



CONFIDENTIAL

# Air Conditioner

## SVC MANUAL(R410A)

***MULTI V***<sup>TM</sup> **M**

### **CAUTION**

Before Servicing the unit, read the safety precautions in General SVC manual.  
Only for authorized service personnel.

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# Safety Precautions



To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

**⚠ WARNING** This symbol indicates the possibility of death or serious injury.

**⚠ CAUTION** This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

	<b>Be sure not to do.</b>
	<b>Be sure to follow the instruction.</b>

## ⚠ WARNING

### Installation

- Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.
  - If the power source capacity is inadequate or electric work is performed improperly, electric shock or fire may result.
- Ask the dealer or an authorized technician to install the air conditioner.
  - Improper installation by the user may result in water leakage, electric shock, or fire.
- Always ground the product.
  - There is risk of fire or electric shock.
- Always install a dedicated circuit and breaker.
  - Improper wiring or installation may cause fire or electric shock.
- For re-installation of the installed product, always contact a dealer or an Authorized Service Center.
  - There is risk of fire, electric shock, explosion, or injury.
- Do not install, remove, or re-install the unit by yourself (customer).
  - There is risk of fire, electric shock, explosion, or injury.
- The appliance shall be disconnected from its power source during service and when replacing parts.
- Do not store or use flammable gas or combustibles near the air conditioner.
  - There is risk of fire or failure of product.
- Use the correctly rated breaker or fuse.
  - There is risk of fire or electric shock.
- Prepare for strong wind or earthquake and install the unit at the specified place.
  - Improper installation may cause the unit to topple and result in injury.

## Safety Precautions

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- Do not install the product on a defective installation stand.
  - It may cause injury, accident, or damage to the product.
- When installing and moving the air conditioner to another site, do not charge it with a different refrigerant from the refrigerant specified on the unit.
  - If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.
- Do not reconstruct to change the settings of the protection devices.
  - If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by LGE are used, fire or explosion may result.
- Ventilate before operating air conditioner when gas leaked out.
  - It may cause explosion, fire, and burn.
- Securely install the cover of control box and the panel.
  - If the cover and panel are not installed securely, dust or water may enter the MULTI V M and fire or electric shock may result.
- If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit when the refrigerant leaks.
  - Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result
- Use a vacuum pump or inert(nitrogen) gas when doing leakage test or air purge. Do not compress air or Oxygen and do not use flammable gas es. Otherwise, it may cause fire or explosion.
  - There is the risk of death, injury, fire or explosion.

## Operation

- Do not damage or use an unspecified power cable.
  - There is risk of fire, electric shock, explosion, or injury.
- Use a dedicated power cable for this appliance.
  - There is risk of fire or electrical shock.
- Be cautious that water could not enter the product.
  - There is risk of fire, electric shock, or product damage.
- Do not touch the power switch with wet hands.
  - There is risk of fire, electric shock, explosion, or injury.
- When the product is soaked (flooded or submerged), contact an Authorized Service Center.
  - There is risk of fire or electric shock.
- Be cautious not to touch the sharp edges when installing.
  - It may cause injury.
- Take care to ensure that nobody could step on or fall onto the MULTI V M.
  - This could result in personal injury and product damage.
- Do not open the inlet grille of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)
  - There is risk of physical injury, electric shock, or product failure.

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**⚠ CAUTION**

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## **Installation**

- Always check for gas (refrigerant) leakage after installation or repair of product.
  - Low refrigerant levels may cause failure of product.
- Do not install the product where the noise or hot air from the MULTI V M could damage the neighborhoods.
  - It may cause a problem for your neighbors.
- Keep level even when installing the product.
  - To avoid vibration or water leakage.
- Do not install the unit where combustible gas may leak.
  - If the gas leaks and accumulates around the unit, an explosion may result.
- Use power cables of sufficient current carrying capacity and rating.
  - Cables that are too small may leak, generate heat, and cause a fire.
- Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.
  - There is risk of damage or loss of property.
- Keep the unit away from children. The heat exchanger is very sharp.
  - It can cause the injury, such as cutting the finger. Also the damaged fin may result in degradation of capacity.
- When installing the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.
  - The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.
- Do not install the product where it is exposed to sea wind (salt spray) directly.
  - It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

## **Operation**

- Do not use the air conditioner in special environments.
  - Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.
- Do not block the inlet or outlet.
  - It may cause failure of appliance or accident.
- Make the connections securely so that the outside force of the cable may not be applied to the terminals.
  - Inadequate connection and fastening may generate heat and cause a fire.
- Be sure the installation area does not deteriorate with age.
  - If the base collapses, the air conditioner could fall with it, causing property damage, product failure, or personal injury.

## *Safety Precautions*

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- Install and insulate the drain hose to ensure that water is drained away properly based on the installation manual.
  - A bad connection may cause water leakage.
- Be very careful about product transportation.
  - Only one person should not carry the product if it weighs more than 20 kg.
  - Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
  - Do not touch the heat exchanger fins. Doing so may cut your fingers.
  - When transporting the MULTI V M, suspending it at the specified positions on the unit base. Also support the MULTI V M at four points so that it cannot slip sideways.
- Safely dispose of the packing materials.
  - Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
  - Tear apart and throw away plastic packaging bags so that children may not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.
- Turn on the power at least 6 hours before starting operation.
  - Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.
- Do not touch any of the refrigerant piping during and after operation.
  - It can cause a burn or frostbite.
- Do not operate the air conditioner with the panels or guards removed.
  - Rotating, hot, or high-voltage parts can cause injuries.
- Do not directly turn off the main power switch after stopping operation.
  - Wait at least 5 minutes before turning off the main power switch. Otherwise it may result in water leakage or other problems.
- Auto-addressing should be done in condition of connecting the power of all indoor and outdoor units. Auto-addressing should also be done in case of changing the indoor unit PCB. Use a firm stool or ladder when cleaning or maintaining the air conditioner.
  - Be careful and avoid personal injury.
- Do not insert hands or other objects through the air inlet or outlet while the air conditioner is powered on.
  - There are sharp and moving parts that could cause personal injury.

# Part 1

## General Information

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# 1. Model Names

## 1.1 Indoor Unit

Category		Chassis Name	Capacity(Btu/h(kW))													
			5k (1.6)	7k (2.2)	9k (2.8)	12k (3.6)	15k (4.5)	18k (5.6)	21k (6.2)	24k (7.1)	28k (8.2)	30k (9.0)	36k (10.6)	42k (12.3)	48k (14.1)	
Wall Mounted Unit	Standard	SJ	○	●	●	●	●									
		SK						●		●						
		SV										○	○			
ARTCOOL	Mirror	SB	○	●	●	●	●									
	Gallery	SC						●		●						
Ceiling Cassette	1 Way	TU		●	●	●										
		TT						●		●						
	2 Way	TS			●	●			●		●					
		4 Way	TR	○	●	●	●									
	TQ						●	●	○							
	TP									●	●	○				
	TN		○				○	○					●			
TM									○				●	●		
Ceiling Concealed Duct	High Static	BG									●		●	●		
		BR													●	
		B8														
	High Sensible	BG		○	○	○	○									
		BR							○		○	○				
		B8											○	○	○	
	Middle Static	M1		●	●	●	●	●	●		●					
		M2										●		●	●	
		M3														●
	Low Static	L1	○	●	●											
L2					●	●	●									
L3									○	●						
Built In (Low Static)	B3		●	●	●	●										
	B4							●		●						
Floor Standing	With Case	CE		○	●	●	●									
		CF						●		●						
	Without Case	CE		○	●	●	●									
		CF							●		●					
Console		QA		○	○	○	○									

\* In matters of combination with MULTI V M system, refer the PDB of that MULTI V M.  
 \* ART COOL- SE/S8( \* R:Mirror, V:Silver), SF(\* E:Red, V:Silver, G:Gold , 1: Kiss (Photo changeable))  
 \*Wall Mounted- A: Basic, L:Plasma, \*Ceiling Cassette- A: Basic, C:Plasma

## 1.2 MULTI V M

Power Supply	5HP
380-415 V 3N~ 50 Hz	ARUN050LMC0
220-240 V~ 50 Hz	ARUN050GME0





## 2. External Appearance

### 2.1 Indoor Unit

<p><b>Ceiling Mounted Cassette (1-Way)</b>                      ARNU07GTU*4                      ARNU09GTU*4                      ARNU12GTU*4</p>  <p>ARNU18GTT*4                      ARNU24GTT*4</p> <p>* A:Basic, C:Plasma</p>	<p><b>Ceiling Concealed Duct (High Static)</b>                      ARNU76GB8A4                      ARNU96GB8A4</p>  <p><b>Ceiling Concealed Duct (High Sensible)</b>                      ARNU07GBGA4      ARNU24GBRA4                      ARNU09GBGA4      ARNU28GBRA4                      ARNU12GBGA4      ARNU36GB8A4                      ARNU15GBGA4      ARNU42GB8A4                      ARNU18GBRA4      ARNU48GB8A4</p> 
<p><b>Ceiling Mounted Cassette (2-Way)</b>                      ARNU09GTSC4                      ARNU12GTSC4                      ARNU18GTSC4                      ARNU24GTSC4</p> 	<p><b>Floor Standing Unit</b></p> <p><b>With case</b>                      ARNU07GCEA4      ARNU15GCEA4                      ARNU09GCEA4      ARNU18GCFA4                      ARNU12GCEA4      ARNU24GCFA4</p>  <p><b>Without case</b>                      ARNU07GCEU4      ARNU15GCEU4                      ARNU09GCEU4      ARNU18GCFU4                      ARNU12GCEU4      ARNU24GCFU4</p> 
<p><b>Ceiling Mounted Cassette (4-Way)</b>                      ARNU05GTR*4      ARNU24GTP*4                      ARNU07GTR*4      ARNU28GTP*4                      ARNU09GTR*4      ARNU30GTP*4                      ARNU12GTR*4      ARNU36GTN*4                      ARNU15GTQ*4      ARNU42GTM*4                      ARNU18GTQ*4      ARNU48GTM*4                      ARNU21GTQ*4      ARNU54GTM*4</p>  <p>* A:Basic, C:Plasma</p>	<p><b>Wall Mounted Unit (Standard)</b>                      ARNU05GSJ*4      ARNU15GSJ*4                      ARNU07GSJ*4      ARNU18GSK*4                      ARNU09GSJ*4      ARNU24GSK*4                      ARNU12GSJ*4      * A:Basic, N:Ionizer</p>  <p>ARNU30GSVA4      ARNU36GSVA4</p> 
<p><b>Ceiling Mounted Cassette (4-Way(2))</b>                      ARNU07GTNA4      ARNU24GTMA4                      ARNU09GTNA4      ARNU28GTMA4                      ARNU12GTNA4      ARNU36GTMA4                      ARNU15GTNA4      ARNU42GTMA4                      ARNU18GTNA4</p> data-bbox="358 525 482 580"/>	<p><b>Ceiling Concealed Duct (Low Static)</b>                      ARNU05GL1G4      ARNU15GL2G4                      ARNU07GL1G4      ARNU18GL2G4                      ARNU09GL1G4      ARNU21GL3G4                      ARNU12GL2G4      ARNU24GL3G4</p>  <p><b>ARTCOOL (Mirror)</b>                      ARNU05GSJR4      ARNU15GSJR4                      ARNU07GSJR4      ARNU18GSKR4                      ARNU09GSJR4      ARNU24GSKR4                      ARNU12GSJR4</p> 
<p><b>Ceiling Concealed Duct (Built-in (Low Static))</b>                      ARNU07GB3G4      ARNU15GB3G4                      ARNU09GB3G4      ARNU18GB4G4                      ARNU12GB3G4      ARNU24GB4G4</p> data-bbox="362 682 488 730"/>	<p><b>ARTCOOL (Gallery)</b>                      ARNU07GSF14                      ARNU09GSF14                      ARNU12GSF14</p> 
<p><b>Ceiling Concealed Duct (Middle Static)</b>                      ARNU07GM1A4      ARNU28GM2A4                      ARNU09GM1A4      ARNU36GM2A4                      ARNU12GM1A4      ARNU42GM2A4                      ARNU15GM1A4      ARNU48GM3A4                      ARNU18GM1A4      ARNU54GM3A4                      ARNU24GM1A4</p> data-bbox="362 762 482 798"/>	<p><b>Ceiling &amp; Floor Convertible Unit</b>                      ARNU09GVEA4                      ARNU12GVEA4</p> 
<p><b>Ceiling Suspended Unit</b>                      ARNU18GV1A4                      ARNU24GV1A4                      ARNU36GV2A4                      ARNU48GV2A4</p> 	<p><b>Console</b>                      ARNU07GQAA4                      ARNU09GQAA4                      ARNU12GQAA4                      ARNU15GQAA4</p> 

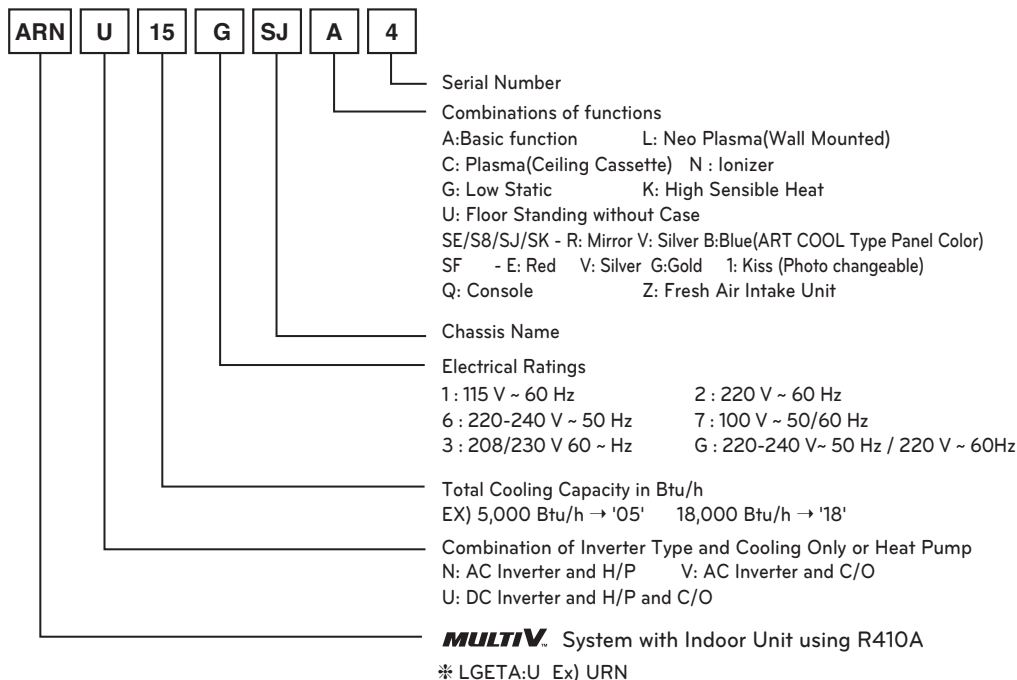
\* In matters of combination with MULTI V M system, refer the PDB of that MULTI V M.

## 2.2 MULTI V M

Chassis	Model Name	External Appearance
K4	ARNU050LMC0	
B8	ARNU050GME0	

# 3. Nomenclature

## 3.1 Indoor Unit



## 3.2 MULTI V M

Model Name	ARU	N	050	L	M	S	0
No.	1	2	3	4	5	6	7

No.	Signification
1	<b>MULTI V System Outside Unit using R410A</b>
2	<b>Combination of Inverter Type and Cooling Only or Heat Pump</b> N: Inverter and H/P, V: Inverter and C/O
3	<b>Total Cooling Capacity in Horse Power(HP) unit</b> EX) 5HP → '050', 8HP → '080'
4	<b>Electrical Ratings</b> L :380-415 V 3N~ 50 Hz G : 220-240 V~ 50 Hz / 220 V ~ 60Hz
5	<b>Air discharge tpye</b> S : Side Discharge T : Top Discharge N : Top Discharge Standard H/P(380V) L : Top Discharge special H/P M : Module type
6	<b>Model Type</b> S : Set C : Compressor Module E : Heat Exchanger Module
7	<b>Serial number</b>

• Additional information : Serial number is refer to the bar code on the product.

# Part 2

## MULTI V M

# ARU\* Series

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# Function

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## 1. Basic control

### 1.1 Normal operation

Actuator	Cooling operation	Heating operation	Stop state
Compressor	Fuzzy control	Fuzzy control	Stop
Fan	Fuzzy control	Fuzzy control	Stop
Main EEV	Full open	Fuzzy control	Close
4 way valve	OFF	ON	1 hour after Heating stop & outdoor temp. > 30°C → OFF
Subcooling EEV	Fuzzy control	Fuzzy control	Close
Indoor Unit EEV	Superheat fuzzy control	Subcooling fuzzy control	Close

**Note :** Heating operation is not functional at an outdoor air temperature of 27°C or more.

Cooling operation is not functional at an outdoor air temperature of 2°C or less with indoor unit combination of 10% or less

### 1.2 Compressor control

Fuzzy control : Maintain evaporating temperature( $T_e$ ) to be constant on cooling mode and condensing temperature( $T_c$ ) on heating mode by Fuzzy control to ensure the stable system performance.

( $T_c$ :47 ~51°C,  $T_e$ :2 ~ 5°C)

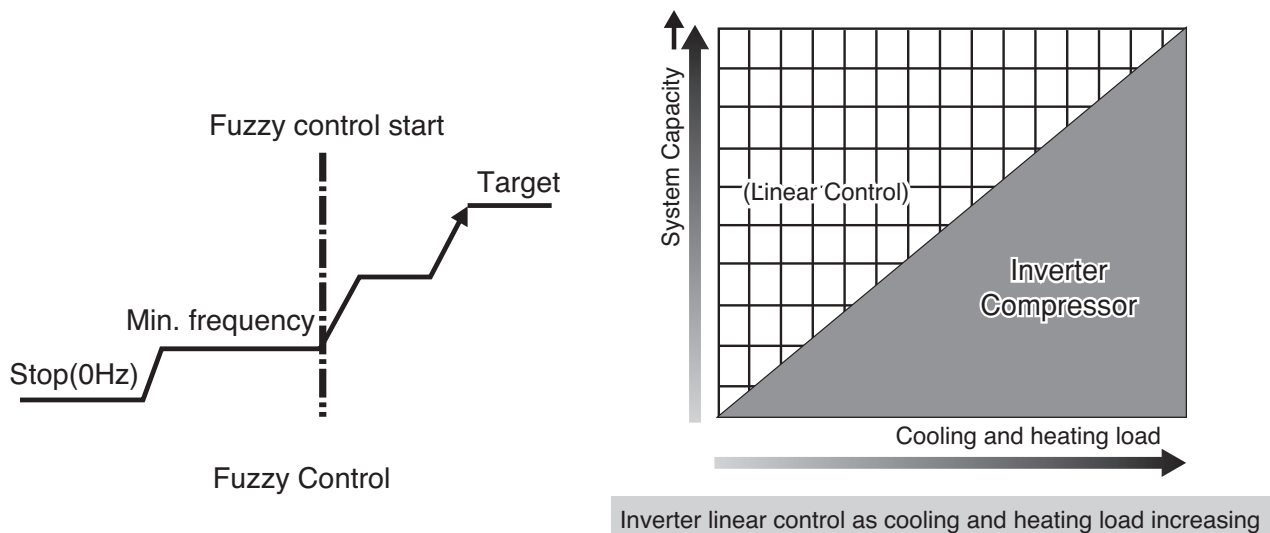
(1) Cooling mode

$T_e$  can be set various step at installation mode.

(2) Heating mode

$T_c$  can be set various step at installation mode.

**Note:** By setting dip switch,  $T_e$  and  $T_c$  are decided simultaneously.



## 1.3 EEV control

(1) Main EEV control

Main EEV operates with fuzzy control rules to keep the degree of super Heat(Superheat) (about 3°C) at the evaporator outlet stable during heating mode

The degree of Superheat =  $T_{\text{suction}} - T_{\text{evaporation}}$

$T_{\text{suction}}$  : temperature at suction pipe sensor(°C)

$T_{\text{evaporation}}$  : evaporation temperature equivalent to low pressure(°C)

(2) Subcooling EEV control(about 15°C)

Subcooling EEV works with fuzzy rules to keep the degree of Subcool at the outlet of subcooler during cooling mode

The degree of Subcool =  $T_{\text{condensation}} - T_{\text{liquid}}$

$T_{\text{liquid}}$  : temperature at outlet of subcooler(°C)

$T_{\text{condensation}}$  : condensation temperature equivalent to high pressure(°C)

(3) Avoiding excessive high discharge temperature : when main EEV opens some given opening and discharge temperature is above 85°C in heating operation, subcooling EEV may control the "subcooling out temperature-evaporating temperature" to be some given difference.



## 2. Special control

### 2.1 Oil return control

#### 2.1.1 Oil return control on cooling mode

Oil return operation recovers Oil level in compressor by collecting oil accumulated in pipe. Each cycle component operates as shown on the below table during oil return operation.

#### MULTI V M

Component	Starting	Running	Ending
Inverter compressor	30Hz	Setting Value	30Hz
Fan	Normal control	Normal control	Normal control
Main EEV	Max. pulse	Max. pulse	Max. pulse
Subcooling EEV	Min. pulse	Min. pulse	Min. pulse
4way valve	OFF	OFF	OFF

#### Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	Normal control	Normal control
Thermo on unit EEV	Normal control	Normal control	Normal control
Thermo off unit EEV	40 pulse	400 pulse	40 pulse
Oil return signal	OFF	ON	OFF

- Oil return operation time : 3 min for running step
- Starting condition : Every 8 hours operate
- Oil return process ends if compressor protection control starts

## 2.1.2 Oil return control on heating mode

### MULTI V M

Component	Starting	Running	Ending
Inverter compressor	30Hz	Setting Value	40Hz
Fan	OFF	Normal control	OFF
Main EEV	300 pulse	Max. pulse	200 pulse
Subcooling EEV	Min. pulse	Min. pulse	Min. pulse
4way valve	ON	ON → OFF → ON	ON

### Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	Normal control	Normal control
Thermo on unit EEV	Normal control	400~800 pulse	1200 → 600 → Normal Control
Thermo off unit EEV	60~100 pulse	400~800 pulse	1200 → 600 → 60~100 pulse

- Oil return operation time : 3 min for running step
- Starting condition:same as cooling mode
- Oil return process ends if compressor protection control starts

## 2.2 Defrost

Defrost operation eliminates ice accumulated on heat exchanger, recovering performance of heat exchanger. Each cycle component operates as following table during defrost operation.

### MULTI V M

Component	Starting	Running	Ending
Inverter compressor	30Hz	Setting Value	40Hz
Fan	OFF	Normal control	OFF
Main EEV	300 pulse	Max. pulse	200 pulse
Subcooling EEV	Min. pulse	Min. pulse	Min. pulse
4way valve	ON	ON → OFF → ON	ON

### Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	Normal control	Normal control
Thermo on unit EEV	Normal control	400~800 pulse	1200 → 600 → Normal Control
Thermo off unit EEV	60~100 pulse	400~800 pulse	1200 → 600 → 60~100 pulse

#### ■ Ending condition

- 1) All heat exchanger pipe temperature are above setting temperature for 30 s
- 2) The running time of defrost operation is over 30% of the total heating time
- 3) If compressor protection control starts by high discharge temperature of compressor etc.

## 2.3 Stopping operation

### 2.3.1 Stopping operation on cooling mode

Component	Operation	Note
Inverter compressor	0Hz	-
Fan	Stop	-
Main EEV	Min. pulse	-
Subcooling EEV	Min. pulse	-
4way valve	OFF	-

### 2.3.2 Stopping operation on heating mode

Component	Operation	Note
Inverter compressor	0Hz	-
Fan	Stop	-
Main EEV	Min. pulse	-
Subcooling EEV	Min. pulse	-
4way valve	ON → OFF	1 hour after stop & outdoor temp. > 30°C ➡ OFF

## 3. Protection control

### 3.1 Pressure protection control

#### 3.1.1 Pressure control on cooling mode

##### ■ High pressure control

Pressure Range	Compressor
$P_d \geq 4167$	Stop
$P_d \geq 4036$	-5Hz/10 s
$P_d \geq 3938$	Frequency holding
$P_d < 3840$	Normal control

##### ■ Low pressure control

Pressure Range	Compressor	Fan
$P_s \leq 98$ kPa, 1 minute later operation	Stop	
$P_s \leq 124$ kPa	-15Hz/10 s	-100RPM/10 s

\* Frequency holding : frequency (or RPM) is not increasing ( can decrease )

#### 3.1.2 Pressure control on heating mode

##### ■ High pressure control

Pressure Range	Compressor	Fan
$P_d > 3846$ kPa	Stop	
$P_d \geq 3513$ kPa	-15Hz/10 s	-50RPM/10 s
$P_d \geq 3317$ kPa	Frequency holding	-50RPM/10 s
$P_d \geq 3115$ kPa	Frequency holding	RPM holding
$P_d < 3115$ kPa	Normal control	

##### ■ Low pressure control

Pressure Range	Compressor	Fan
$P_s \leq 98$ kPa, 1 minute later operation	Stop	
$P_s \leq 124$ kPa	-15Hz/10 s	+100RPM/10 s
$P_s > 124$ kPa	Frequency holding	+100RPM/10 s
$P_s \geq 137$ kPa	+2Hz or less/10 s	+100RPM/10 s
$P_s \geq 190$ kPa	Normal control	

\* Frequency holding : frequency (or RPM) is not increasing ( can decrease ).

### 3.2 Discharge temperature control

#### ■ MULTI V M control

Temperature Range	Compressor	Sub cooling EEV	IDU EEV
$T_{dis} \geq 115\text{ }^{\circ}\text{C}$	OFF	Min. pulse	Min. pulse
$T_{dis} \geq 110\text{ }^{\circ}\text{C}$	-5Hz/10 s	SC_SH decrease control	SH decrease control
$T_{dis} \geq 108\text{ }^{\circ}\text{C}$	-5Hz/30 s		
$108\text{ }^{\circ}\text{C} > T_{dis} \geq 105\text{ }^{\circ}\text{C}$	no increase		
$105\text{ }^{\circ}\text{C} > T_{dis} \geq 100\text{ }^{\circ}\text{C}$	+3Hz or less		
$T_{dis} < 100\text{ }^{\circ}\text{C}$	Normal control		

SC : Sub Cooling, SH : Super Heating

### 3.3 Inverter protection control

#### ■ ARUN050LMS0

- Cooling mode

	Normal Operation	Frequency Down	System stop
AC input Current	20 and less	20 or Over	29
Compressor Current	10 and less	10 or Over	12

- Heating mode

	Normal Operation	Frequency Down	System stop
AC input Current	20 and less	20 or Over	29
Compressor Current	11 and less	11 or Over	13

### 3.4 Phase detection

■ If the power lines are connected incorrectly the product will not work and displays error like below.

