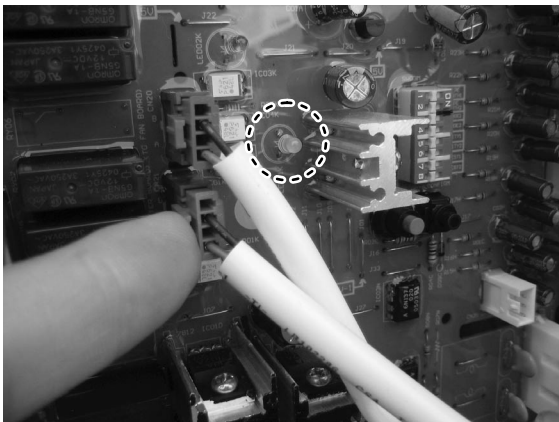


Error Code	Error Contents	Meaning	Main Causes	Error display position
52	Communication error (Inverter PCB ' Main PCB )	The inverter PCB cannot receive the signal from the Main PCB	<ol style="list-style-type: none"> <li>1. Power line or the communication line is not connected</li> <li>2. Communication cable is Open/Short</li> <li>3. Outdoor main fuse is damaged</li> <li>4. Defective outdoor Main/inverter PCB.</li> </ol>	<p>Concerned Remote Controller</p> <p>Outdoor unit</p>

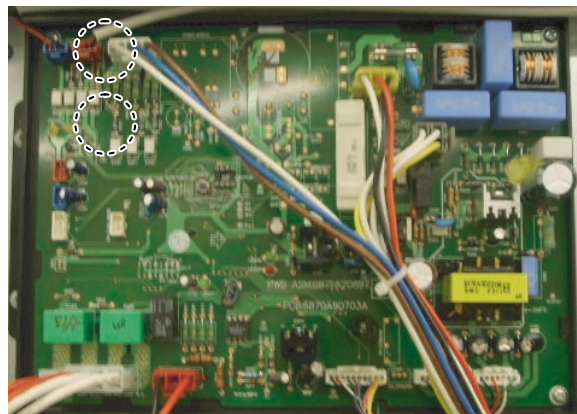
■ Defect inspection method

- 1) Check whether the communication cable connection is normal.  
Otherwise, check the communication cable and replace if required.
- 2) Check whether the Outdoor Main /inverter PCB is working on power input  
Check whether the PCB orange color LED is blinking.  
(if the power input and the communication is normal then the LED is blinking)
- 3) Check the outdoor Main / inverter PCB and replace the PCB if required .

▶ Communication connector & LED in the main PCB



▶ Communication connector & LED in the inverter PCB





Error Code	Error Contents	Meaning	Main Causes	Error display position
53	Communication error (indoor › Main PCB )	The indoor cannot receive signal from the Main PCB	1. The communication cable is not connected 2. Communication cable is cut or short 3. Defective outdoor Main / indoor PCB	Concerned Remote Controller  Outdoor unit

**■ Defect inspection method**

- 1) Check the indoor unit's control box's power supply and communication connecting condition (terminal block )
- 2) Check if the communication cable is short or open and remove the cause if any  
 (Open confirmation :  
 After the power OFF short the two cables with each other and measure the resistance with a tester ' If above 5Ω then it is Open)  
 (Short confirmation :After power OFF separate the cables and measure the resistance with a tester › If below 5Ω then it is short )
- 3) In case there is no error in above given cases 1~2 the separate all the communication cables and recheck after connecting the indoor units individually  
 (The error code is displayed when the defective PCB is connected to the indoor unit) › Replace the concerned indoor unit's PCB .
- 4) In case one indoor or a few indoor has 'CH53' error display :  
 Re operate the Auto-Addressing and check whether the all indoor units have Auto-Addressing setting .  
 (After the power ON, make sure to operate the Auto-Addressing after one minute )  
 › In case the any PCB has not got the Auto-Addressing then recheck the communication cable and replace the indoor PCB if required .
- 5) Make sure to separate the power line (AC220/380V) and the communication line by at least 30 cm

