Internal Use Only

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Air-to-Water Heat Pump (For High Temperature)

SERVICE MANUAL

MODEL : AHNW166T0
AHUW166T0

CAUTION

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

TABLE OF CONTENTS

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.

	**Be sure not to do.**
	**Be sure to follow the instruction.**

⚠WARNING

■ Installation

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.

Take care to ensure that nobody could step on or fall onto the outdoor unit.

- This could result in personal injury and product damage.

Always ground the product.

- There is risk of fire or electric shock.

Always intstall 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.

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.

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 outdoor unit and fire or electric shock may result.

■ Operation

Do not damage or use an unspecified power cord.

- There is risk of fire, electric shock, explosion, or injury.

Use a dedicated outlet 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.

⚠ CAUTION

■ 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 outdoor unit 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 installting 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.

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 outdoor unit, suspending it at the specified positions on the unit base. Also support the outdoor unit 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 outdoour 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 plugged in.

• There are sharp and moving parts that could cause personal injury.

Part 1
General Information

1. Model Names

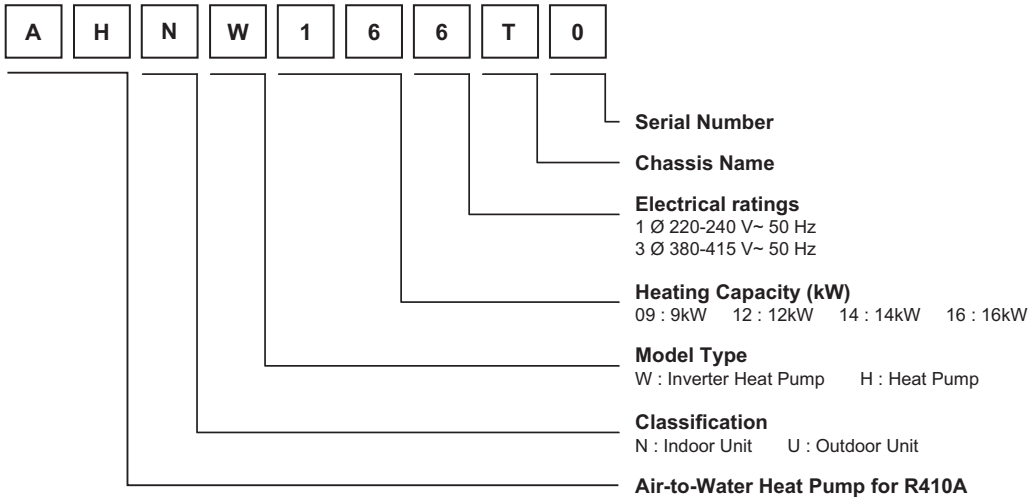
Indoor Unit	AHNW166T0
Outdoor Unit	AHUW166T0

2. External Appearance

16kW

3. Nomenclature

3.1 Model Information



Part 2
Indoor Unit

Air-to-Water Heat Pump (For High Temperature)

1. List of Function

1) Indoor Unit

Category	Function	ARNH08GK3A2
Installation	Drain pump	X
	E.S.P. control	X
	Electric heater	X
	High ceiling operation	X
	Auto Elevation Grille	X
Reliability	Hot start	X
	Self diagnosis	O
	Soft dry operation	X
Convenience	Auto changeover	X
	Auto cleaning	X
	Auto operation(artificial intelligence)	X
	Auto Restart	O
	Child lock	O
	Forced operation	X
	Group control	O
	Sleep mode	X
	Timer(on/off)	O
	Timer(weekly)	O
	Two thermistor control	X
Individual control	Standard Wired remote controller	O
	Deluxe wired remote controller	X
	Simple wired remote controller	X
	Simple Wired remote controller(for hotel use)	X
	Wireless remote controller	X
CAC network function	General central controller (Non LGAP)	X
	Network Solution(LGAP)	O
	Dry contact	PQDSA(1) / PQDSB(1)
	PDI(power distribution indicator)	X
	PI 485(for Indoor Unit)	X
Special function kit	Zone controller	X
	CTI(Communication transfer interface)	X
	Electronic thermostat	X
Others	Remote temperature sensor	PQRSTA0
	Telecom shelter controller	X
Air to Water Heat Pump Functions	Anti-condensation on floor(cooling)	X
	Water pump on / off Control	O
	Flow switch control	O
	Thermostat interface (230V AC)	O
	Thermostat interface (24V AC)	X
	Sanitary tank heating	O
	Solar-thermal interface with sanitary tank	X
	PHEX anti-freezing control	O
	Water pump forced operation	O
	Autosetting according to ambient temperature	O
	Slient operation	X
	Anti-overheating of water pipe	O
	Emergency operation	O

Notes
O : Applied, X : Not applied
Accessory model name : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separate package.

2) Outdoor Unit

Category	Function	AHUW166T0
Reliability	Defrost/ Deicing	O
	High pressure switch	O
	Phase protection	O
	Restart delay(3-minutes)	O
	Self diagnosis	O
	Soft start	O
	Trial operation	O
Convenience	Auto operation(Artificial intelligence)	O
	Auto restart operation	O
CAC network Function	Network Solution(LGAP)	O

O : Applied X : Not applied - : No reation
Option : Model name & price are different according to options, and assembled in factory with main unit
Accessory : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separated package.

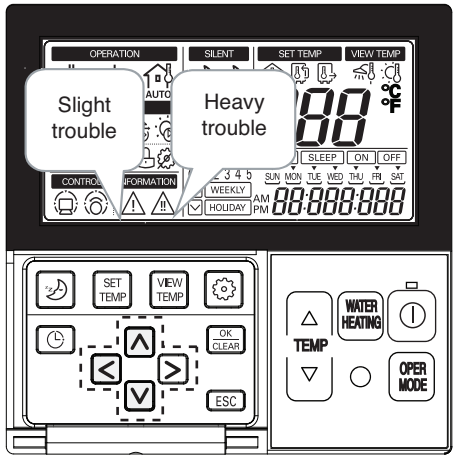
Category	Function	AHUW166T0
CAC Network	Power Distribution Indicator(PDI)	PQNUD1S40
	Dry contact(Indoor Unit)	PQDSA
	ODU Dry Contact	PQDSBCDVM0
	AC Smart II	PQCSW320A1E, PQCSW421E0A
	ACP	PQCPC22N0, PQCPC22A0
	AC Manager	PQCSSA21E0
	LONWORKS Gateway (BNU-LW)	PLNWKB000
	Remote controller	AWHP INSTALLATION KIT
	BACnet Gateway (BNU-BAC)	PQNFB17C0
Program	LG MV	Option
Other	Air Guide	Accessory
	Refrigerant Charging Kit	PRAC1

O : Applied X : Not applied - : No reation
Option : Model name & price are different according to options, and assembled in factory with main unit
Accessory : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separated package.

2. Features

1. Summarized Features

1.1 Emergency Control



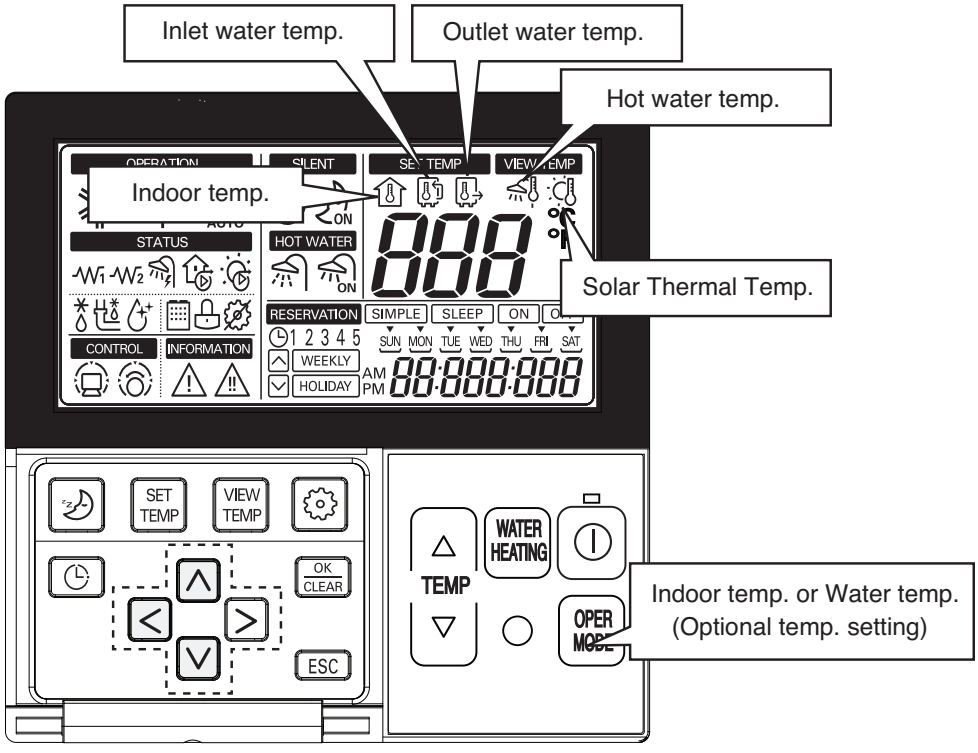
Easy checking of system failure

- Slight / Heavy trouble

Emergency operating

- Heavy trouble
- Secure at least heating before A/S

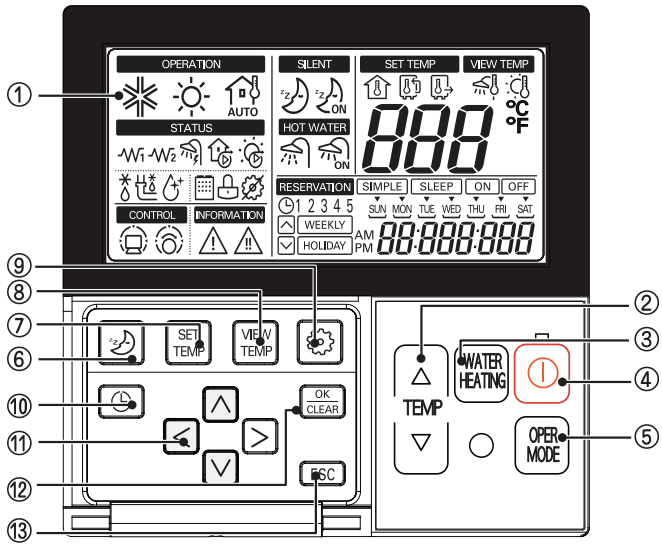
1.2 Easy Setting Feature



* 'Solar Thermal Temp' function may not be operated and displayed

1.3 Remote controller

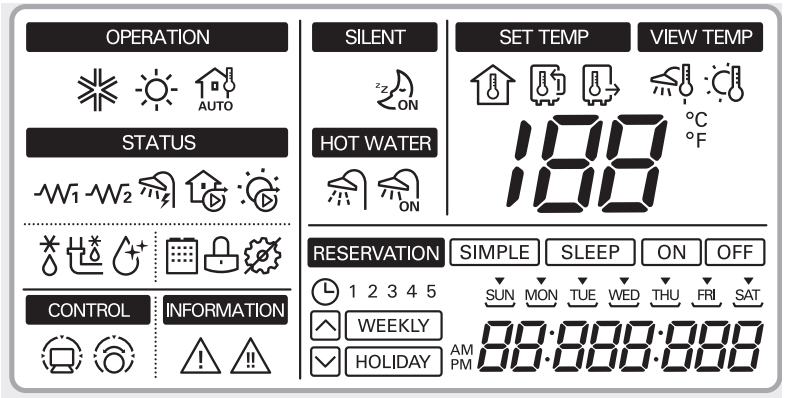
• Controller Configuration



No	Name
1	Display
2	Change Temperature Button
3	Water Heating Enable / Disable Button
4	Power Button
5	Operation Mode Selection Button
6	Silent Mode On / Off Button
7	Temperature Setting Mode Button
8	Temperature View Mode Button
9	Function Setting Button
10	Programming Button
11	Direction Button (Up, Down, Left, Right)
12	Set / Clear button
13	ESC Button

* Gray painted function may not be operated and displayed

• Display Panel



	Cooling		Electric Heater (2)		Defrost
	Heating		Water Tank Electric Heater		Water-Pipe Anti Freezing
AUTO	Weather-dependent Heating		Water Pump		Water Tank Disinfection
	Space Temp.		Solar Thermal circulation pump		Outdoor Unit
	Water Inlet Temp.		Water Tank Heating Enable / Disable		Child Lock
	Water Outlet Temp.	ON	Water Tank Heating (by Heat Pump)		Not Available Function
	Central Controller	ON	Silent Mode ON / OFF		Slight Trouble
	Thermostat		Water Tank Temp.		Heavy Trouble
	Electric Heater (1)		Solar Heating Temp.		

* Grey painted functions may not be operated and displayed.

2. Special Function

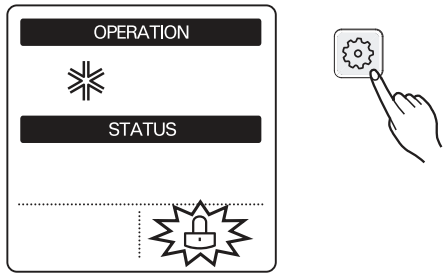
2.1 Child Lock Function

This function prevents children or others from tampering with the control buttons on the unit.

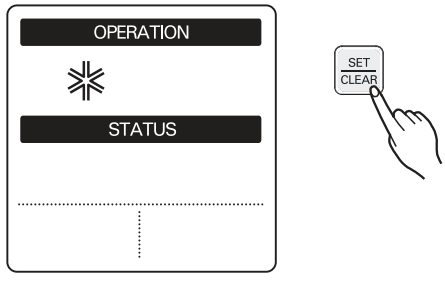
• All the buttons on indoor display panel will blocked.

The function is used to restrict children to not to use the Hydro Kit carelessly.(CL is an abbreviated form of Child Lock.)

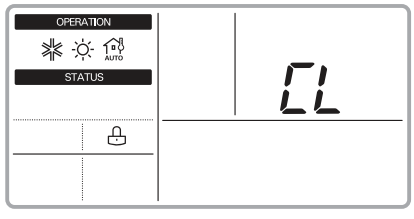
1 Press Function Setting Button to enter user setting mode.
(The segment will be flashed)



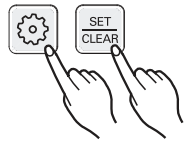
2 Press set / clear button to finish the selection.
The segment will be disappear.



3 During Child Lock, icon and 'CL' will be displayed during 3 seconds whenever entering any kind of buttons except for view temperature button and setting/clear button .



4 To release this setting, Press function Setting button until Icon flashes and then enter setting/clear button.



2.2 Sleep Timer Operation

• When the sleep time is reached after <1,2,3,4,5,6,7,0(cancel) hr> is input by the remote controller while in appliance operation, the operation of the appliance stops.

• While the appliance is on pause, the sleep timer mode cannot be input.

2.3 Timer(On/Off)

2.3.1 On-Timer Operation

• When the set time is reached after the time is input by the remote controller, the appliance starts to operate.

• The timer LED is on when the on-timer is input. It is off when the time set by the timer is reached.

• If the appliance is operating at the time set by the timer, the operation continues.

2.3.2 Off-Timer Operation

• When the set time is reached after the time is input by the remote controller, the appliance stops operating.

• The timer LED is on when the off-timer is input. It is off when the time set by the timer is reached.

• If the appliance is on pause at the time set by the timer, the pause continues.

2.4 Weekly Program

• If necessary, an operator can make an On/Off reservation of the product for a period of one week.

- On/Off schedule of operation for a period of One week.

• No need to turn the unit On/Off manually during working days.
On/Off time is scheduled in micom of the wired remote control.

Operation Time Table (Example)

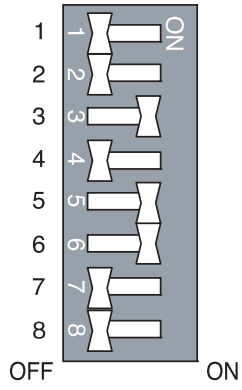
Setting	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Temp.	25°C (77°F)	25°C (77°F)	25°C (77°F)	25°C (77°F)	25°C (77°F)	Off	
On	09:00	08:00	09:00	08:00	09:00		
Off	12:00	17:00	12:00	12:00	12:00		

3. System Set-up

As Air-to-Water Heat Pump (For High Temperature) is designed to satisfy various installation environment, it is important to set up system correctly. If not configured correctly, improper operation or degrade of performance can be expected.

3.1 DIP Switch Setting

1) Indoor



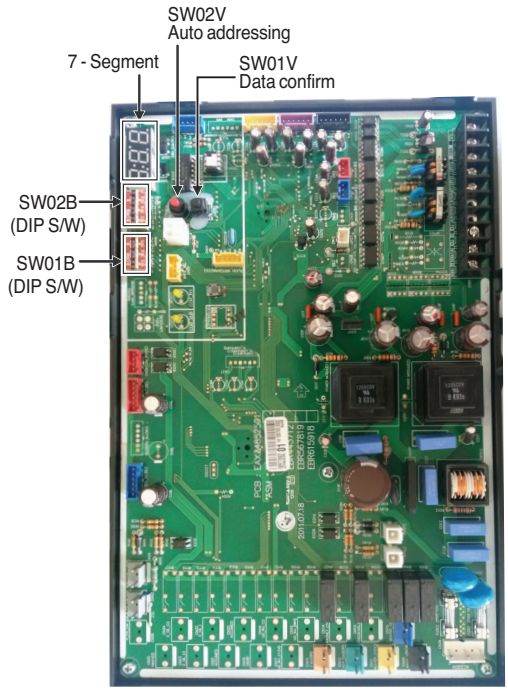
- Turn off electric power supply before setting DIP switch, There is risk of electric shock.
- Dip switch is turned on when pulled right.
- Always set dip switch #6 to ON and #7 to OFF.
- Do not set dip switch #2 to ON and #3 to OFF.
- If dip switch is not set as below, the unit may not operate properly.

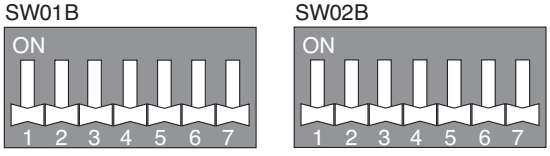
X : OFF ● : On

Description	Dip switch setting								Function	Default
	1	2	3	4	5	6	7	8		
Installation Scene		X	X						Floor heating only	
		X	●						vFloor heating + Hot water	○
		●	●						Hot water only	
Emergency operation				X					High temperature operation	○
				●					Low temperature operation	
Water pump control					X				Water pump controlled with Hydro Kit	
					●				Water pump NOT controlled with Hydro Kit	○
Thermostat connection								X	Thermostat NOT installed	○
								●	Thermostat installed	

2) Outdoor

Main PCB





<Initial shipping condition of DIP Switch>

1. When outdoor unit is powered on after configuring the DIP switch, proper input of configuration value can be verified through 7-Segment.
2. This function is shown only for 2 seconds after turning on the power.

■ **Verification of outdoor unit configuration**

- After power is turned on, number are shown on 7-Segment consecutively
- These numbers show the configuration status

In case of 1Ø, 16kW model

Seqence	NO.	Content
1	31	Model code, 1~255
2	5	Nominal Capacity(HP)
3	2	2 : heatpump No display : cooling only
4	25	Normal
5	30	Model type, 1~255

Model Code

Phase	Capacity(kW)	Model code	Model type
1Ø	16	31	30

⚠ WARNING

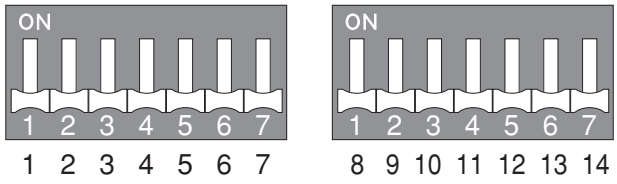
- **Main PCB power should be reset in order to recognize the changed function after handling the DIP switch for configuration of additional functions.**
- **Main PCB power should be reset after resetting the DIP switch for cancellation of additional function**
- **Please configure DIP switch properly. Otherwise, It can overstrain product during operation**

⚠ CAUTION

1. "X" mark means DIP switch must be off, Otherwise the function may not perates correctly.
2. If each DIP switch doesn't set correctly, unit will operate abnormally.
3. In case of proceeding test run, start after checking if all indoor unit is off.

■ Setting the DIP switch

• If you set the Dip switch when power is on, the changed setting will not be applied immediately.
The changed setting will be enabled only when Power is reset or by pressing Reset button.