Case 1) 1 or more phase lines are omitting (disconnected)

Case 2) Neutral (N) line connected wrongly to any phase line

Case	Terminal block				Error No.
	R	S	T	N	
Missed Phase	X				50
		X			05
			X		50 (when Fan Motor operating)
				X	50 (when Fan Motor operating)

### 3.5 Pressure switch

- Main has pressure sensing switch in series between compressor and power relay.







- The state of pressure sensing switch is normally on. It has small electric current from 220V AC. Never touch the connecting terminal with hand nor short two wires directly.

## 4. Other control

### 4.1 Initial setup

There are 4 initial setup steps before running.  
All DIP switch setting must be completed before initial setup.

- 1) Step 1 : factory setting value display  
Factory setting value is displayed in 7 segment on PCB for 24 s  
All dip switches must be set properly before step 1.

Power is on		
Master model code is displayed (3 s)		(In case of 5HP : 05)
Blank(6 s)		
Total capacity including sub units is displayed (2 s)		
Heat pump : Display 2 is default value		
Power type		
Model type		

※ AC input current is input current of inverter compressor except constant current (current pass through noise filter)

## Function

### 2) Step 2 : Communication check

- If all model code is displayed in 7 segment communication between Compressor Module is normal.
- If 104\* is displayed in 7-segment, check communication wires between Compressor Module and Dip switch setting.

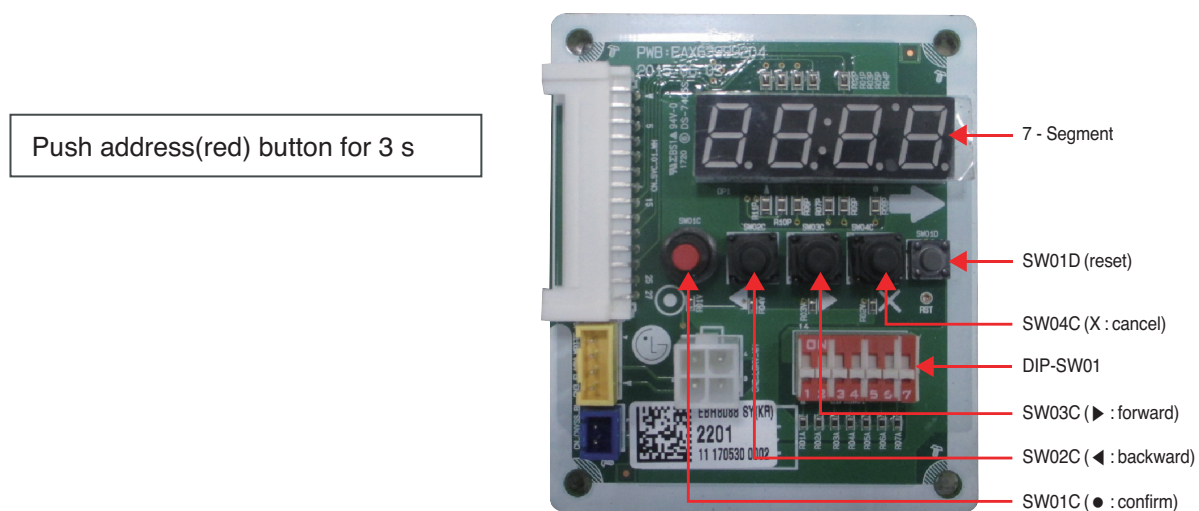
### 3) Step 3 : PCB error check

- After 40 s, error check begins.

### 4) Step 4 : Auto addressing of indoor units

- Auto addressing begins when address(red) button in DISPLAY PCB is pressed for 6 s.
- During auto addressing, 7 segment on DISPLAY PCB displays "88"
- After auto addressing, the number of indoor units is displayed in 7 segment for 30 s. The address of each indoor unit is displayed on each wired remote controller.

#### ■ DISPLAY PCB

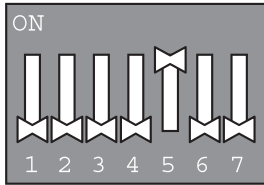


Auto address starts		
Auto address is in progress (max. 15 min.)		
The number of indoor units is displayed for 30 s		(10 indoor units found)
Auto address process is finished. Every indoor unit displays its address on wired remote controller and the 7 segment of main PCB is off.		

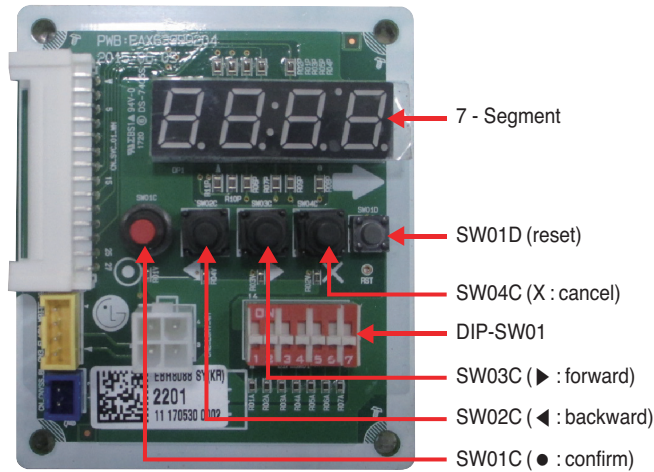


### ■ Setting the function

Select the mode/function/option/value using ‘▶’, ‘◀’ Button and confirm that using the ‘●’ button after dip switch No.5 is turned on.



1 2 3 4 5 6 7



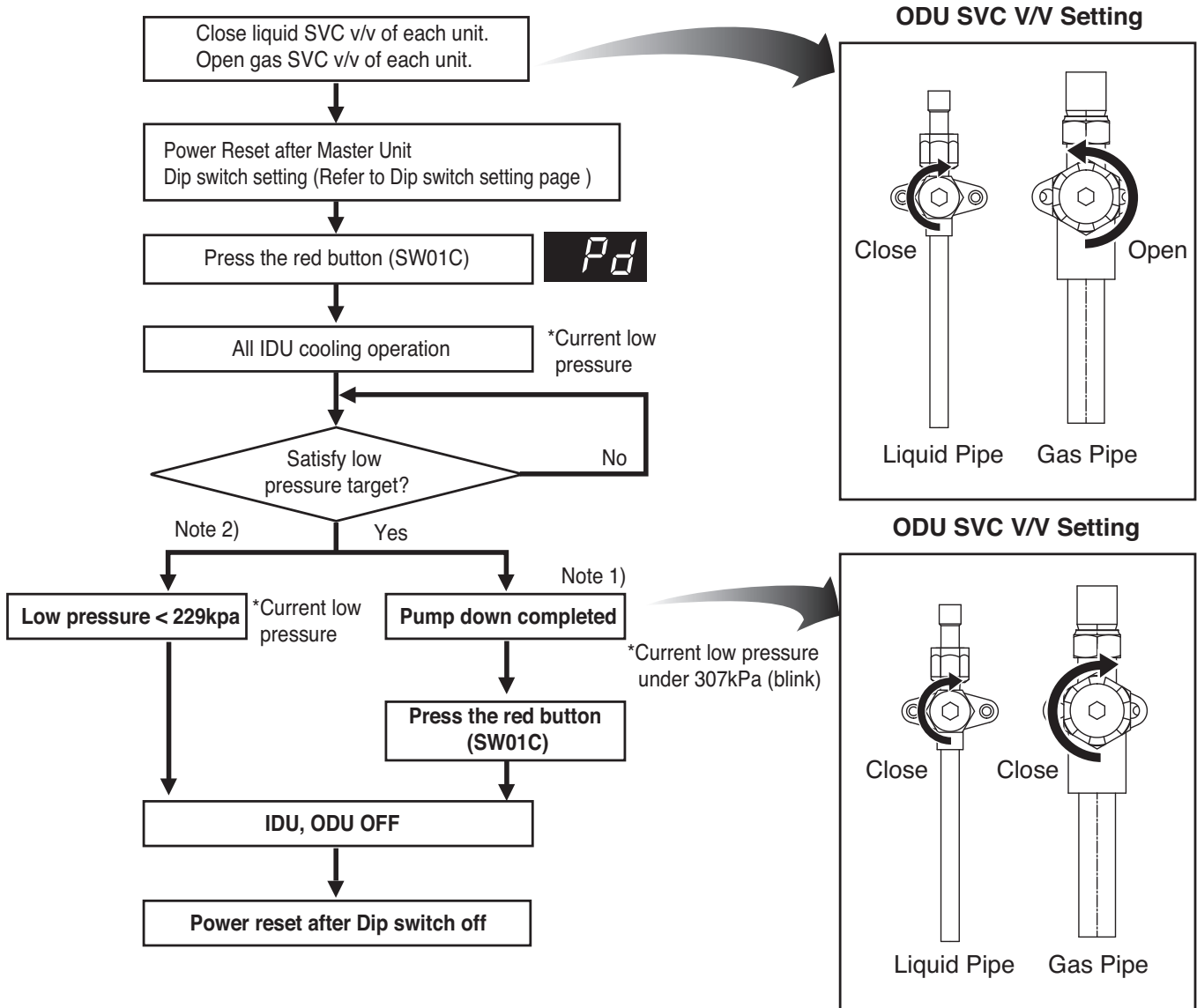
MODE		FUNCTION		OPTION			VALUE		ACTION		Remarks
Content	Display1	Content	Display2	Content	Display3	Content	Display4	Implement	Display5		
Installation	Func	Cool & Heat Selector	F <sub>n1</sub>	oFF	op1~op2	selected the option	-	-	change the set value	blank	save in EEPROM
		Static pressure compensation	F <sub>n2</sub>	oFF	op1~op3	selected the option	-	-	change the set value	blank	save in EEPROM
		Night low noise	F <sub>n3</sub>	oFF	op1~op15	selected the option	-	-	change the set value	blank	save in EEPROM
		ODU address	F <sub>n5</sub>	-	-	-	0~254	set the value	change the set value	blank	save in EEPROM
		Snow removal & rapid defrost	F <sub>nb</sub>	oFF	op1~op3	selected the option	-	-	change the set value	blank	save in EEPROM
		Target pressure adjusting	F <sub>n8</sub>	-	op1~op6	selected the option	-	-	change the set value	blank	save in EEPROM
SVC	S <sub>vc</sub>	Pump Down	SE <sub>1</sub>	-	-	-	-	start operation	P <sub>d</sub>	-	
		Vacuum mode	SE <sub>3</sub>	-	-	-	-	start operation	u <sub>Rec</sub>	-	
		Forced oil return	SE <sub>5</sub>	-	-	-	-	start operation	o <sub>1</sub>	-	
		Forced defrost	SE <sub>b</sub>	-	-	-	-	start operation	d <sub>EF</sub>	-	
		Cycle data view	SE <sub>7</sub>	-	-	-	-	Show in segment	Show the each numerical value in process	-	
		Refrigerant noise reduction mode	SE <sub>B</sub>	oFF	on	-	-	-	Change the set value	on oFF	save in EEPROM

\* Functions save in EEPROM will be kept continuously, though the system power was reset.

## 4.2 Pump Down

This function gathers the refrigerant present in the system to ODU

Use this function to store refrigerant of system in ODU for leakage or IDU replacement.



**[Note]**

If low pressure become under 307kPa (blink), close the gas SVC V/V of all ODU immediately.

If low pressure descends below 229 kPa, the system turns off automatically. Close the gas SVC V/V immediately.

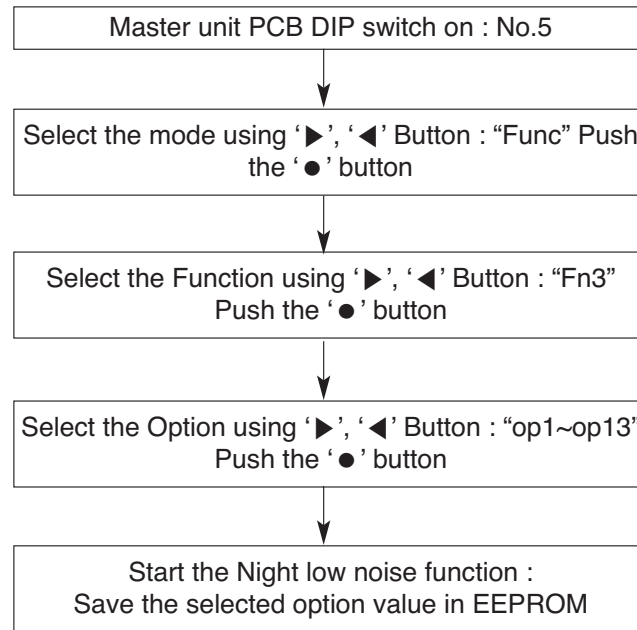
**⚠ Caution**

1. Use pump down function within guaranteed temperature range  
 IDU : 20~32 °C  
 ODU : 5~40 °C
2. Make certain that IDU doesn't run with thermo off mode during operation
3. Maximum operation time of pump down function is 30 min.  
 (In case low pressure doesn't go down)

### 4.3 Night Low Noise Function

In cooling mode, this function makes the ODU fan operate at low RPM to reduce the fan noise of ODU at night which has low cooling load.

#### Night low noise function setting method



#### RPM / Time Settings

Step	Judgment Time(hr)	Operation Time(hr)
op1	8	9
op2	6.5	10.5
op3	5	12
op4	8	9
op5	6.5	10.5
op6	5	12
op7	8	9
op8	6.5	10.5
op9	5	12
op10	Continuous operation	
op11		
op12		
op13	6.5	10.5
op14	6.5	10.5
op15	6.5	10.5



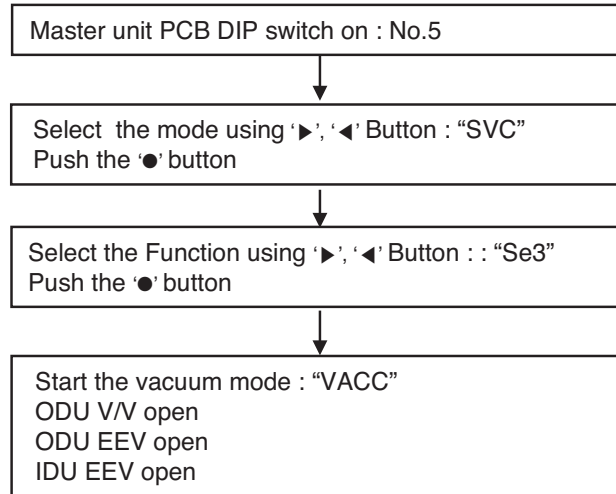
#### CAUTION

- Request installer to set the function during installation.
- In case the function is not used, set the dip S/W OFF and reset the power.
- If ODU Hz and RPM change, cooling capacity may go down.

## 4.4 Vacuum Mode

This function is used for creating vacuum in the system after compressor replacement, ODU parts replacement or IDU addition/replacement.

### Vacuum mode setting method



### Vacuum mode cancellation method



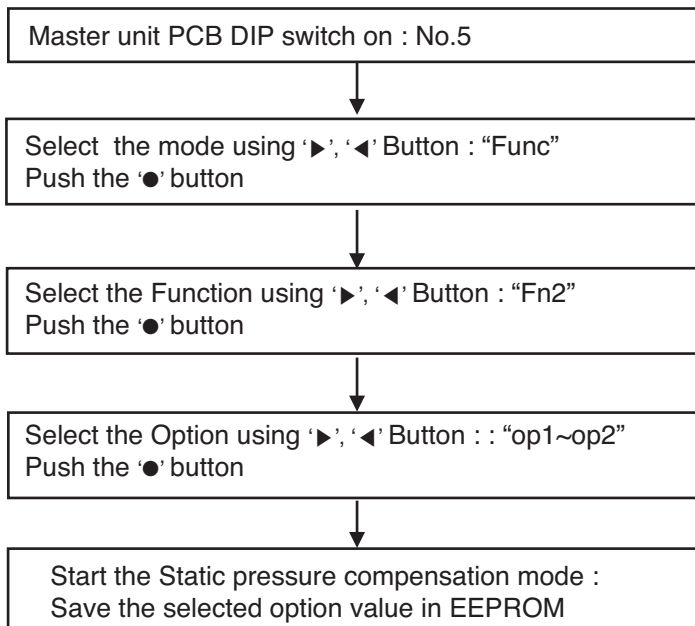
### CAUTION

ODU operation stops during vacuum mode. Compressor can't operate.

## 4.5 Static pressure compensation mode

This function is used for creating vacuum in the system after compressor replacement, ODU parts replacement or IDU addition/replacement.

### Static pressure compensation mode setting method

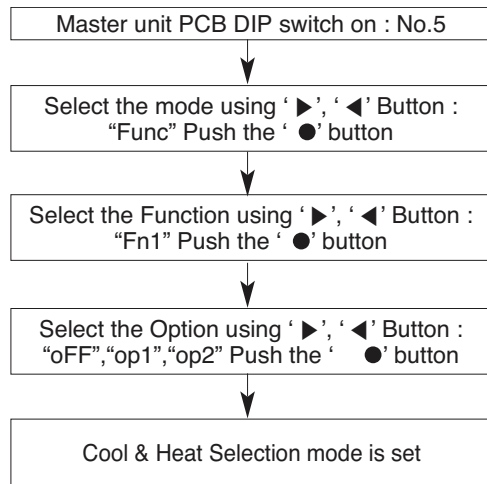


### FAN Maximum RPM of each step

		Capacity	5HP
Fan Max. RPM	op1		+50
	op2		+100
	op3		+150

## 4.6 Cool & Heat selector

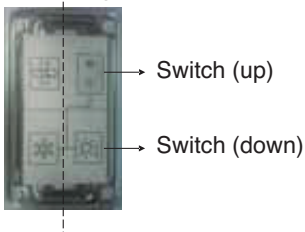
### mode setting method



### mode setting method

Switch control		Function		
Switch(up)	Switch(down)	oFF	op1(mode)	op2(mode)
Right side(on)	Left side(off)	Not operate	Cooling	Cooling
Right side(on)	Right side(on)	Not operate	Heating	Heating
Left side(off)	-	Not operate	Fan mode	Off

Left side | Right side



### CAUTION

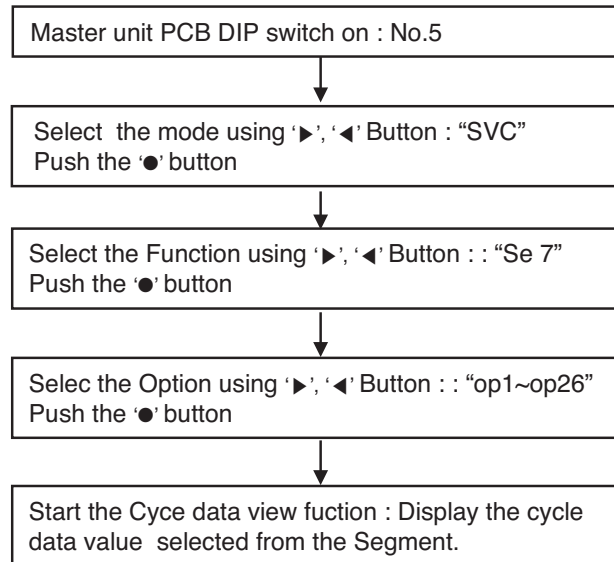
- Ask an authorized technician to setting a function.
- If do not use a function, set an off-mode.
- If use a function, first install a Cool & Heat selector.

## 4.7 Cycle Data View

This function is intended to identify the Cycle data of ODU, which is running on.

The 7 Segment is display 26 different cycle data.

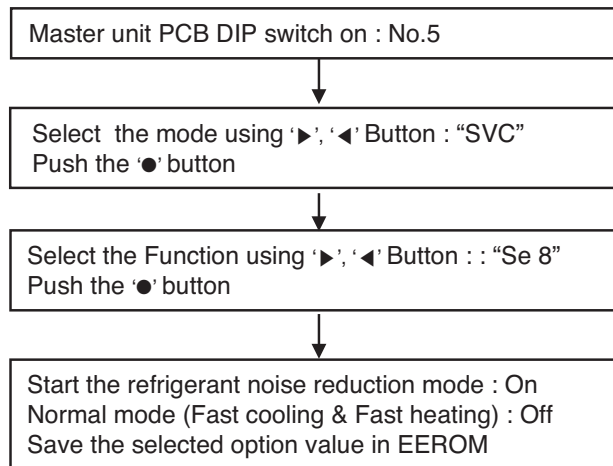
### Cycle data view function setting method



No	Title	7-seg	Example	Seg_1	Seg_2	Seg_3	Seg_4
1	Current High Pressure	P1	4321 kPa	4	3	2	1
2	Current Low Pressure	P2	1234 kPa	1	2	3	4
3	Inv. Comp.	H1	120 Hz		1	2	0
4	Fan1	H3	110 RPM		1	1	0
5	Fan2	H4	110 RPM		1	1	0
6	Superheating degreee	T1	53°C		5	3	0
7	Subcooling degreee	T2	-4.5°C	-		4	5
8	ODU temp.	T3	10°C		1	0	0
9	Suction temp.	T4	43.4°C		4	3	4
10	Comp. discharge temp.	T5	150°C	1	5	0	0
12	Liquid pipe temp.	T7	10°C		1	0	0
14	SC_OUT	T9	10°C		1	0	0
15	Hex	T10	10°C		1	0	0
18	Inlet pipe average temp. of IDU	T13	-10°C	-	1	0	0
19	Main EEV	PLS1	1950 pls	1	9	5	0
21	SC EEV	PLS3	16 pls			1	6
25	IDU running capacity	IDU1	24 kBTU			2	4
26	Total number of IDU	IDU2	10 EA			1	0

## 4.8 Refrigerant noise reduction mode

### Refrigerant noise reduction mode setting method





# **Part 3**

## **PCB Setting and Test Run**



# Test Run

## 1. Checks Before Test Run

1	Check to see whether there is any refrigerant leakage, and slack of power or communication cable.
2	<p>Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less.</p> <p>NOTE: Never carry out megaohm check over terminal control board. Otherwise the control board would be broken.</p> <p>Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground may decrease to approx. 2 MΩ as a result of refrigerant accumulating in the internal compressor. If the insulation resistance is less than 2 MΩ, turning on the main power supply and energizing the crankcase heater for more than 6 hours will cause the refrigerant to evaporate, increasing the insulation resistance.</p>
3	<p>Check if high/low pressure common pipe, liquid pipe and gas pipe valves are fully opened.</p> <p>NOTE: Be sure to tighten caps.</p>
4	<p>Check if there are any problems in automatic addressing or not:</p> <p>Check and confirm that there are no error messages in the display of indoor units or remote controls and LED in MULTI V M.</p>



### CAUTION

#### when cutting main power of the Multi V

- Always apply main power of the MULTI V M during use of product (cooling season/heating season).
- Always apply power before 4 hours to heat the crank case heater where performing test run after installation of product. It may result in burning out of the compressor if not preheating the crank



### CAUTION

#### Preheat of compressor

- Start preheat operation for 4 hours after supplying main power.
- In case that the outdoor temperature is low, be sure to supply power 4 hours before operation so

## 2. How to cope with Test Run abnormality

### 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
		Strainer clogged	Change strainer
		Oil leakage	Check Oil level after opening oil port
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Abnormal noise during running	R-S-T misconnection	Check compressor R-S-T connection
<b>Heat Exchanger Module fan</b>	High pressure error at cooling	Motor failure, bad ventilation around outdoor heat exchanger	Check the Heat Exchanger Module fan operation after being turned the Heat Exchanger Module off for some time. Remove obstacles around the Heat Exchanger Module
<b>MULTI V M EEV</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	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	Service necessary

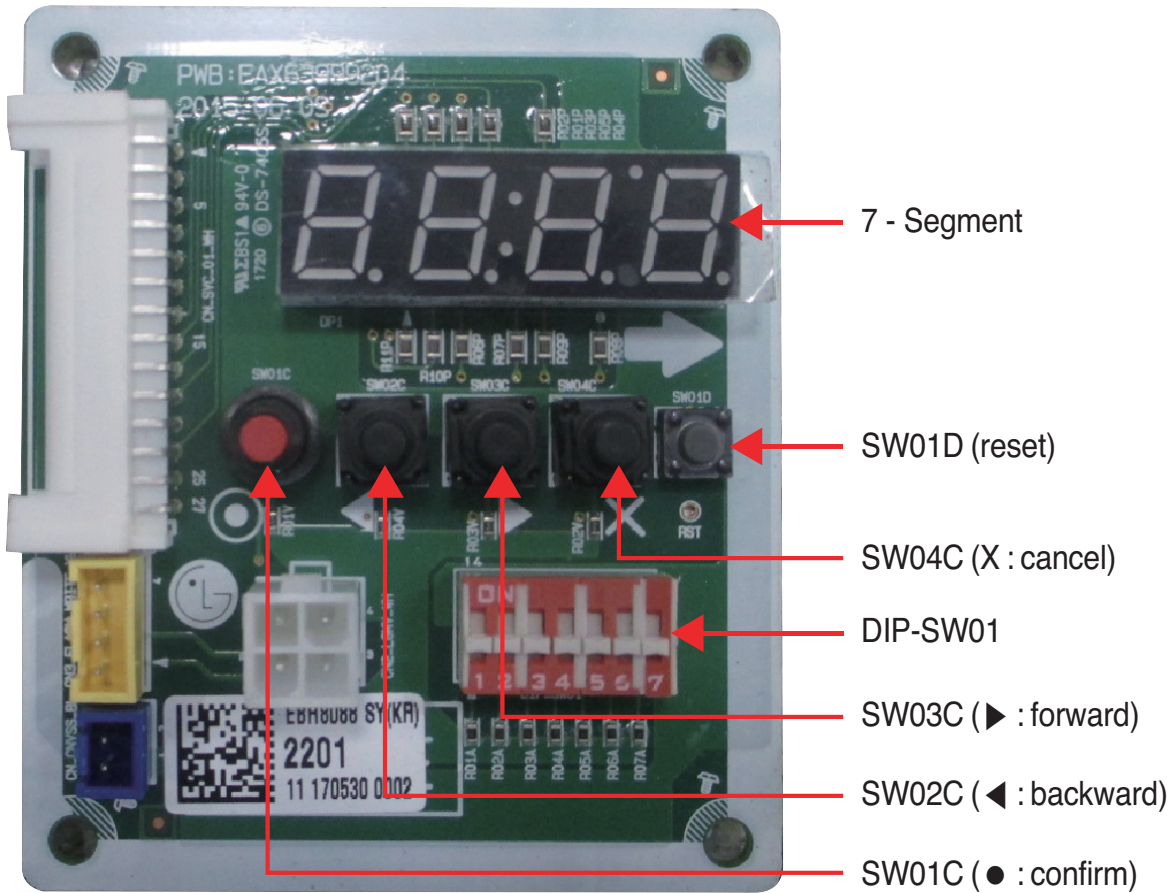
When system fault occurs, the error code is displayed at indoor unit display or remote control display, the trouble shooting guide is in the service manual

- When CH05/53 ERROR occurs, check if auto-addressing has done and communication wiring is ok.