 **CAUTION**

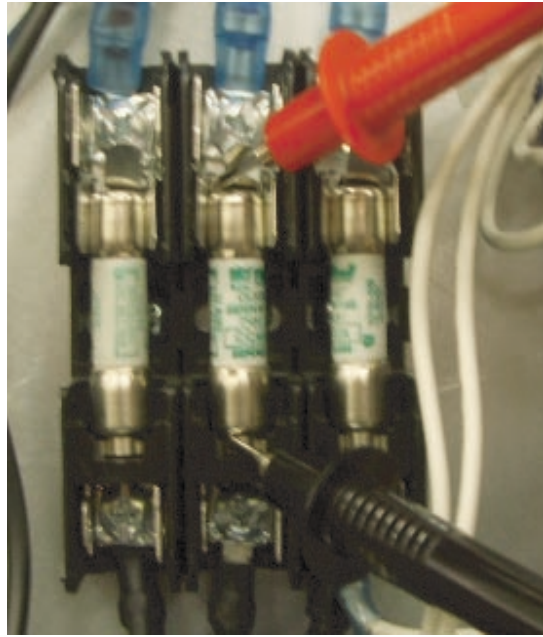
- In case you replace the communication cable with the power cable by mistake then al indoor units PCB can be damaged

Error Code	Error Contents	Meaning	Main Causes	Error display position
54	Outdoor 3 phase power supply wrong wiring (Phase omission )	Wrong wiring at the outdoor 3 phase (Phase omission )	1. Defective inverter PCB 2. R, S, T power not connected 3. Main Fuse damaged	Concerned Remote Controller  Outdoor unit

**■ Defect inspection method**

- 1) Check the outdoor Main fuse .
- 2) If the error code exists even after replacing the outdoor PCB then request the building's electric in charge to recheck the power supplied.

► Check main fuse of out door unit



Error Code	Error Contents	Meaning	Main Causes	Error display position
57	Communication error (Main PCB , inverter PCB )	Main PCB cannot receive the signal from the inverter PCB		Refer to CH52

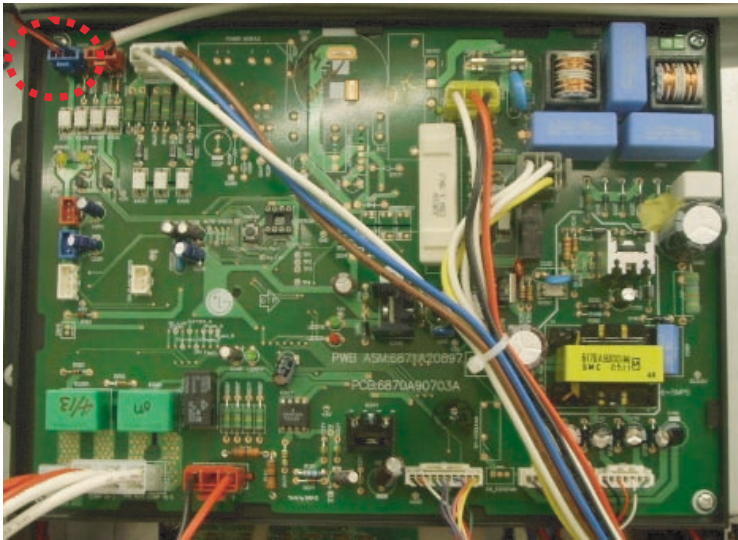
Error Code	Error Contents	Meaning	Main Causes	Error display position
62	Excess of heat in inverter PCB heat sink	Excessive rise of Inverter heat sink temperature	<ol style="list-style-type: none"> <li>1. Defective heat sink fan</li> <li>2. Overheat of the inverter comp IPM</li> <li>3. Inverter fan IPM overheat</li> <li>4. Defective fan Main PCB</li> <li>5. Defective heat sink region connection</li> <li>6. Defective heat sink fan power supply terminal</li> </ol>	<p>Concerned Remote Controller</p> <p>Outdoor unit</p>