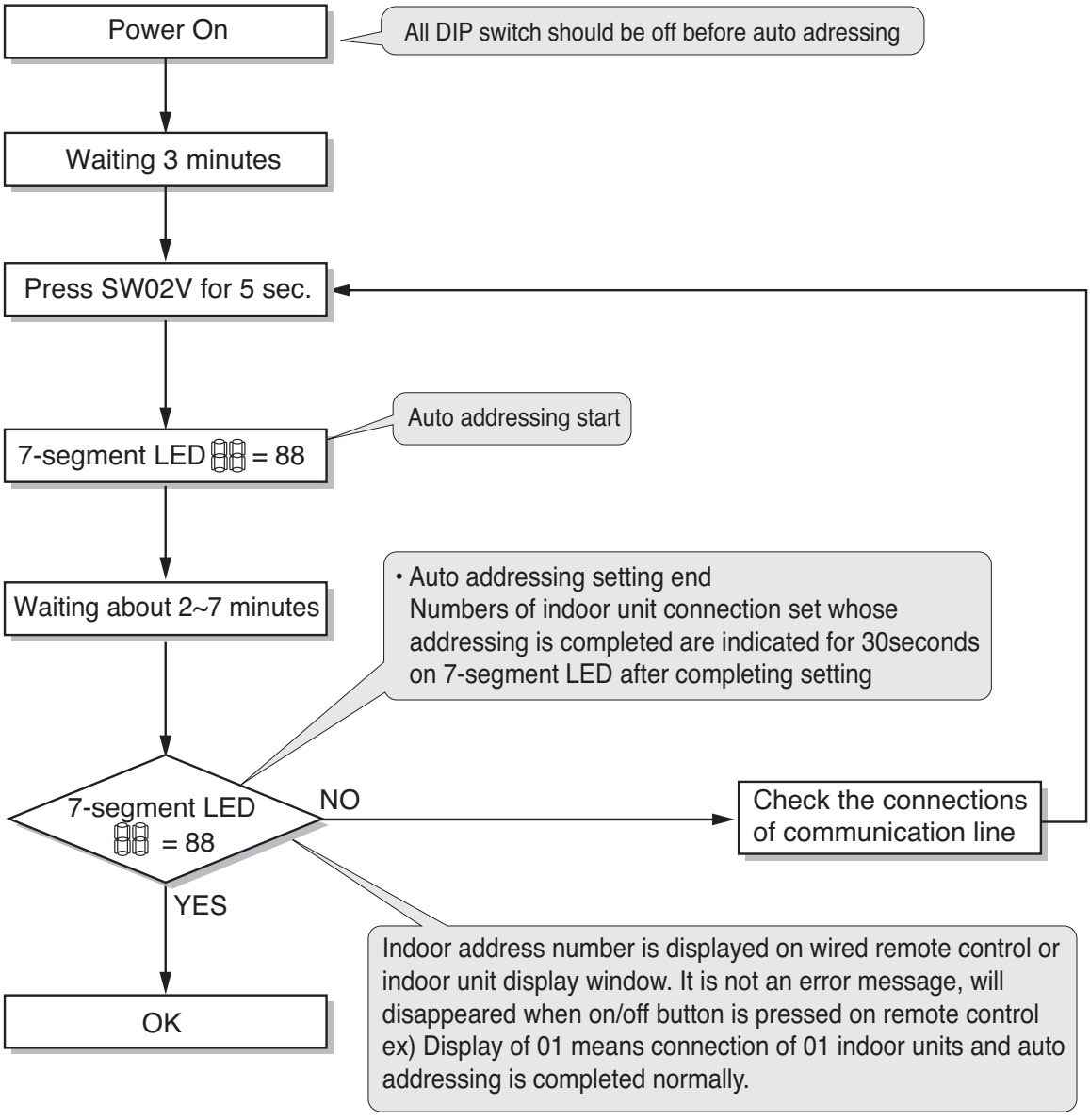
1 2 3 4 5 6 7 8 9 10 11 12 13 14

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short Pipe Length	●	×												
Long Pipe Length	×	●												
Snow							×	●	×					
Forced Defrosting							×	×	●					
Snow + Forced Defrosting							×	●	●					
Pump Down										●				×
Vacuum Mode											●			●

⚠ CAUTION

1. "X" mark means dip switch must be off. Otherwise the function may not operates correctly.
2. If each dip switch doesn't set correctly, unit will operate abnormally.
3. In case of proceeding test run, start after checking if all indoor unit is off.

■ The Procedure of Automatic Addressing

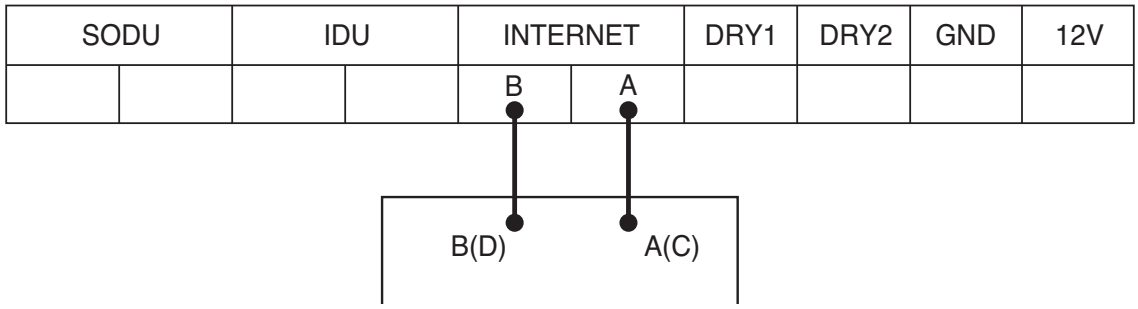


■ How to connect central controller

- The communication lines connected to INTERNET terminal should be connected to central control of Outdoor unti with care for their polarity(A → A, B → B)
- Connect communication lines between outdoor unit and indoor units through the terminal block.
- When connecting communication line between outdoor unit and indoor units with shielded wire, connect the shield ground to the earth screw.
- When connecting the central control system with shielded wire, connect the shield ground to the earth screw.

Outdoor Units

Terminal block on the main PCB



NOTICE

Emergency Operation

• **Definition of terms**
- **Trouble :** a problem which can stop system operation, and can be resumed temporally under limited operation without certificated professional's assist.
- **Error :** problem which can stop system operation, and can be resumed ONLY after certificated professional's check.
- **Emergency mode :** temporary heating operation while system met Trouble.

• **Objective of introducing 'Trouble'**
- Not like airconditioning unit, **Indoor Unit** is generally operated in whole winter season without any system stopping.
- If system found some problem, which is not critical to system operating for yielding heating energy, the system can temporarily continue in emergency mode operation with end user's decision.

• **Classified Trouble**
- Trouble is classified two levels according to the seriousness of the problem : Slight Trouble and Heavy trouble
- **Slight Trouble :** Sensor trouble.
- **Heavy trouble :** Compressor cycle trouble.
- **Option Trouble :** a problem is found for option operation such as water tank heating. In this trouble, the troubled option is assumed as if it is not installed at the system.

• **Emergency operation level**
- When the system is faced with trouble, it stops and waits for user's decision. : Calling service center or starting emergency operation.
- To start emergency operation, user simply push ON / OFF button once more.
- Two different levels are prepared for emergency operation : High temperature cycle and low temperature cycle.
- In emergency operation mode, user can not adjust target temperature.

	DIP Switch (No. 4)	Target Leaving Water Temperature	Target Room Air Temperature	Target Sanitary Water Temperature
High temperature cycle	OFF	70°C(158°F)	24°C(75°F)	70°C(158°F)
Low temperature cycle	ON	50°C(122°F)	19°C(66°F)	50°C(122°F)

• **Following features are permitted in emergency operation :**

-  Operation On/Off
-  VIEW TEMP button(*)
-  Temperature adjusting button(**)
-  Sanitary water heating button

(*) : Temperature measured by failed sensor is displayed as '- -'.

(**) : The unit is not turned on/off according to the setting temperature at the remote controller.
It is turned on/off according to the thermostat signal.

• **Following features are NOT permitted in emergency operation :**

-  Operating mode (heating/ weather-dependent) selection
-  Time scheduling
-  SET TEMP button

• **Duplicated trouble : Option trouble with Slight or Heavy trouble**
If option trouble is occurred with slight (or heavy) trouble at the same time, the system puts higher priority to slight (or heavy) trouble and operates as if slight (or heavy) trouble is occurred.
Therefore, sometimes sanitary water heating can be impossible in emergency operation mode. When sanitary water is not warming up while emergency operation, please check whether the sanitary water sensor and related wiring are connected well or not.

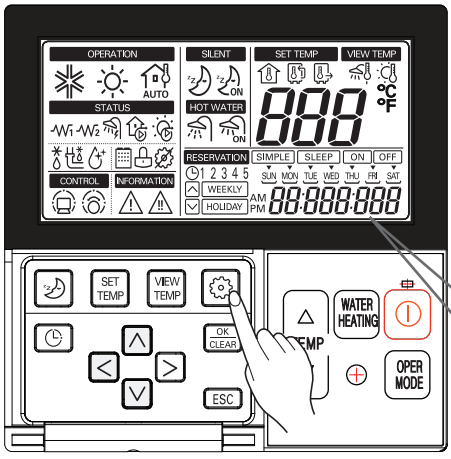
• **Emergency operation is not automatically restarted after main electricity power is reset.**
In normal condition, the unit operating information is restored and automatically restarted after main electricity power is reset.
But in emergency operation, automatic re-start is prohibited to protect the unit.
Therefore, user must restart the unit after power reset when emergency operation has been running.

Installer Setting

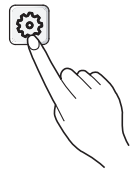
How to enter installer setting mode

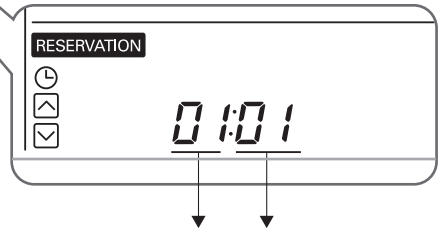
CAUTION

Installer setting mode is to set the detail function of the remote controller.
If the installer setting mode is not set correctly, it could cause problems to the unit, user injury or property damage.
This must be set by an certificated installer, and any installation or change that is carried out by a non-certificated person should be responsible for the results. In this case, free service cannot be provided.



1 Press Function Setting button for 3 seconds to enter the installer setting mode.





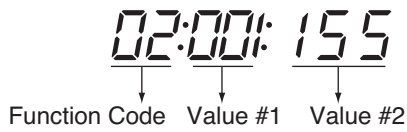
Function Code Value

(When you enter the installer setting mode initially, function code is displayed on the bottom of the LCD screen.)

Repeat pressing button, and the function code will be changed from 01 to 2B.
Please refer the code table on the next page.

Summary

Example of Fuction Code Display



Function	Default	Value #1	Value #2	Remark
Disable 3 Min. Delay	02:01	01	-	
Remote Air Sensor Connection	03:01	01 : NOT connected. 02 : connected.	-	
Celsius/Fahrenheit Switching	04:01	01 : Celsius 02 : Fahrenheit	-	
Setting Temp. Selection	05:02	01 : Air Temp. 02 : Leaving water Temp.	-	
Auto Dry Contact	06:01	01 : Auto Start OFF 02 : Auto Start ON	-	
Address Setting	07:00	00 ~ FF	-	
Override Setting	08:00	00 : Slave 01 : Master	-	
Water Pump Test Run	09:00	01 : Set		
Setting Air Temp. (Heating Mode)	13:030:016	24°C(75°F) ~ 30°C(86°F) : Upper Limit of setting range	16°C(60°F) ~ 22°C(71°F) : Lower Limit of setting range	
Setting Leaving Waer Temp. (Heating Mode)	14:080:046	50°C(122°F) ~ 80°C(176°F) : Upper Limit of setting range	30°C(86°F) ~ 46°C(114°F) : Lower Limit of setting range	
Setting Sanitary Tank Water Temp. (Sanitary Water Heating)	15:080:046	50°C(122°F) ~ 80°C(176°F) : Upper Limit of setting range	30°C(86°F) ~ 46°C(114°F) : Lower Limit of setting range	
Setting outdoor Temp. range (Weather-dependent operation)	23:-10:015	10°C(50°F) ~ 20°C(68°F) : Upper Limit of setting range	-20°C(-4°F) ~ 05°C(41°F) : Lower Limit of setting range	
Setting indoor air Temp. range (Weather-dependent operation)	24:021:016	20°C(68°F) ~ 30°C(86°F) : Upper Limit of setting range	16°C(60°F) ~ 19°C(66°F) : Lower Limit of setting range	
Setting leaving water Temp. (Weather-dependent operation)	25:080:046	65°C(149°F) ~ 80°C(176°F) : Upper Limit of setting range	40°C(104°F) ~ 54°C(129°F) : Lower Limit of setting range	
Setting start/maintain time (Disinfection Operation)	26:000	00 : Disable 01 : Enable	-	
	26:006:023	01~07 : Starting Date (01:Sun, 02:Mon, ····, 07:Sat)	00~23 hours : Starting Time in 24 hours	
Setting Temp. (Disinfection Operation)	27:070:010	40°C(104°F) ~ 70°C(129°F)70 : Maximum heating Temp.	05~60 min : Maximum heating duration	
Setting control parameter (Sanitary water heating operation)	28:005:080	01°C(33°F) ~ 20°C(68°F) : Temp. gap from Value #2	50°C(122°F) ~ 80°C(176°F)	
Setting control parameter (Sanitary water heating operation)	29:003:000	02°C(35°F) ~ 04°C(39°F)	00~01	
Setting sanitary water heating timers	2b:030	5 ~ 95 min (step: 5 min)	-	
	2b:180:020	0 ~ 600 min (step: 30 min)	20 ~ 95 min (step: 5 min)	
Changing thermal on/off room air Temp.	2E:00	00~03	-	
Changing thermal on/off leaving water Temp.	2F:00	00~03	-	
Program version	30:***	Display Version number	-	

*Temp. = Temperature

Common Setting

• **Function Code 02** : Disable 3 minute Delay
Only used for an inspection in a factory.

• **Function Code 03** : Remote Air Sensor Connection
If remote air sensor is connected to control the unit by room air temperature, the connection information should be notified to the unit.

Note : If remote air sensor is connected but this function code is not set correctly, the unit can not be controlled by room air temperature.

• **Function Code 04** : Celsius/Fahrenheit Switching
Temperature is displayed in Celsius or Fahrenheit.

• **Function Code 05** : Setting Temperature Selection
The unit can be operated according to air temperature or leaving water temperature. The selection for setting temperature as air temperature or leaving water temperature is determined.

Note : Air temperature as setting temperature is ONLY available when Remote Air Sensor Connection is enabled and Function Code 03 is set as 02.

• **Function Code 06** : Auto Dry Contact
This function enables the Dry Contact to operate under Auto Run mode or Manual mode with remote controller.

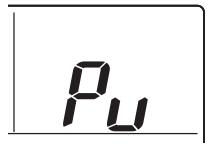
If thermostat is used, value should be changed from "2" to "1".

• **Function Code 07** : Address Setting
When Central Controller is installed, address assigning is set by this function.

• **Function Code 08 :** Override Setting
Override master/slave selection function is to prevent the unit's different mode operation. If the unit is set as the slave, it blocks a change of opposite operating mode(cooling/heating).

❊ To use override master/slave selection function is only possible when units are connected in series to the outdoor unit.

• **Function Code 09 :** Water Pump Test Run
After water pipe work is done, Water Pump Test Run mode should be performed to check whether water circulation is normal.



Temperature Range Setting

• **Function Code 13** : Setting Air Temperature in Heating Mode
Determine heating setting temperature range when air temperature is selected as setting temperature.

CAUTION

Only available when remote air temperature sensor is connected.
• Accessory PQRSTA0 should be installed.
• Also, Function Code 03 should be set properly.

• **Function Code 14** : Setting Leaving Water Temperature in Heating Mode
Determine heating setting temperature range when leaving water temperature is selected as setting temperature.

• **Function Code 15** : Setting Sanitary Tank Leaving Water Temperature
Determine heating setting temperature range of water tank leaving water.

NOTICE

Only available when sanitary water tank temperature sensor is installed.
• Sanitary water tank and sanitary water tank kit should be installed.
• DIP switch No. 2 and 3 should be set properly.

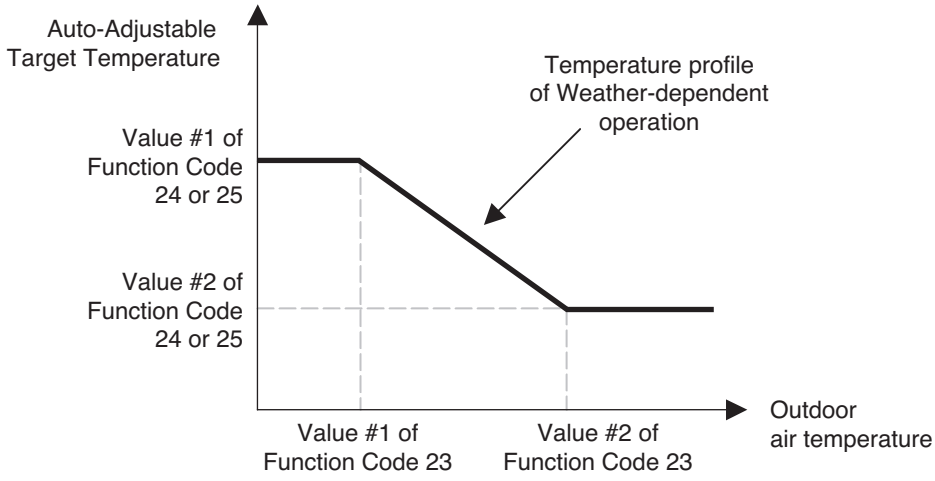
Temperature Control Parameter Setting and Etc

• **Function Code 23, 24, and 25** : Setting Weather-dependent operation

Weather-dependent operation is that the unit automatically adjusts target temperature (leaving water or room air) according to the outdoor air temperature.

- Value #1 and Value #2 of Function Code 23 : range of outdoor air temperature
- Value #1 and Value #2 of Function Code 24 : range of auto-adjustable target room air temperature
- Value #1 and Value #2 of Function Code 25 : range of auto-adjustable target leaving water temperature

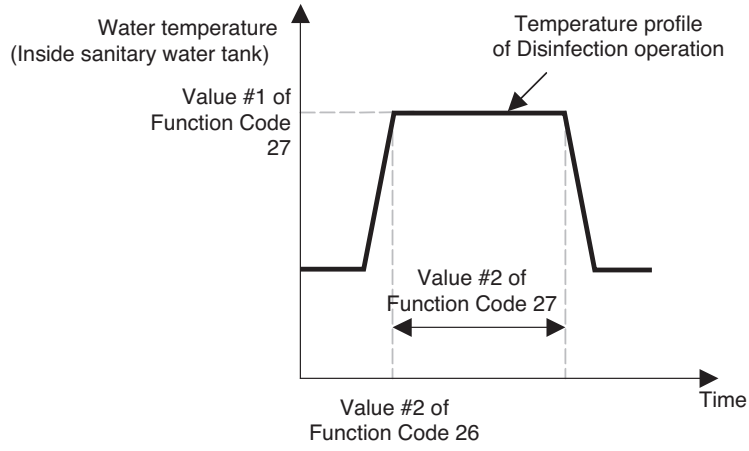
Note : Weather-dependent operation is applied for heating mode only.



• **Function Code 26 and 27** : Setting Disinfection operation

Disinfection operation is special sanitary tank operation mode to kill and to prevent growth of viruses inside the tank.

- Value #1 of Function Code 26 : Selecting disinfection operation mode. '00' for setting disinfection mode off, and '01' for setting disinfection mode on.
- Value #2 of Function Code 26 : Determining the date when the disinfection mode is running. '01' for Sunday, '02' for Monday, … , and '06' for Saturday.
- Value #3 of Function Code 26 : Determining the time when the disinfection mode is running. '00' for 0:00am, '01' for 01:00am, … , '22' for 10:00pm, and '23' for 11:00pm.
- Value #1 of Function Code 27 : Target temperature of disinfection mode.
- Value #2 of Function Code 27 : Duration of disinfection mode.



WARNING

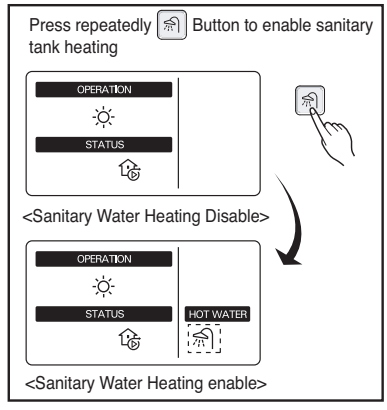
Vales of Function Code 26

- If Value #1 of Function Code 26 is set as '00', Value #2 and Value #3 is not used.
- When Value #1 is set as '01', Value #2 is displayed at the position of Value #1 and Value #3 is displayed at the position of Value #2 due to limited width of the control panel display.

CAUTION

Sanitary water heating should be enabled

- If sanitary water heating is disabled, the disinfection mode will not be operated although Value #1 of Code 26 is set as '01'.
- To use disinfection mode, sanitary water heating should be enabled.



• **Function Code 28 and 29** : Setting control parameter for Sanity water heating operation

Descriptions for each parameters are as following.