### 3. DIP Switch Setting

#### ■ Location of setting Switch

#### Display PCB



**Checking the setting of MULTI V M**

**■ Checking according to dip switch setting**

1. You can check the setting values of the Master Compressor Module from the 7 segment LED.  
The dip switch setting should be changed when the power is OFF.
2. It checks whether the input is properly performed without the bad contact of the dip switch or not

**■ Checking the setting of Compressor Module**

**Checking according to dip switch setting**

- You can check the setting values of the Master Compressor Module from the 7 segment LED.  
The dip switch setting should be changed when the power is OFF.

**Checking the initial display**

The number is sequentially appeared at the 7 segment in 5 seconds after applying the power. This number represents the setting condition. (For example, represents R410A 5HP)

• Initial display order

Order	No	Note
①	5~8	Model capacity
②	1	Cooling only
	2	Heat pump
③	38	380V
	46	460V
	22	220V
④	1	Standard
	5	Cold temperature area
	6	Tropical

# **Part 4**

## **Trouble shooting guide**

# Trouble shooting guide

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<b>2. Checking Method for Key Components .....</b>	<b>40</b>
<b>2.1 Compressor .....</b>	<b>40</b>
<b>2.2 Fan Motor .....</b>	<b>41</b>
<b>2.3 Electronic Expansion Valve.....</b>	<b>42</b>
<b>2.4 Phase Bridge Diode Checking Method .....</b>	<b>45</b>
<b>2.5 Inverter IPM Checking Method .....</b>	<b>46</b>
<b>2.6 Pressure Sensor(High/Low Pressure Sensor) .....</b>	<b>47</b>
<b>2.7 Outdoor Fan .....</b>	<b>47</b>
<b>2.8 4 way Valve.....</b>	<b>48</b>
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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
		Strainer clogged	Change strainer
		Oil leakage	Check Oil level after opening oil port
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Abnormal noise during running	R-S-T misconnection	Check compressor R-S-T connection
<b>Heat Exchanger Module fan</b>	High pressure error in cooling mode operation	Motor failure, bad ventilation around outdoor heat exchanger	Check the fan operation to confirm proper motor functioning. Switch OFF the Heat Exchanger Module and remove obstacles, if any, around the HEX. Check connector
<b>MULTI V M EEV</b>	Heating failure, frequent defrosting	Bad connector contact	Check resistance between terminals
	No operation sound after switching ON the power supply	Coil failure	Service necessary
	Heating failure, frozen outdoor heat exchanger part	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	

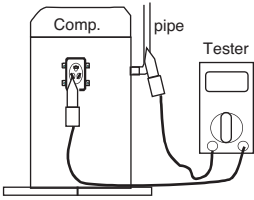
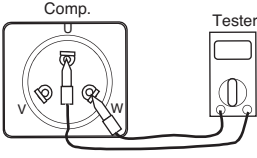
When system fault occurs, the error code is displayed on the indoor unit display or remote control display. The trouble shooting guide is available in the service manual.

- When CH05/53/11 ERROR occurs, check if auto-addressing has done and communication wiring is ok.

## 2. Checking Method for Key Components

### 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 IPM may fail.												
		2) If output voltage of the inverter is stably output. Note 1)	* Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor. * Insulation resistor : 50MΩ or more * Coil resistor (below table) RJA036MAA <table border="1" data-bbox="1102 995 1461 1123"> <thead> <tr> <th>Temp</th> <th>25°C</th> <th>75°C</th> </tr> </thead> <tbody> <tr> <td>U-V</td> <td>0.529 ±7 % Ohms</td> <td>0.631 ±7 % Ohms</td> </tr> <tr> <td>V-W</td> <td>0.529 ±7 % Ohms</td> <td>0.631 ±7 % Ohms</td> </tr> <tr> <td>W-U</td> <td>0.529 ±7 % Ohms</td> <td>0.631 ±7 % Ohms</td> </tr> </tbody> </table>	Temp	25°C	75°C	U-V	0.529 ±7 % Ohms	0.631 ±7 % Ohms	V-W	0.529 ±7 % Ohms	0.631 ±7 % Ohms	W-U	0.529 ±7 % Ohms	0.631 ±7 % Ohms
		Temp	25°C	75°C											
U-V	0.529 ±7 % Ohms	0.631 ±7 % Ohms													
V-W	0.529 ±7 % Ohms	0.631 ±7 % Ohms													
W-U	0.529 ±7 % Ohms	0.631 ±7 % Ohms													
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.

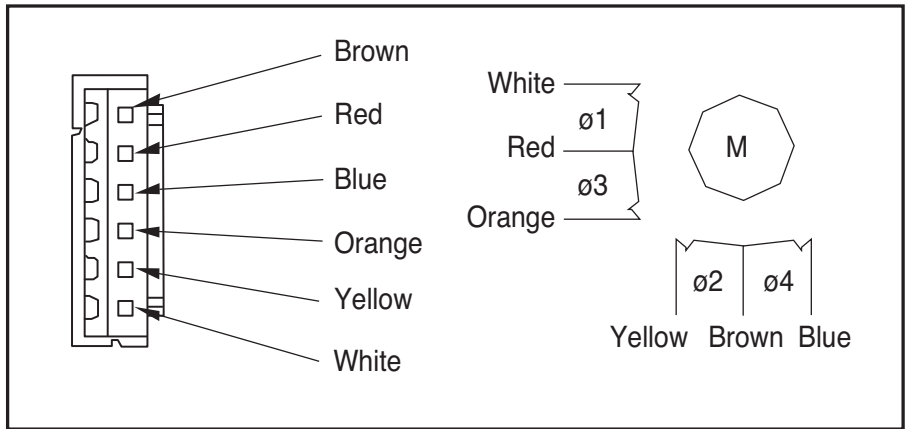
- 1) If using a movable tester when checking that output voltage of the inverter is constant (when comparing relative voltage between lines), always use an analog tester. Especially exercise particular caution if the output frequency of the inverter is low, when using a movable tester, where change of 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
(1) The fan motor does not operate. Does failure appears again when starting operation?	1) When power supply is abnormal	* Modify connection status in front of or at the rear of the breaker, or if the power terminal console is at frosting condition. * Modify the power supply voltage is beyond specified scope.
	2) For wrong wiring	* For following wiring. 1. Check connection status. 2. Check contact of the connector. 3. Check that parts are firmly secured by tightening screws. 4. Check connection of polarity. 5. Check short circuit and grounding.
(2) Vibration of the fan motor is large.		

## 2.3 Electronic Expansion Valve



### • Pulse signal output value and valve operation

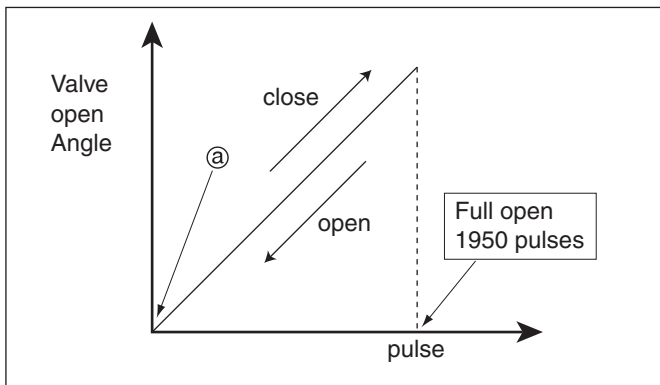
Output(ø) No.	Output state			
	1	2	3	4
ø1	ON	ON	OFF	ON
ø2	ON	ON	ON	OFF
ø3	OFF	OFF	ON	OFF
ø4	OFF	OFF	OFF	ON

### • Output pulse sequence

- In valve close state: 4 → 3 → 2 → 1 → 4
- In valve open state: 1 → 2 → 3 → 4 → 1

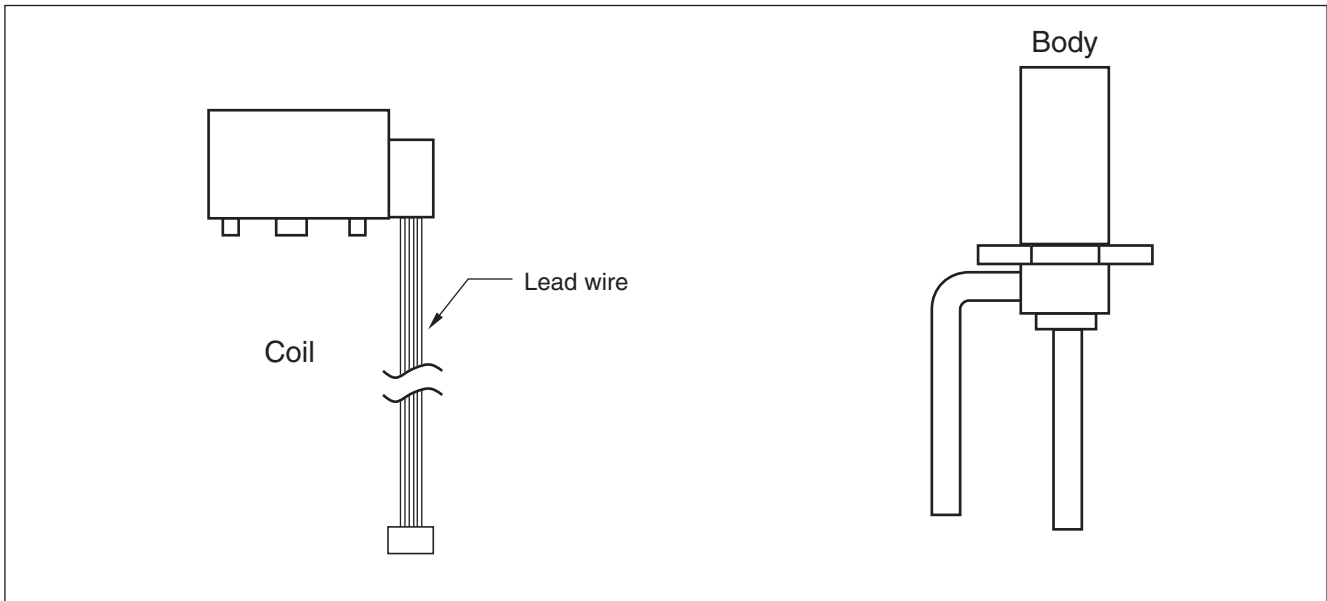
- \* 1. If EEV open angle does not change, all of output phase will be OFF
- 2. If output phase is different or continuously in the ON state, motor will not operate smoothly and start vibrating.

### • EEV valve operation

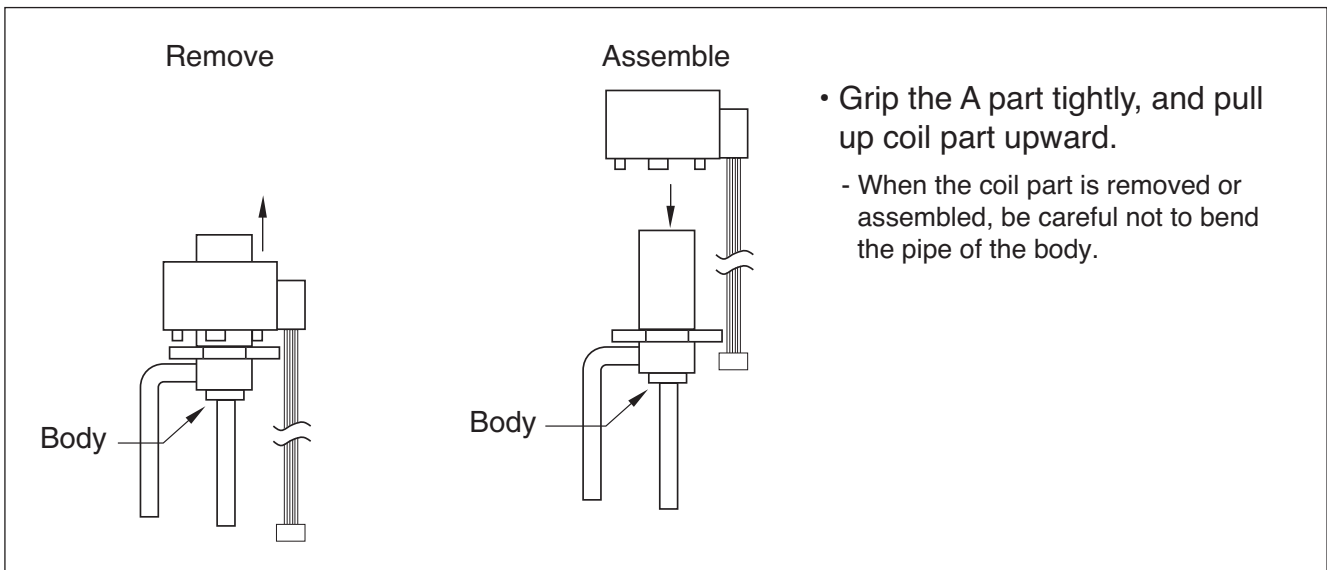


- At power ON, open angle signal of 1400 pulses output and valve position is set to @  
If valve operates smoothly, no noise and vibration occurs and if valve is closed. noise occurs.
- Noise from EEV can be confirmed by touching the EEV surface with a screw driver and listening the EEV noise.
- If liquid refrigerant is in EEV, the noise is lower.

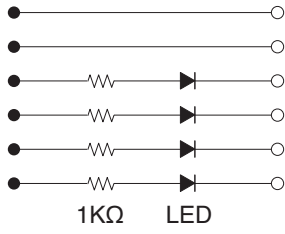
• EEV Coil and body(MULTI V M)



• Remove and assemble the coil

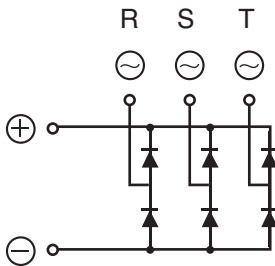


• EEV failure check method

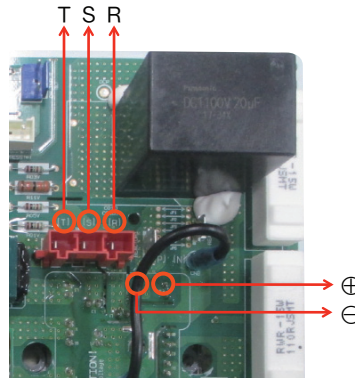
Failure mode	Diagnosis	Repair process	Unit
Microcomputer Driving circuit failure	<p>1. Disconnect the EEV connector form control board and connect testing LED</p>  <p>2. Main power ON, pulse signal is out from EEV for 17 s If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal</p>	Check and replace Indoor unit control board	Indoor unit
EEV locking	1. If EEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace EEV	Indoor / MULTI V M
EEV 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</math> then the EEV is normal</p>	Replace EEV	MULTI V M
	<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</math> then the EEV is normal</p>	Replace EEV	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 Compressor Module control board)</p> <p>3. When fan rotate and EEV 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 EEV	Indoor unit

## 2.4 Phase Bridge Diode Checking Method

Internal circuit diagram



Appearance



1. Wait until Comp PCB DC voltage gets discharged, after the main power switch off.
2. Pull out DC\_Link connector connected with Inverter PCB.
3. Set multi tester in diode mode.
4. Measured value should be 0.4~0.7V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure. If the value is small (0 Ω) or high (hundreds M Ω), PCB needs to be replaced.

Diode terminal Tester terminal	+ terminal: black(-)	- terminal: red(+)
R(~) : red(+)	0.4 V ~ 0.7 V	-
S(~) : red(+)	0.4 V ~ 0.7 V	-
T(~) : red(+)	0.4 V ~ 0.7 V	-
R(~) : black(-)	-	0.4 V ~ 0.7 V
S(~) : black(-)	-	0.4 V ~ 0.7 V
T(~) : black(-)	-	0.4 V ~ 0.7 V

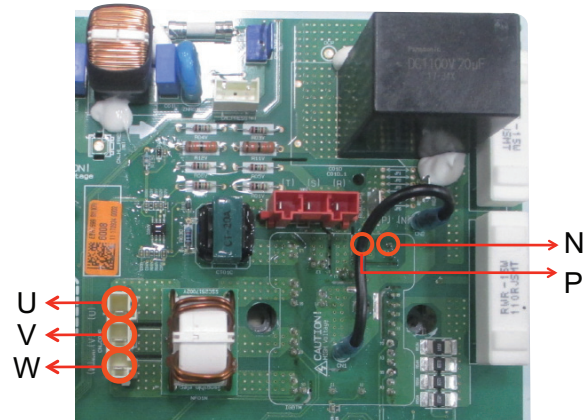
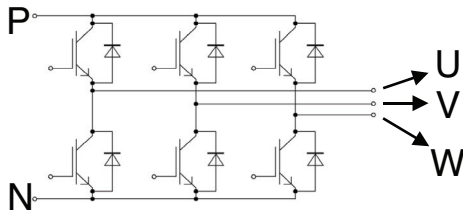
\* Red(+) and black(-) are the measuring terminals of multi tester.



### CAUTION

- Check the electric parts of c/box, 10 minutes after switching off the main supply and checking DC voltage is discharged. Otherwise, there is chance of getting electric shock.
- There is chance of electric shock by charged voltage.

## 2.5 Inverter IGBTM Checking Method



Inverter PCB

1. Wait until Comp PCB DC voltage is discharged after main power off.
2. Pull out DC\_Link connector and U,V,W comp connector connected with Inverter PCB
3. Set multi tester in diode mode.
4. Measured value should be 0.2~0.6V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure. If the value is small(0Ω) or high( hundreds MΩ), PCB needs to be replaced.
6. In case that IGBTM is damaged, check if comp is needed to be replaced

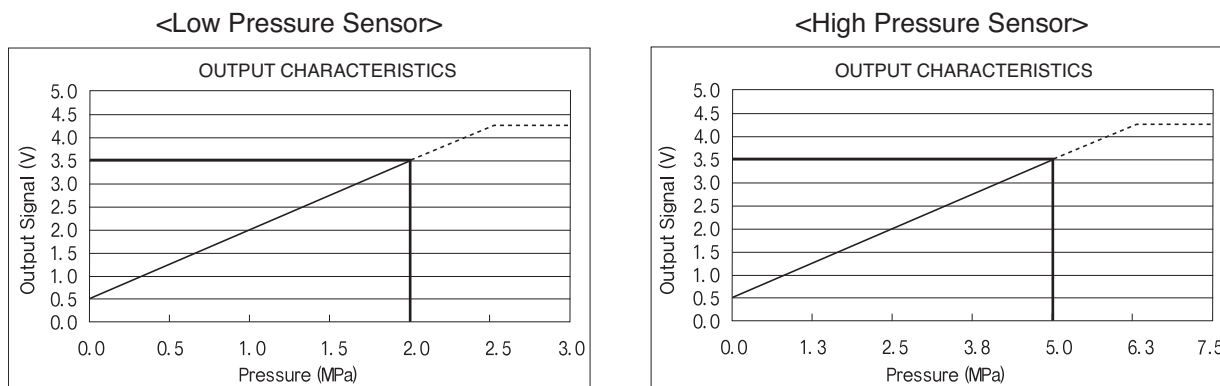
	P terminal : black(-)	N terminal: red(+)
U terminal : red(+)	0.2V~0.6V	
V terminal : red(+)	0.2V~0.6V	
W terminal : red(+)	0.2V~0.6V	
U terminal : black(-)		0.2V~0.6V
V terminal : black(-)		0.2V~0.6V
W terminal : black(-)		0.2V~0.6V

\* Red(+) and black(-) are the measuring terminals of multi tester.

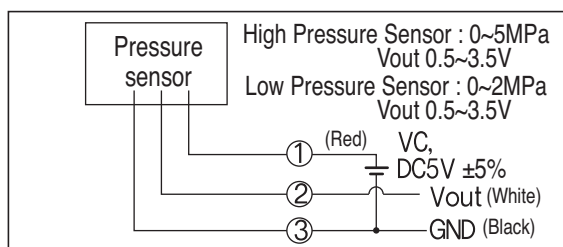
## 2.6 Pressure Sensor(High/Low Pressure Sensor)

Connect manifold gauge to the service valve of Compressor Module, and compare the output of high pressure sensor to the output of low pressure sensor to detect the defect.

below) Compare the output of pressure sensor to the output of manifold gauge pressure using the table below. Read the pressure clearly between black and white as the composition of pressure sensor.



- 1) If the pressure of manifold gauge is 0~1kg/cm<sup>2</sup>, it indicates the pressure got lower due to the leakage of refrigerant. Find the place of leakage and fix it.
- 2) If the difference of the outputs of high and low pressure is in the range of 1kg/cm<sup>2</sup>, the pressure sensor is normal.
- 3) If the difference of the outputs of high and low pressure is over 1kg/cm<sup>2</sup>, the pressure sensor is out of order, it need to be replaced.
- 4) The composition of pressure sensor



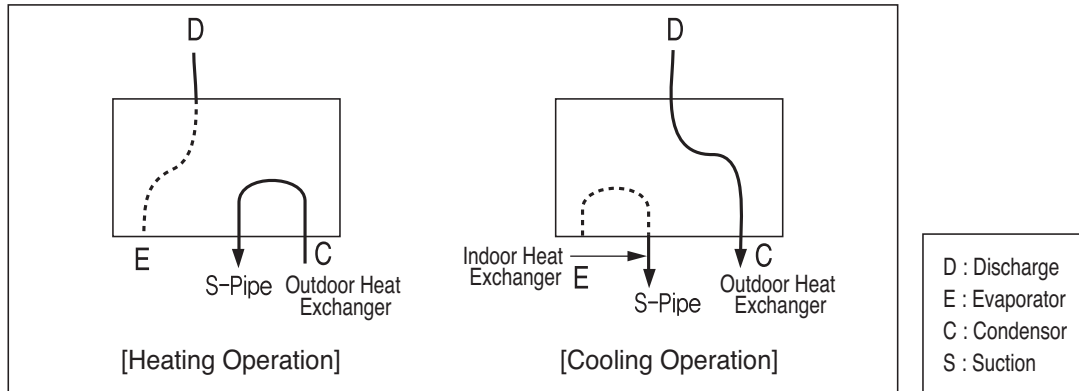
The pressure sensor is composed like the circuit picture shown above. If DC 5V voltage flows on red and black wire, voltage would be made between the white and black wire. The pressure which is equivalent to the pressure output is shown in the table above.

## 2.7 Outdoor Fan

- 1) The outdoor fan is controlled by the inverter motor which can control the number of rotations.
- 2) The outdoor fan is controlled by the high/low pressure of the Compressor Module after the operation of compressor.
- 3) There is possibility that the outdoor fan does not operate due to low capacity operation or low outdoor temperature even if the compressor is operating. This does not mean breakdown of the unit, the fan will start operating if it reaches the set point.

## 2.8 4 way Valve

1. Keep it off before the Compressor Module is powered on and the indoor unit is turned on.
2. Cooling, defrosting, oil recovery : OFF, heating : ON
3. When alternating cooling to heating, transform 4 way valve during re-starting for 3 minutes.
4. To check the mode of cooling/heating operation of 4 way valve, touch the piping surface of low pressure service valve.
5. Refrigerant flowchart of 4 way valve



6. Insulation resistance in the state of connecting the valve to coil should be over 100mΩ when measure it with DC mega tester(DC 500V).

## 2.9 Temperature Sensor

- 1) Outdoor temperature sensor : TH1
- 2) Discharge pipe(D-pipe) temperature sensor : TH2
  1. Check the condition of installation and the contact of temperature sensor.
  2. Check whether the connector contact of temperature sensor is normal.
  3. Measure the resistance of temperature sensor.
- 3) Pipe temperature sensor : TH3

	TH1	TH2	TH3
Resistance	10kΩ±1%(25°C)	200kΩ±1%(25°C)	5kΩ±1%(25°C)
	1.07kΩ±3.3%(85°C)	28kΩ±7.7%(85°C)	535Ω±3.3%(85°C)



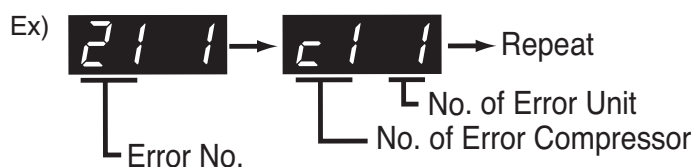
### 3. Self-diagnosis function

#### 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 Compressor Module 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.

#### Error Display

1st,2nd,3rd LED of 7-segment indicates error number, 4th LED indicates unit number.



Only applies to Module type VRF.

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	Communication error : wired remote controller ↔ indoor unit	Failing to receive wired remote controller signal in indoor unit PCB
	0 4	Drain pump	Malfunction of drain pump
	0 5	Communication error : Compressor Module ↔ indoor unit	Failing to receive Compressor Module signal in indoor unit PCB
	0 6	Outlet pipe temperature sensor of indoor unit	Outlet pipe temperature sensor of indoor unit is open or short
	0 9	Indoor EEPROM Error	In case when the serial number marked on EEPROM of Indoor unit is 0 or FFFFFFFF
	1 0	Poor fan motor operation	Disconnecting the fan motor connector/Failure of indoor fan motor lock
MULTI V M related error	2 1	Compressor Module Inverter Compressor IPM Fault	Compressor Module Inverter Compressor Drive IPM Fault
	2 2	Inverter Board Input Over Current(RMS) of Compressor Module	Compressor Module Inverter Board Input Current excess (RMS)
	2 3	Compressor Module Inverter Compressor DC link Low Voltage	DC charging is not performed at Compressor Module after starting relay turn on.
	2 4	Compressor Module High Pressure Switch	System is turned off by Compressor Module high pressure switch.
	2 5	Compressor Module Input Voltage High/Low Voltage	Compressor Module input voltage is over 487V or below 270V
	2 6	Compressor Module Inverter Compressor Start Failure	The First Start Failure by Compressor Module Inverter Compressor Abnormality
	2 9	Compressor Module Inverter Compressor Over Current	Compressor Module Inverter Compressor Fault OR Drive Fault

※ Refer to the Indoor manual for some Indoor Error code.