■ Defect inspection method

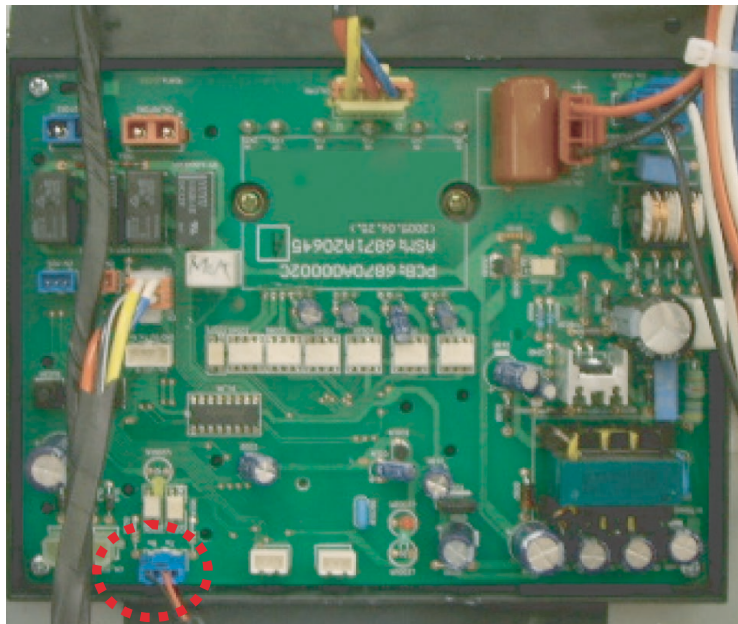
- 1) Check whether the heat sink cooling fan is normal ?  
 Check the power supply connector to the cooling fan of the heat sink on the upper side of the Main PCB is 12Vdc (Always operating when the inverter comp is operating)  
 Also check the heat sink cooling fan Lead-Wire
- 2) Check whether the air is coming out from the cooling fan of the heat sink on the upper side of the of the control box.  
 Check the assembly condition in the surrounding of the heat sink
- 6) In case the above given 4,5, the fan is not working then replace the cooling fan.
- 7) Check the compressor IPM and replace of required.(refer: error code 21)
- 8) Check if the fan IPM is normal. Otherwise, replace the IPM .
- 9) In case the error persists even after the fan IPM is replaced then replace the fan main PCB .

Error Code	Error Contents	Meaning	Main Causes	Error display position
105 108	Communication error between the Inverter PCB and the fan PCB	Communication error between the Inverter PCB and the fan PCB (Fan > outdoor, outdoor > fan )	<ol style="list-style-type: none"> <li>1. Defective communication Cable connection</li> <li>2. Communication cable Open/Short</li> <li>3. Defective outdoor PCB</li> <li>4. Defective fan PCB</li> </ol>	<p>Concerned Remote Controller</p> <p>Outdoor Unit</p>

► **Communication connector & LED between inverter PCB and fan PCB**



**Inverter PCB**



**Fan PCB**

If "n1" is displayed at the 7 segment in the main PCB, check Fan Motor "n1" or Fan PCB "n1"

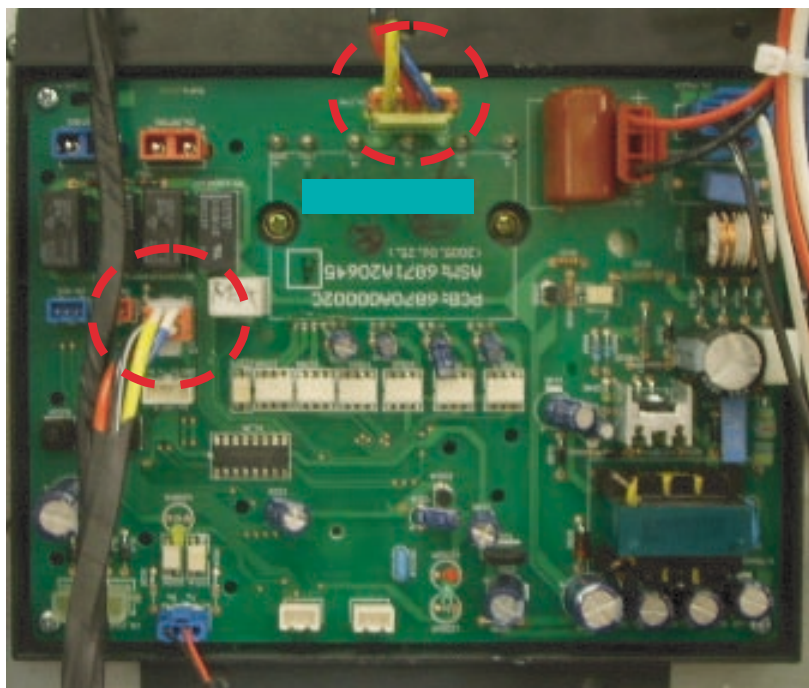
If "n2" is displayed at the 7 segment in the main PCB, check Fan Motor "n2" or Fan PCB "n2"