- Value #1 of Function Code 28 : temperature gap from Value #2 of Function Code 28.
- Value #2 of Function Code 28 : maximum temperature.
- Example : If Value #1 is set as '5' and Value #2 is set as '80', then water tank heating will be started when the water tank temperature is below 75°C(167°F).
- Value #1 of Function Code 29 : temperature gap from target sanitary water temperature.
- Value #2 of Function Code 29 : Determining heating demand priority between sanitary water tank heating and under floor heating.
- Example : If user's target temperature is set as '50' and Value #1 is set as '3', then water tank heating will be turned off when the water temperature is above 53°C(127°F). Water tank heating will be turned on when the water temperature is below 50°C(122°F).
- Example : If Value #2 is set as '0', that means heating priority is on sanitary water heating, In this case the under floor can not be heated while sanitary water heating. On the other hand, if the Value #2 is set as '1', that means heating priority is on under floor heating, sanitary tank can not be heated while under floor heating.

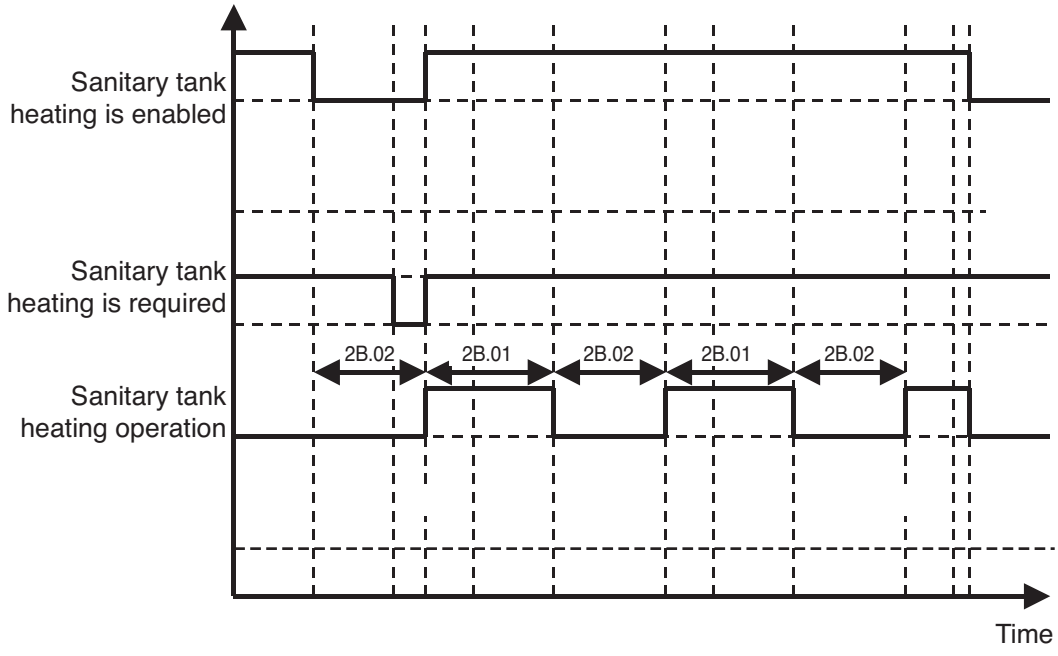
NOTICE

Sanitary water heating does not operate when it is disabled.

Enabling / Disabling sanitary water heating to operate is determined by pushing  button.

When  icon is displayed on the remote controller, sanitary water heating is enabled.
(by button input or scheduler programming)

• **Function Code 2B** : Setting sanitary water heating timers
Determine time duration : Operation time and stop time of sanitary tank heating.
- Value #1 of Function Code 2B : This time duration defines how long sanitary tank heating can be continued.
- Value #2 of Function Code 2B : This time duration defines how long sanitary tank heating can be stopped. It is also regarded as time gap between sanitary tank heating cycle.
- Example of timing chart :



• **Function Code 2E and 2F :** Changing thermal on/off temperature
Select Thermal on/off Temperature gap.

2E : Room Air temperature

	Th On	Th Off
0	-0.5°C	1.5°C
1	4°C	6°C
2	2°C	4°C
3	-1°C	1°C

2F : Leaving Water temperature

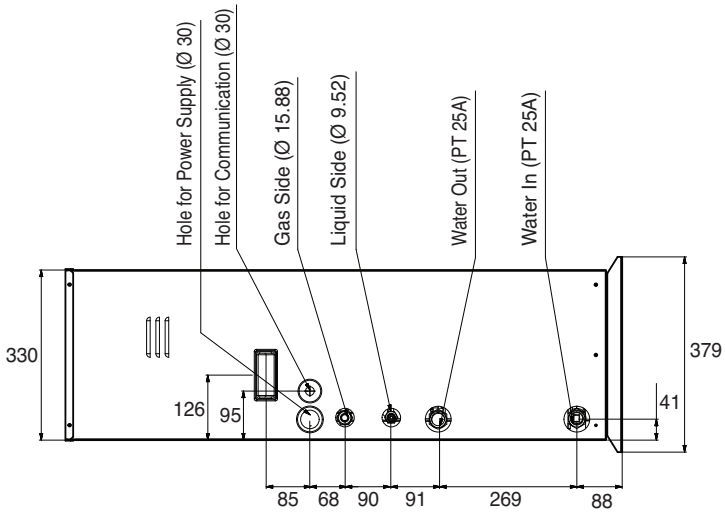
	Th On	Th Off
0	-2°C	2°C
1	-6°C	4°C
2	-2°C	4°C
3	-1°C	1°C

• **Function Code 30 :** Remote Controller Program Version
Display Remote Controller Program Version.

3. Dimensions

Air-to-Water Heat Pump (For High Temperature)

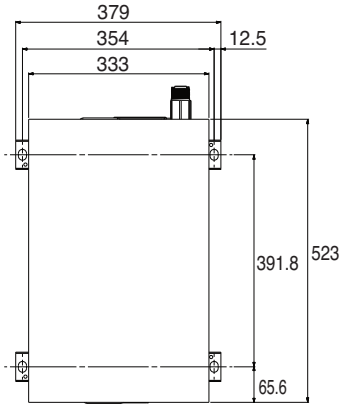
AHNW166T0 (Indoor)

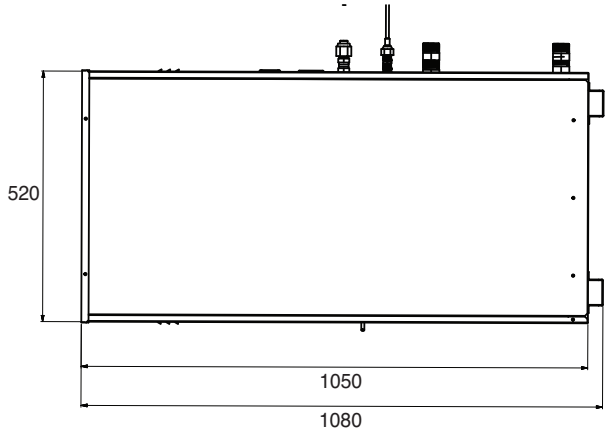


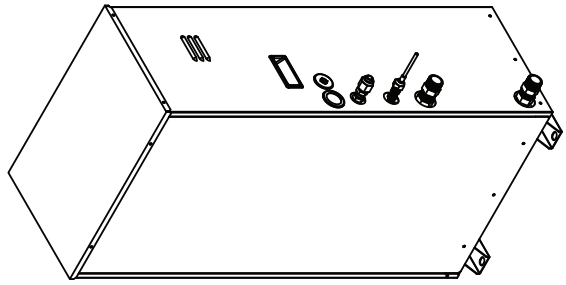
(Unit : mm)

▣ Note

1. Unit should be installed in compliance with the installation manual in the product box.
2. Unit shall be grounded in accordance with the local regulations or applicable national codes.







CHASSIS CODE : K3

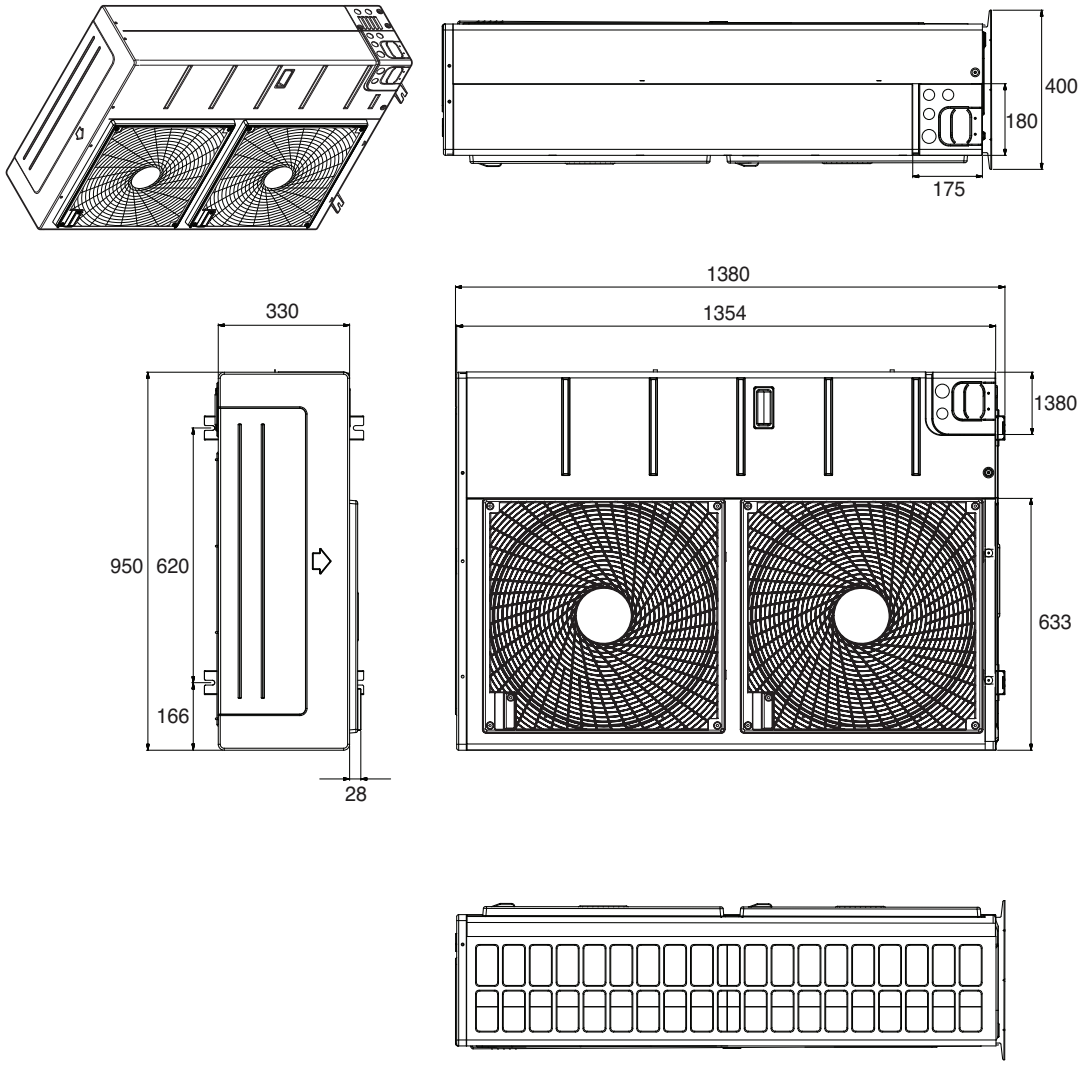
76, Seongsan-dong, Changwon City, Gyeongnam, 641-713, Korea

LG Electronics

Air-to Water Heat Pump(For High Temperature)

AHUW166T0 (Outdoor)

(Unit : mm)



CHASSIS CODE: U3

2 FAN MODEL

76, Seongsan-dong, Changwon City, Gyeongnam,
641-713, Korea
www.lgeaircon.com

LG Electronics

Part 3
Outdoor Units

Function

1. Basic Control

1.1 Normal operation

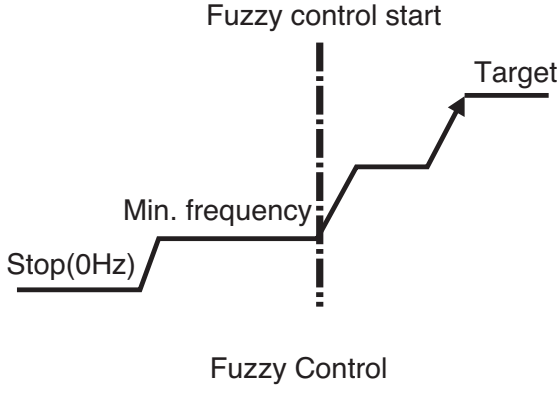
Actuator	Heating operation	Stop state
Compressor	Fuzzy control	Stop
Fan	Fuzzy control	Stop
Main EEV	Fuzzy control	Close
4 way valve	ON	1 hour after stop & outdoor temp. < 27°C ➡ OFF
Subcooling EEV	Fuzzy control	Close
Indoor Unit EEV	Subcooling fuzzy control	Before 10min : Stop After 10min : Stop

Note : Heating operation is not functional at an outdoor air temperature of 27°C or more.
And High pressure 3540kpa over

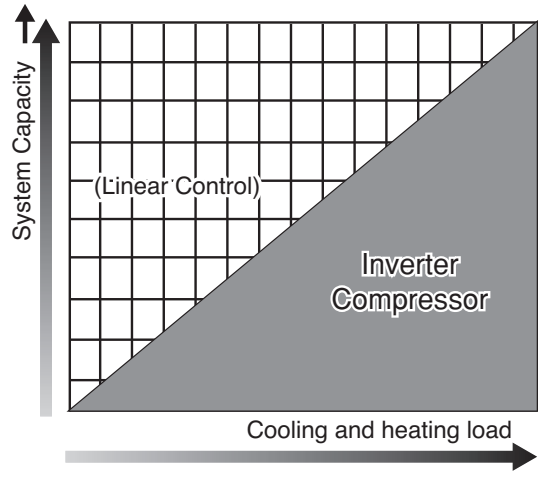
1.2 Compressor control

Fuzzy control : Maintain evaporating temperature(Te) to be constant on cooling mode and condensing temperature(Tc) on heating mode by Fuzzy control to ensure the stable system performance.
(Tc:47 ~51°C, Te:2 ~ 5°C)
(1) Heating mode
Tc can be set by initial DIP switch setting. (Standard, Long pipe)

Note: By setting DIP switch, Te and Tc are decided simultaneously.



Fuzzy Control



Inverter linear control as cooling and heating load increasing

1.3 EEV control

(1) EEV control
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 = Tsuction - Tevaporation
Tsuction : temperature at suction pipe sensor(°C)
Tevaporation : 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
The degree of Subcool = Tsubcool_out - Tevaporation
Tsubcool_out : temperatrue at outlet of subcooler(°C)
Tevaporation: evaporation temperature equivalent to low pressure(°C)

2. Special Control

2.1 Defrost

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

Outdoor Unit

Component	Starting	Running	Ending
Inverter compressor	30Hz	Setting Value	30Hz
Fan	Normal control	0Hz ' Normal control ' 700 RPM	Normal control
Main EEV	Normal control	Max. pulse	200 pulse
Subcooling EEV	Normal control	Normal control	Normal control
4way valve	ON	ON ' OFF ' ON	ON
Hot gas bypass valve	ON	ON	ON

Indoor Unit

Component	Starting	Running	Ending
Thermo on unit EEV	Normal control	1200 pulse	Normal control
Thermo off unit EEV	Min. pulse	1200 pulse	Min. pulse
Oil return signal	OFF	ON	OFF

■ Ending condition

1) All heat exchanger pipe temperature are above 15°C(U3) for 30 sec.
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.

2.2 Stopping operation

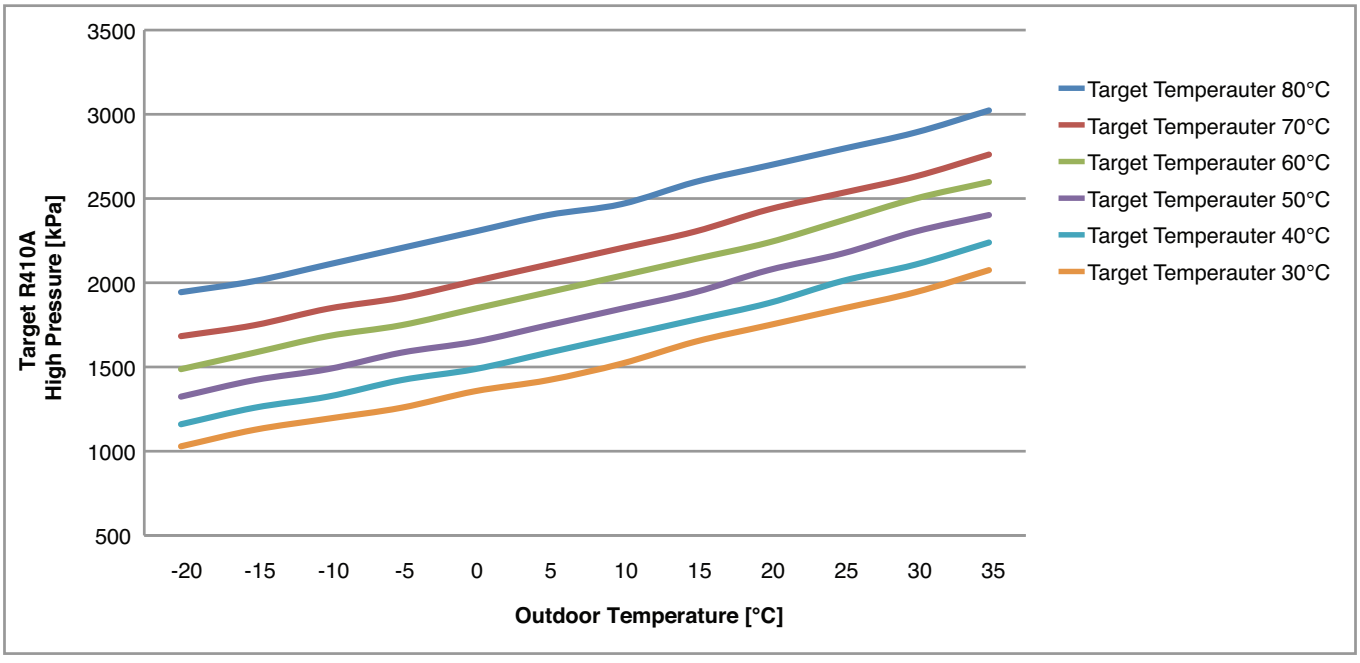
2.2.1 Stopping operation on cooling mode

Stopping operation on heating mode

Component	Operation	Note
Inverter compressor	0Hz	-
Fan	Stop	-
Main EEV	Min. pulse	-
Subcooling EEV	Min. pulse	-
4way valve	OFF	After 60 min. , outdoor temp < 27˚C
Hot gas bypass valve	OFF	After 15 min. (Before 15 min. : ON)

2.3 Intermediate Temperature for Maximum COP of Cascade Cycle (R410A & R134a)

2.3.1 Outdoor Cycle Target High Pressure Graph



3. Protection control

3.1 Pressure protection control

3.1.1 Pressure control on heating mode

■ **High pressure control**

Pressure range(kPa)	Compressor	Fan
Ph ≥ 4003	Stop	Stop
Ph > 3415	-5Hz/4 sec.	-50RPM/4 sec.
Ph < 3317	Normal control	Normal control

Pressure range(kPa)	Hot Gas
Ph ≥ 3448	ON
Ph < Target pressure	OFF

P_h : high pressure

■ **Low pressure control**

Pressure range(kPa)	Compressor	Fan
Pl ≤ 190 after 1min.	Stop	Stop
Pl ≤ 190 before 1min	-5Hz/4 sec.	+100RPM/4 sec.
Pl > 229	Normal control	Normal control

Pressure range(kPa)	Hot Gas
Pl < 203	ON
Pl > 307	OFF

P_l : low pressure

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

3.2 Discharge temperature control

■ **Indoor unit control**

Temperature range	EEV
Tdis > 110˚C	+10% Open
Tdis > 100˚C	Emergency Control + 5% Open
Tdis ≤ 100˚C	Normal

■ **Outdoor unit control**

Temperature range	Compressor
Tdis > 115˚C	System stop
Tdis > 108°C	Frequency down
Tdis > 105˚C	Frequency Holding
	Frequency down enable
Tdis > 100˚C	Limit control Frequency up enable

3.3 Inverter protection control

Indoor		Normal operation	Frequency down	System stop
AC input current (RMS)	Heating	14A or less	17A or more	20A or more
Compressor current(PEAK)		14A or less	15A or more	25A or more

Outdoor		Normal operation	Frequency down	System stop
AC input current (RMS)	Heating	15A or less	16A or more	19A or more
Compressor current(PEAK)		15A or less	16A or more	25A or more

❊ AC input current is inverter input current except constant speed compressor current(Noise filter passed current)

3.4 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.

16kW, Mini 1Ø Model

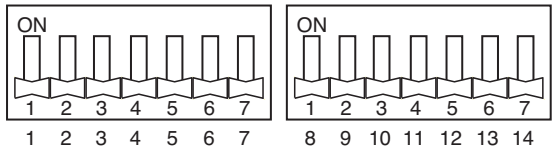
1) Step 1 : factory setting value display
   Factory setting value is displayed in 7 segment on PCB for 24sec.
   All DIP switches must be set properly before step 1.