Self-diagnosis function

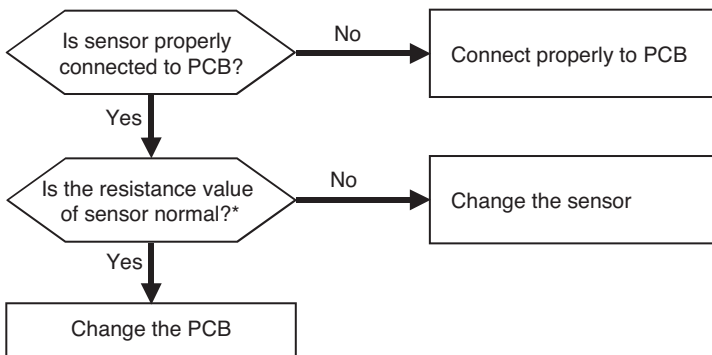
Display		Title	Cause of Error	
MULTI V M related error	3	2	Compressor Module Inverter Compressor1 High Discharge Temperature	Compressor Module Inverter Compressor1 High Discharge Temperature
	3	4	High Pressure of Compressor Module	High Pressure of Compressor Module
	3	5	Low Pressure of Compressor Module	Low Pressure of Compressor Module
	3	6	Compressor Module Low Compression Ratio Limited	Compressor Module Low Compression Ratio Limited
	4	0	Compressor Module Inverter Compressor CT Sensor Fault	Compressor Module Inverter Compressor CT Sensor open or short
	4	1	Compressor Module Inverter Compressor1 Discharge Temperature Sensor Fault	Compressor Module Inverter Compressor Discharge Temperature Sensor open or short
	4	2	Compressor Module Low Pressure Sensor Fault	Compressor Module Low Pressure Sensor open or short
	4	3	Compressor Module High Pressure Sensor Fault	Compressor Module High Pressure Sensor open or short
	4	4	Heat Exchanger Module Air Temperature Sensor Fault	Heat Exchanger Module Air Temperature Sensor open or short
	4	5	Heat Exchanger Module Heat Exchanger Temperature Sensor (Front side) Fault	Heat Exchanger Module Heat Exchanger Temperature Sensor(Front side) open or short
	4	6	Compressor Module Suction Temperature Sensor Fault	Compressor Module Suction Temperature Sensor open or short
	5	0	Omitting connection of R, S, T power of Compressor Module	Omitting connection of Compressor Module
	5	1	Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of Compressor Module
	5	2	Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Compressor Module
	5	3	Communication error : indoor unit → Main PCB of Compressor Module	Failing to receive indoor unit signal at main PCB of Compressor Module .
	5	7	Communication error : Main PCB → inverter PCB	Failing to receive signal main PCB at inverter PCB of Compressor Module
	6	0	Inverter PCB EEPROM Error of Compressor Module	Access Error of Inverter PCB of Compressor Module
	6	2	Compressor Module Inverter Heatsink High Temperature	System is turned off by Compressor Module Inverter Heatsink High Temperature
	6	5	Compressor Module Inverter Heatsink Temperature Sensor Fault	Compressor Module Inverter Heatsink Temperature Sensor open or short
	6	7	Heat Exchanger Module Fan Lock	Restriction of Heat Exchanger Module
7	1	Converter CT Sensor Error of Compressor Module	Converter CT Sensor Error of Compressor Module	
8	6	Compressor Module Main PCB EEPROM Error	Communication Fail Between Compressor Module Main MICOM and EEPROM or omitting EEPROM	

Display			Title	Cause of Error	
MULTI V M related error	1	1	3	Compressor Module Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of Compressor Module is open or short
	1	1	4	Compressor Module Subcooling Inlet Temperature Sensor Error	Compressor Module Subcooling Inlet Temperature Sensor Error
	1	1	5	Compressor Module Subcooling Outlet Temperature Sensor Error	Compressor Module Subcooling Outlet Temperature Sensor Error
	1	5	0	Compressor Module Discharge Superheat not satisfied	Compressor Module Compressor Discharge Superheat not satisfied during 5 Min.
	1	5	1	Failure of operation mode conversion at Compressor Module	Failure of operation mode conversion at Compressor Module

## Troubleshooting Guide

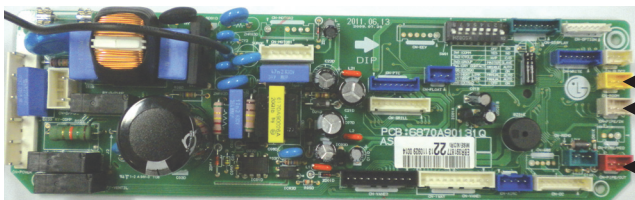
Error No.	Error Type	Error Point	Main Reasons
01	Indoor unit air sensor error	Indoor unit sensor is open/short	1. Indoor unit PCB wrong connection 2. Indoor unit PCB failure 3. Sensor problem (main reason)
02	Indoor unit pipe inlet sensor error		
06	Indoor unit pipe outlet sensor error		

### ■ Error diagnosis and countermeasure flow chart



\*\* In case the value is more than 100kΩ (open) or less than 100Ω (short), Error occurs

Refer: Resistance value maybe change according to temperature of temp sensor,  
It shows according to criteria of current temperature(±5% margin) → Normal  
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



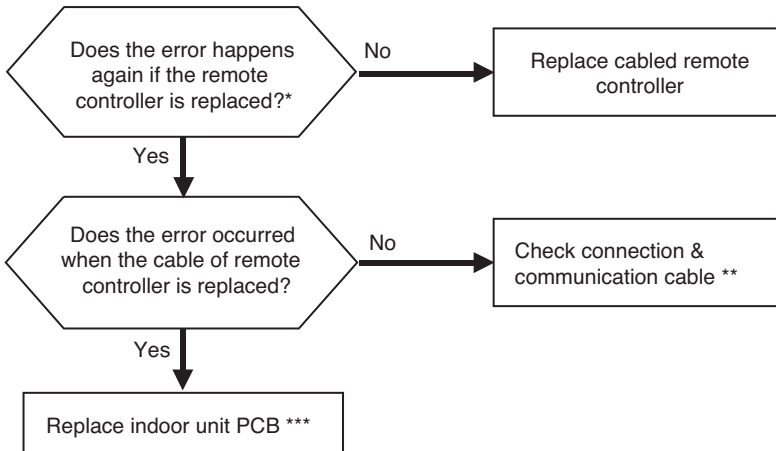
← CN-ROOM : Indoor air temp sensor  
 ← CN-PIPE IN : Pipe inlet temp sensor  
 ← CN-PIPE OUT : Pipe outlet temp sensor



→ Measure the resistance of outlet pipe temp sensor.

Error No.	Error Type	Error Point	Main Reasons
03	No communication between cabled remote controller & indoor unit	The remote controller did not receive the signal from indoor unit during specific time	1. Remote controller fault 2. Indoor unit PCB fault 3. Connector fault, Wrong connection 4. Communication cable problem

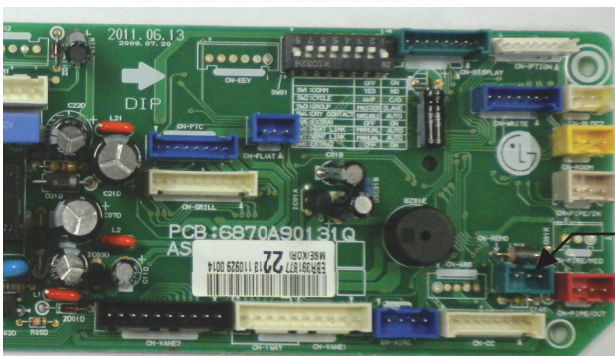
**■ Error diagnosis and countermeasure flow chart**



\* If there is no remote controller to replace : Use another unit's remote controller doing well

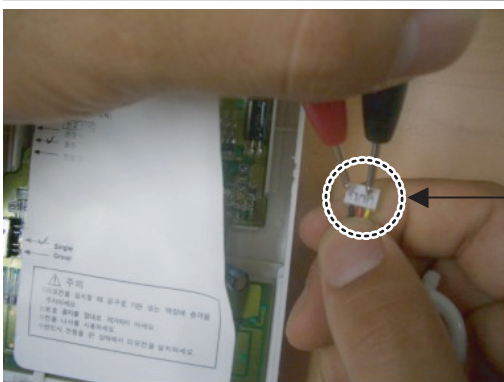
\*\* Check cable : Contact failure of connected portion or extension of cable are main cause  
 Check any surrounded noise ( check the distance with main power cable)  
 → make safe distance from the devices generate electromagnetic wave

\*\*\* After replacing indoor unit PCB, do Auto Addressing & input unit's address if connected to central controller.  
 (All the indoor units connected should be turned on before Auto Addressing)



**CN-REMO** : Remote controller connection

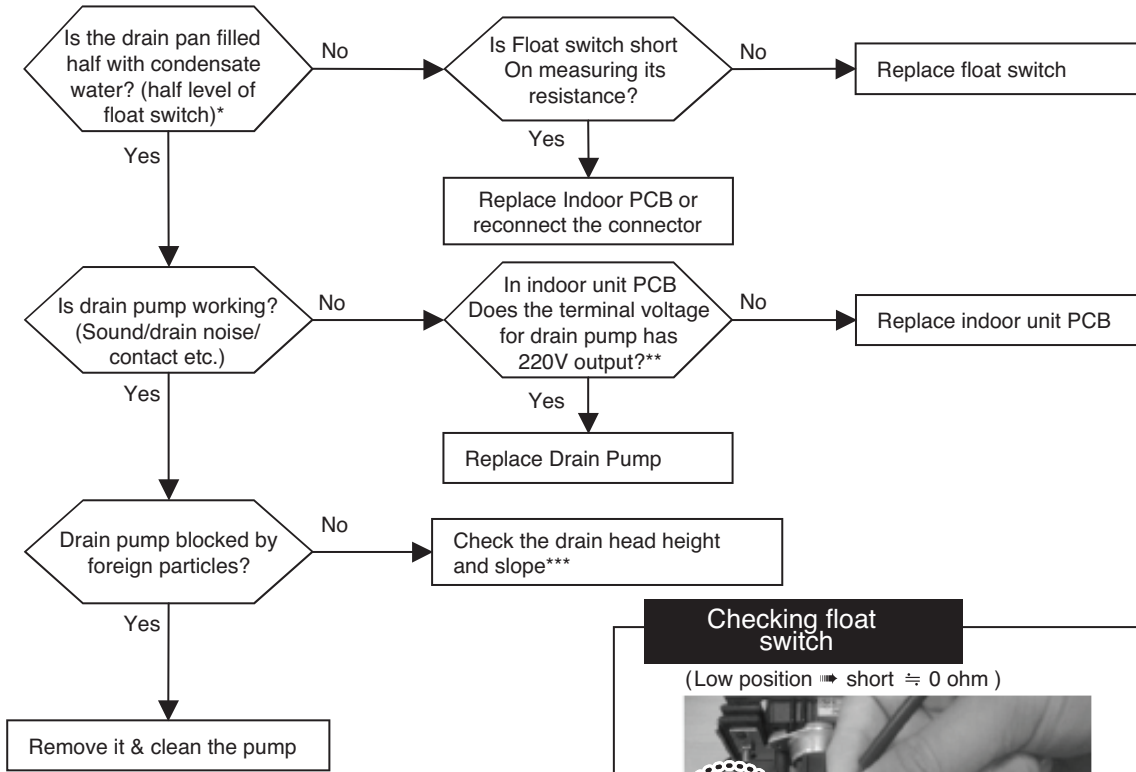
\* The PCB can differ from model to model. Check from the right source.



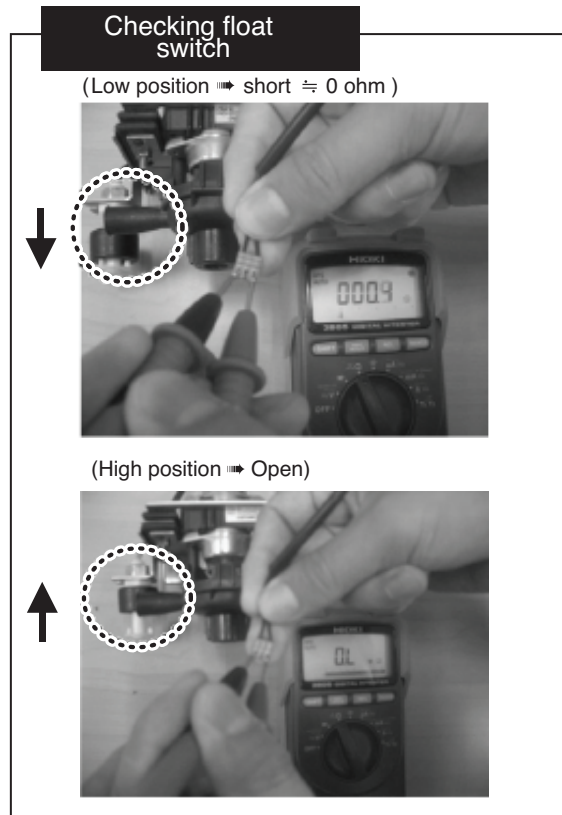
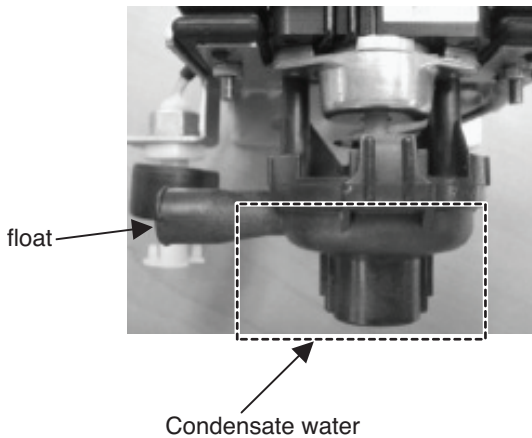
Checking communication cable connection status

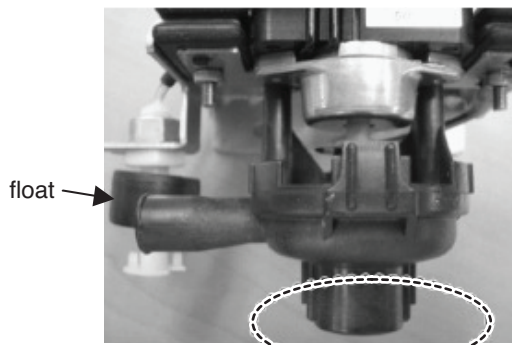
Error No.	Error Type	Error Point	Main Reasons
04	Drain pump error	Float switch is open due to rising of condensate water level because of drain pump fault or drain pipe clogging	1. Drain pump/float switch fault 2. Improper drain pipe location, clogging of drain pipe 3. Indoor unit PCB fault

■ Error diagnosis and countermeasure flow chart

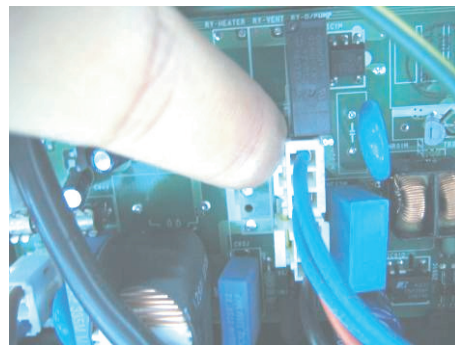


\* If the float goes up higher than a half of float switch then the circuit is open & the unit is stopped automatically.

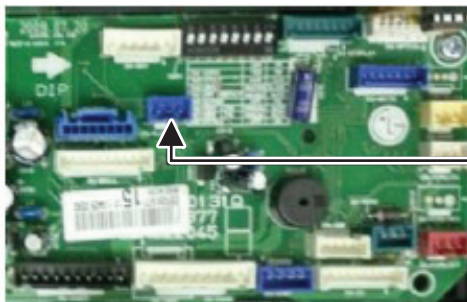




A:Point to check rotating

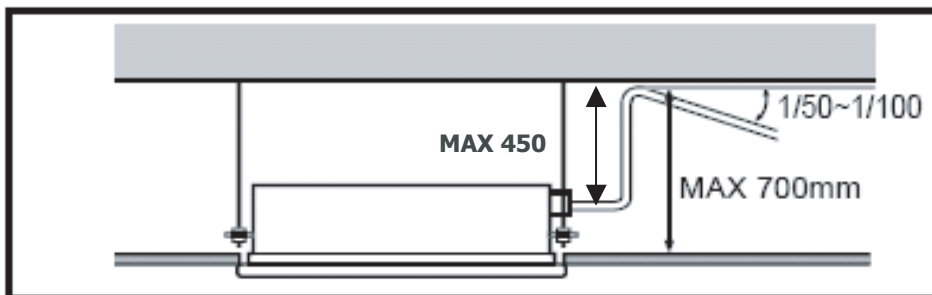


\*\*\* Indoor PCB drain pump connector  
(Check input of 220V)  
(Marked as **CN-DPUMP**)



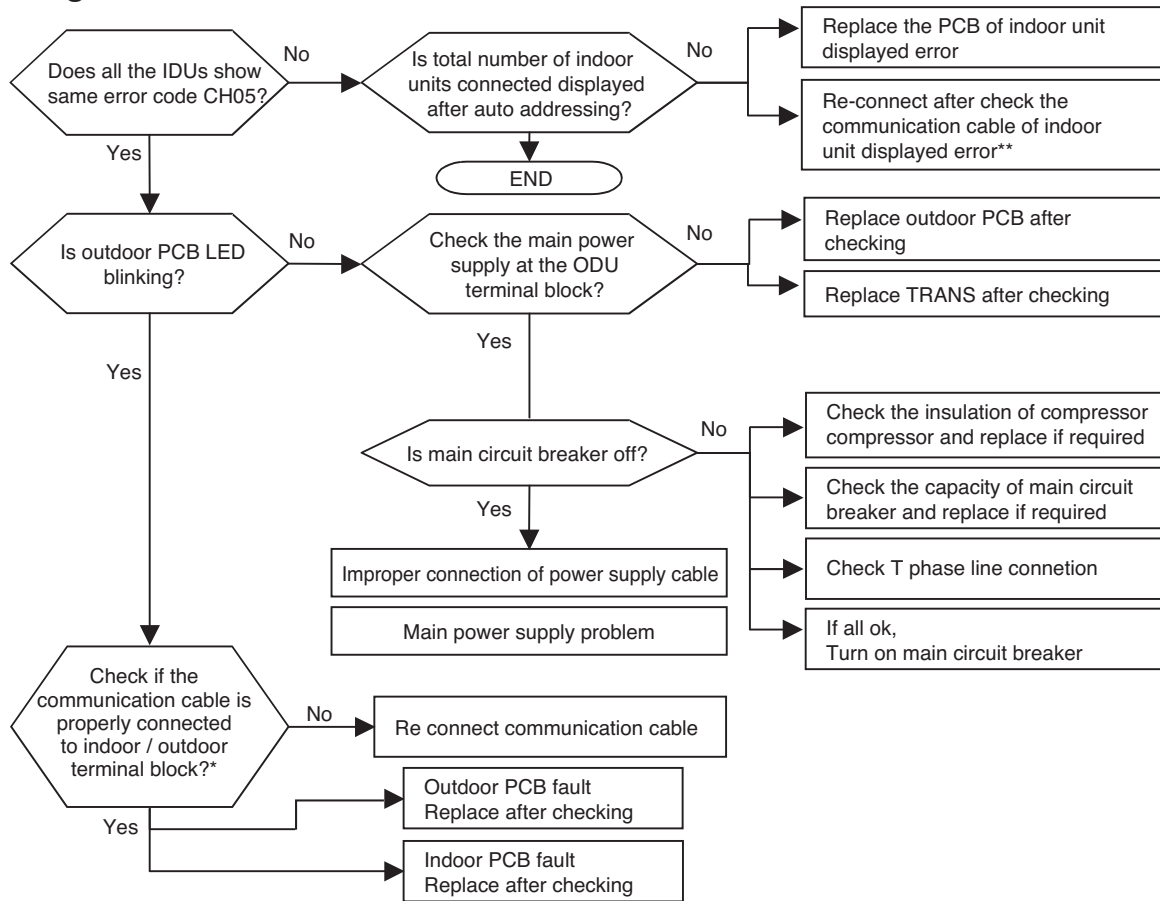
Float switch Housing (CN-FLOAT)

[\*\*\*] Standard of drain pipe head height / slope

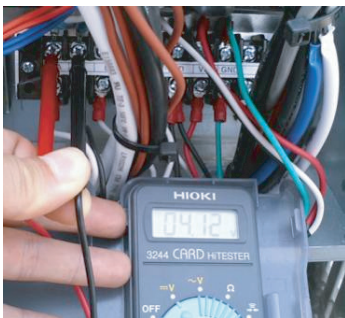


Error No.	Error Type	Error Point	Main Reasons
05	Indoor & Compressor Module communication error	No signal communication between indoor & Compressor Module.	1. Auto addressing is not done 2. Communication cable is not connected 3. Short circuit of communication cable 4. Indoor unit communication circuit fault 5. Compressor Module communication circuit fault 6. Not enough distance between power and communication cable? 7. T phase line disconnection or N phase connected.

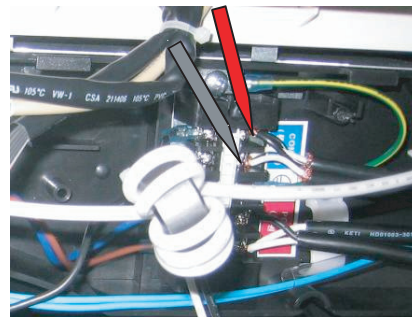
■ Error diagnosis and countermeasure flow chart



\* (Note1) communication from IDU is normal if voltage fluctuation(-9V ~ +9V) exists when checking DC voltage of communication terminal between IDU and ODU



\* If the DC voltage between communication terminal A, B of indoor unit is fluctuate within (-9V~+9V) then communication from outdoor unit is normal





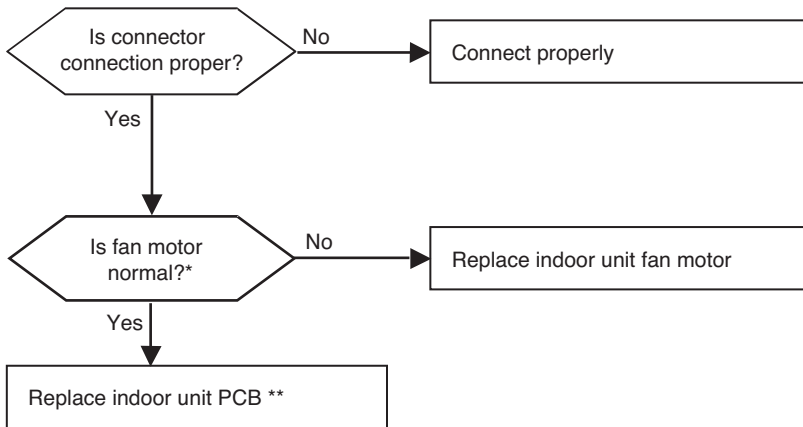
Error No.	Error Type	Error Point	Main Reasons
09	Indoor unit EEPROM error	Error occur in EEPROM of the Indoor PCB	1. Error developed in communication between the micro-processor and the EEPROM on the surface of the PCB. 2. ERROR due to the EEPROM damage

■ **Error diagnosis and countermeasure flow chart**

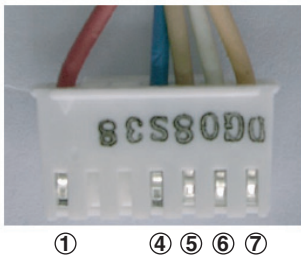
- Replace the indoor unit PCB, and then make sure to perform Auto addressing and input the address of central control

Error No.	Error Type	Error Point	Main Reasons
10	Indoor unit BLDC fan motor failure	Indoor BLDC fan motor feedback signal is absent (for 50 s)	1. Motor connector connection fault 2. Indoor PCB fault 3. Motor fault

■ Error diagnosis and countermeasure flow chart



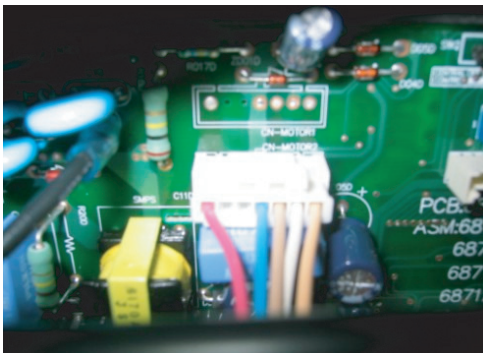
\* It is normal when check hall sensor of indoor fan motor as shown below



Each terminal with the tester

Tester		Normal resistance(±10%)	
+	-	Chassis	
①	④	∞	∞
⑤	④	hundreds kΩ	hundreds kΩ
⑥	④	∞	∞
⑦	④	hundreds kΩ	hundreds kΩ

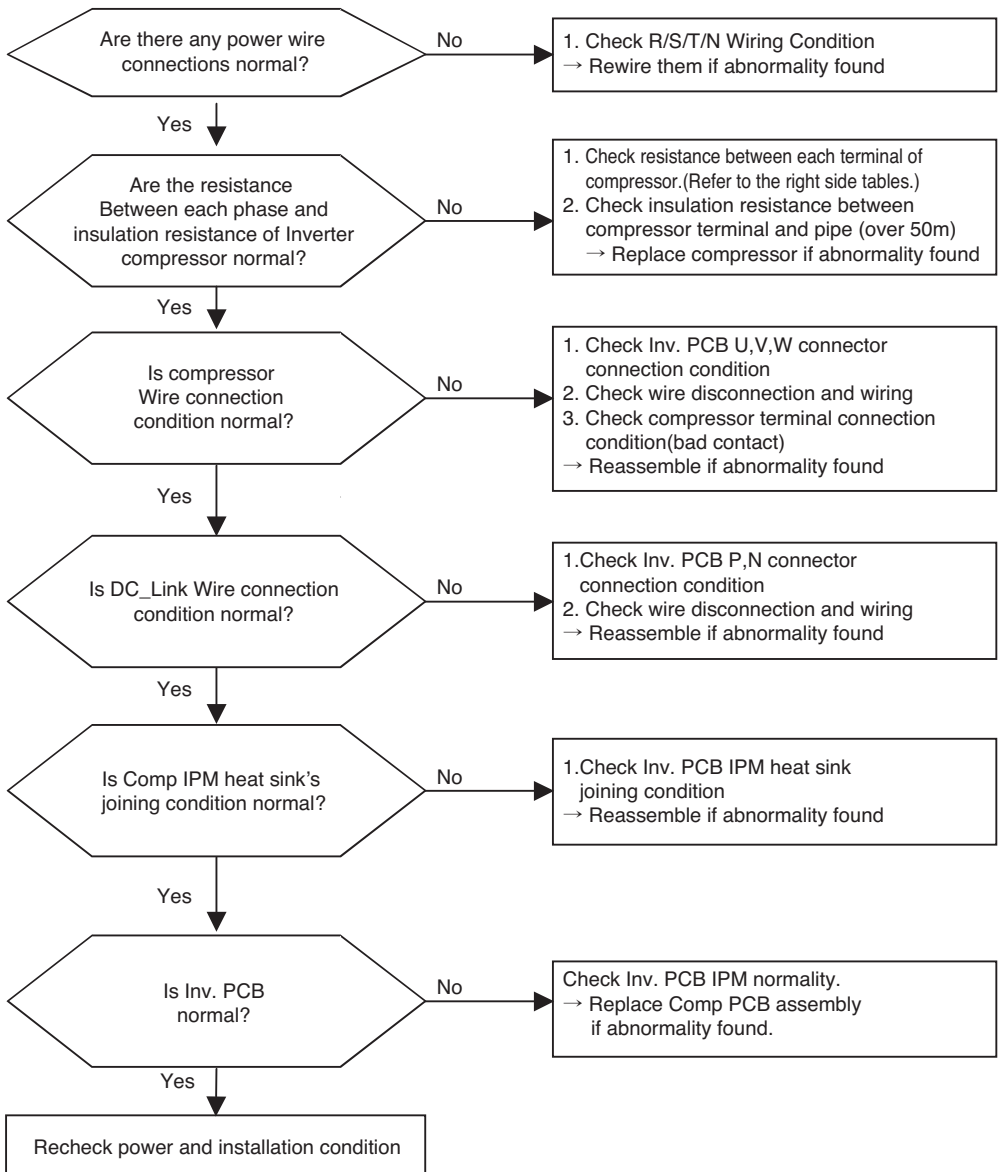
<Checking connection state of fan motor connector>