Error Code	Error Contents	Meaning	Main Causes	Error display position
106	Over current of Main outdoor Fan motor (Fan IPM error)	Over current of Main outdoor Fan motor	1. Defective fan motor connector connection 2. Fan Lock 3. Defective heat sink	Concerned Remote Controller  Outdoor Unit

■ Defect inspection method

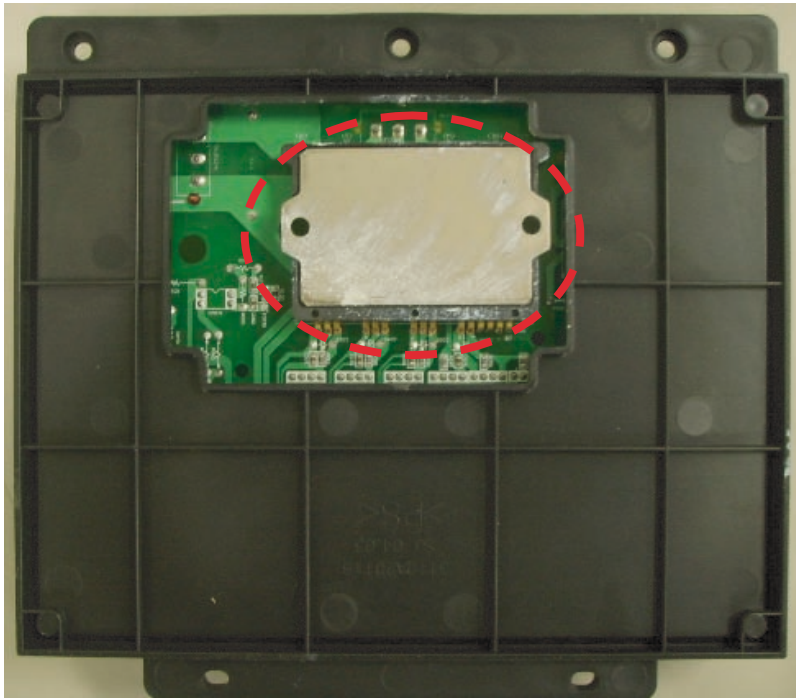
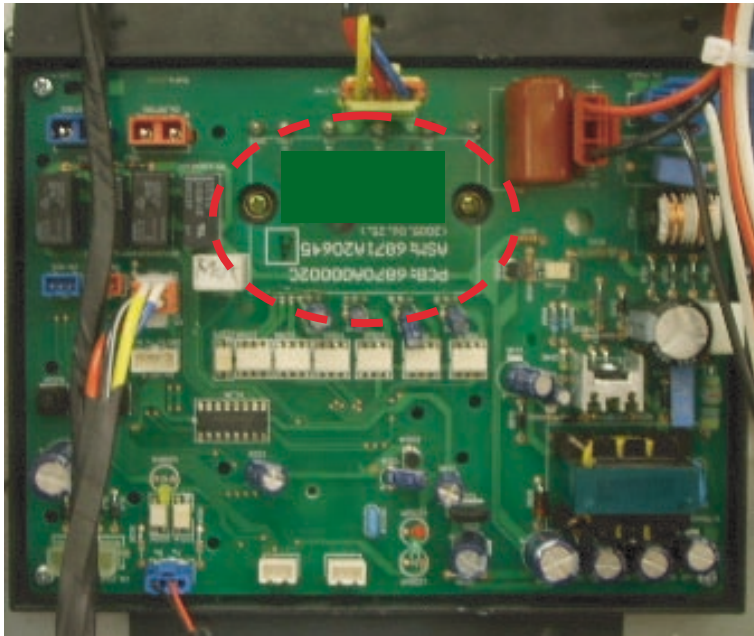
- 1) Check the fan motor connector connection .
- 2) Is outdoor fan in Fan Lock condition  
 Otherwise, remove the LOCK causing obstacle (stick etc ).
- 3) Check the heat sink fan operation .(Refer to CH62)
- 4) In case all of the above contents are normal and still the error code is displayed then please replace the fan IPM PCB .
- 5) In case the error code still persists even after replacing the fan IPM PCB then replace the fan Main PCB .