Power is on	
Outdoor Model code is displayed (3sec)	
Nominal Capacity (5HP) including is displayed (2sec)	
Heat pump : Display 2 is default value Cooling only : no display	
Factory setting(25 is normal)	
Model type	

2) Step 2 : Communication check
If all model code is displayed in 7 segment communication between outdoor units is normal.

3) Step 3 : PCB error check
- After 40 sec, error check begins.
- All errors of units are displayed in 7 segment.
- If communication between main PCB and inverter PCB isn't normal, 521 is displayed in 7-segment.
If error is displayed, check corresponding wires.

Push auto addressing(red) button for 6 sec.



6 sec.

Auto addressing starts

Auto addressing is in progress (max. 15 min.)

The number of indoor units is displayed for 30 sec.

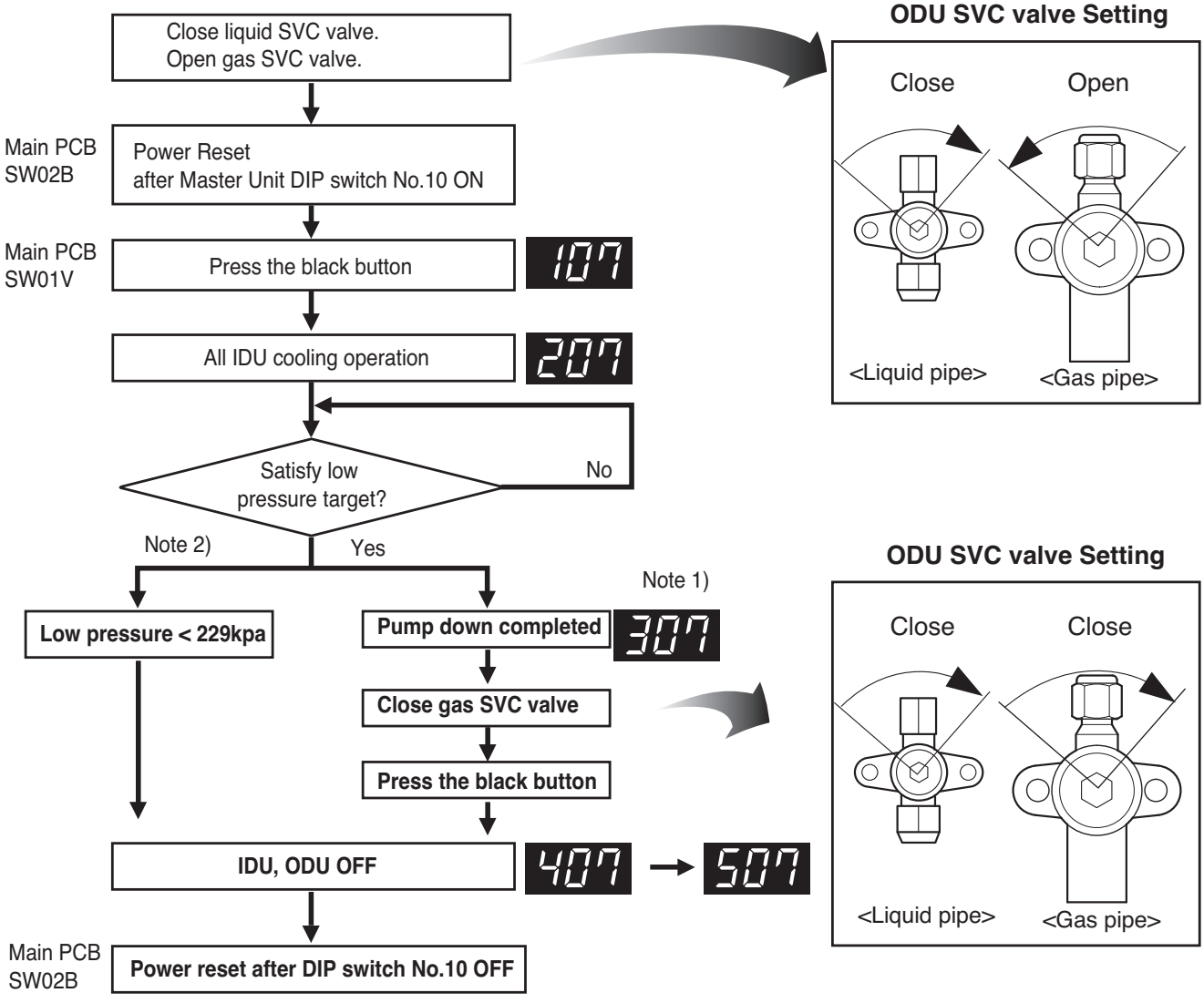
(1 indoor units found)

Auto addressing process is finished.
Every indoor unit displays its address on wired remote controller and the 7 segment of main PCB is off.

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

1. If 307 is displayed, close gas SVC valve of all ODU immediately.

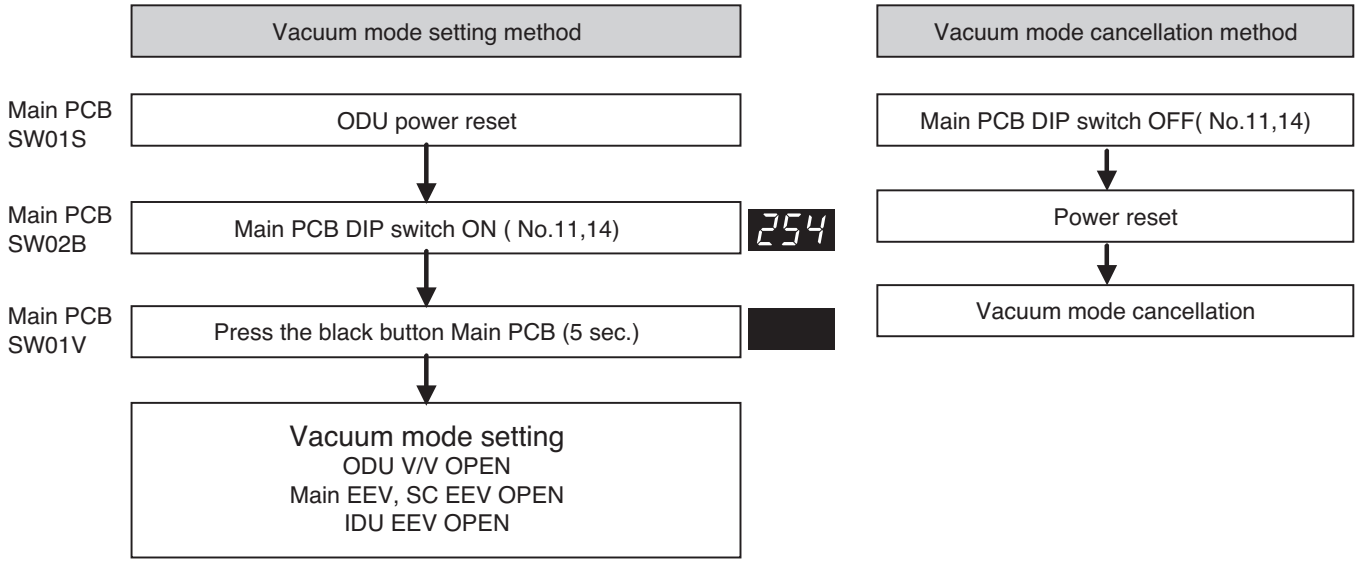
2. If low pressure descends below 229 kPa, the system turns off automatically. Close the gas SVC valve immediately.

⚠ 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. Press black+red button during operation to end pump down.(IDU,ODU off)
  407 → 507

4.3 Vacuum Mode

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



Caution

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

4.4 Black Box Function

This function saves data immediately before the error occurs in ODU main PCB, and thus making error analysis cause possible.

Data Loading Method

IDU, ODU stop

↓

Press the black button (10 sec.)

↓

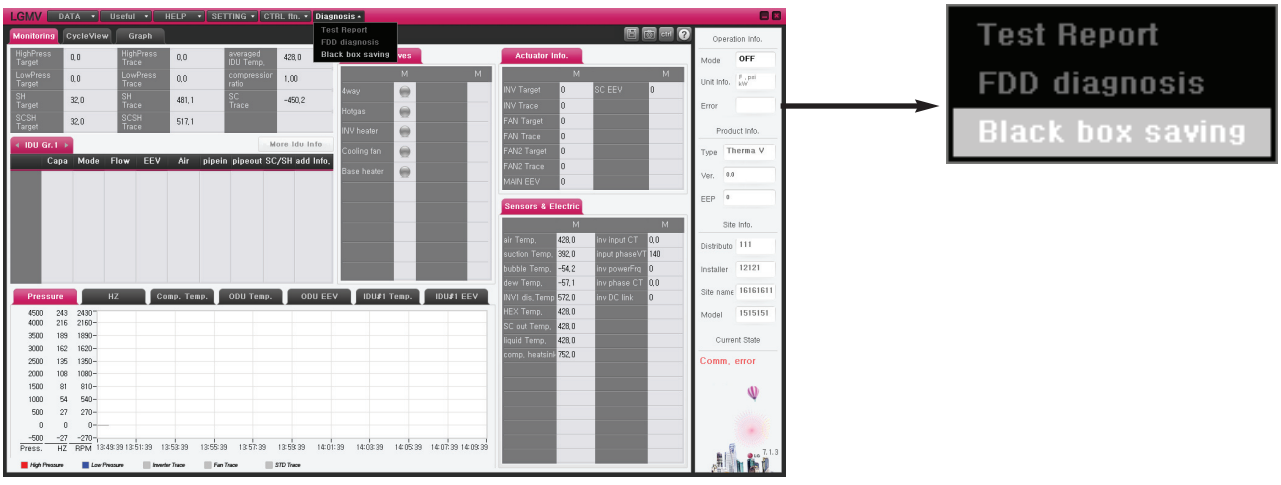
EEPROM ➠ Main micom data loading

Yellow LED(LED01C) stops when data is loading
After completion, it is starts blinking (about 20 sec.).

↓

EEPROM data save to PC by using
<Save EEP data> in LGMV

■ Saving process : LG MV ➠ Diagnosis ➠ Black Box saving



Part 4
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 transmission cable.
2	Confirm that 500 V megger shows 2 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2 MΩ or less. NOTE: Never carry out megaohm check over terminal control board. Otherwise the control board would be broken. 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, turn on the main power supply for more than 6 hours. That will make refrigerant evaporate so that makes insulation resistance increase.
3	Check if high/low pressure common pipe, liquid pipe and gas pipe valves are fully opened. NOTE: Be sure to tighten caps.
4	Check if there are any problems in automatic addressing or not: Check and confirm that there are no error messages in the display of indoor units or remote controls and LED in outdoor units.

⚠ CAUTION

When cutting main power of the Multi V

- **Always apply main power of the outdoor unit during use of product (cooling season/heating season).**
- **Always apply power before 6 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 case with the electrical heater for more than 6 hours.(In case of the outdoor temperature below 10°C)**
- **When operating the unit after powering off, automatically run into in the preheat mode for 3 hours and "PH" is indicated on the outdoor unit 7-Segment.**

⚠ CAUTION

Preheat of compressor

- **Start preheat operation for 3 hours after supplying main power.**
- **In case that the outdoor temperature is low, be sure to supply power 6 hours before operation so that the heater is heated(insufficient heating may cause damage of the compressor.)**

2. How to cope with Test Run Abnormality

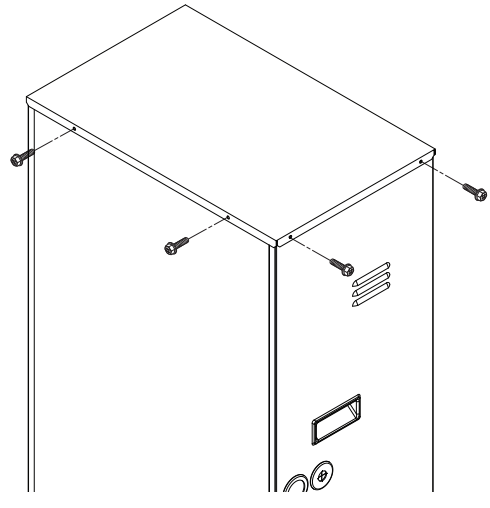
The phenomena from main component failure

Component	Phenomenon	Cause	Check method and Trouble shooting
Compressor	Not operating	Motor insulation broken	Check resistance between terminals and chassis
		Strainer clogged	Change strainer
		Oil leakage	Check oil amount after opening oil port
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Abnormal noise during running	U-V-W misconnection	Check compressor U-V-W connection
Outdoor fan	High pressure error at cooling	Motor failure, bad ventilation around outdoor heat exchanger	Check the outdoor fan operation after being turned the outdoor units off for some time. Remove obstacles around the outdoor units
Outdoor EEV	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. Reference the trouble shooting guide in the service manual.
- When CH05/53/11 ERROR occurs, check if auto-addressing has done and communication wiring is ok.

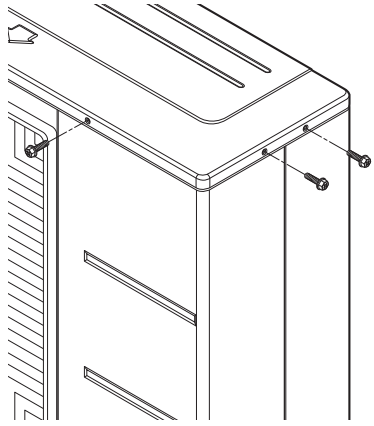
Caution for Assembling Indoor Panels after Test Run

When assemble the outdoor panels after test run, make sure that screws of top panel are assembled as shown figure.
If screws are not assembled, it allows rain come into control box causing defect of unit.



Caution for Assembling Outdoor Panels after Test Run

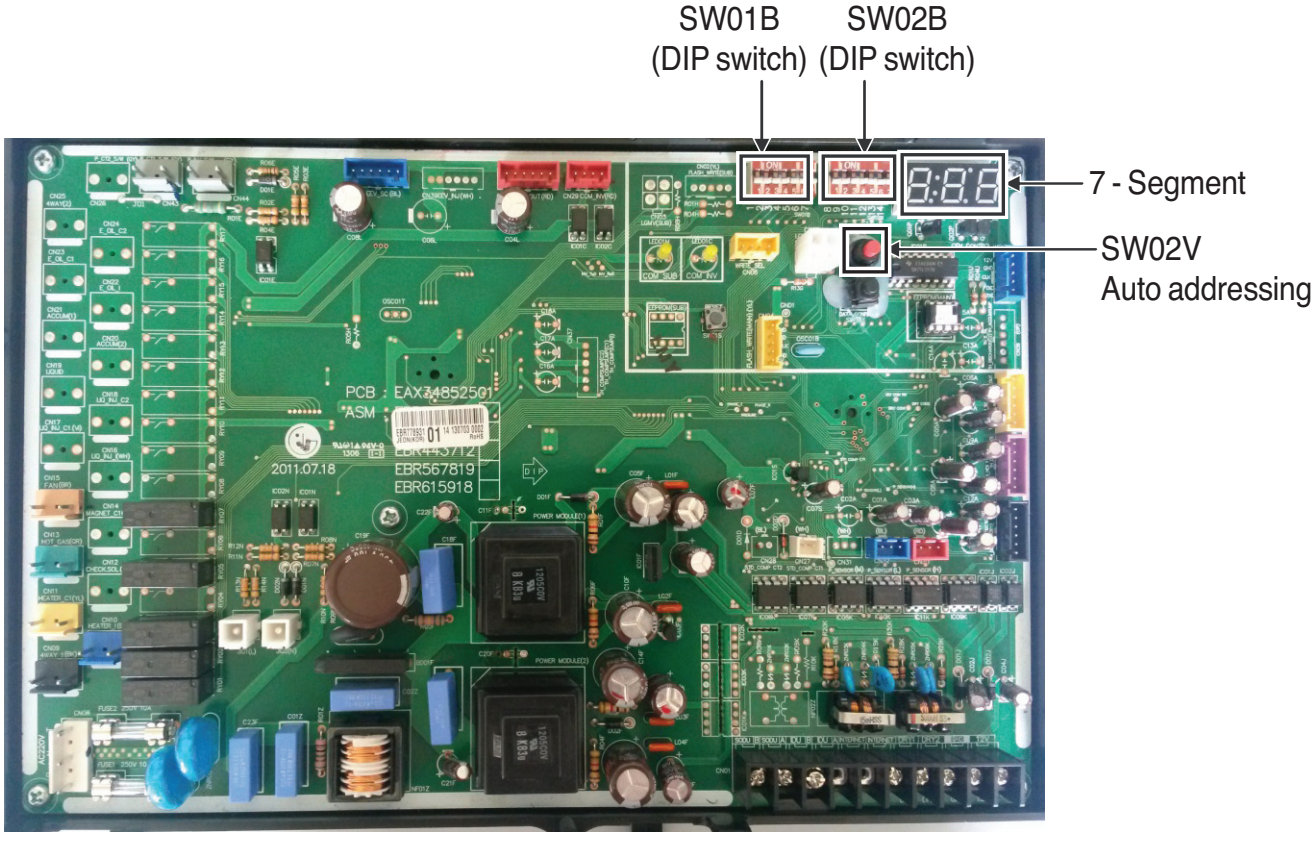
When assemble the outdoor panels after test run, make sure that screws of top panel are assembled as shown figure.
If screws are not assembled, it allows rain come into control box causing defect of unit.



3. DIP Switch Setting

3.1 Location of Setting Switch

Main PCB



■ Checking according to DIP switch setting

1. You can check the setting values of the outdoor unit 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 the unit

The number is sequentially appeared at the 7 segment in 5 seconds after applying the power. This number represents the setting condition. & model code ➔ total capacity ➔ 2 ➔ 25 ➔ model type

1 Model code

Model Code	Unit(kW)	Ref.
31	16	R410A

2 5HP (Nominal Capacity) : 5HP (Nominal Capacity) Numbers (16kW)
3 No display : cooling only 2 : heat pump
4 25 : normal
5 30 : Model type(AWHP, 1Φ, 220-240V~)

Example) 5HP (Nominal Capacity), R410A
31 → 5 → 2 → 25 → 30
1 2 3 4 5

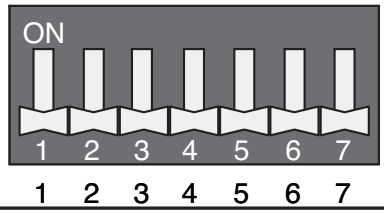
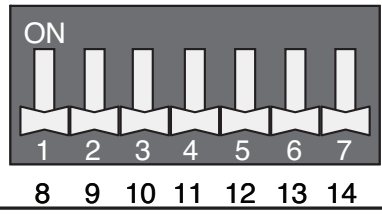
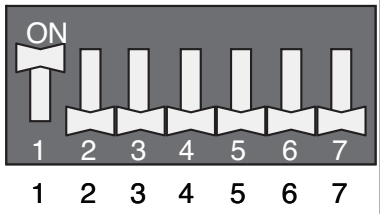
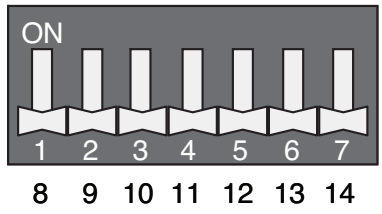
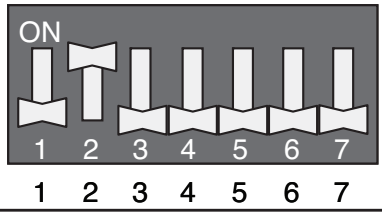
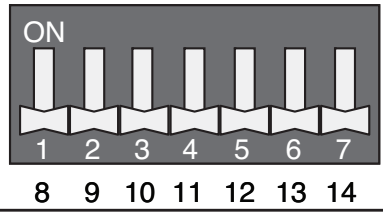
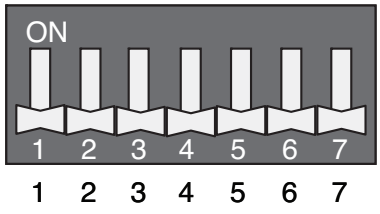
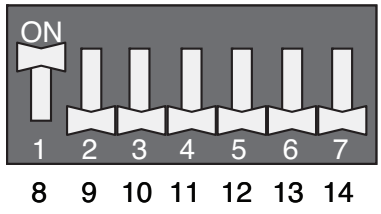
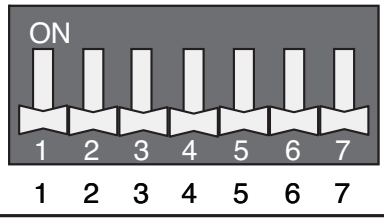
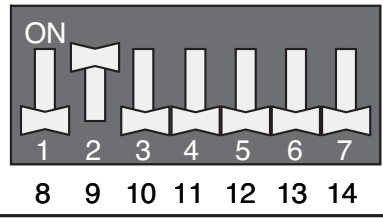
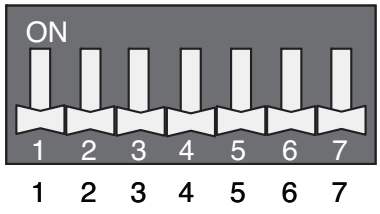
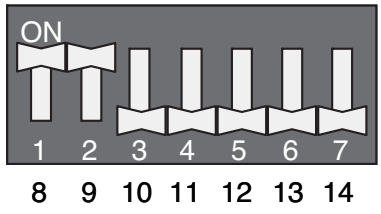
CAUTION

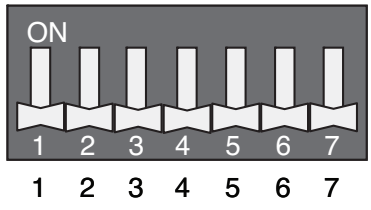
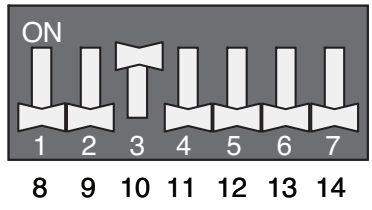
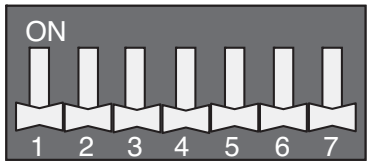
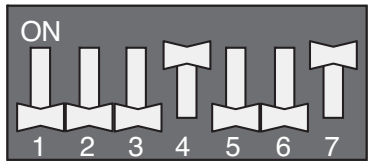
Product may not properly operate if the relevant DIP switch is not properly setup.