\*\* Replace the indoor unit PCB, and then make sure to do Auto addressing and input the address of central control  
(Notice: The connection of motor connector to PCB should be done under no power supplying to PCB)

Error No.	Error Type	Error Point	Main Reasons
211	Inv. PCB IPM Fault occur	IPM self protection circuit activation (Overcurrent/IPM overheating/Vcc low voltage)	1. Over current detection at Inverter compressor(U,V,W) 2. Compressor damaged (insulation damaged/Motor damaged) 3. IPM overheating (Heat sink disassembled) 4. Inverter compressor terminal disconnected or loose 5. Inverter PCB assembly damaged 6. ODU input current low

**■ Error diagnosis and countermeasure flow chart**

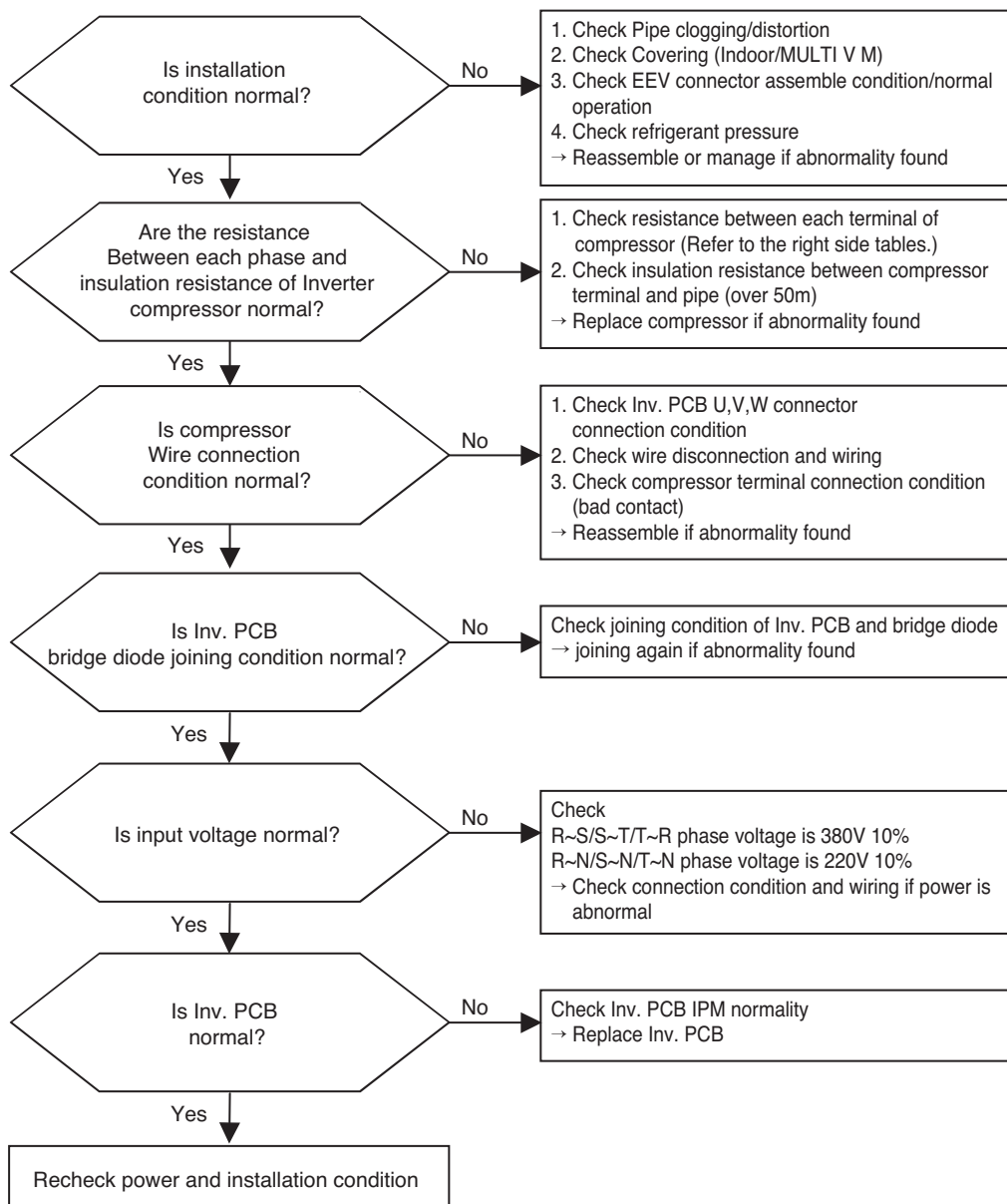


RJA036MAA

Temp	25°C	75°C
U-V	0.529 ± 7% Ohms	0.631 ± 7% Ohms
V-W	0.529 ± 7% Ohms	0.631 ± 7% Ohms
W-U	0.529 ± 7% Ohms	0.631 ± 7% Ohms

Error No.	Error Type	Error Point	Main Reasons
221	AC Input Current Over Error	Inv. PCB input 3 phase power current is over limited value(24A)	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. Power Line Misconnection 5. Inv. PCB damage (Input current sensing part)

■ Error Diagnosis and Countermeasure Flow Chart

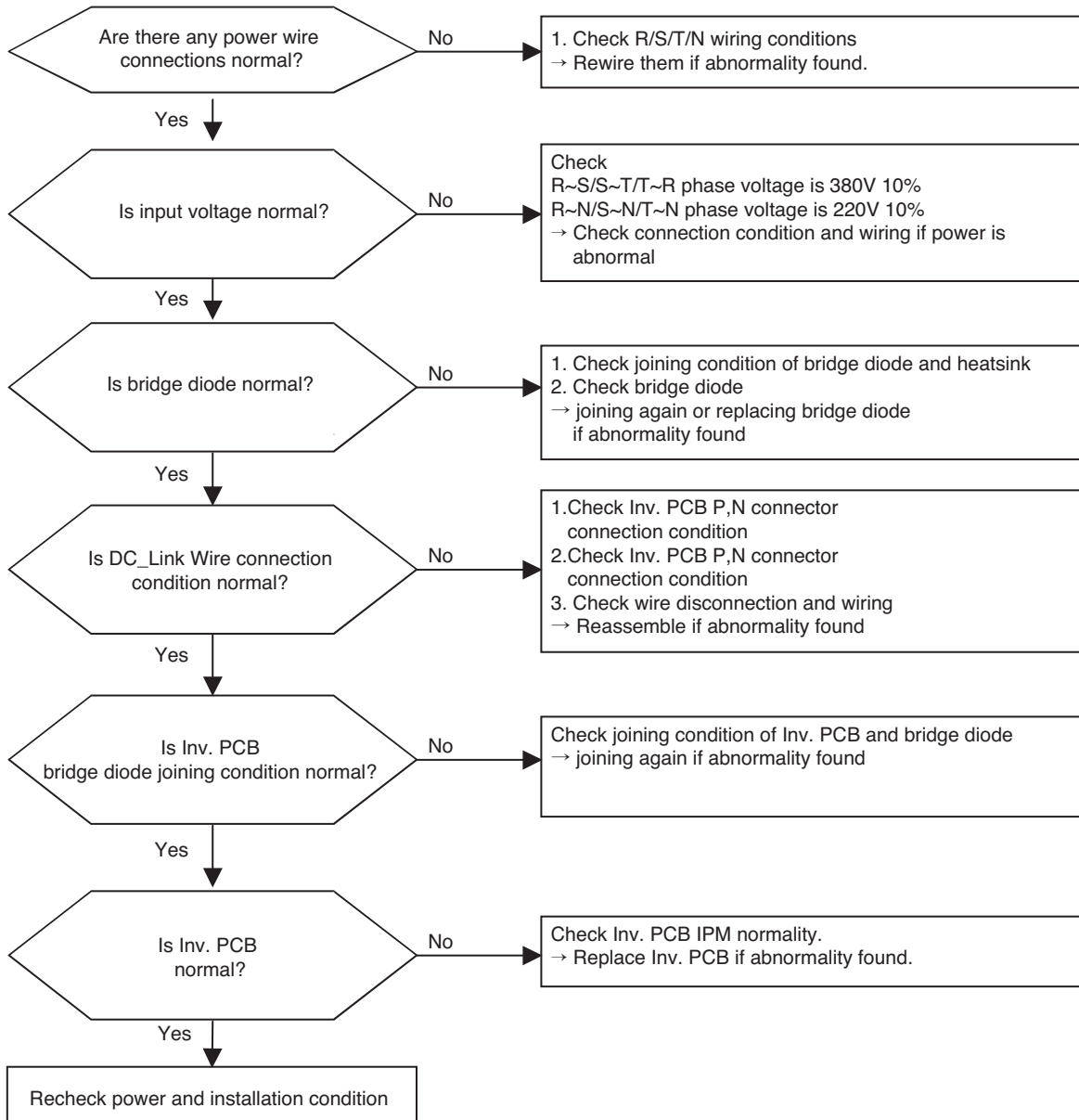


RJA036MAA

Temp	25°C	75°C
U-V	0.529 ± 7% Ohms	0.631 ± 7% Ohms
V-W	0.529 ± 7% Ohms	0.631 ± 7% Ohms
W-U	0.529 ± 7% Ohms	0.631 ± 7% Ohms

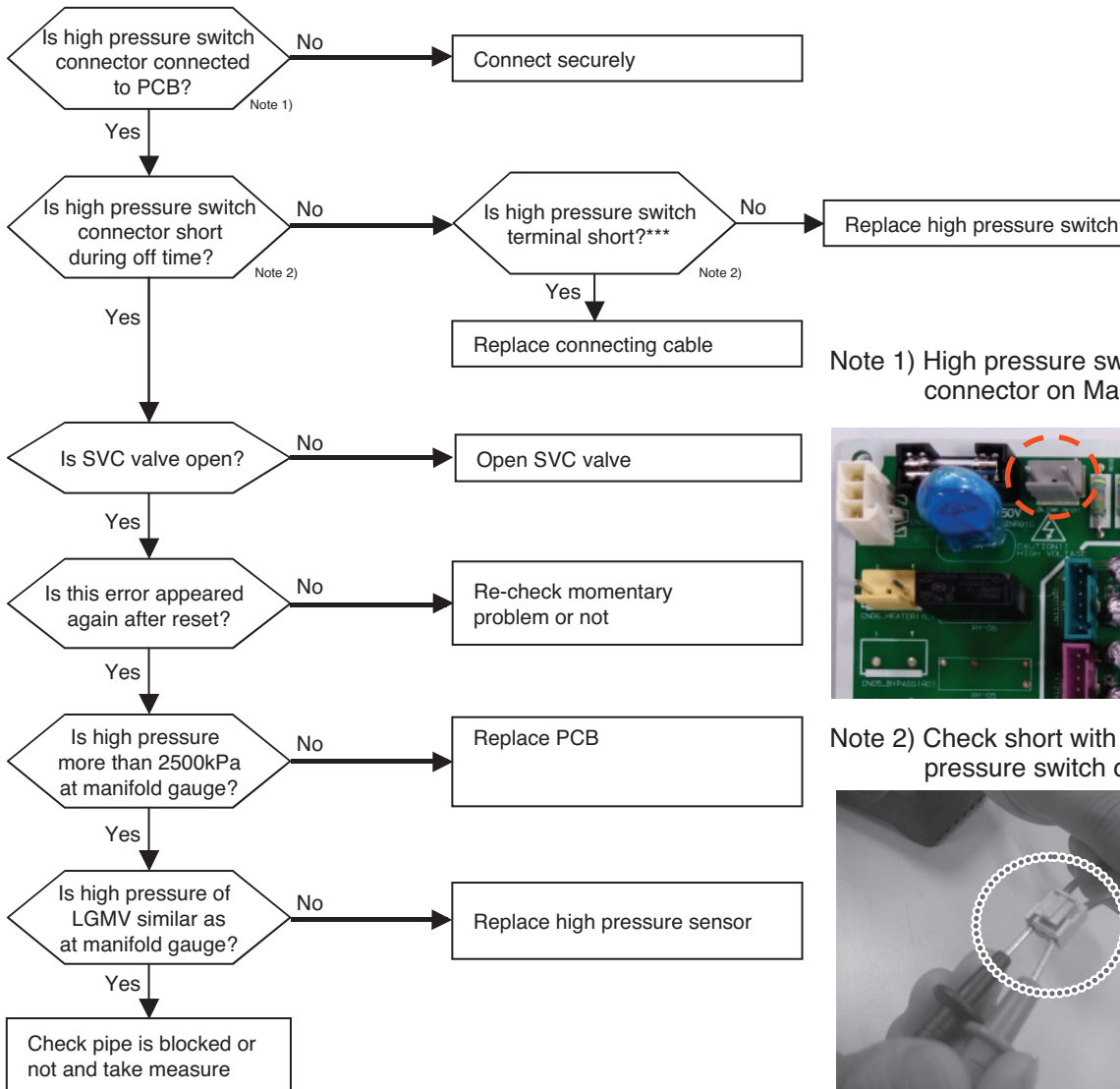
Error No.	Error Type	Error Point	Main Reasons
231	Inverter Compressor DC Link Low Voltage	DC Voltage isn't charged after starting relay on	<ol style="list-style-type: none"> <li>1. DC Link terminal misconnection/terminal contact fault</li> <li>2. Starting relay damage</li> <li>3. Condenser damage</li> <li>4. Inv. PCB damage (DC Link voltage sensing part)</li> <li>5. Input voltage low</li> </ol>

■ Error Diagnosis and Countermeasure Flow Chart

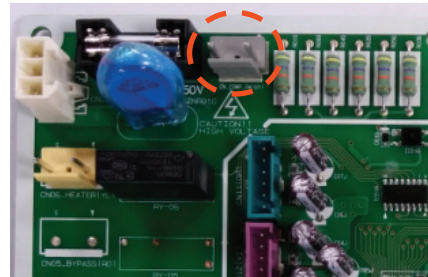


Error No.	Error Type	Error Point	Main Reasons
241	Excessive rise of discharge pressure in outdoor compressor	Compressor off due to the high pressure switch in Compressor Module	<ol style="list-style-type: none"> <li>1. Defective high pressure switch</li> <li>2. Defective fan of indoor unit or Compressor Module</li> <li>3. Check valve of compressor clogged</li> <li>4. Pipe distortion due to the pipe damage</li> <li>5. Refrigerant overcharge</li> <li>6. Defective LEV at the indoor or Compressor Module.</li> <li>7. Covering or clogging(Outdoor covering during the cooling mode /Indoor unit filter clogging during the heating mode)</li> <li>8. SVC valve clogging</li> <li>9. Defective outdoor PCB</li> </ol>

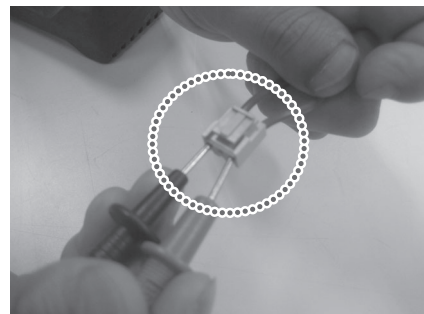
■ Error diagnosis and countermeasure flow chart



Note 1) High pressure switch connector on Main PCB

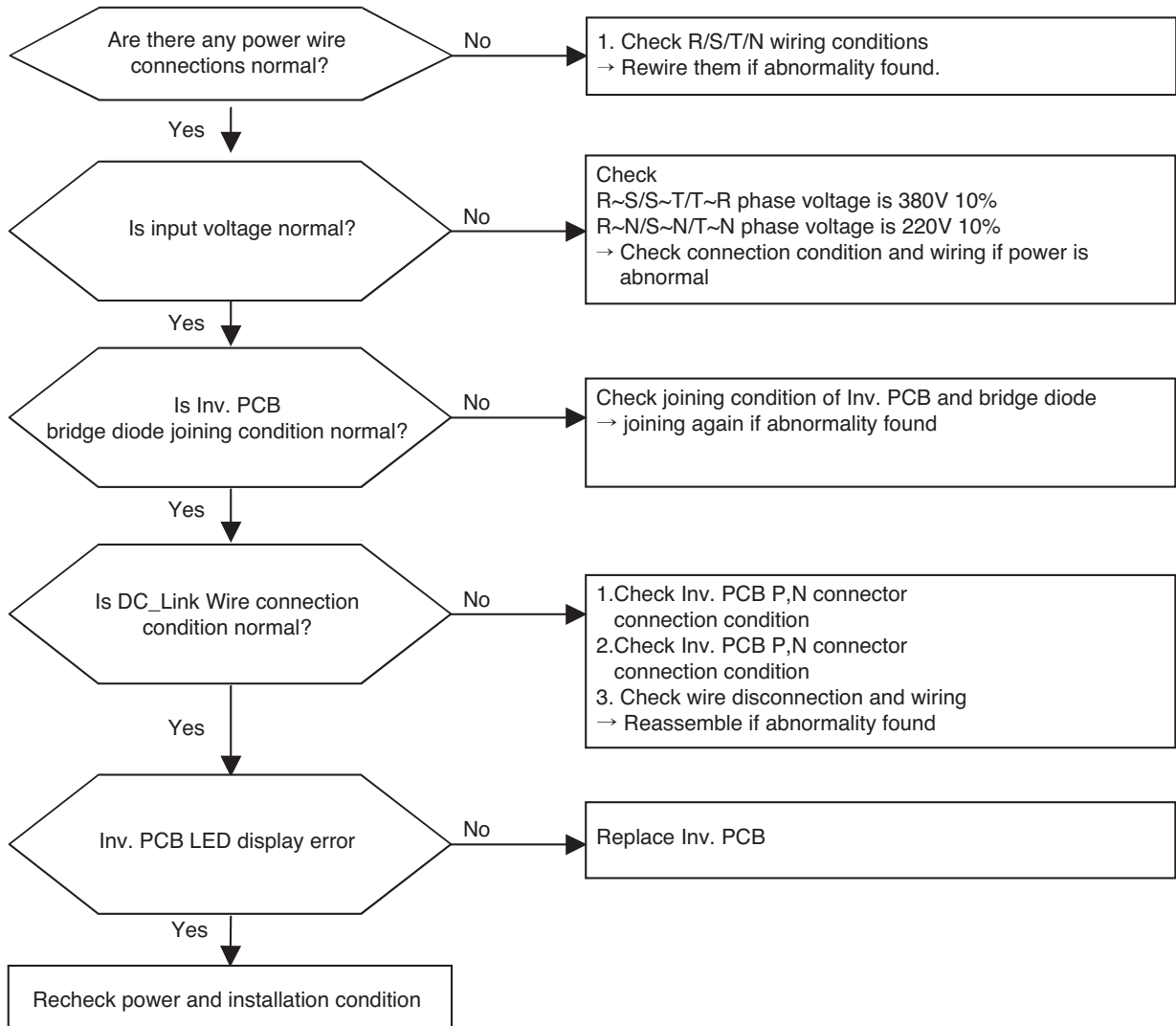


Note 2) Check short with high pressure switch connector



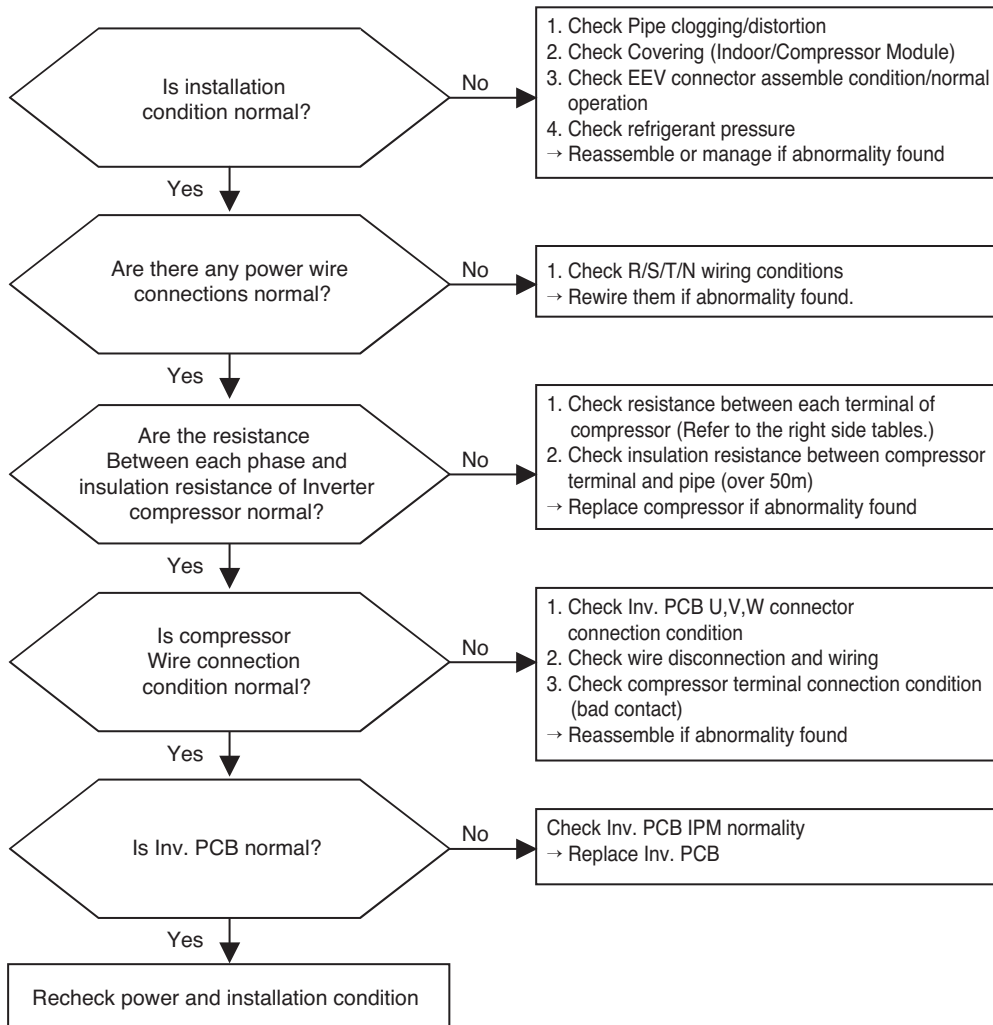
Error No.	Error Type	Error Point	Main Reasons
251	Input Voltage high/low	Input voltage is over limited value of the product (173V or less, 289V or more)	1. Input voltage abnormal (R-N) 2. Compressor Module Inv. PCB damage (input voltage sensing part) 3. N phase line disconnection

■ Error Diagnosis and Countermeasure Flow Chart



Error No.	Error Type	Error Point	Main Reasons
261	Inverter compressor starting failure Error	Starting failure because of compressor abnormality	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Compressor wiring fault 4. Inv. PCB damage (CT)

■ Error Diagnosis and Countermeasure Flow Chart



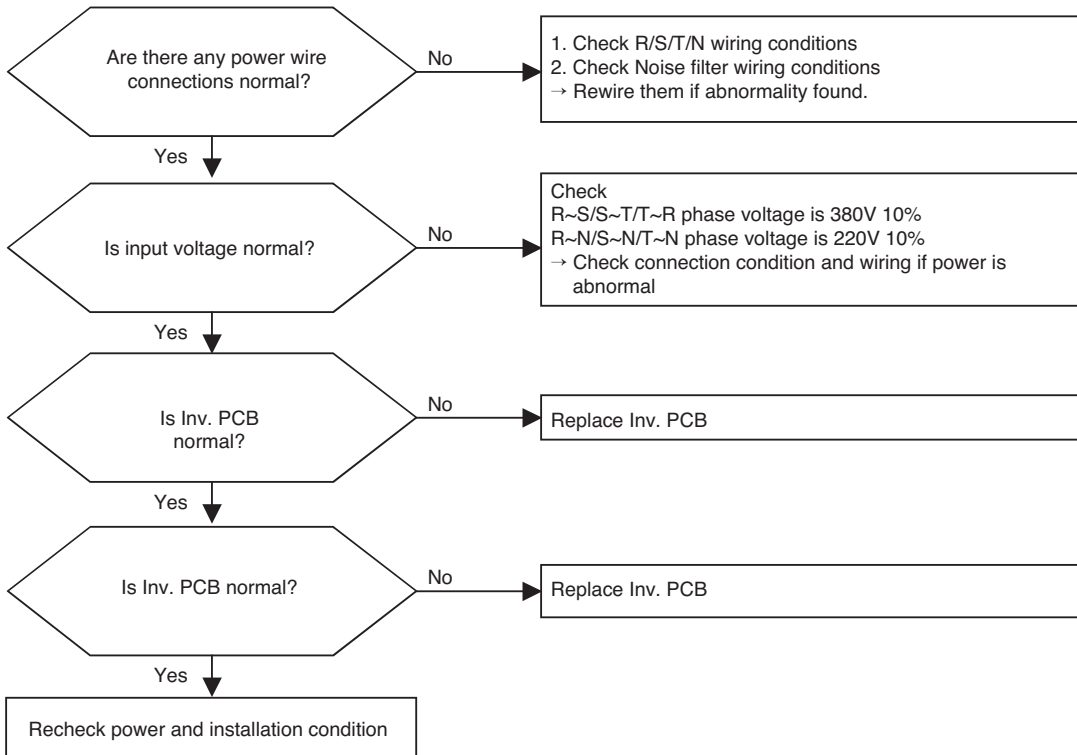
RJA036MAA

Temp	25°C	75°C
U-V	0.529 ± 7% Ohms	0.631 ± 7% Ohms
V-W	0.529 ± 7% Ohms	0.631 ± 7% Ohms
W-U	0.529 ± 7% Ohms	0.631 ± 7% Ohms