► Fan motor connector





► Fan IPM

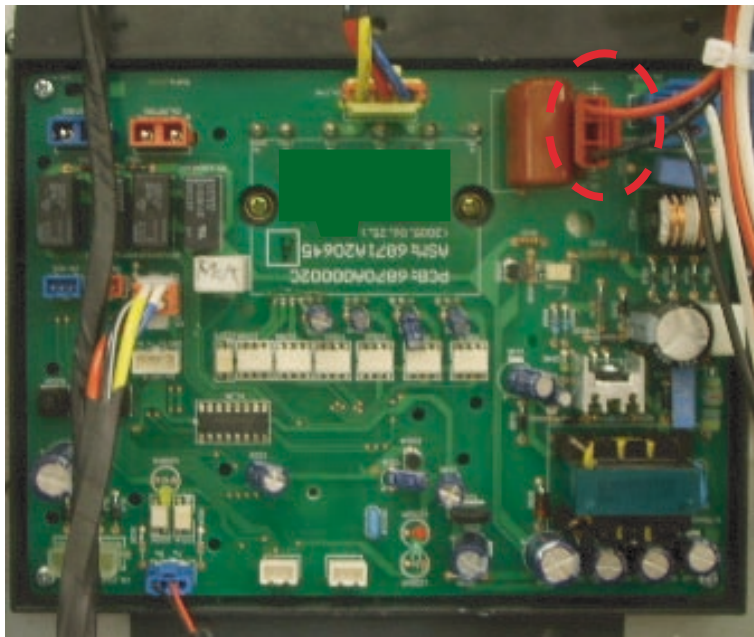


Error Code	Error Contents	Meaning	Main Causes	Error display position
107	Low voltage in the fan motor	Low voltage in the fan motor	1. Defective fan PCB DC link voltage lead wire connection 2. Abnormal fan PCB Capacitor 3. Abnormal fan PCB input power 4. Fan PCB defect	Concerned Remote Controller  Outdoor Unit

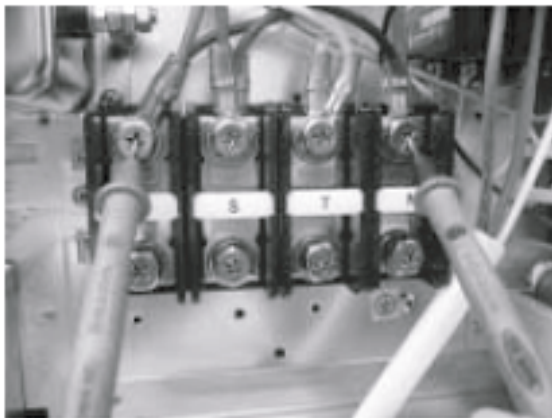
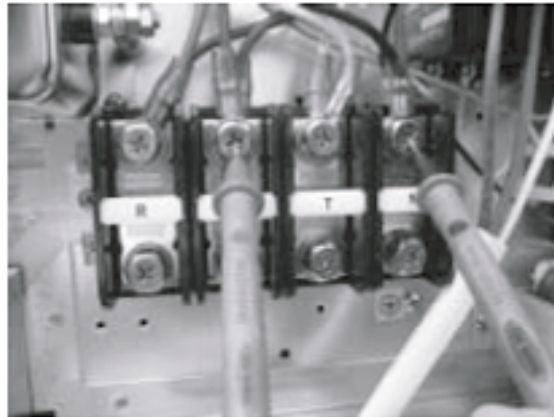
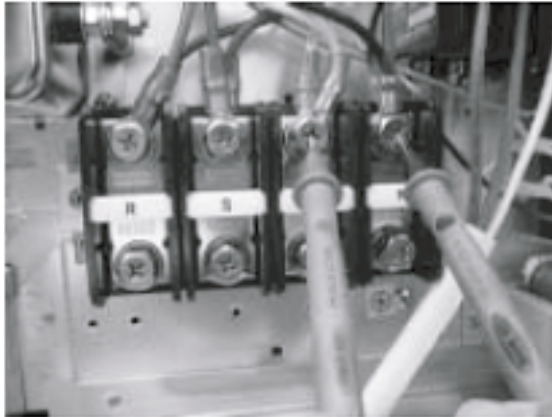
■ Defect inspection method