■ Setting the DIP switch

- Set the DIP switch with the power turned off. If you change the setting when the power is on, the changed setting is not applied immediately. The changed setting is applied at the moment that the power is on.
- Instant indoor unit checking, data display mode, and forced oil collecting operation are used when theunits are running. If you don't have to use those functions after using them, restore the DIP switch setting.

1. Settings of outdoor unit

Function	SW01B Setting	SW02B Setting	Remarks
Standard			- Factory Shipping Setting
Short Pipe Length			- Set this function in case of installing short pipe length
Long Pipe Length			- Set this function in case of installing long pipe length
Snow			- Set this function to prevent snowfall on outdoor unit.
Forced Defrosting			- Set this function to defrost heat exchanger of outdoor unit manually.
Snow + Forced Defrosting			- Set this function to defrost heat exchanger of outdoor unit and blow away snow fallen on outdoor unit.

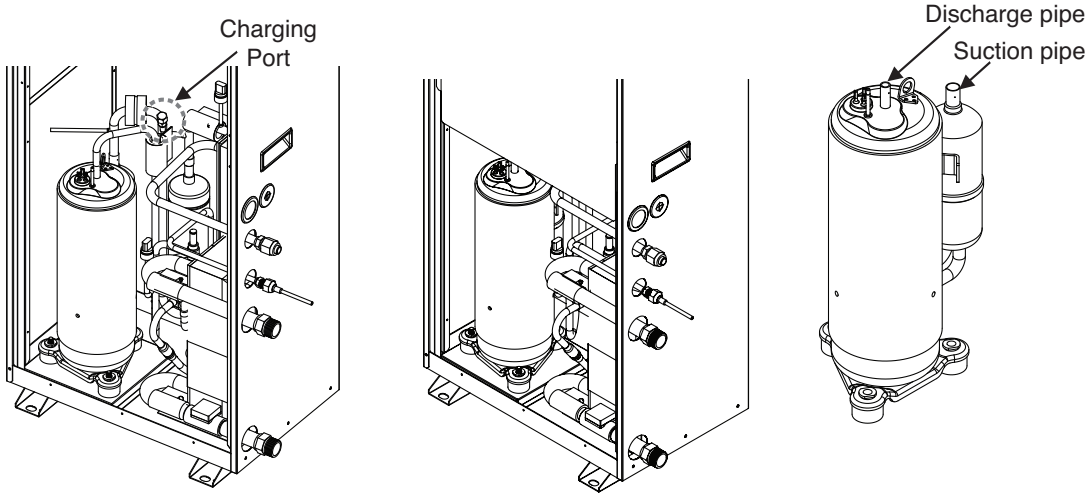
Function	SW01B Setting	SW02B Setting	Remarks
Pump Down	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	- Set this function to perform pump down to gather to outdoor unit for service.
Vacuum Mode	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	- Set this function to vacuum the system with vacuum pump after service.

Replacement Procedure

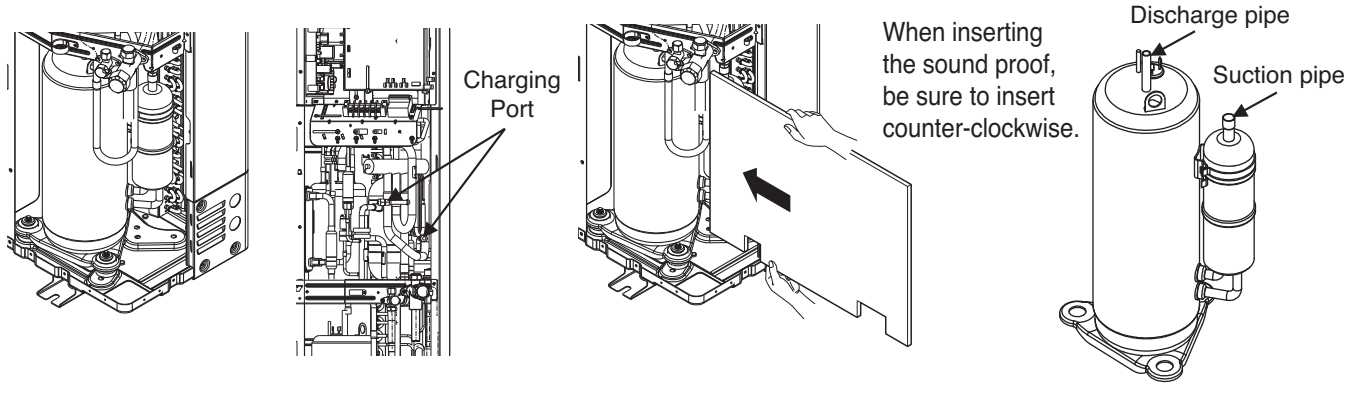
Replacement procedure for Compressor

1. Carry out "Pump Out" function to accumulate refrigerant outside of outdoor unit or collect refrigerant by using refrigerant recovery unit.
(Refer to DIP switch setting for Pump Out)
2. Remove the sound proof covering the faulty compressor, and disconnect the power
3. Disconnect the brazing sections of suction pipe and discharge pipe by using brazing torch after the refrigerant has been pumped out or collected completely.
4. Remove three nut at cushion rubber section to take out the faulty compressor outside the unit.
5. Install the new compressor in the unit.(Be sure to insert the cushion rubbers before tightening the fixing nut of compressor.)
6. Remove the rubber caps put on the suction and discharge pipe of the new compressor to release the sealing nitrogen gas.
7. Braze the suction and discharge pipe with brazing torch to the compressor.
8. If pump out is carried out, connect manifold to the charging port as shown right.
9. Conduct air tight test to check the piping system is free from leakage.
10. Connect power cable to the terminal board of compressor and cover the compressor with sound proof.
11. Conduct vacuum.
(Refer to DIP switch setting for vacuum mode)
12. After completion of vacuum, if pump out is carried out, open the service valves. If recovery unit is used, charge refrigerant.
13. Carry out "Refrigerant Checking" function to check if amount of refrigerant is appropriate.

Indoor



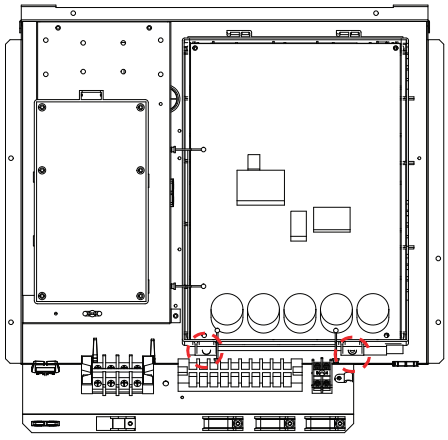
Outdoor

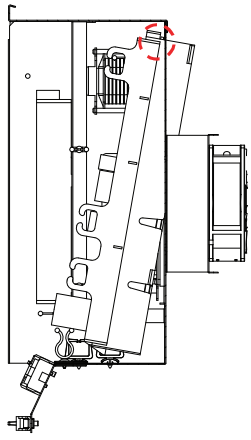


Replacement Procedure for INV PCB

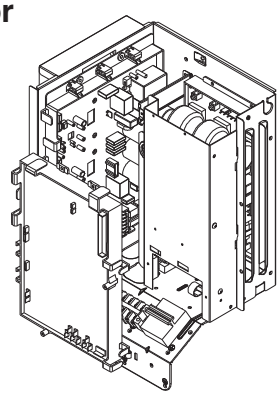
1. Disassemble main PCB by unscrewing 2 screws. (Figure 1.)
2. Disassemble panel assembly (with cooling fan) by unscrewing 4 screws. (Figure 2.)
3. Replace INV PCB assembly. (Figure 3.)
   When assemble INV PCB assembly with control case, make sure that PCB case is inserted surely in the slit of control case.
4. Assemble panel assembly and main PCB.

Indoor

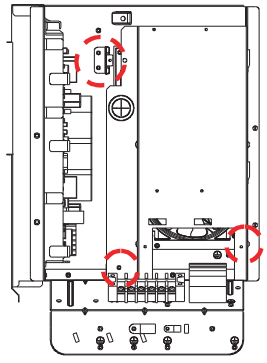




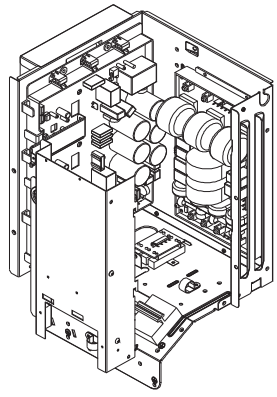
Outdoor



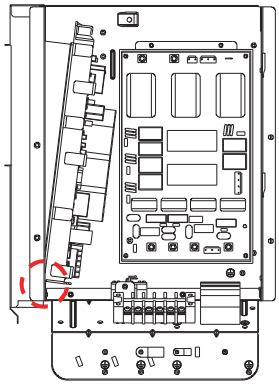
< Figure 1. >



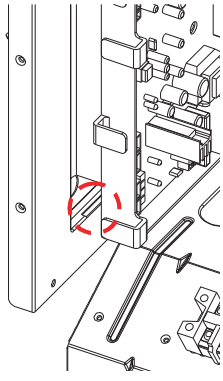
< Figure 2-1. >



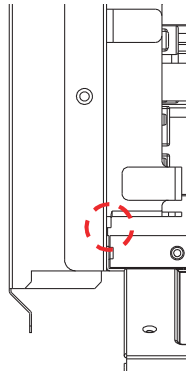
< Figure 2-2. >



< Figure 3-1. >



< Figure 3-2. >



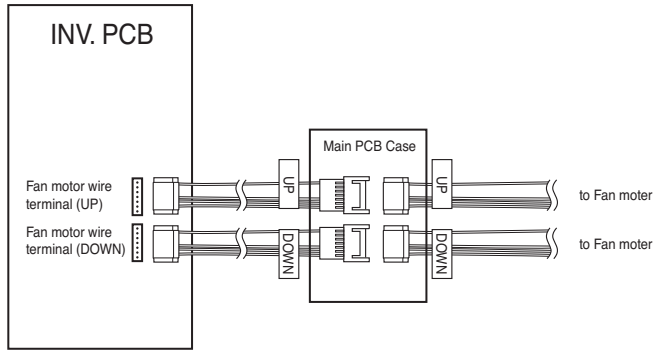
< Figure 4. >

CAUTION

Be sure that INV PCB assembly is firmly assembled with control case.
Confirm that there is no gap between INV PCB case and control case.(Figure 4.)
If any gap is present, it will cause product malfunction.

CAUTION

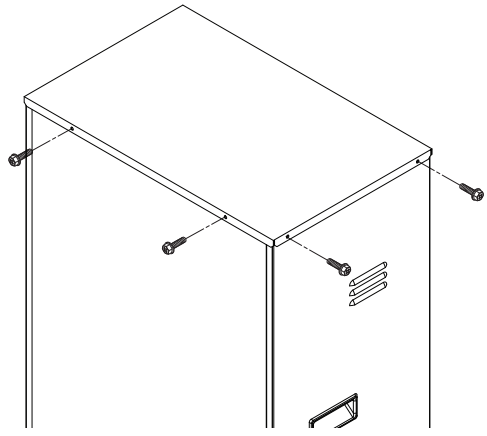
After replace the INV PCB assembly,
make sure that connection of fan motor wires is correct.



If the connection between wires is incorrect, performance of the unit would be decreased.

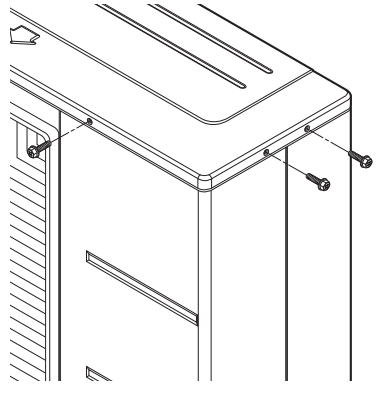
Caution for Assembling Indoor Panels after replacement

When assemble the outdoor panels after replacement, make sure that screws of top panel are assembled as shown figure.
If screws are not assembled, it allows rain come into control box causing defect of unit.



Caution for Assembling Outdoor Panels after replacement

When assemble the outdoor panels after replacement, make sure that screws of top panel are assembled as shown figure.
If screws are not assembled, it allows rain come into control box causing defect of unit.



Part 5
Trouble Shooting Guide

Trouble Shooting Guide

1. The Phenomena from Main Component Failure

The phenomena from main component failure

Component	Phenomenon	Cause	Check method and Trouble shooting
Compressor	Not operating	Motor insulation broken	Check resistance between terminals and chassis
		Strainer clogged	Change strainer
		Oil leakage	Check oil amount after opening oil port
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Abnormal noise during running	U-V-W misconnection	Check compressor U-V-W connection
Outdoor fan	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 outdoor unit and remove obstacles, if any, around the HEX. Check connector
Outdoor EEV	Heating failure, frequent defrosting	Bad connector contact	Check connector
	No operation sound after switching ON the power supply	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

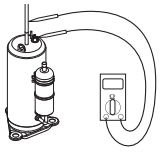
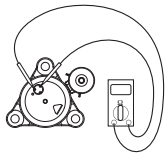
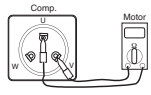
When system fault occurs, the error code is displayed on the indoor unit display or remote control display. The trouble shooting guide is available in the service manual.

• 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  Method to measure coil resistance   Figure 2.	1) The compressor stops andsame error appears again.	• Check IPM may fail.
		2) If output voltage of the inverter is stably output.	• Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor. • Insulation resistor: 2MΩ or more • Coil resistor: at 20°C Inverter: Indoor EPT525DBA / Outdoor GPT442MBA U-V: 0.520 Ohms / 0.438 Ohms U-W: 0.513 Ohms / 0.438 Ohms V-W: 0.516 Ohms / 0.438 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]

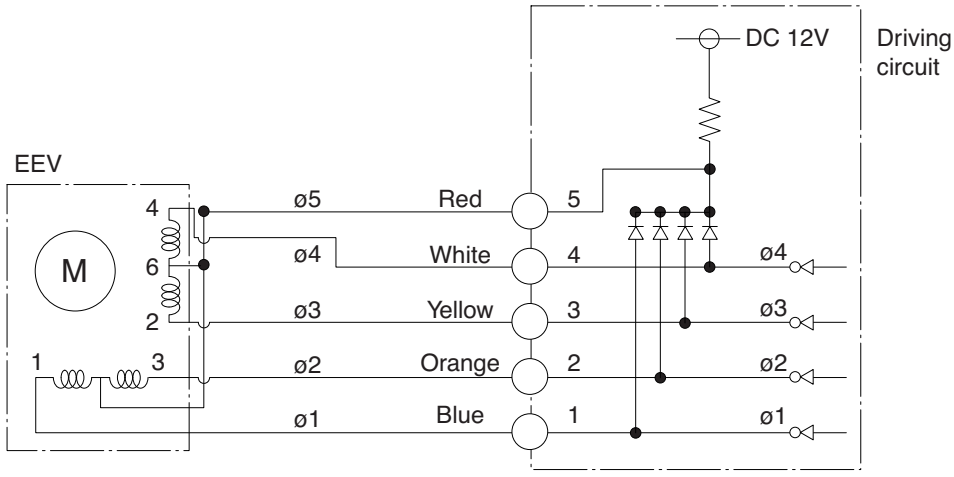
Measuring values may differ depending on measuring tools and measuring circuits since voltage, current in the power supply or output side of the inverter has no since waveform.
Especially, output voltage changes when output voltage of the inverter has a pattern of pulse wave.
In addition, measuring values appear largely differently depending on measuring tools.
Note

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? (2) Vibration of the fan motor is large.	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.
	3) For failure of motor	• Measure winding resistance of the motor coils.
	4) For failure of circuit board	Replace the circuit board in following procedures if problems occur again when powering on and if there are no matters equivalent to items as specified in above 1) through 4). (Carefully check both connector and grounding wires when replacing the circuit board.) 1. Replace only fan control boards. If starting is done, it means that the fan control board has defect. 2. Replace both fan control board and the main board. If starting is done, it means that the main board has defect. 3. If problems continue to occur even after countermeasure of No.1 and No.2, it means that both boards has defect.

2.3 Electronic Expansion Valve



• Pulse signal output value and valve operation

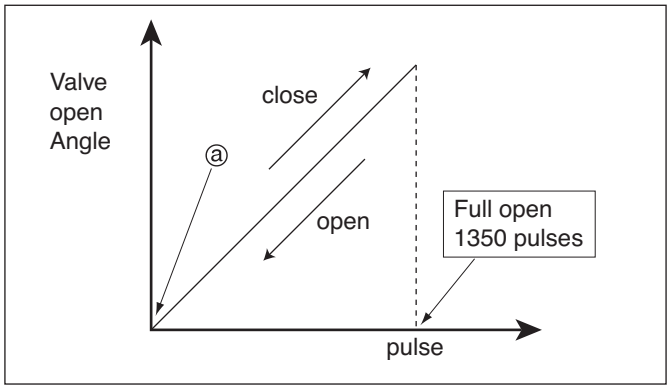
Output(ø) No.	Output state							
	1	2	3	4	5	6	7	8
ø1	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
ø2	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
ø3	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
ø4	OFF	OFF	OFF	OFF	ON	ON	ON	OFF

• Output pulse sequence

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

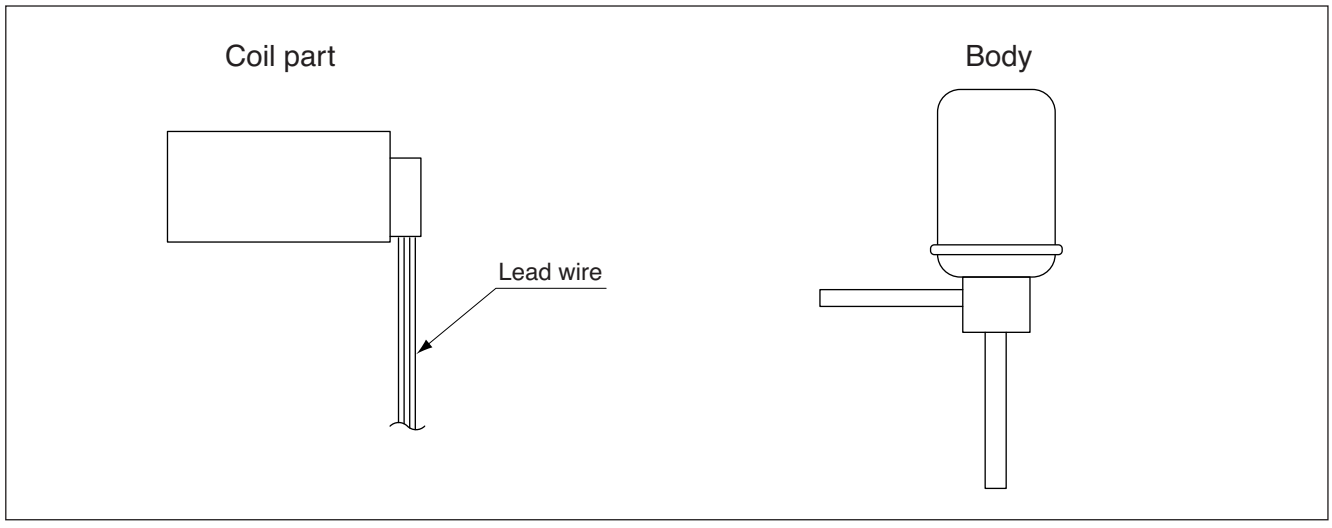
1. If EEV open angle does not change, all of output phase will be OFF
2. If output phase is different or continuously in the ON state, motor will not operate smoothly and start vibrating.