Error No.	Error Type	Error Point	Main Reasons
281	Inverter DC link high voltage error	Inv PCB DC link voltage supplied over 780V	1. Input voltage abnormal (R,S,T,N) 2. Inv. PCB damage (DC Link voltage sensing part)

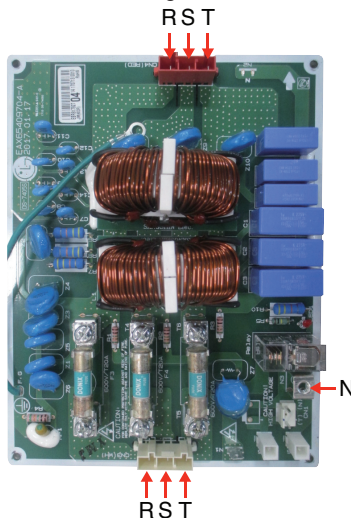
■ Error Diagnosis and Countermeasure Flow Chart



\* Measuring input voltage

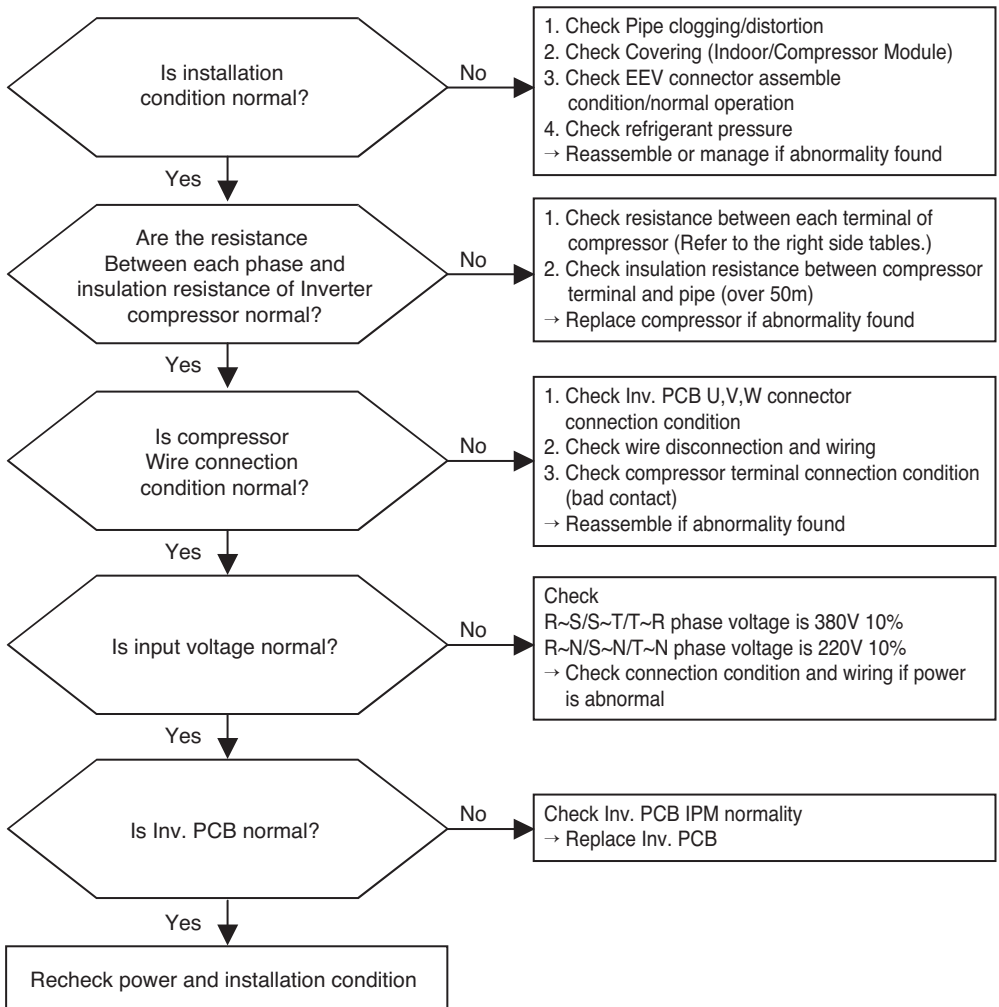


\* Noise filter wiring



Error No.	Error Type	Error Point	Main Reasons
291	Inverter compressor over current	Inverter compressor input current is over 30A	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. Inv. PCB damage

■ Error Diagnosis and Countermeasure Flow Chart

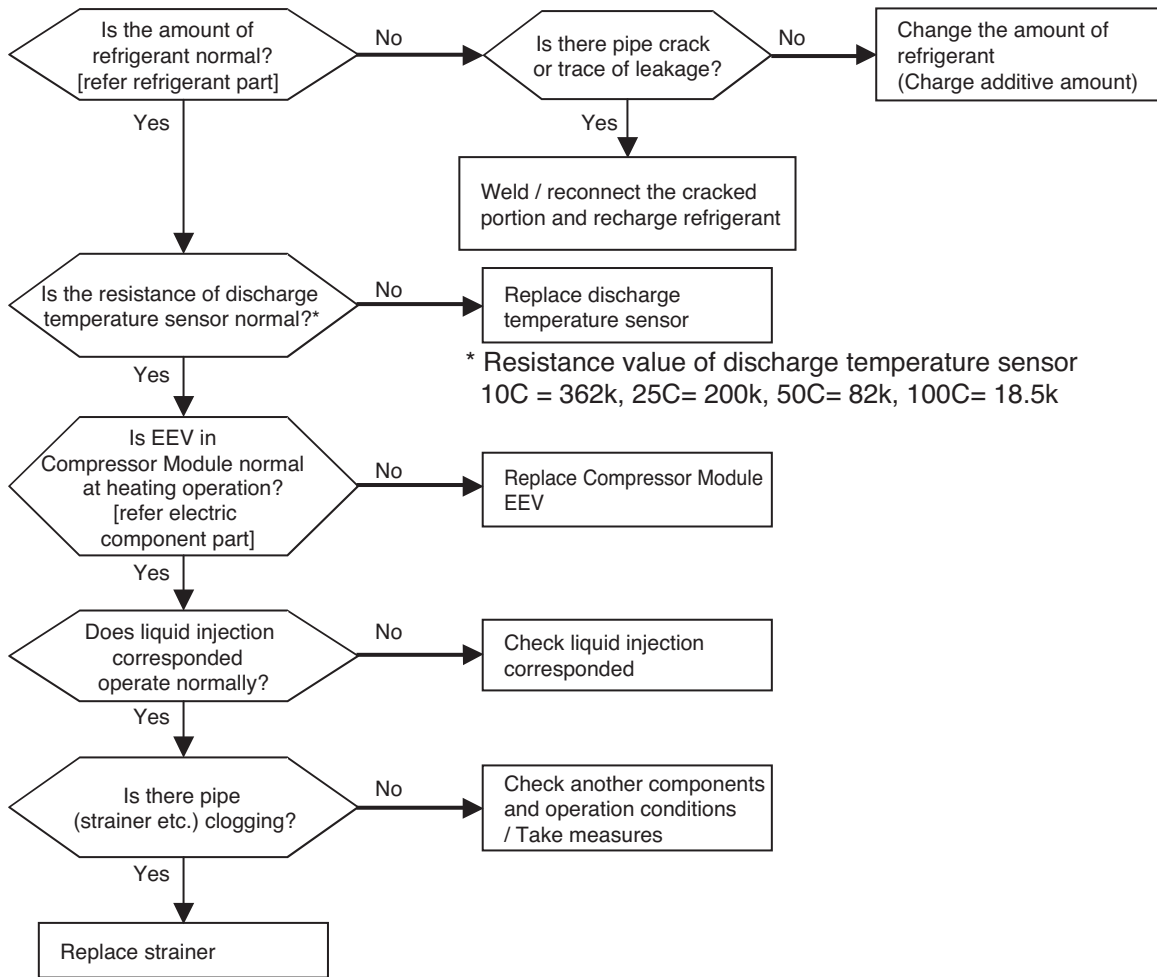


RJA036MAA

Temp	25°C	75°C
U-V	0.529 ± 7% Ohms	0.631 ± 7% Ohms
V-W	0.529 ± 7% Ohms	0.631 ± 7% Ohms
W-U	0.529 ± 7% Ohms	0.631 ± 7% Ohms

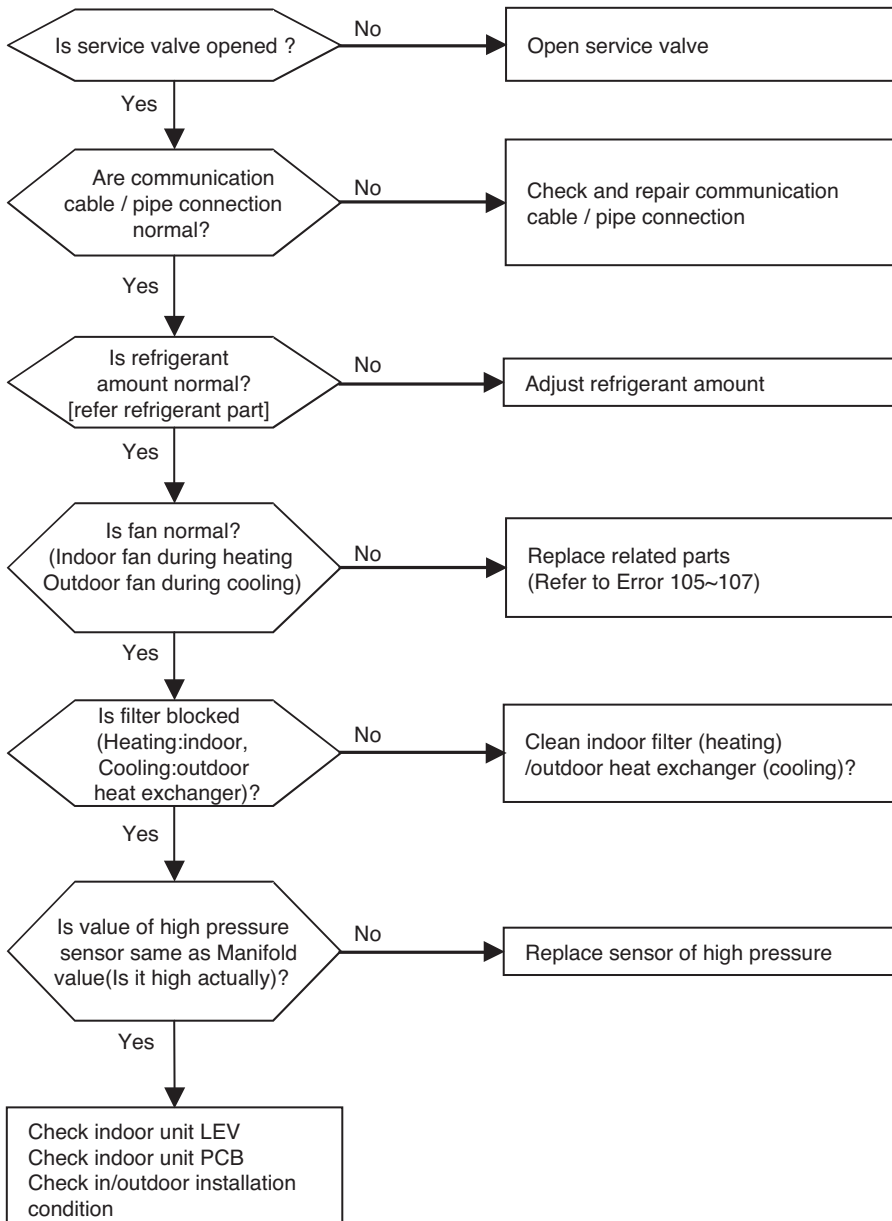
Error No.	Error Type	Error Point	Main Reasons
321	Over-increase discharge temperature of inverter compressor 1 at main Compressor Module	Compressor is off because of over-increase discharge temperature of inverter compressor 1	1. Temperature sensor defect of inverter compressor 1 discharge pipe 2. Refrigerant shortage / leak 3. EEV defect 4. Liquid injection valve defect

■ Error diagnosis and countermeasure flow chart



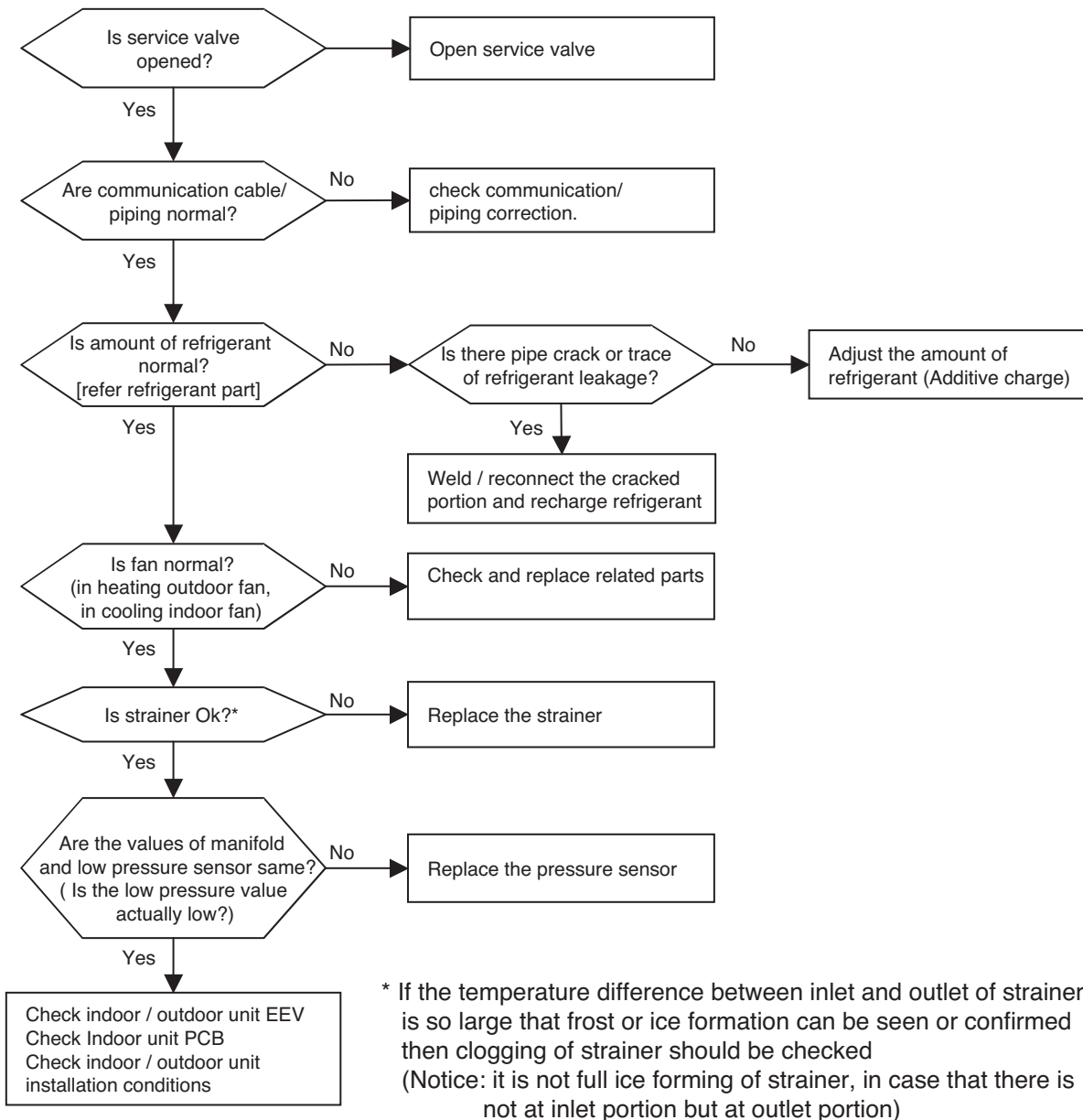
Error No.	Error Type	Error Point	Main Reasons
341	Over-increase of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to over-increase of high pressure by high pressure sensor	<ol style="list-style-type: none"> <li>1. Defect of high pressure sensor</li> <li>2. Defect of indoor or Compressor Module fan</li> <li>3. Deformation because of damage of refrigerant pipe</li> <li>4. Over-charged refrigerant</li> <li>5. Defective indoor / Compressor Module EEV</li> <li>6. When blocked                             <ul style="list-style-type: none"> <li>- Compressor Module is blocked during cooling</li> <li>- Indoor unit filter is blocked during heating</li> </ul> </li> <li>7. SVC valve is clogged</li> <li>8. PCB defect of Compressor Module</li> <li>10. Indoor unit pipe temperature sensor defect</li> </ol>

■ Error diagnosis and countermeasure flow chart



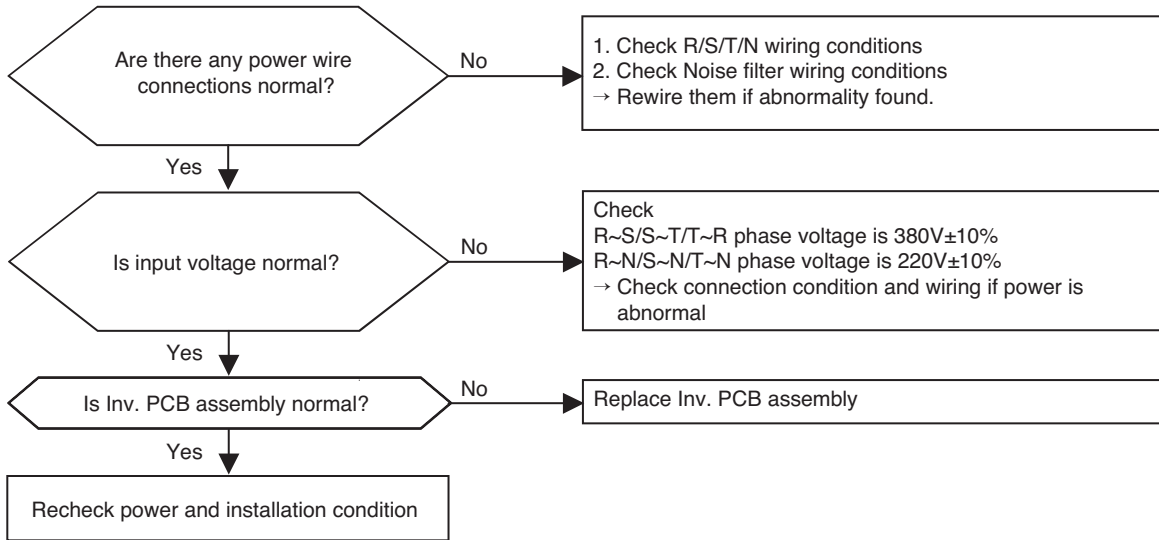
Error No.	Error Type	Error Point	Main Reasons
351	Excessive drop of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to excessive drop of low pressure by the low pressure sensor	<ol style="list-style-type: none"> <li>1. Defective low pressure sensor</li> <li>2. Defective outdoor/indoor unit fan</li> <li>3. Refrigerant shortage/leakage</li> <li>4. Deformation because of damage of refrigerant pipe</li> <li>5. Defective indoor / Compressor Module EEV</li> <li>6. Covering / clogging (Compressor Module covering during the cooling mode/ indoor unit filter clogging during heating mode)</li> <li>7. SVC valve clogging</li> <li>8. Defective Compressor Module PCB</li> <li>9. Defective indoor unit pipe sensor</li> </ol>

**■ Error diagnosis and countermeasure flow chart**



Error No.	Error Type	Error Point	Main Reasons
401	Inverter compressor CT sensor error	Micom input voltage isn't within $2.5V \pm 0.3V$ at initial state of power supply	1. Input voltage abnormal (T-N) 2. ODU Inv. PCB damage (CT sensing part)

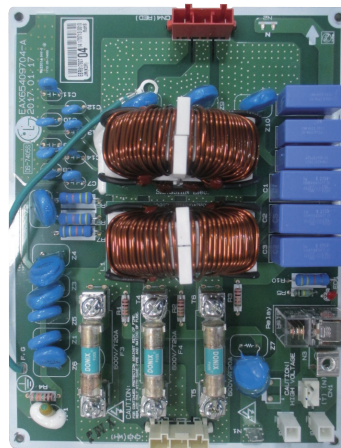
■ Error Diagnosis and Countermeasure Flow Chart



\* Measuring input voltage

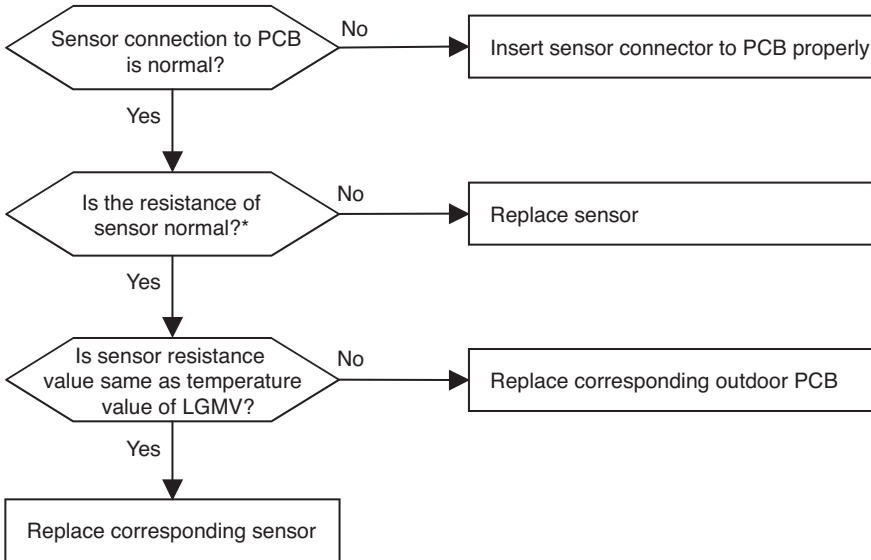


\* Inv. PCB assembly



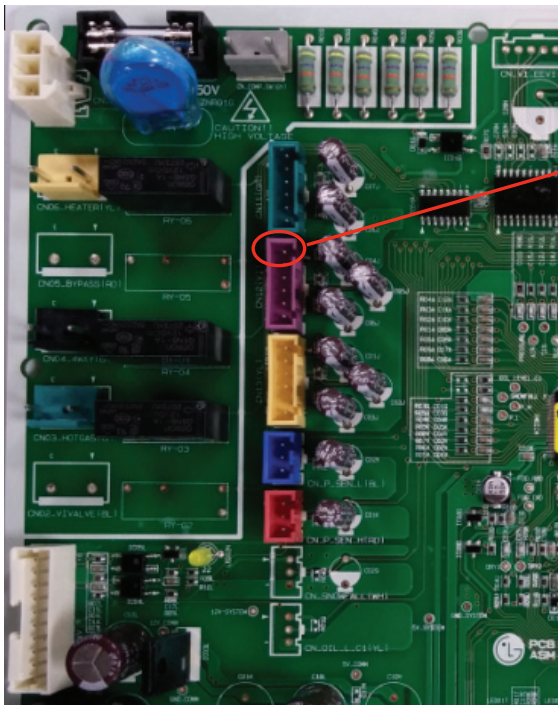
Error No.	Error Type	Error Point	Main Reasons
411	Compressor1 discharge pipe temperature sensor error	Sensor measurement value is abnormal (Open/Short)	1. Defective connection of the compressor1 discharge pipe temperature sensor 2. Defective discharge pipe compressor sensor of the compressor1 (open/short) 3. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart



\* Error is generated if the resistance is more than 5M(open) and less than 2k (short)

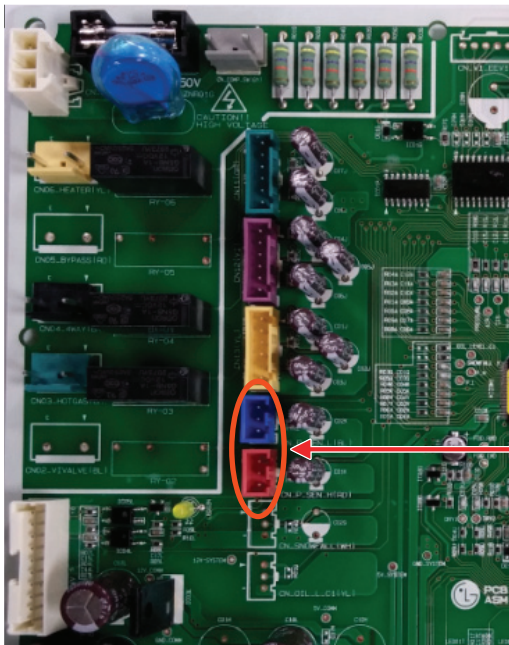
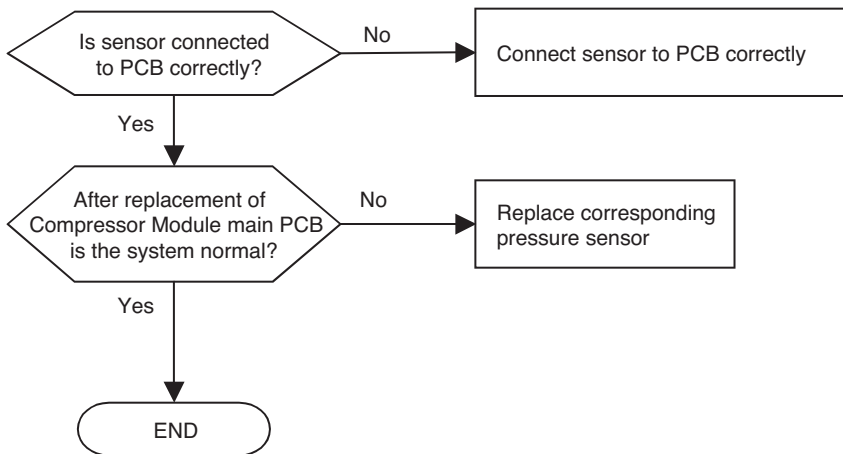
Note: Standard values of resistance of sensors at different temperatures (5% variation)  
 10C = 362k : 25C= 200k : 50C= 82k : 100C= 18.5k