- 1) Check the fan PCB DC link voltage lead wire connecting condition .
- 2) Check Fan PCB input power voltage (normal : rated  $\pm 10\%$ )
- 3) Check whether the fan PCB Capacitor ahs any abnormality.  
In case it is abnormal then outer shape is deformed (outer shape expansion).
- 4) In case of Capacitor abnormality replace the fan PCB .
- 5) In case the error code exists even after the PCB replacement then replace the fan IPM PCB

► DC link location of outdoor fan



▶ Measure input power of fan main PCB



Error Code	Error Contents	Meaning	Main Causes	Error display position
108	Communication error between the Main PCB and the fan PCB	Communication error between the Main PCB and the fan PCB (Fan › outdoor , outdoor › fan )		Refer to CH105

Error Code	Error Contents	Meaning	Main Causes	Error display position
113	Sensor error at the outdoor Liquid Refrigerant pipe	Abnormal value of Sensor measurement (Open/Short)	1. Defective temp sensor connector connection 2. Defective temp sensor Open/Short) 3. Defective outdoor PCB	Concerned Remote Controller Outdoor unit

Error Code	Error Contents	Meaning	Main Causes	Error display position
114(Main Sub cool inlet) 115(Main Sub cool outlet)	Sensor error at the outdoor sub cooling inlet or outlet	Abnormal value of the sensor measurement (Open/Short)	1. Defective temp sensor connector connection 2. Defective temp sensor (Open/Short) 3. Defective outdoor PCB	Concerned Remote Controller Outdoor unit

■ Defect inspection method

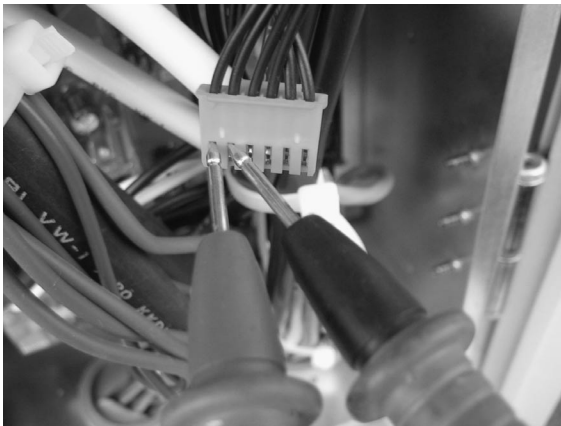
- 1) Check the temp sensor connector connecting condition and lead wire.
- 2) Is the temp sensor resistance value normal? Otherwise, replace the sensor  
- Pipe temp sensor : 10°C = 10kΩ : 25°C = 5kΩ : 50°C = 1.8kΩ
- 3) In case the sensor connection and the resistance value is correct then replace the outdoor PCB .

► Measure resistance of LEV coil



Sub-cool circuit in the outdoor unit

► Measure temp sensor of liquid pipe



► Measure temp sensor of sub-cool inlet



► Measure temp sensor of sub-cool outlet





Error Code	Error Contents	Meaning	Main Causes	Error display position
151	Outdoor 4way (reversing valve) Switching Error	When the Main or the Sub outdoor has one of them having a 4way valve error	1. 4 way valve error due to the inlet of sludge into the valve 2. Comp damage leading to pressure change does not occur , 3. Wrong installation of common pipe between the outdoor units 4. 4way valve error	Concerned Remote Controller  Outdoor unit

■ Defect inspection method

- 1) Check whether the piping between the outdoor units is normal  
(liquid pipe should be connected to liquid pipe, common pipe be connected to common pipe ) fi Pipe modification
- 2) Check whether the Main/Sub outdoor compressor is damaged or not.(Refer to CH21)
- 3) Please confirm the Main PCB's 4way valve terminal voltage (220V±10%).  
In case of abnormal voltage please replace the outdoor main PCB
- 4) Check the outdoor PCB's 4way valve connector connections and coil connections.
- 5) Measure the 4way valve's coil resistance at the connector  
Normal resistance :
- 6) In case the error still persists even after the all above conditions are normal then replace the 4way valve .

► 4way valve in the outdoor unit



► 4way valve connector on the Main PCB