• EEV valve operation

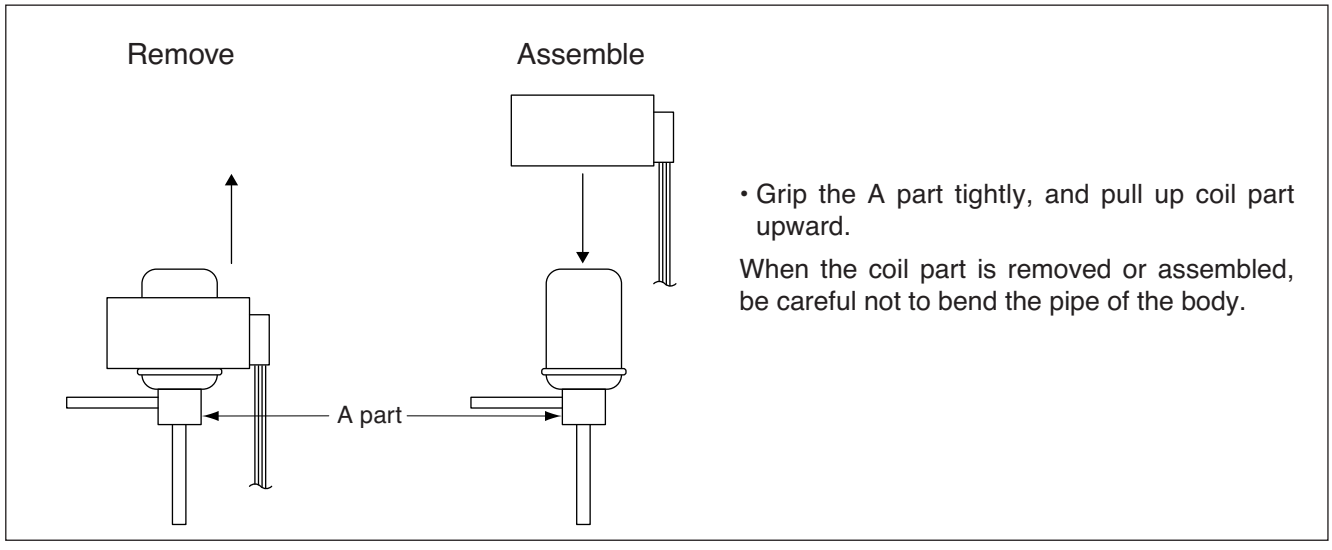


- At power ON, open angle signal of 1400 pulses output and valve position is set to ⓐ
  If valve operates smoothly, no noise and vibration occurs and if valve is closed. noise occurs.
- Noise from EEV can be confirmed by touching the EEV surface with a screw driver and listening the EEV noise.
- If liquid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

• EEV Coil and body(Outdoor unit)



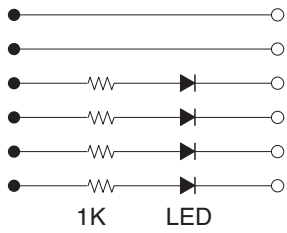
• Remove and assemble the coil



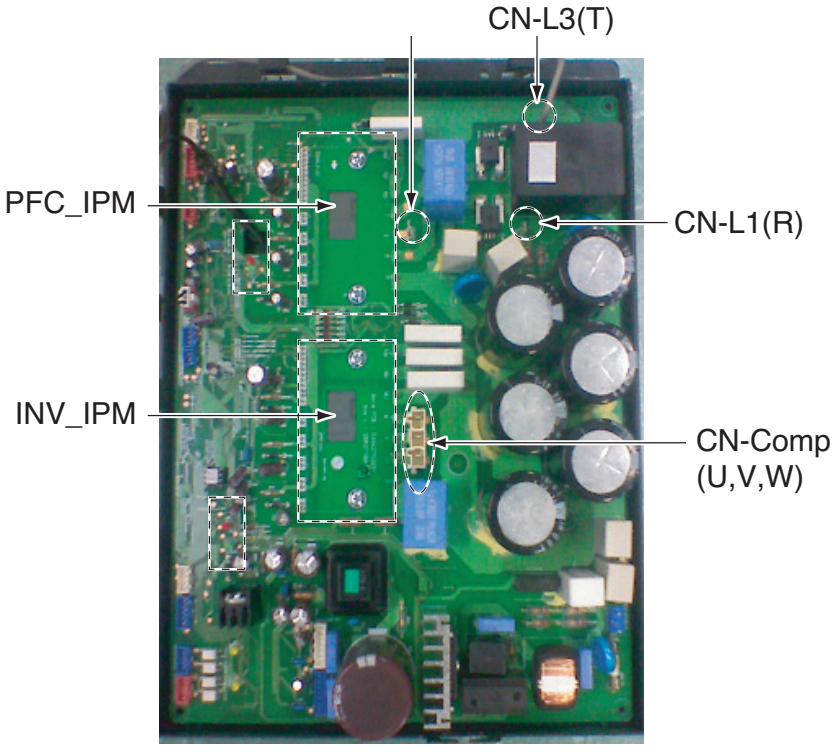
• Grip the A part tightly, and pull up coil part upward.

When the coil part is removed or assembled, be careful not to bend the pipe of the body.

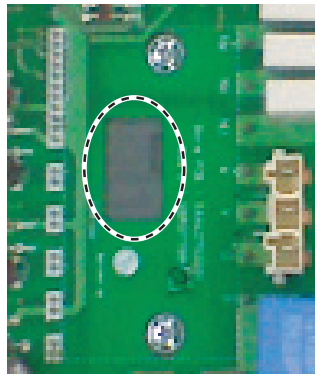
- **EEV failure check method**

Failure mode	Diagnosis	Repair process	Unit
Microcomputer Driving circuit failure	1.Disconnect the EEV connector form control board and connect testing LED  2. Main power ON, pulse signal is out from EEV for 17 sec. If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal	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 / Outdoor unit
EEV Motor coil short or misconnection	1. Check the resistance between coil terminal (red-white, red-yellow, red-orange, red-blue) 2. If the estimated resistance value is in 52 3 then the EEV is normal	Replace EEV	Outdoor unit
	1. Check the resistance between coil terminal (brown-white, brown-yellow, brown-orange, brown-blue) 2. If the estimated resistance value is in 150 10 then the EEV is normal	Replace EEV	Indoor unit
Full closing (valve leakage)	1. Operate indoor unit with FAN mode and operate another indoor unit with COOLING mode 2. Check indoor unit(FAN mode) liquid pipe temperature (from operation monitor of outdoor unit control board) 3. When fan rotate and EEV is fully closed, if there is any leakage, then the temperature is down If estimated temperature is very low in comparison with suction temperature which is displayed at remote controller then the valve is not fully closed	If the amount of leakage is much, Replace EEV	Indoor unit

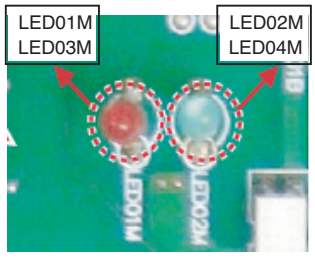
2.4 PFC_IPM & INV_IPM Checking Method



< INV PCB >

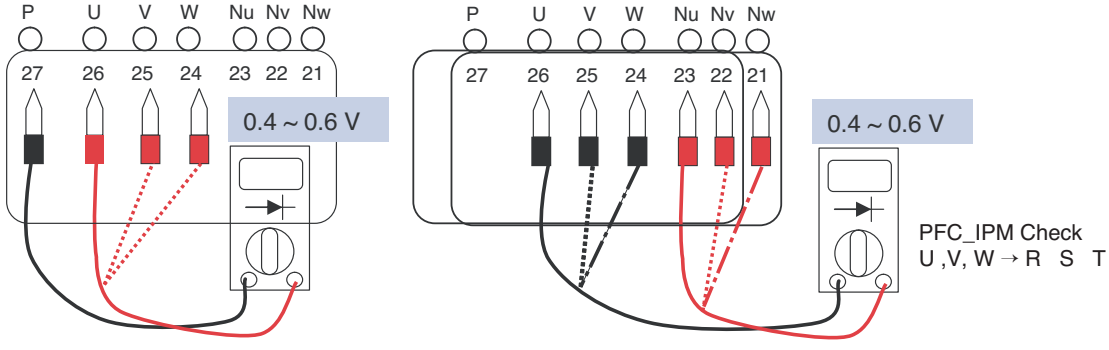


<PFC_IPM & INV IPM>



<PFC&INV LED>

1. Wait until inverter PCB DC voltage is discharged after main power off.
2. Pull out CN-L1(R), CN-L2(S), CN-L3(T) and CN-COMP Connector
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short(0Ω) or open(hundreds MΩ), PCB needs to be replaced.(IPM damaged)
5. Set the multi tester to diode mode.
6. In case measured value is different from the table, PCB needs to be replaced.(PCB damaged).



CAUTION

In case that the control box is opend and before checking electrical parts, it should be checked that the LED 01M, 02M turned off(wait 7 minutes after main power OFF), otherwise it may cause electrical shock.

2.5 Self-diagnosis Function

1) Indoor

Concept of 'Classified Trouble'

• **Definition of terms**

- Trouble : a problem which can stop system operation, and can be resumed temporarily under limited operation without certificated professional's assist.
- Error : a problem which can stop system operation, and can be resumed ONLY after certificated professional's check.
- Emergency mode : temporary heating operation while system met Trouble

• **Objective of introducing 'Trouble'**

- Not like airconditioning product, Hydro Kit is generally operated in whole winter season without any system stopping.
- If system found some problem, which is not critical to system operating for yielding heating energy, the system can temporarily continue in emergency mode operation with enduser's decision.

• **Classified Trouble**

- Trouble is classified into two levels according to the seriousness of the problem : Slight Trouble and Heavy Trouble
- Slight Trouble : a problem is found inside the indoor unit. In most case, this trouble is concerned with sensor problems. The outdoor unit is operated under emergency mode operation condition which is configured by DIP switch No. 4 of the indoor unit PCB.
- Heavy Trouble : a problem is found inside the outdoor unit.
- Option Trouble : a problem is found for option operation such as water tank heating. In this trouble, the troubled option is assumed as if it is not installed at the system.

• **Emergency operation is not automatically restarted after main electricity power is reset.**

- In normal condition, the product operating information is restored and automatically restarted after main electricity power is reset.
- But in emergency operation, automatic re-start is prohibited to protect the product.
- Therefore, user must restart the product after power reset when emergency operation has been running.

Error Display

- This function performs the self diagnosis for the unit and displays the types of the error when a error occurs.
- Error displays the following codes on wired remote controller and red/green LED on out door unit control board.
- If two or more errors simultaneously occur, it displays in the order of error number.
- If inverter PCB error occurs, remote controller No. 12 error is displayed, and detail error display can be checked using LED of the inverter PCB.
- After an occurrence of a error, error code disappears once the error is corrected.

Error Code List

Error No.	Error Type	Classification			
		Slight Trouble	Heavy Trouble	Option Trouble	Error
01	Air temperature sensor error	O			
03	No communication between wired remote controller & indoor unit				O
05	Indoor unit & outdoor unit communication error				O
08	Water tank temperature sensor error			O	
09	Indoor unit EEPROM error				O
11	Indoor unit & inverter PCB communication error				O
12	Inverter PCB error				O
13	Solar temperature sensor error				O
14	Flow switch error				O
15	Water pipe overheated				O
16	Water inlet & outlet temperature sensor error				O
17	Water inlet temperature sensor error	O			
18	Water outlet temperature sensor error	O			

• **Notice of error code**

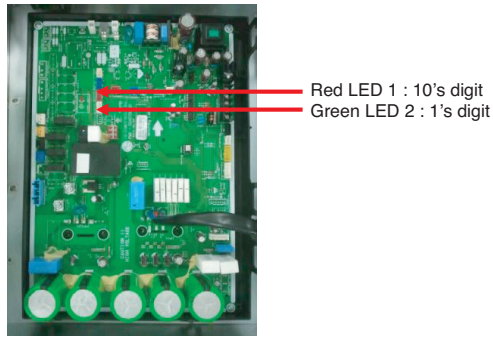
- Slight / Heavy / Option Troubles : lowercases ‘ch’ + code no.
- Errors : capital letters ‘CH’ + code no.

Inverter PCB Error Code List

- Red LED means error no. 10's digit, and green LED means 1's digit, and when red and green simultaneously blink, it means 100's unit.

  Ex) Inverter compressor IPM defect Error : error number 21

Error Code	Description	LED 1 (Red)	LED 2 (Green)
21	Inverter compressor IPM defect	2times ◑	1time ◑

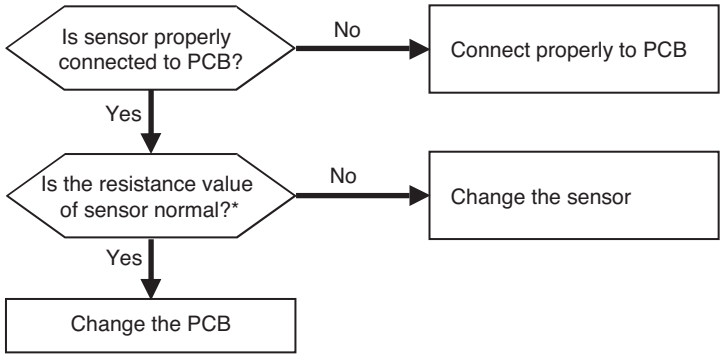


Error No.	Error Type	Main Reasons
21	Inverter compressor IPM defect	Inverter compressor drive IPM defect / inverter compressor defect
22	Inverter compressor overcurrent	Increase of inverter compressor CT value
23	Inverter compressor DC Link low voltage	After inverter activation relay is ON, DC voltage recharge defect
25	High/low Inverter input voltage	Inverter input voltage exceeds the unit limit and lasts for 4 sec. (173V ~ 289V)
26	Inverter compressor activation failure	Inverter compressor error, causing initial activation failure
27	Inverter PSC/PFC Fault Error	Error by overcurrent at inverter input
28	Inverter DC Link high voltage error	Inverter DC voltage recharge, causing compressor OFF
29	Inverter compressor overcurrent	Inverter compressor activation failure or increase of CT value
32	Excessive rise of inverter compressor discharge temperature	Excessive rise of inverter compressor discharge temperature, causing compressor OFF
34	Excessive rise of high pressure of inverter compressor	Excessive rise of high pressure of inverter compressor, causing compressor OFF
35	Excessive drop of low pressure of inverter compressor	Excessive drop of low pressure of inverter compressor, causing compressor OFF
36	Low pressure ratio error of inverter compressor	High pressure/low pressure ratio of inverter compressor is maintained at below 1.8 for 3 min. or more
40	Inverter compressor CT sensor defect	Inverter compressor CT sensor defect
41	Inverter compressor discharge pipe temperature sensor defect	Inverter compressor discharge temperature sensor disconnection or short circuit
42	Low pressure sensor defect of inverter compressor	Low pressure sensor disconnection or short circuit of inverter compressor
43	High pressure sensor defect of inverter compressor	High pressure sensor disconnection or short circuit of inverter compressor
44	Inverter inside air temperature sensor defect	Inverter inside air temperature sensor disconnection or short circuit
46	Inverter compressor suction pipe temperature sensor defect	Inverter compressor suction temperature sensor disconnection or short circuit
53	Communication error(indoor unit outdoor unit main PCB)	Outdoor unit does not receive signal from indoor unit
60	Inverter PCB EEPROM error	Inverter PCB EEPROM error
62	Excessive rise of inverter heatsink temperature	Inverter PCB heat generation, causing the rise of heatsink temperature
65	Inverter heatsink temperature sensor defect	Inverter heatsink temperature sensor disconnection or short circuit
73	Overcurrent (Peak) detected at inverter input	Error by overcur'rent detection at inverter input

Major error Diagnosis Method

Error No.	Error Type	Error Point	Main Reasons
01	Air temperature sensor error	Sensor is open/short	1. Indoor unit PCB wrong connection! 2. Indoor unit PCB failure! 3. Sensor problem (main reason)
08	Water tank temperature sensor error		
13	Solar temperature sensor error		
16	Water inlet & outlet temperature sensor error		
17	Water inlet temperature sensor error		
18	Water outlet temperature sensor error		

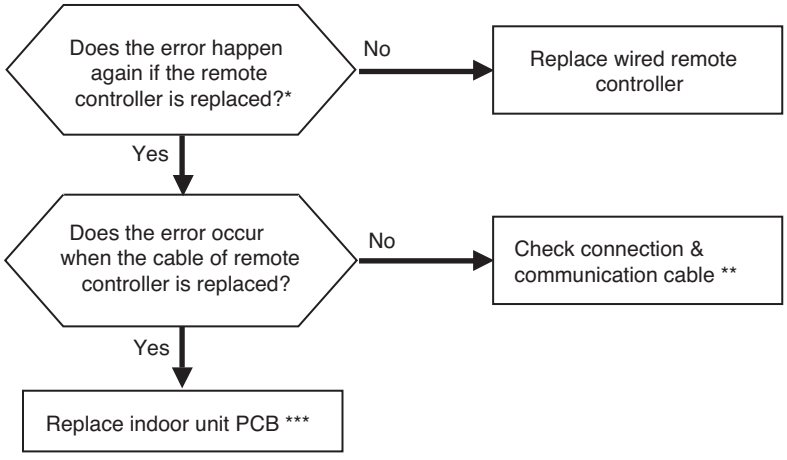
■ Error diagnosis and countermeasure flow chart



* If the resistance value of the temperature sensor changes according to temperature, and the following resistance values are displayed based on the current temperature, it is normal. (±5% error)
  Air temperature sensor : 10°C(50°F)=20.7kΩ : 25°C(77°F)=10kΩ : 50°C(122°F)=3.4kΩ
  Water inlet/outlet temperature sensor : 10°C(50°F)=10kΩ : 25°C(77°F)=5kΩ : 50°C(122°F)=1.8kΩ
  Water tank temperature sensor : 10°C(50°F)=10kΩ : 25°C(77°F)=5kΩ : 50°C(122°F)=1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
03	No communication between wired remote controller & indoor unit	The remote controller does 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

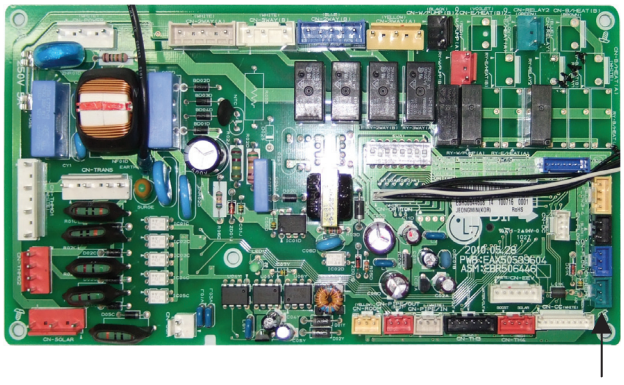
■ Error diagnosis and countermeasure flow chart



* 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



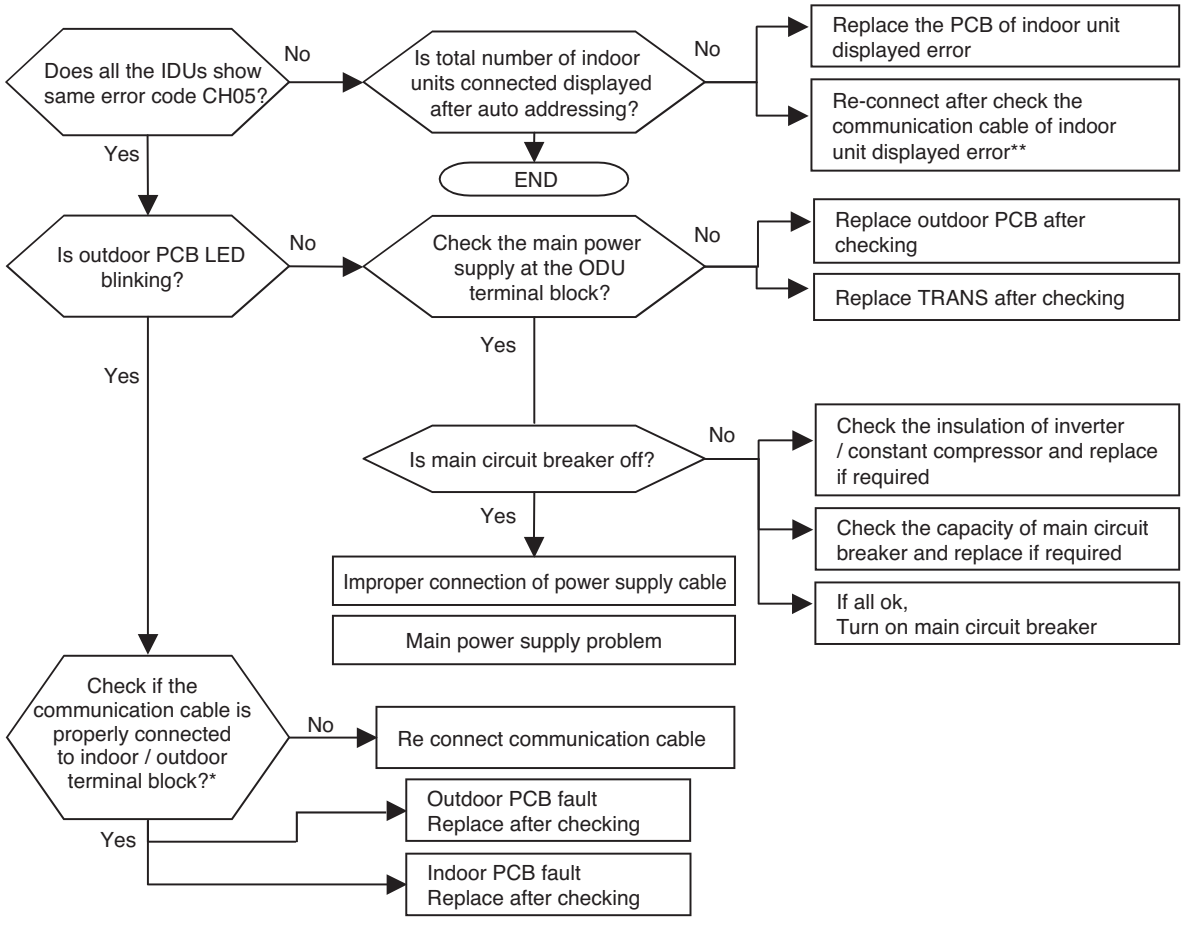
CN-REMO : Remote controller connection

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

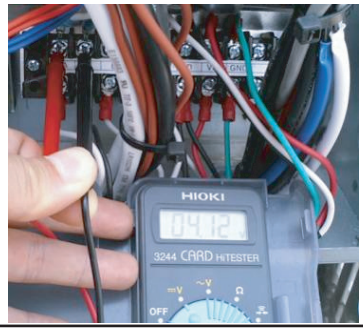
After replacing the control panel or indoor unit PCB, it is very important to perform parameter setting by 'entering Installer Setting Mode' at the control panel.
If not, system will NOT be operated correctly. It is STRONGLY recommended to keep above instruction.