Check the resistance inverter compressor discharge temperature sensor

Error No.	Error Type	Error Point	Main Reasons
421	Sensor error of low pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of low pressure connector 2. Defect of low pressure connector (Open/Short) 3. Defect of outdoor PCB
431	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of high pressure connector 2. Defect of high pressure connector (Open/Short) 3. Defect of outdoor PCB

■ Error diagnosis and countermeasure flow chart

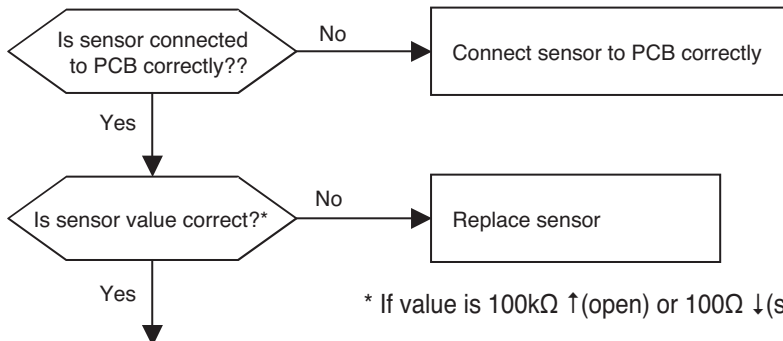


Pressure sensor connector



Error No.	Error Type	Error Point	Main Reasons
441	Sensor error of outdoor air temperature	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
451	Piping temperature sensor error of heat exchanger in master & slave heat exchanger module heat exchanger (A,B)	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
461	Compressor suction temperature sensor error	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB

■ Error diagnosis and countermeasure flow chart



\* If value is 100kΩ ↑(open) or 100Ω ↓(short), error occurs

NB: Resistance value of temperature sensor change according to temperature

It is normal if value shown as below (±5% error)

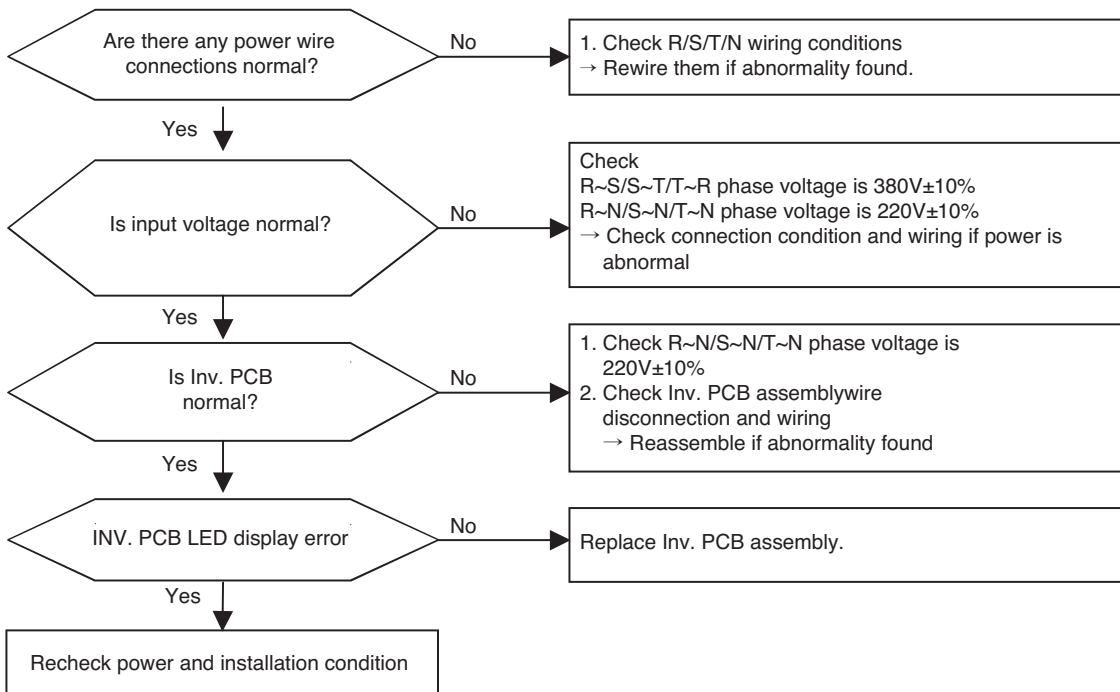
Sensor of air temperature: 10°C = 20.7kΩ : 25°C= 10kΩ : 50°C= 3.4kΩ

Sensor of piping temperature: 10°C = 10kΩ : 25°C= 5kΩ : 50°C= 1.8kΩ

For 441, 451 error Replace the PCB of the Heat exchanger module.  
For 461 error Please replace PCB of compressor module.

Error No.	Error Type	Error Point	Main Reasons
501	ODU 3phase power omission error	Omitting one or more of R,S,T input power	1. Input Voltage abnormal (R,S,T,N) 2. Check power Line connection condition 3. Inv. PCB damage 4. Inv. PCB input current sensor fault

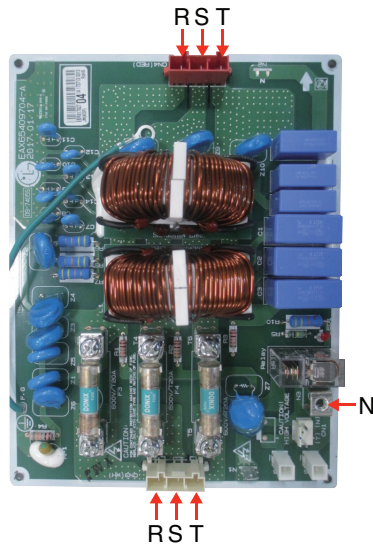
■ Error Diagnosis and Countermeasure Flow Chart



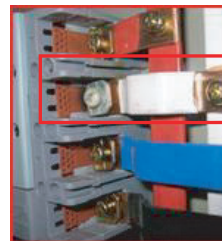
\* Measuring input voltage



\* Noise filter wiring



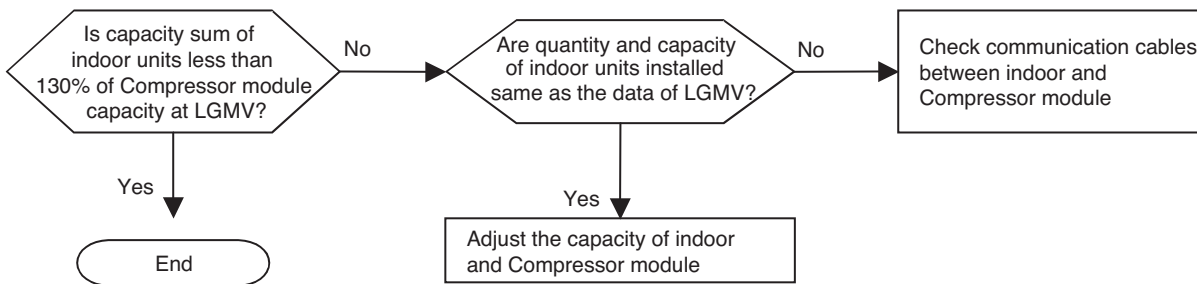
\* Field Fault Case



\* R-Phase Terminal Changed Color.

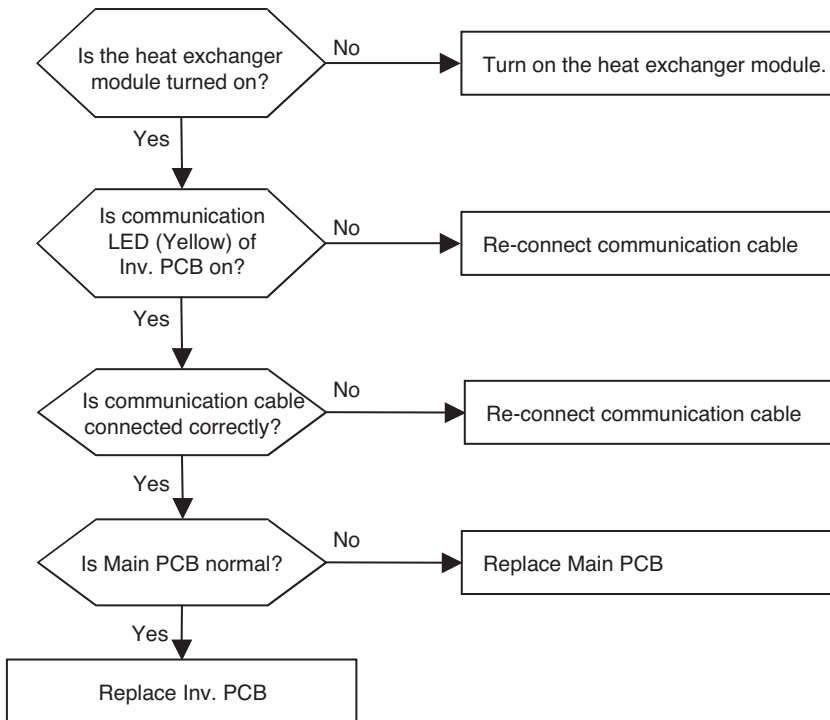
Error No.	Error Type	Error Point	Main Reasons
511	Over-Capacity (Sum of indoor unit capacity is more than outdoor capacity)	Sum of indoor unit capacity exceed Compressor Module capacity specification	<ol style="list-style-type: none"> <li>130% more than Compressor Module rated capacity</li> <li>Wrong connection of transmission cable/piping</li> <li>Detect of Compressor Module PCB</li> </ol>

■ Error diagnosis and countermeasure flow chart

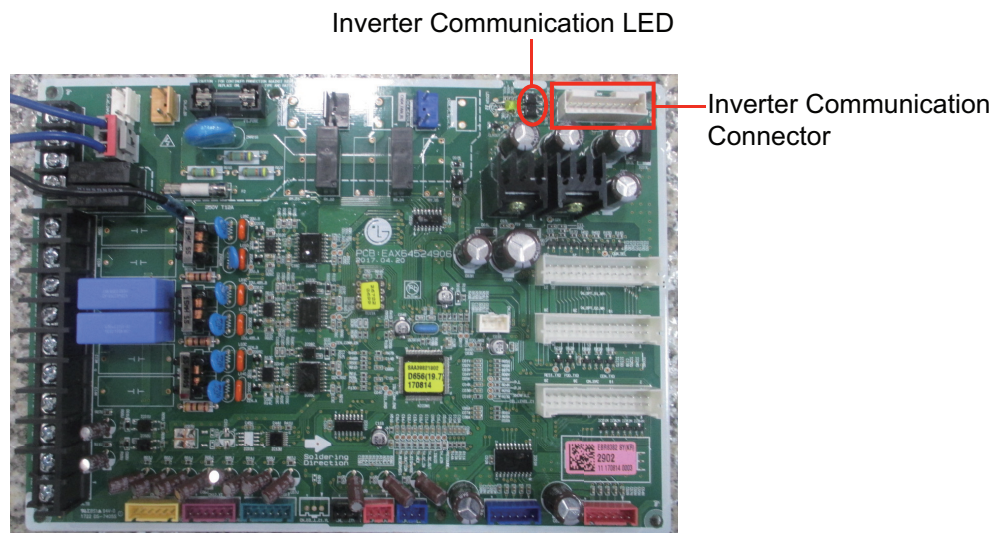


Error No.	Error Type	Error Point	Main Reasons
521	Communication error between (Inv. PCB → Main PCB)	Main PCB of Master unit of Master unit can't receive signal from Inv. PCB	<ol style="list-style-type: none"> <li>1. Power cable or communication cable is not connected</li> <li>2. Defect of outdoor Main PCB or Inv. PCB</li> </ol>

■ Error diagnosis and countermeasure flow chart

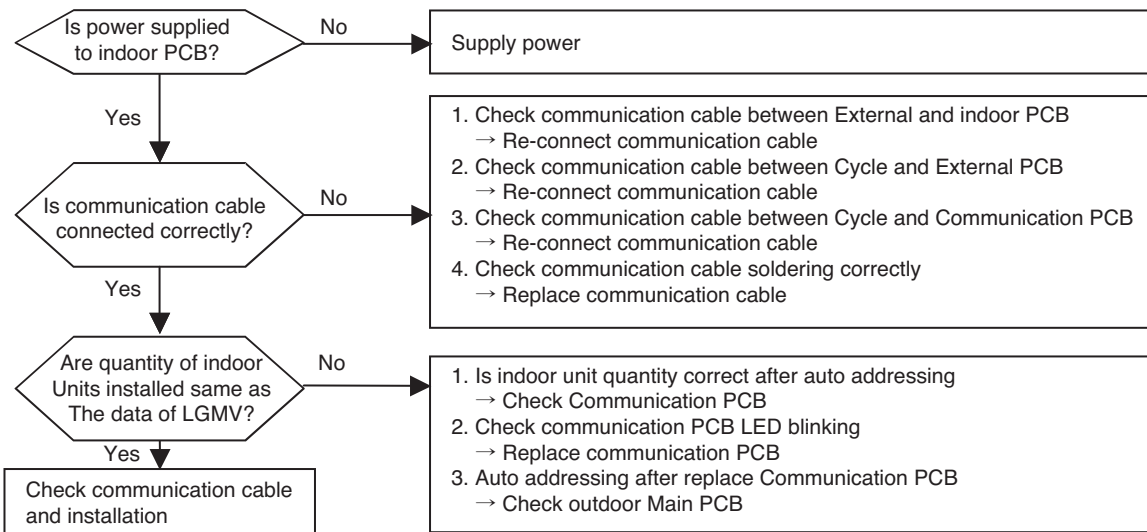


\* The method of checking Main PCB and Inv. PCB (If normal, communication LED blinks)



Error No.	Error Type	Error Point	Main Reasons
531	Communication error (Indoor unit → Compressor Module Main PCB)	In case Compressor Module Main PCB can't receive signal from indoor unit	<ol style="list-style-type: none"> <li>1. Communication cables are not connected between External PCB and indoor PCB</li> <li>2. Communication cables are not connected between Main PCB and External PCB</li> <li>3. Communication cables are not connected between Main PCB and Communication PCB</li> <li>4. Communication cables are short/open</li> <li>5. Indoor PCB power off</li> <li>6. Defect of outdoor Cycle/Communication/indoor PCB</li> <li>7. Communication wire connection fault</li> </ol>

■ Error diagnosis and countermeasure flow chart



In case of CH53, almost happened with CH05, the indoor units not operated actually are normal so check with same method of CH05. and additionally check as shown as below and above flow chart

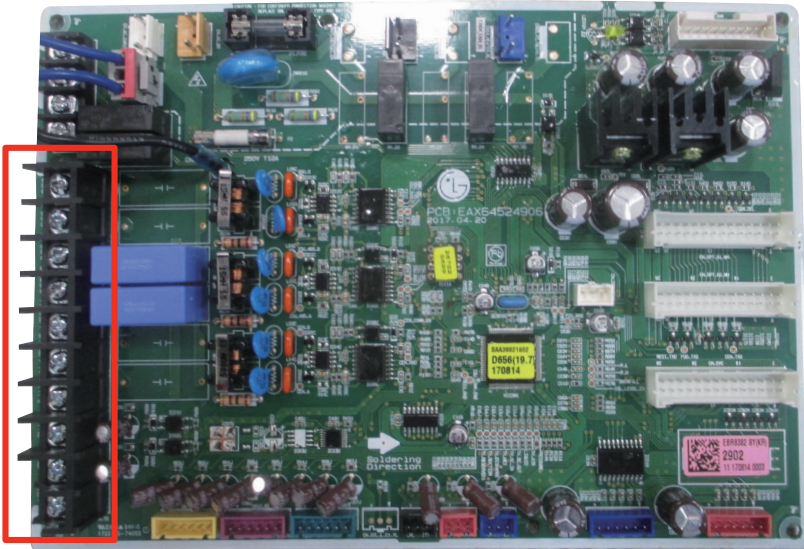
- Although the quantity of indoor units installed is same as LGMV data there may be a few indoor units with which the number of communication is not increased with LGMV
- Although the quantity of indoor units installed is not same as LGMV data, and if communication of the indoor unit displayed at LGMV is done well then the indoor unit suspected to have some problem (and is not appear at LGMV) may have following problems
  - ① wrong connection of communication cable or power cable
  - ② fault of power / PCB / communication cable
  - ③ duplication of indoor unit number
- If communication is not doing well wholly then the Auto Addressing is not done
- The case that CH53 appear at indoor unit also Auto Addressing is not done so indoor unit address may be duplicated

\* After replacement of indoor unit PCB, Auto Addressing should be done, if central controller is installed then the central control address also should be input.  
In case that only communication PCB is replaced above process is not needed

## Troubleshooting Guide

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### Communication Part in Main PCB



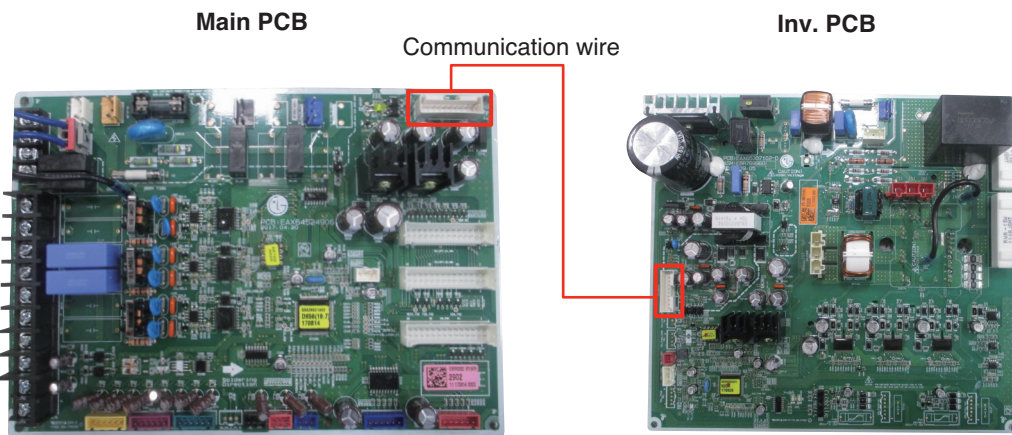
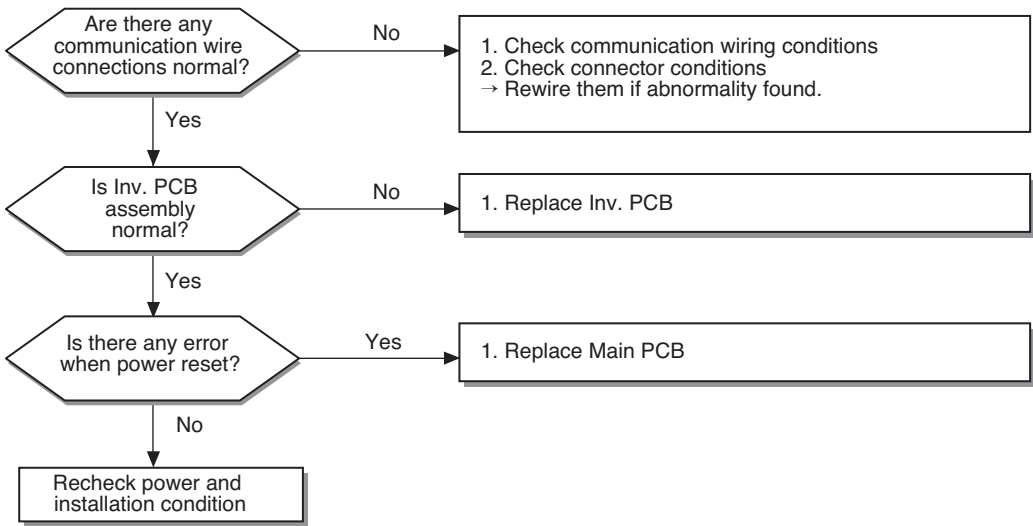
※ Remark : IDU A/IDU B

### Wiring Fault Case



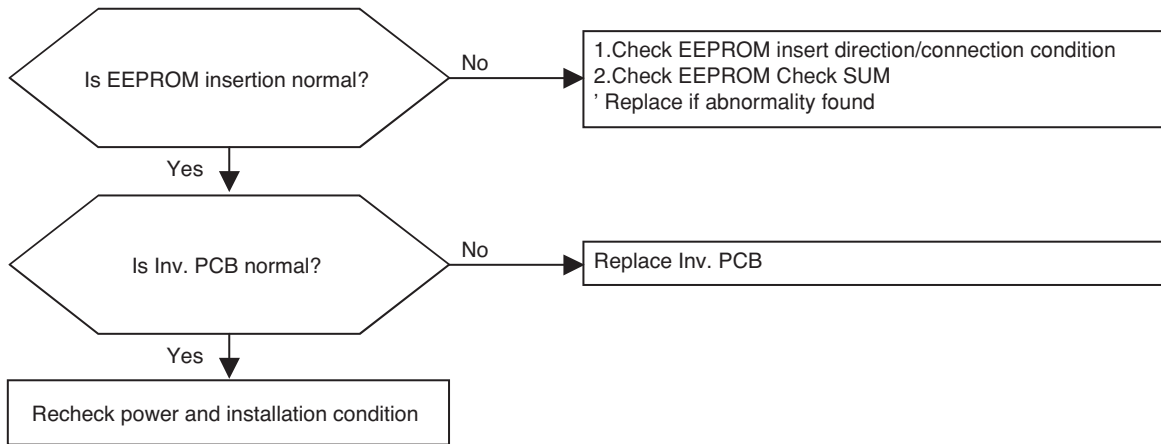
Error No.	Error Type	Error Point	Main Reasons
571	Communication error : Main PCB --> Inv. PCB	Failing to receive inverter signal at main PCB of Compressor module	<ol style="list-style-type: none"> <li>1. Bad Connection Between Main PCB and Inv. PCB</li> <li>2. Communication Wire Noise Effect</li> <li>3. ODU Main PCB Damage</li> </ol>

■ Error diagnosis and countermeasure flow chart

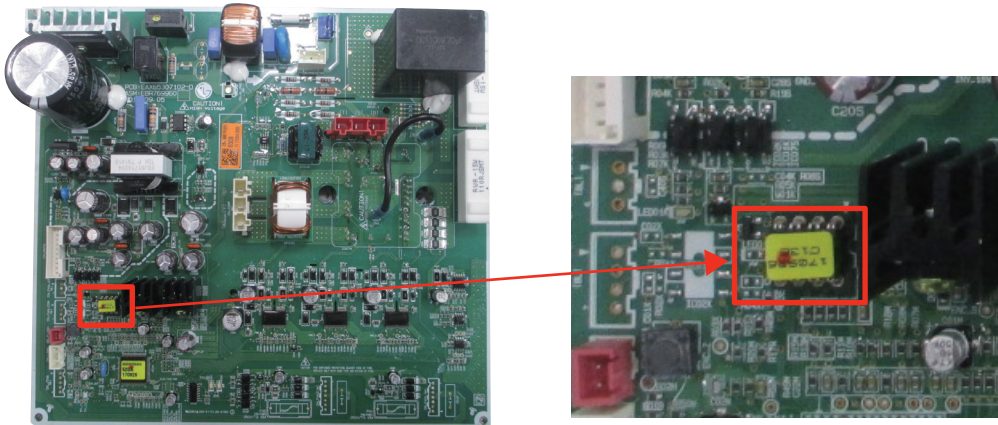


Error No.	Error Type	Error Point	Main Reasons
601	Inv. PCB EEPROM error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU Inv. PCB assembly damage

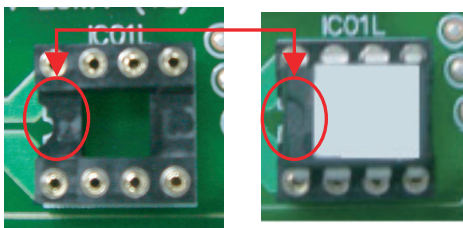
■ Error Diagnosis and Countermeasure Flow Chart



\* Inv. EEPROM inserting point



\* Right inserting direction of Inv. EEPROM

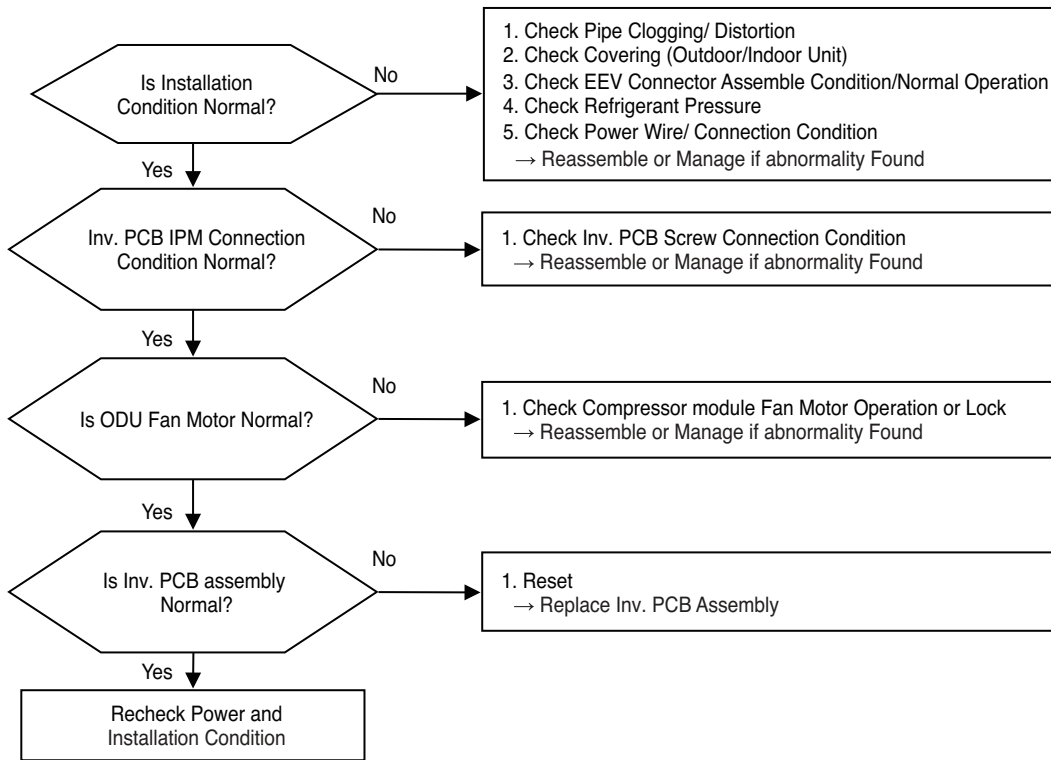


\* Note : Replace after power off

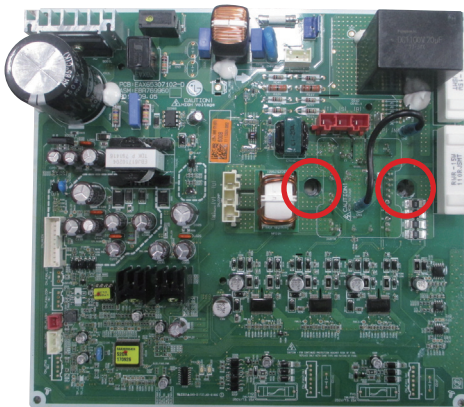


Error No.	Error Type	Error Point	Main Reasons
621	Inv. PCB Heatsink Temperature High	Heatsink Temperature is Over 90°C	1. Inv. PCB IPM Connection Condition Abnormal 2. Compressor module Fan Motor Operation Abnormal 3. Compressor module Inv. PCB Assembly Defect 4. Overload Operation (Pipe Clogging/ Covering/EEV Defect/Ref. Overcharge)

■ Error diagnosis and countermeasure flow chart



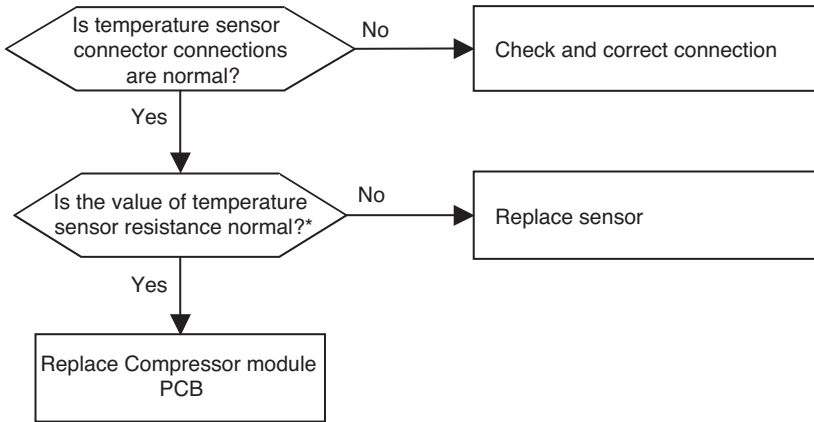
■ Check Inv. PCB Screw Connection Condition



Check Screw Connection Condition

Error No.	Error Type	Error Point	Main Reasons
651	Compressor module liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective Compressor module PCB

■ Error diagnosis and countermeasure flow chart



\* Sensor resistance 100 kΩ over (open) or 100 Ω below (short) will generate error

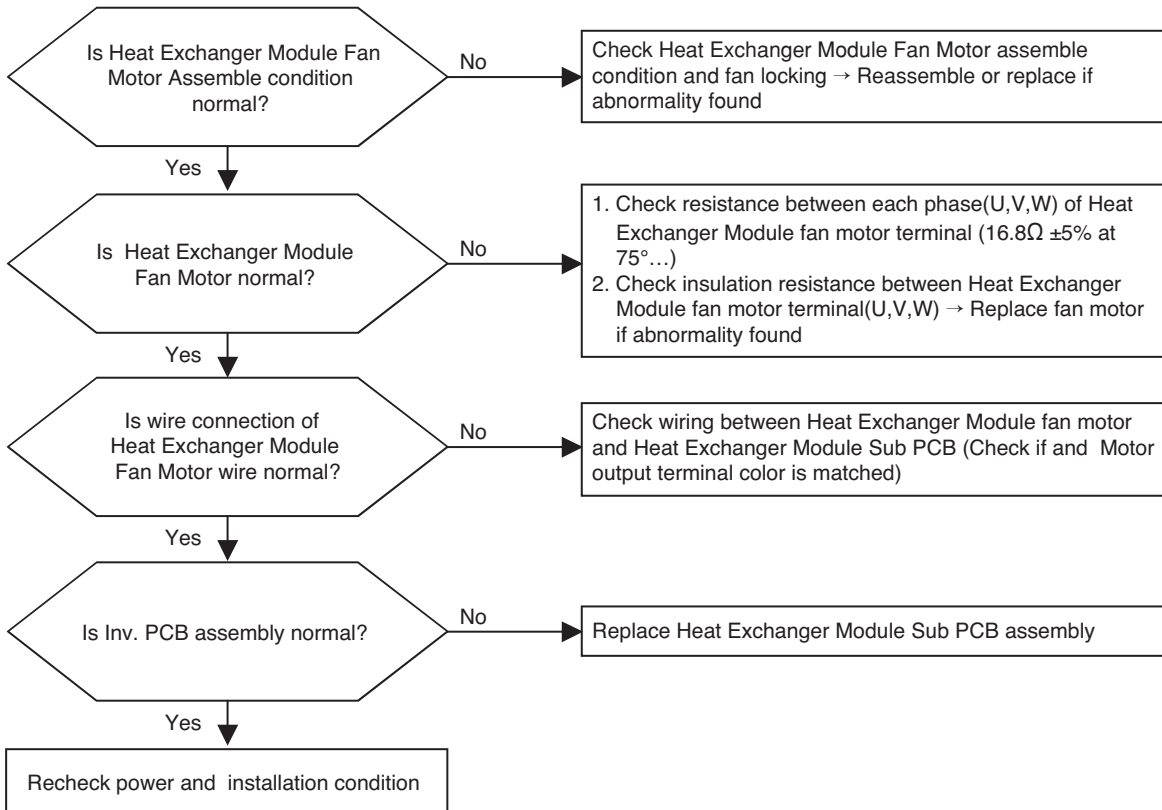
Note: Temperature sensor resistance vary with temperature, So compare temperature sensor resistance value according to Compressor module temperature by referring below table (±5% tolerance)

Air temperature sensor: 10°C = 20.7kΩ : 25°C = 10kΩ : 50°C = 3.4kΩ

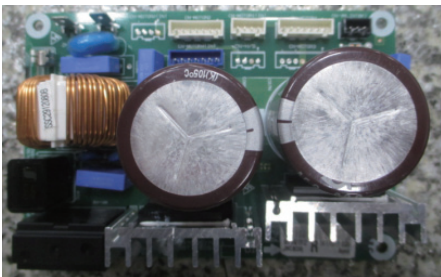
Pipe temperature sensor: 10°C = 10kΩ : 25°C = 5kΩ : 50°C = 1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
671	Fan Lock Error	Fan RPM is 10RPM or less for 5 s when Heat Exchanger Module fan starts or 40 RPM or less after fan starting.	<ol style="list-style-type: none"> <li>1. Fan motor defect / assembly condition abnormal</li> <li>2. Wrong connection of fan motor connector</li> <li>3. Reversing rotation after RPM target apply</li> <li>4. Heat Exchanger Module Sub PCB assembly defect</li> </ol>

■ Error Diagnosis and Countermeasure Flow Chart

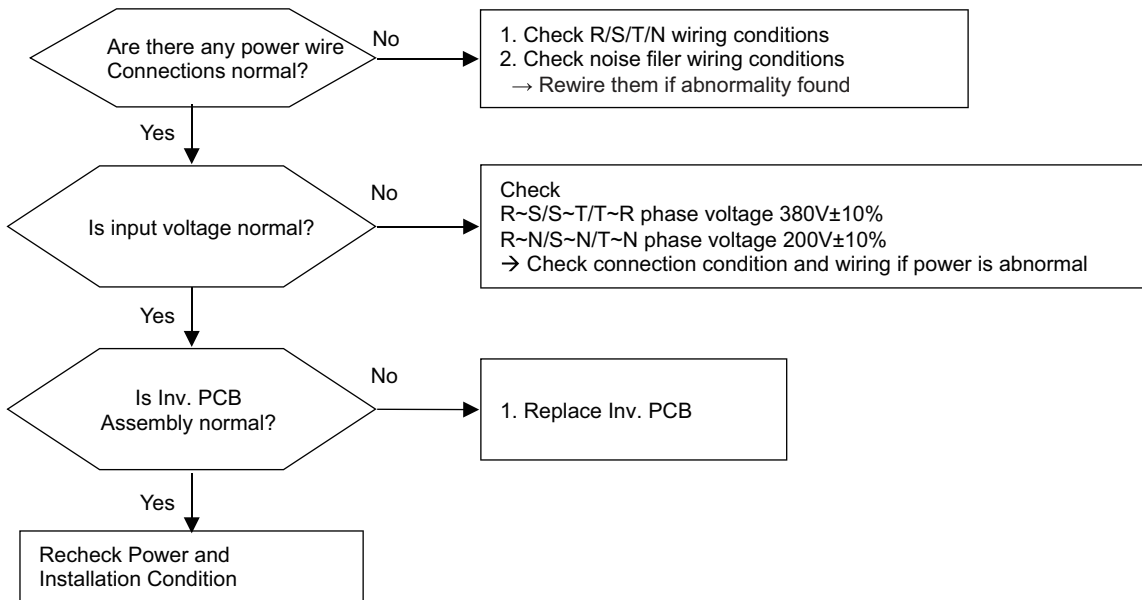


\* Sub PCB



Error No.	Error Type	Error Point	Main Reasons
711	Inv. CT Sensor Error	Micom input voltage isn't within $2.5V \pm 0.3V$ at initial state of power supply	1. Input Voltage is abnormal (T-N) 2. ODU Inv. PCB damage (CT sensing part)

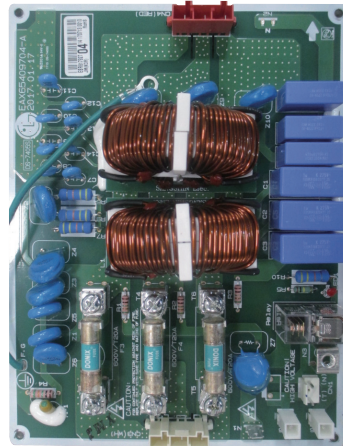
■ Error diagnosis and countermeasure flow chart



\* Measuring input voltage

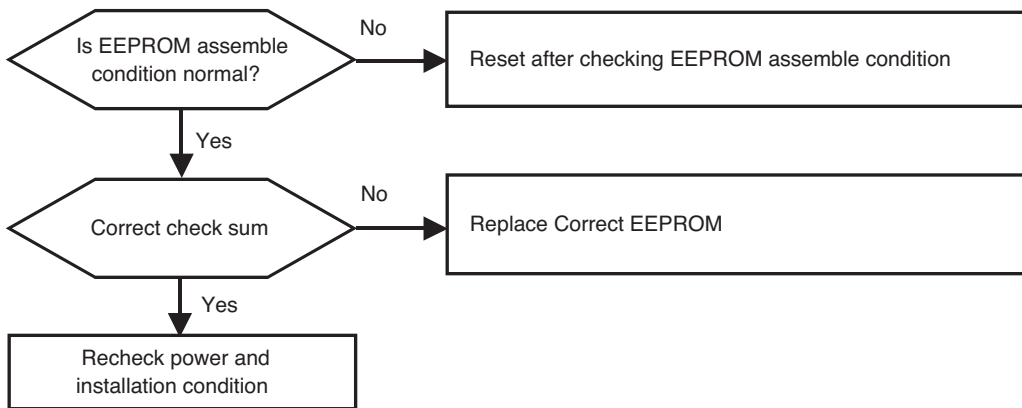


\* Inv. PCB assembly

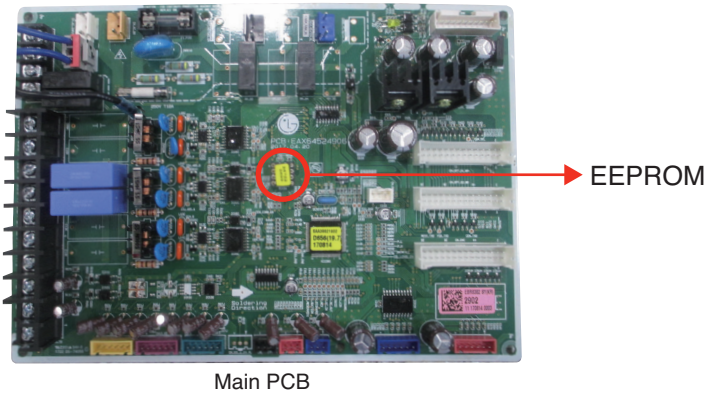


Error No.	Error Type	Error Point	Main Reasons
861	Main PCB EEPROM	EEPROM Access Error	1. No EEPROM 2. EEPROM wrong insertion

■ Error Diagnosis and Countermeasure Flow Chart



EEPROM Insertion

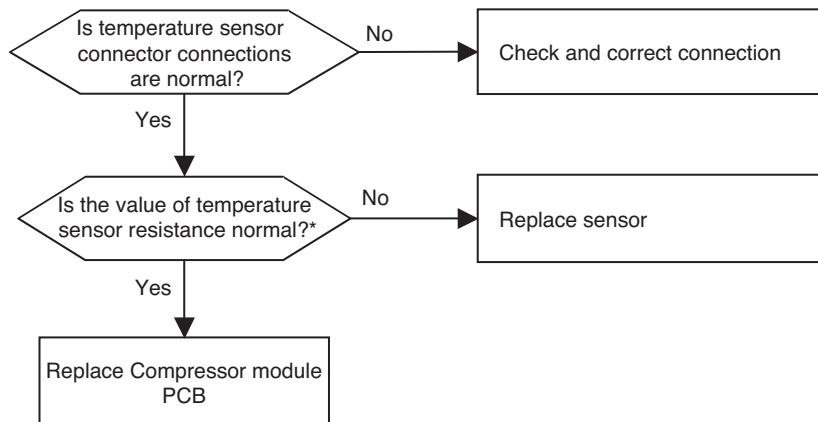


\* Note : Replace after power off



Error No.	Error Type	Error Point	Main Reasons
1131	Compressor module liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective Compressor module PCB
1151	Compressor module Subcooling Outlet Temperature Sensor Error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open/Short) 3. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart



\* Sensor resistance 100 kΩ over (open) or 100 Ω below (short) will generate error

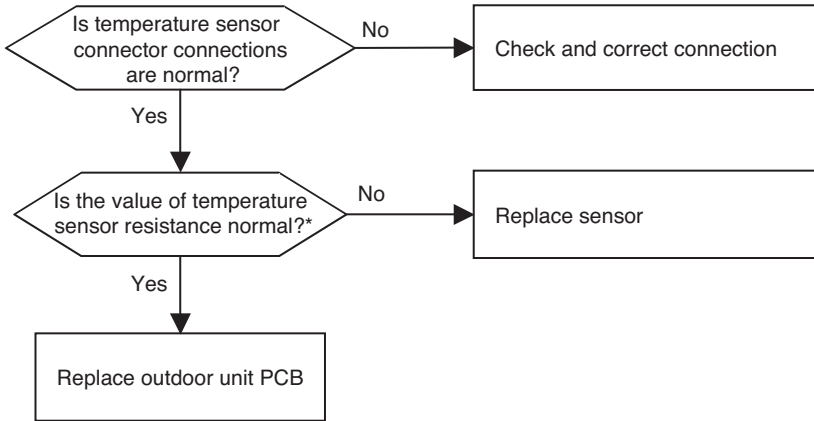
Note: Temperature sensor resistance varies with temperature, so compare temperature sensor resistance value according to Compressor module temperature by referring below table (±5% tolerance)

Air temperature sensor: 10°C = 20.7kΩ : 25°C = 10kΩ : 50°C = 3.4kΩ

Pipe temperature sensor: 10°C = 10kΩ : 25°C = 5kΩ : 50°C = 1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
1141	Compressor module Subcooling Inlet Temperature Sensor Error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open/Short) 3. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart



\* Sensor resistance 100 kΩover (open) or 100 Ω below (short) will generate error

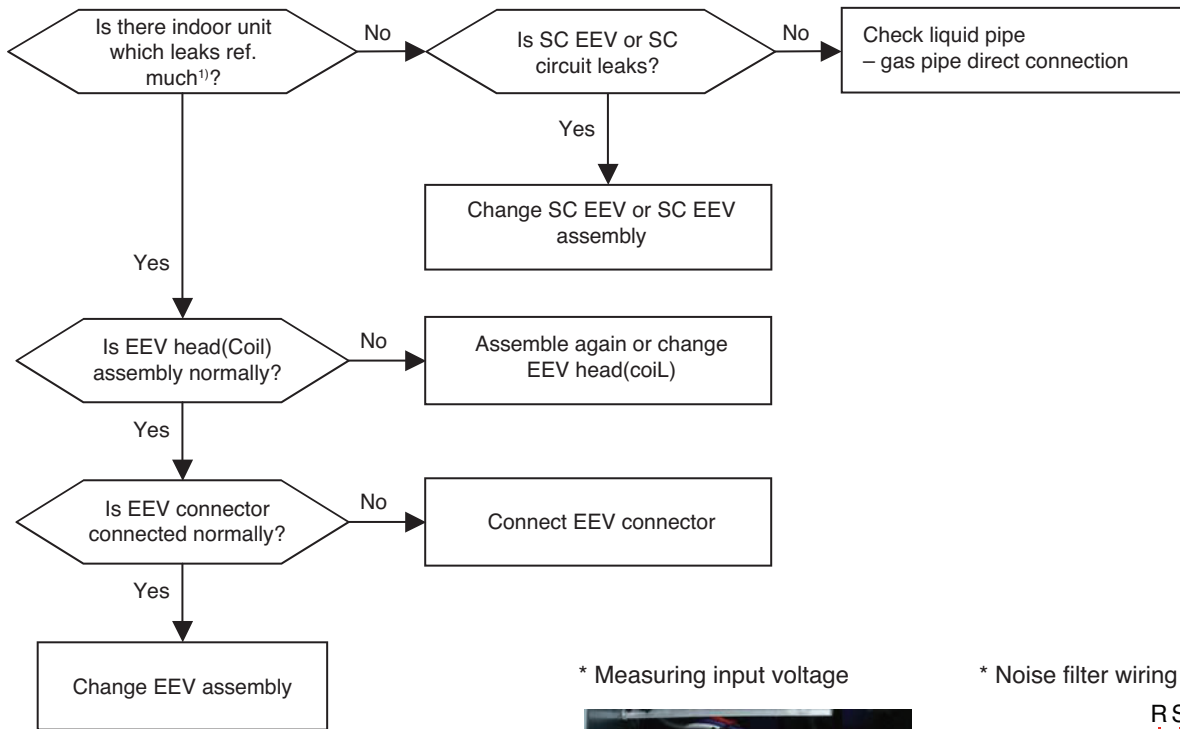
Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to Compressor module temperature by referring below table (±5% tolerance)

Air temperature sensor: 10°C = 20.7kΩ : 25°C = 10kΩ : 50°C= 3.4kΩ

Pipe temperature sensor: 10°C = 10kΩ : 25°C = 5kΩ : 50°C= 1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
1501	Discharge superheat low	Discharge superheat is under 3°C (liquid back)	Check liquid bypass 1. Individual power of indoor unit is open during operation 2. Indoor unit EEV fault(ref. leak much) 3. Indoor unit EEV connector disconnected. 4. SC EEV fault(ref. leak much) 5. Liquid pipe – gas pipe direct connection

■ Error diagnosis and countermeasure flow chart

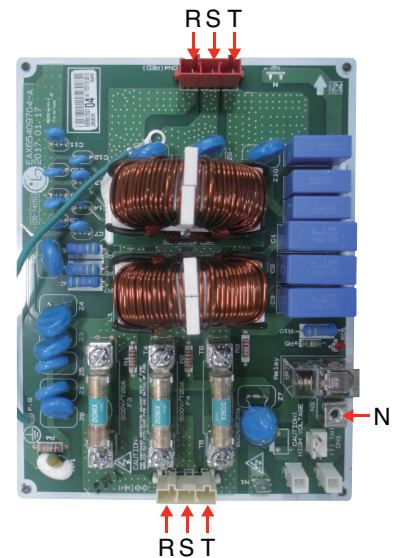


1) Ref. leakage much  
 : Both Pipe in, pipe out temp. is under 10°C during unit is off(EEV 40pls)  
 Also, big refrigerant flow noise occurred

\* Measuring input voltage



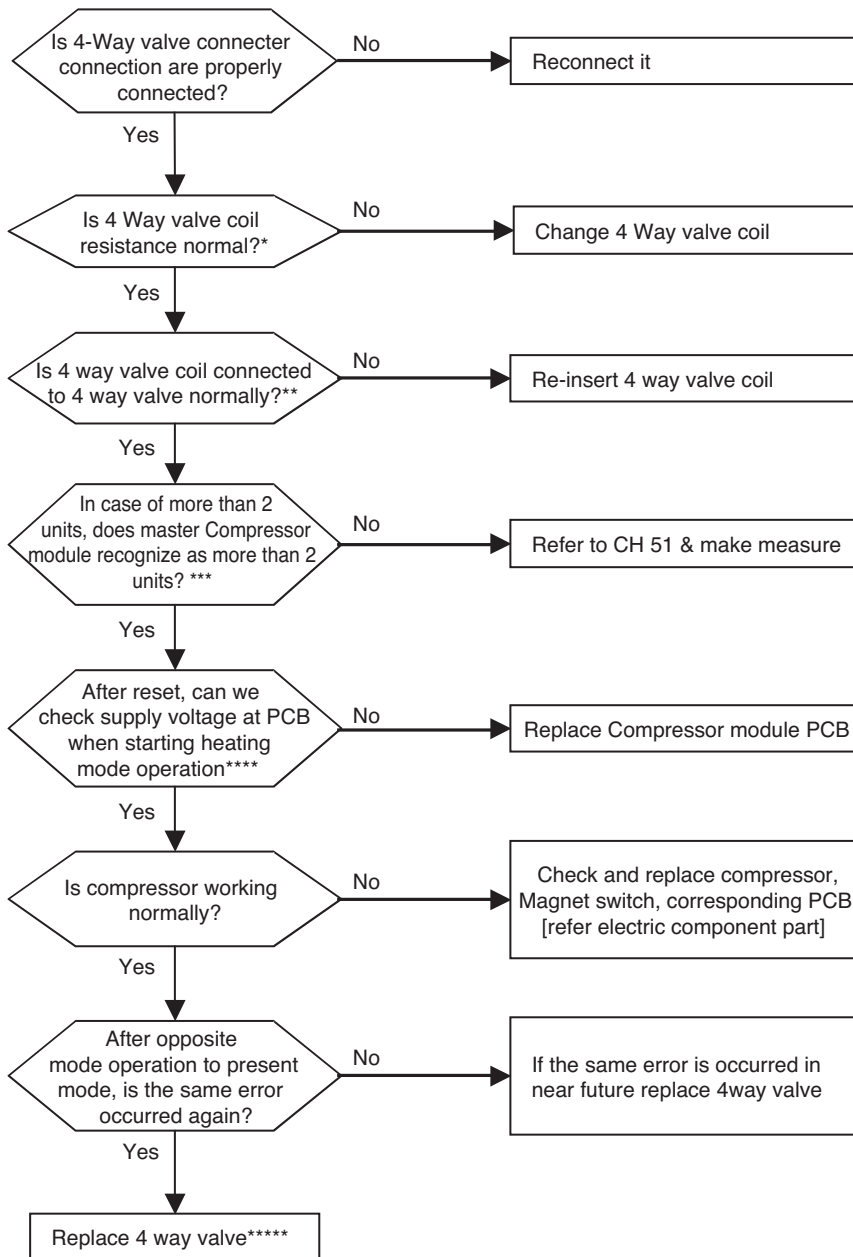
\* Noise filter wiring





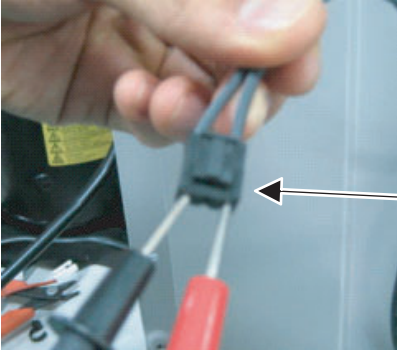
Error No.	Error Type	Error Point	Main Reasons
1511	Function error of outdoor 4way (reversing valve)	Function error of 4way (reversing valve) in Main or Slave Compressor module	1. Wrong operation of 4way valve because of sludge etc. inflow 2. No pressure difference because of compressor fault 3. Wrong installation of In/outdoor common pipe 4. Defect of 4way valve

■ Error diagnosis and countermeasure flow chart

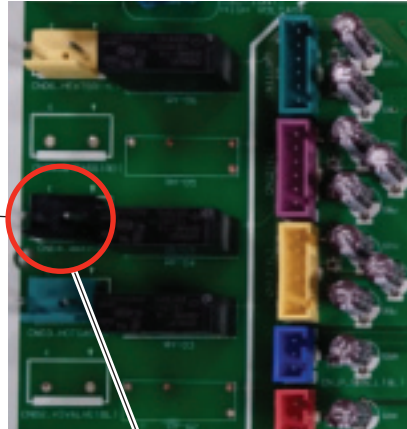


## Troubleshooting Guide

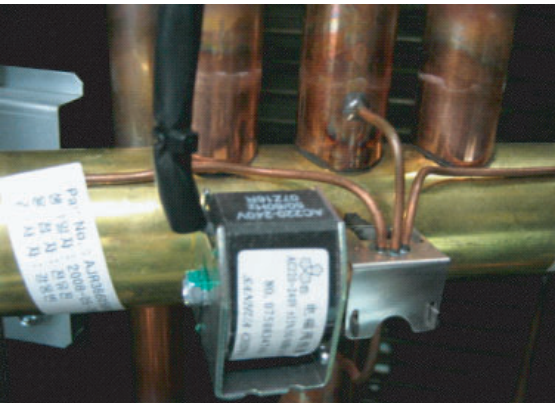
\* Measure the resistance of 4way valve



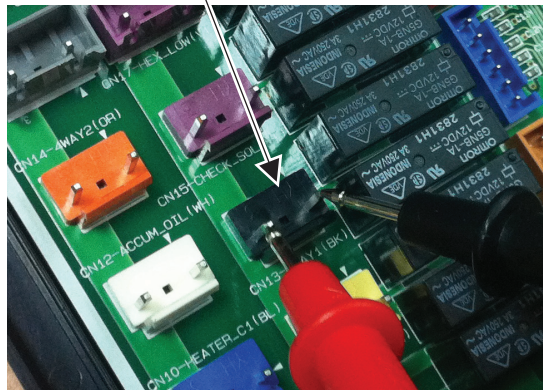
Location of 4way valve connector on Main PCB (marked as 4way, CN09)



\*\* Confirm the 4way valve coil is inserted to the end



\*\*\*\* Check the output voltage of terminal socket during heating operation





P/NO : MFL42395744