Error No.	Error Type	Error Point	Main Reasons
05	Indoor & Outdoor unit communication error	No signal communication between indoor & outdoor units.	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. Outdoor unit communication circuit fault 6. Not enough distance between power and communication cable?

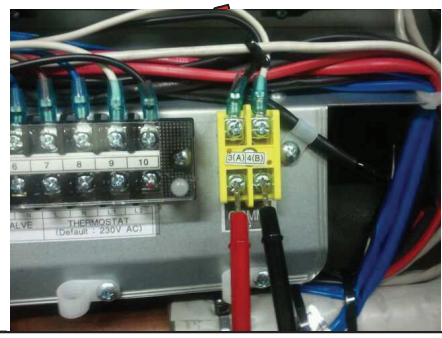
■ Error diagnosis and countermeasure flow chart



* (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 fluctuates within (-9V~+9V) then communication from outdoor unit is normal



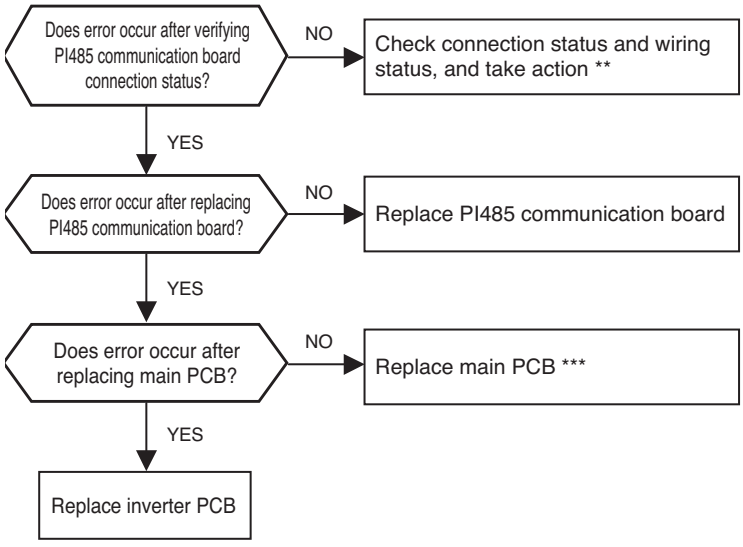
Error No.	Error Type	Error Point	Main Reasons
09	Indoor unit EEPROM error		1. Error developed in communication between the micro- processor and the EEPROM on the surface of the PCB. 2. ERROR due to the EEPROM damage

■ 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
11	Indoor unit & inverter PCB communication error	No signal communication between indoor unit & inverter PCB	1. Wired remote controller fault 2. Indoor unit PCB fault 3. Inverter PCB fault 4. PI485 communication board fault 5. Connector connection and contact defect 6. Cabled remote controller communication defect 7. PI485 communication cable defect

■ Error diagnosis and countermeasure flow chart



* When there is no service wired remote controller : Use the next indoor unit wired remote controller.

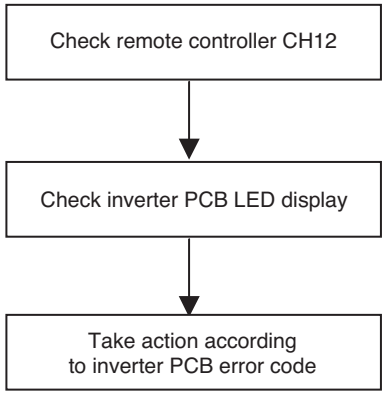
** Check cable status: It usually occurs when connection is defective or remote controller cable is extended and connected for use. Check the ambient noise effect (check distance from power cable), and take distance from device generating EMI.

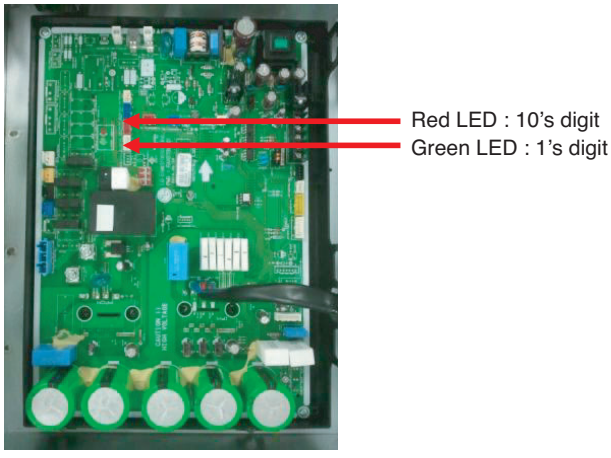
*** After replacing indoor unit PCB, perform auto addressing, and when there is a central controller, input indoor unit central control address.
(Newly perform auto addressing while power is applied to all the connected indoor units.)

Error No.	Error Type	Error Point	Main Reasons
12	Inverter PCB error	Error occurrence in inverter PCB	1. Connector connection defect 2. Inverter compressor error 3. Pressure sensor error

- If inverter PCB error occurs, remote controller No. 12 error is displayed, and detail error display can be checked using LED of the inverter PCB.
- Error display
  - Red LED means error no. 10's digit, and green LED means 1's digit, and when red and green simultaneously blink, it means 100's unit.
    Ex) After red and green LED simultaneously blink, red LED blinks 1 time, and green LED blinks 5 times : error no. 115

■ Error diagnosis and countermeasure flow chart

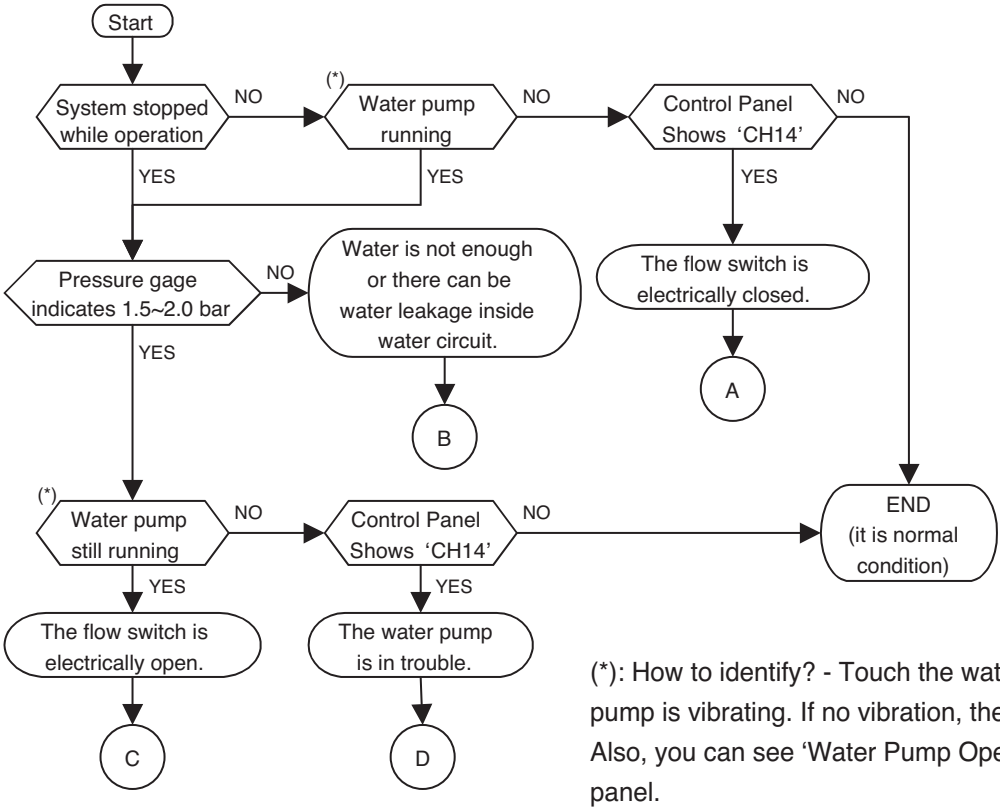




Error No.	Error Type
21	Inverter compressor IPM defect
22	Inverter compressor overcurrent
23	Inverter compressor DC Link low voltage
25	High/low Inverter input voltage
26	Inverter compressor activation failure
27	Inverter PSC/PFC Fault Error
28	Inverter DC Link high voltage error
29	Inverter compressor overcurrent
32	Excessive rise of inverter compressor discharge temperature
34	Excessive rise of high pressure of inverter compressor
35	Excessive drop of low pressure of inverter compressor
36	Low pressure ratio error of inverter compressor
40	Inverter compressor CT sensor defect
41	Inverter compressor discharge pipe temperature sensor defect
42	Low pressure sensor defect of inverter compressor
43	High pressure sensor defect of inverter compressor
44	Inverter inside air temperature sensor defect
46	Inverter compressor suction pipe temperature sensor defect
53	Communication error(indoor unit outdoor unit main PCB)
60	Inverter PCB EEPROM error
62	Excessive rise of inverter heatsink temperature
65	Inverter heatsink temperature sensor defect
73	Overcurrent (Peak) detected at inverter input

Error No.	Error Type	Error Point	Main Reasons
14	Flow Switch error	Abnormal working of flow switch	1.Pump fault 2.Low water flow 3.Flow switch fault

■ Error diagnosis and countermeasure flow chart



(*): How to identify? - Touch the water pump and feel if the water pump is vibrating. If no vibration, the water pump is not operating. Also, you can see 'Water Pump Operating Icon( ) ' at control panel.

A
- Although there is not water flow inside water circuit, the flow switch detects as if water is flowing. It is due to electrically closed (or short) of flow switch or the contact of flow switch is mechanically stuck.
- Replace the flow switch.

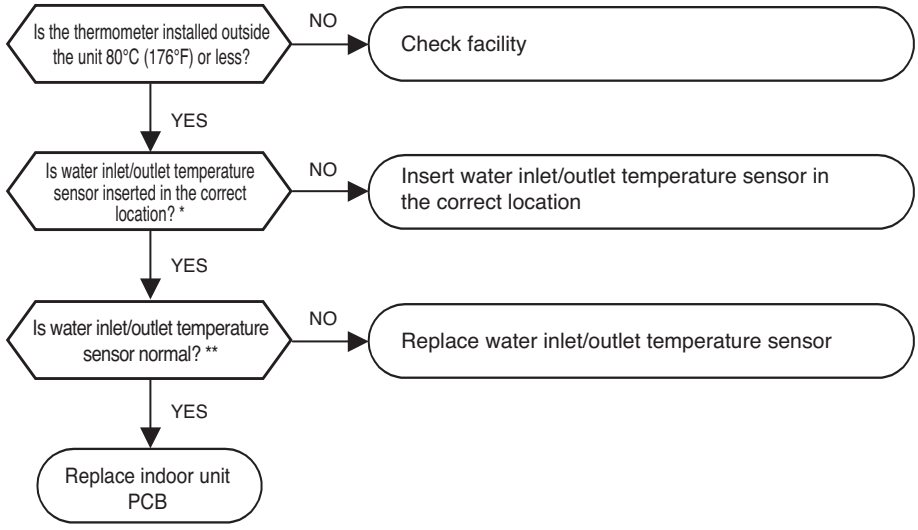
B
- Check if water inside water circuit is fully charged. Pressure gage at the indoor unit should indicate 1.5~2.0 bar.
- Also, as the hand of the pressure gage is not react so fast according to water charging, check the pressure gage again.
- Otherwise, there can be water leakage inside water circuit. Examine if water circuit is completely sealed.

C
- Although water is well flowing, the flow switch can not detect water flow. It is due to electrically) open of flow switch or the contact of flow switch is mechanically broken.
- Replace the flow switch.

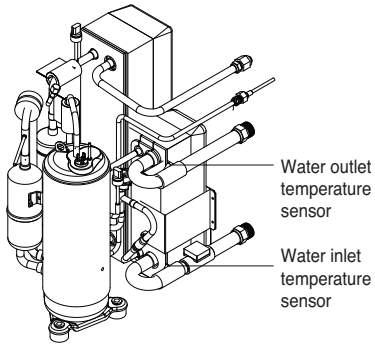
D
- Replace the water pump.
- Also, check the water quality if there are particles that can yield locking at the shaft of the water pump.

Error No.	Error Type	Error Point	Main Reasons
15	Water pipe overheated	Water outlet temperature is above 90°C (194°F)	1. High temperature of water inflow 2. Temperature sensor defect 3. Indoor unit PCB fault

■ Error diagnosis and countermeasure flow chart

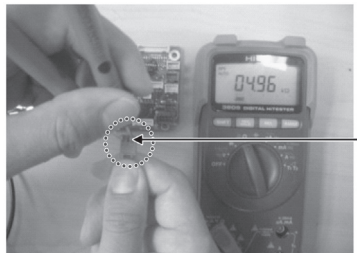


*Water inlet/outlet temperature sensor location



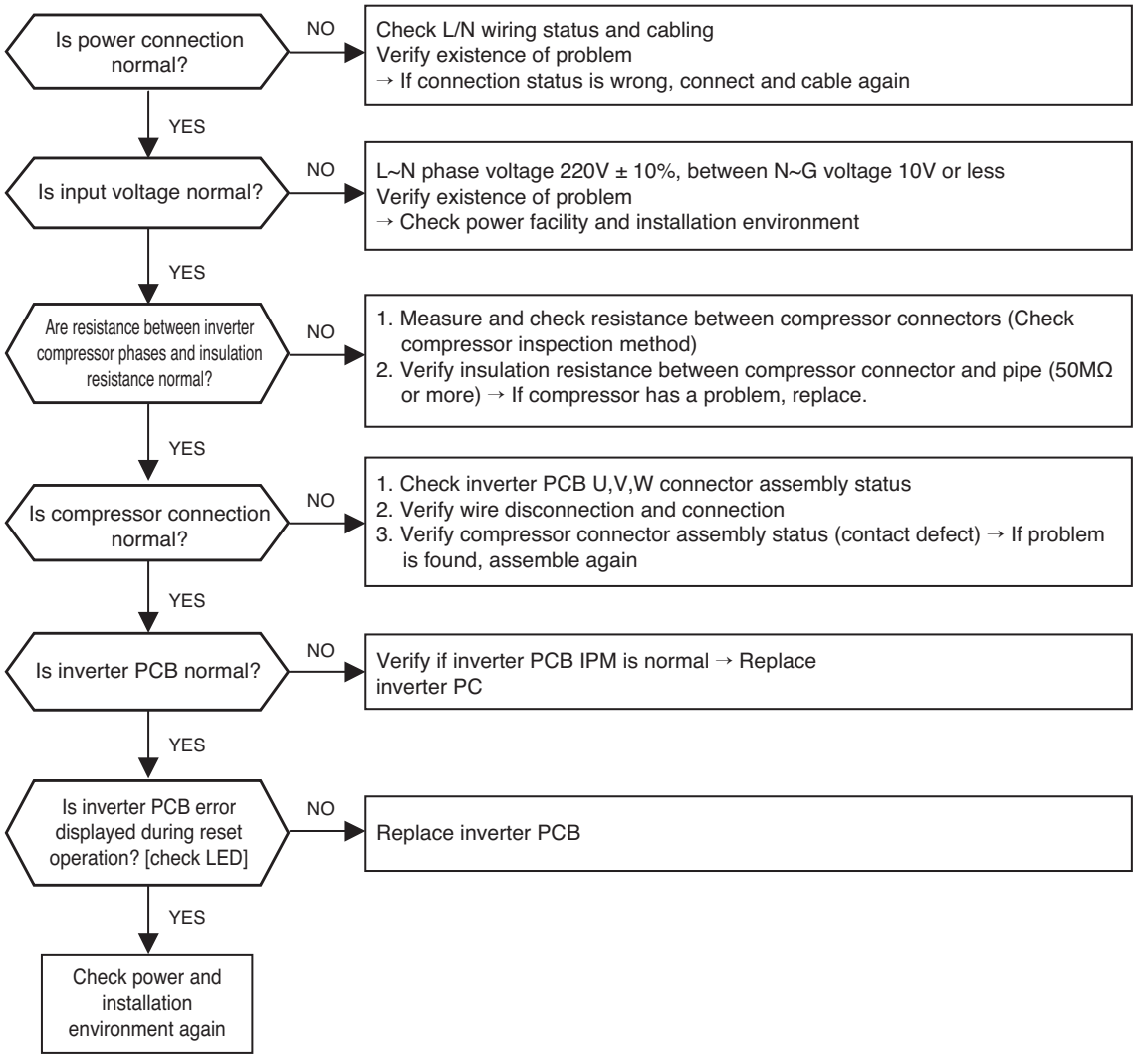
**If the resistance value of the temperature sensor changes according to temperature, and the following resistance values are displayed based on the current temperature, it is normal. (±5% error)

- Air temperature sensor : 10°C(50°F)=20.7kΩ : 25°C(77°F)=10kΩ : 50°C(122°F)=3.4kΩ
- Gas/Liquid side temperature sensor : 10°C(50°F)=10kΩ : 25°C(77°F)=5kΩ : 50°C(122°F)=1.8kΩ
- Water inlet/outlet temperature sensor : 10°C(50°F)=10kΩ : 25°C(77°F)=5kΩ : 50°C(122°F)=1.8kΩ
- Water tank temperature sensor : 10°C(50°F)=10kΩ : 25°C(77°F)=5kΩ : 50°C(122°F)=1.8kΩ



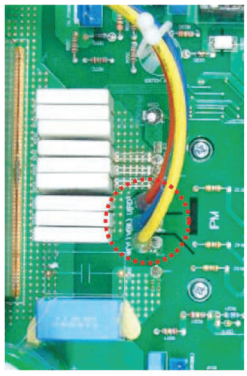
Error No.	Error Type	Error Point	Main Reasons
21	Inverter compressor IPM defect	IPM self protection circuit in operation (overcurrent / IPM overheated / Vcc low voltage)	1. Overcurrent on inverter compressor (U,V,W) 2. Compressor damaged (insulation destroyed / Motor damaged) 3. IPM overheated (heat radiation plate damaged / heat radiation fan connector loose / heat radiation plate not connected) 4. Inverter compressor connector fallen / loose 5. Inverter PCB board damaged 6. Low outdoor unit input voltage

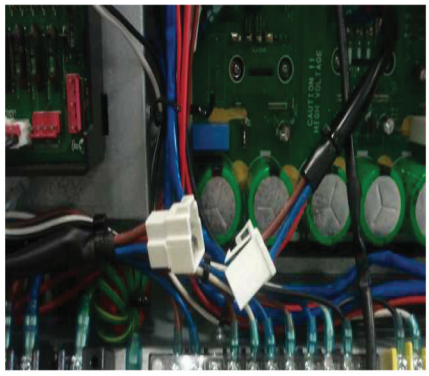
■ Error diagnosis and countermeasure flow chart



Measuring resistance between each compressor connectors

Measuring insulation resistance between compressor connector and chassis

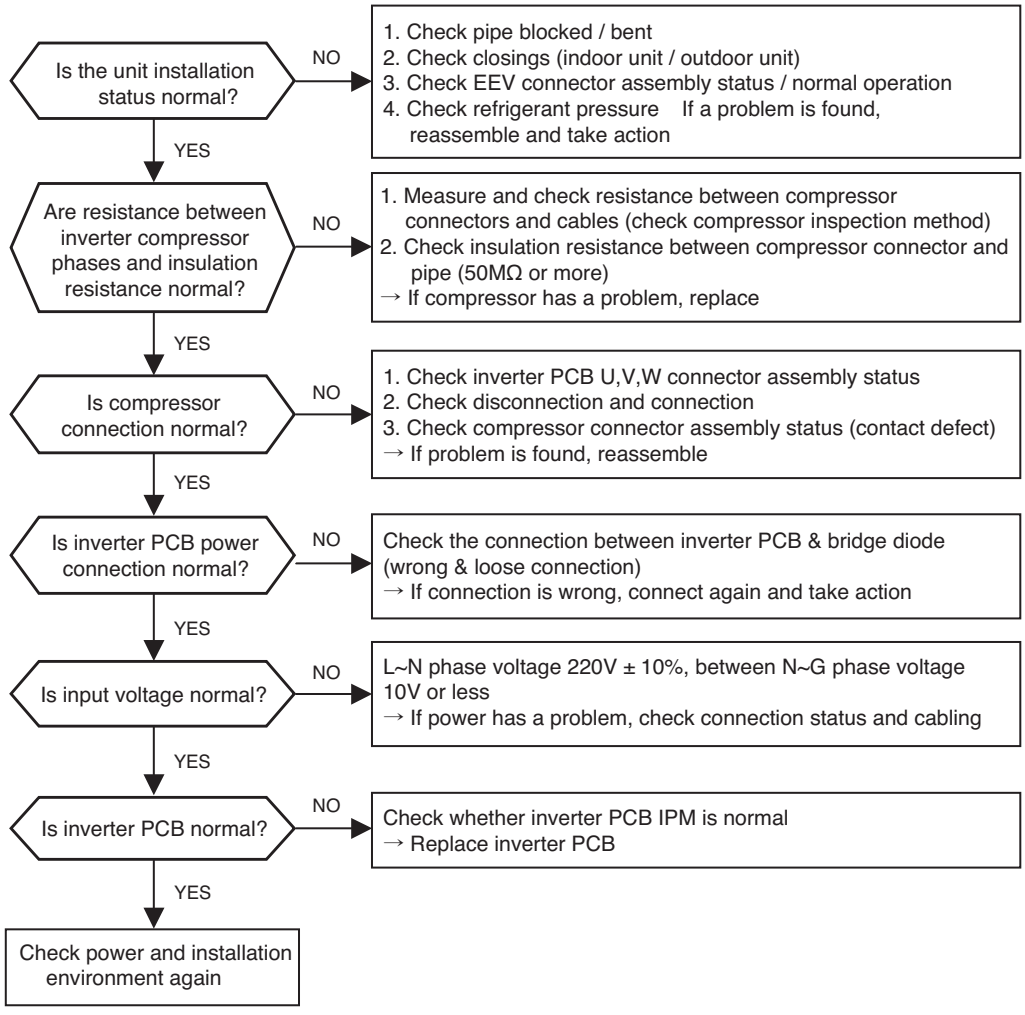


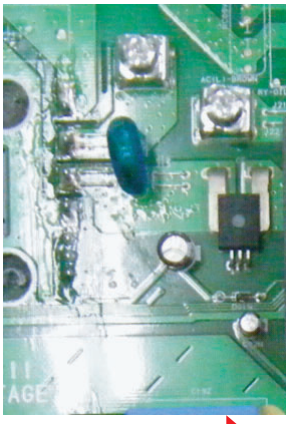


※ Shapes may be different for each model

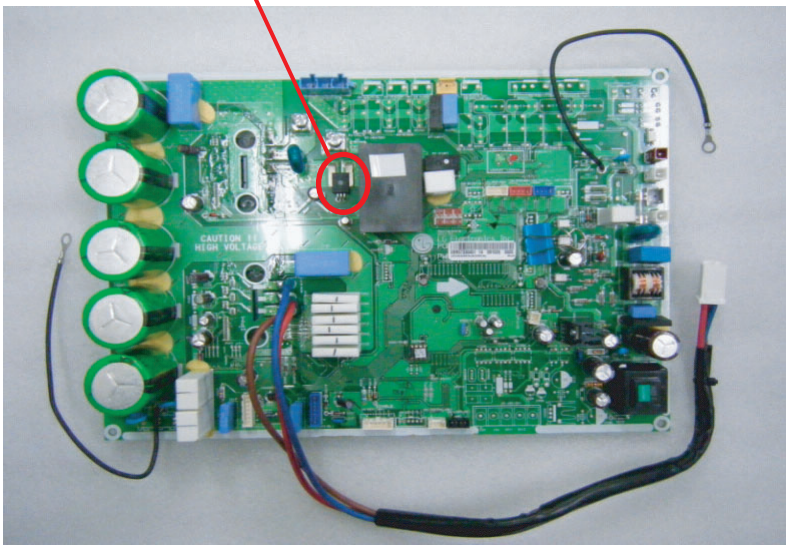
Error No.	Error Type	Error Point	Main Reasons
22	Inverter compressor over-current	Inverter PCB input power current exceeds limit (27A rms)	1. Overload operation (pipe blocked / closed / EEV locked / excessive refrigerant) 2. Compressor damaged (insulation destroyed / motor damaged) 3. Low input voltage 4. Wrong power cable connection 5. Inverter PCB damaged (input current detection part)

■ Error diagnosis and countermeasure flow chart





CT Sensor output terminal

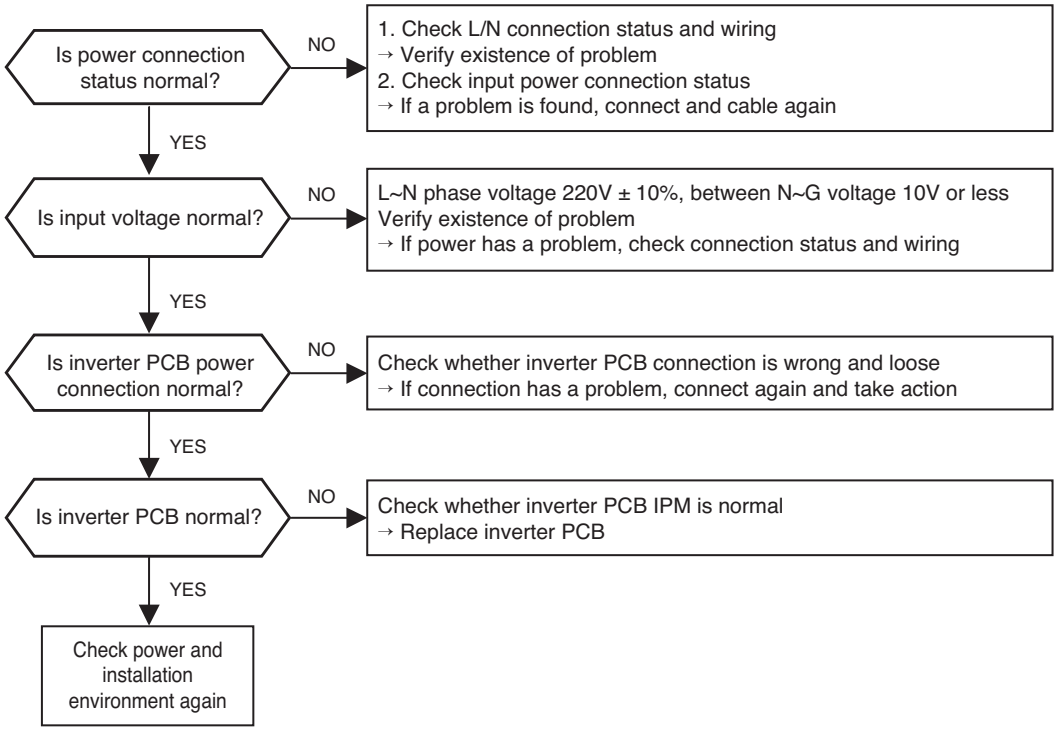


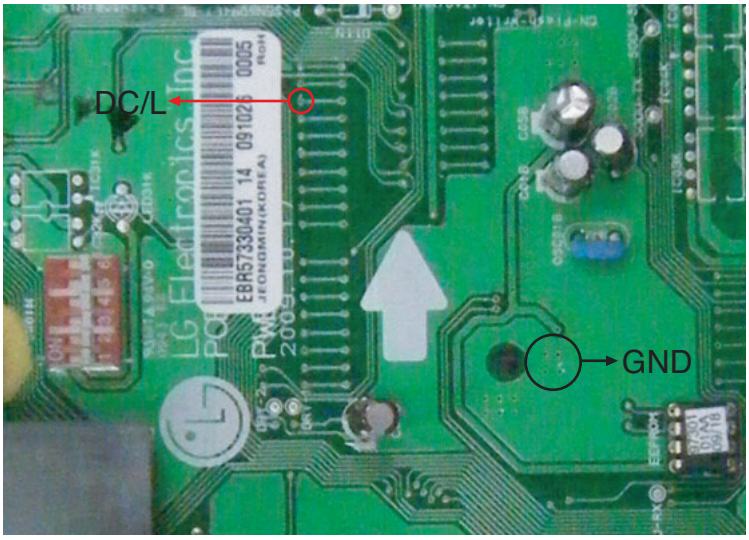
※ How to check PCB input current detection circuit

1. Set Multi tester DC voltage measurement mode
2. Measure DC voltage while power is applied and in operation standby state
3. If the measurement goes out of DC 2.5V ± 0.2V, PCB component is damaged

Error No.	Error Type	Error Point	Main Reasons
23	Inverter compressor DC Link low voltage	After inverter activation relay is ON, DC voltage recharge defect	1. Wrong DC link terminal connection / terminal contact defect 2. Activation relay damaged 3. Condenser damaged 4. Inverter PCB damaged (DC Link voltage detection part) 5. Low input voltage

■ Error diagnosis and countermeasure flow chart



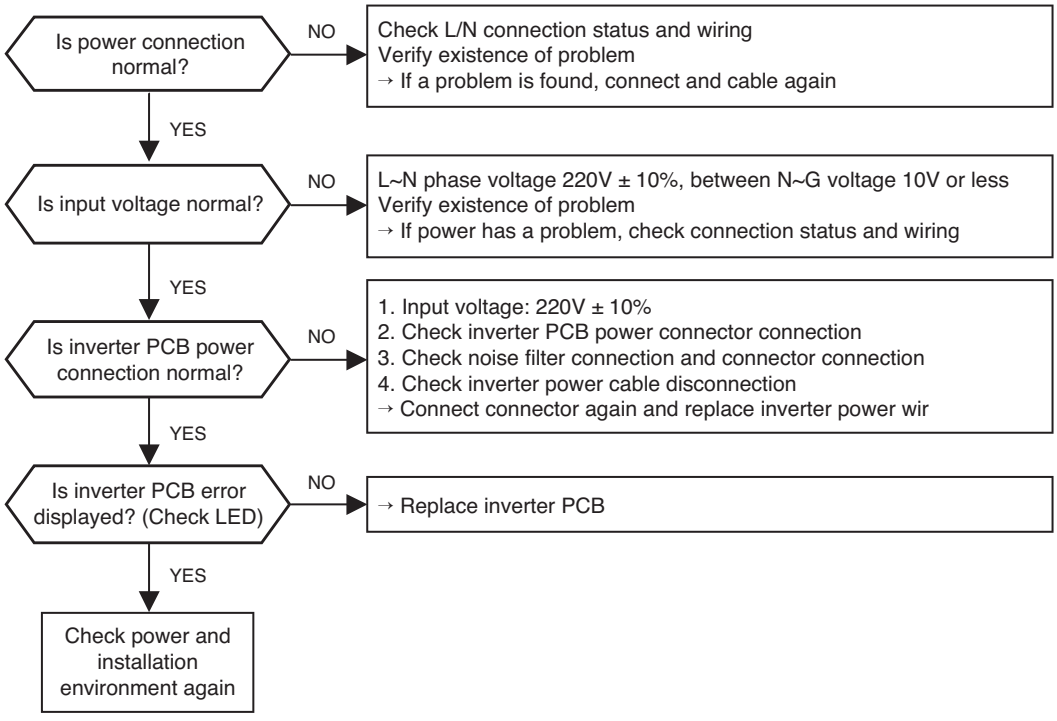


※ How to check PCB DC Link voltage detection circuit

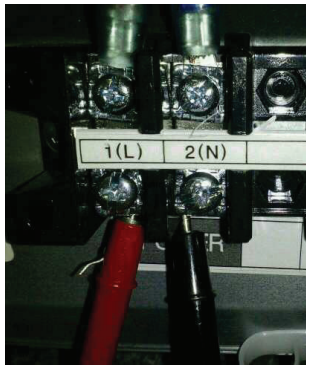
1. Set Multi tester DC voltage measurement mode
2. Measure DC voltage while power is applied and in operation standby state
3. If the measurement goes out of DC 2.4~2.8V, a component is damaged

Error No.	Error Type	Error Point	Main Reasons
25	High/low Inverter input voltage	Inverter input voltage exceeds the unit limit and lasts for 4 sec. (173V – 289V)	1. Abnormal input voltage (single phase : L-N, 3 phase : T-N) 2. Power connection defect (N phase not connected) 3. Outdoor unit inverter PCB damaged (input voltage detection part)

■ Error diagnosis and countermeasure flow chart

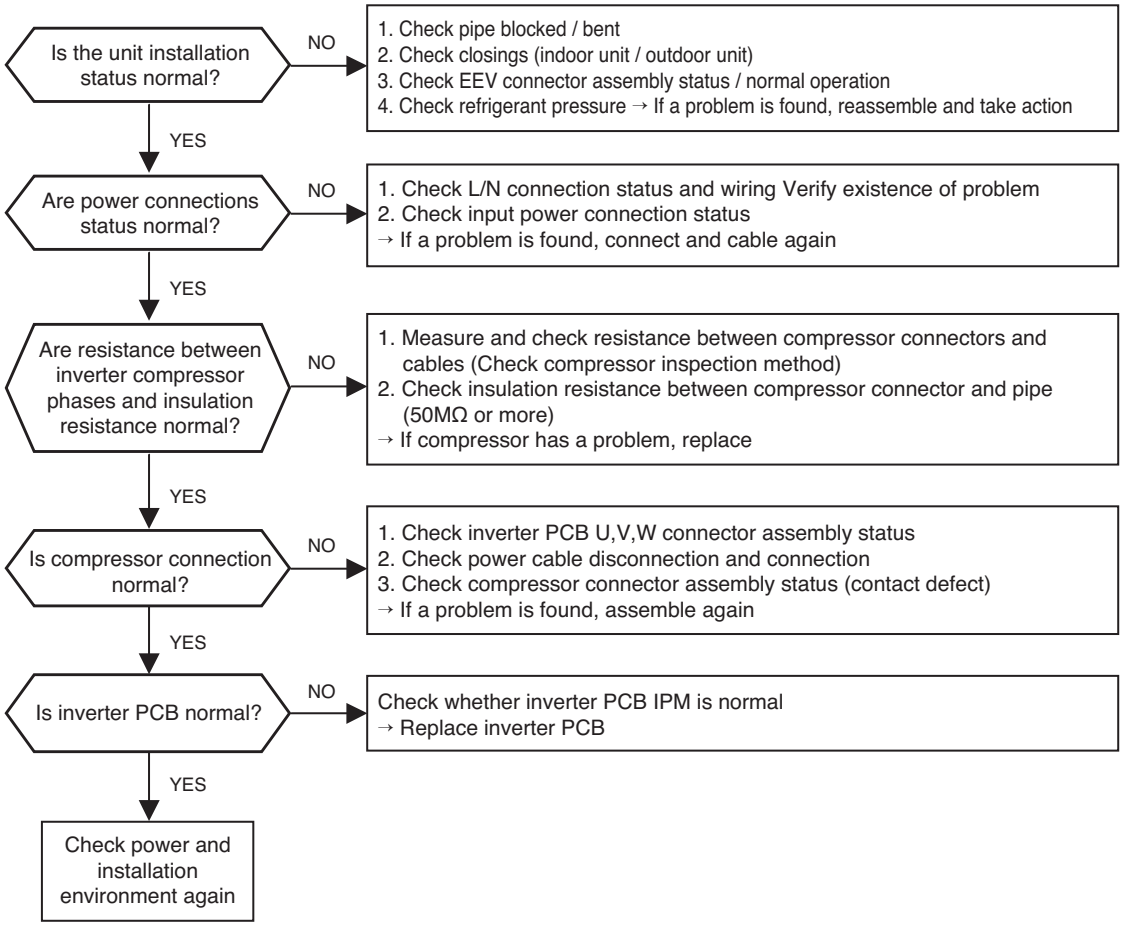


Measuring input voltage



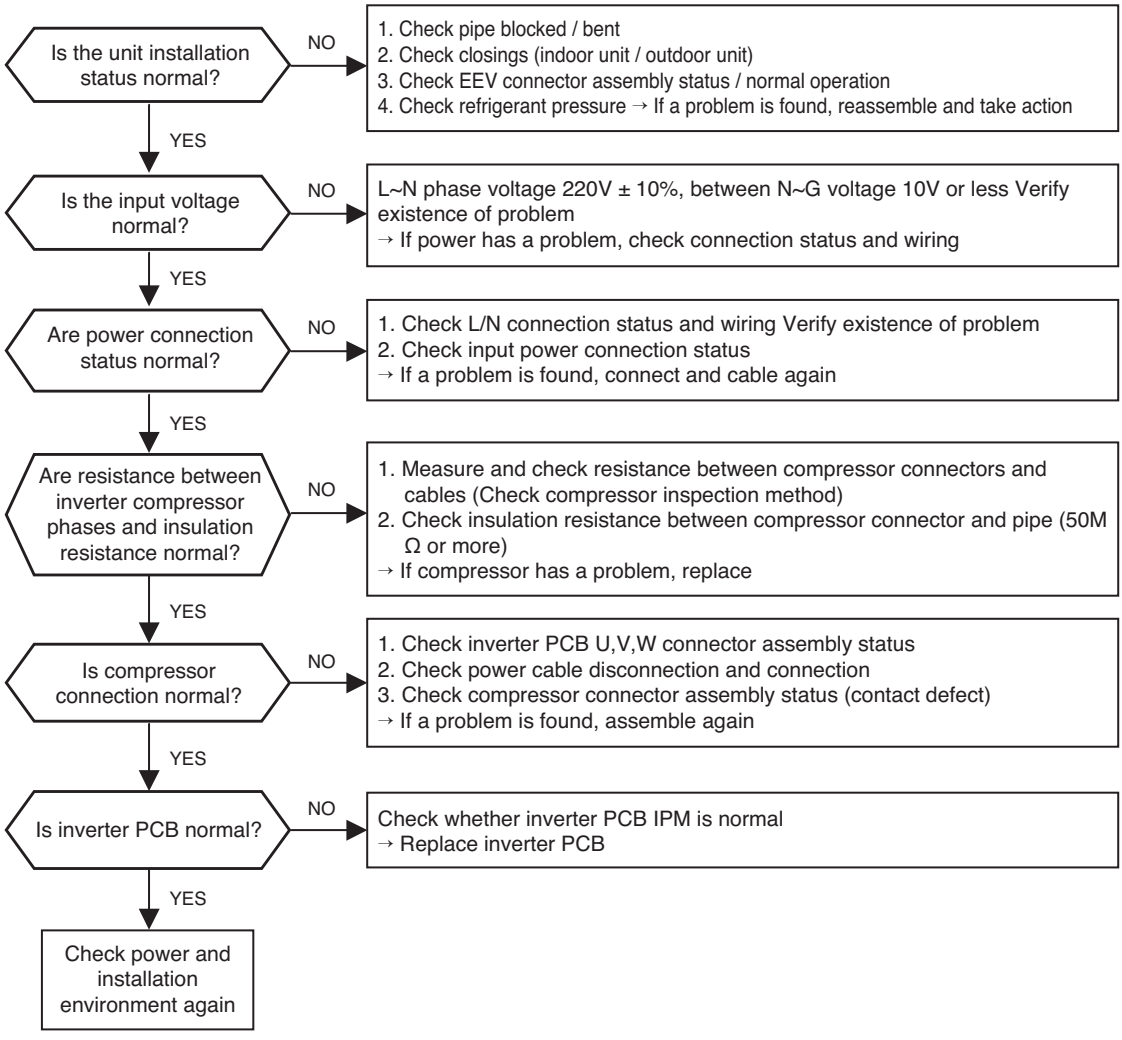
Error No.	Error Type	Error Point	Main Reasons
26	Inverter compressor activation failure	Initial activation failure due to problem with compressor and cycle, or failure to detect location of rotor during operation	1. Overload operation (pipe blocked / EEV locked / excessive refrigerant) 2. Compressor damaged (insulation destroyed / motor damaged) 3. Compressor connection defect 4. Inverter PCB damaged (CT) 5. Power relay defect

■ Error diagnosis and countermeasure flow chart



Error No.	Error Type	Error Point	Main Reasons
27	Inverter PSC/PFC Fault Error	Inverter PCB input current exceeds 100A(peak) for 2*μs*	1. Overload operation (pipe blocked / closed / EEV locked / excessive refrigerant) 2. Compressor damaged (insulation destroyed / motor damage) 3. Abnormal input voltage (L,N) 4. Wrong power cable connection 5. Inverter PCB damaged (input current detection part)

■ Error diagnosis and countermeasure flow chart



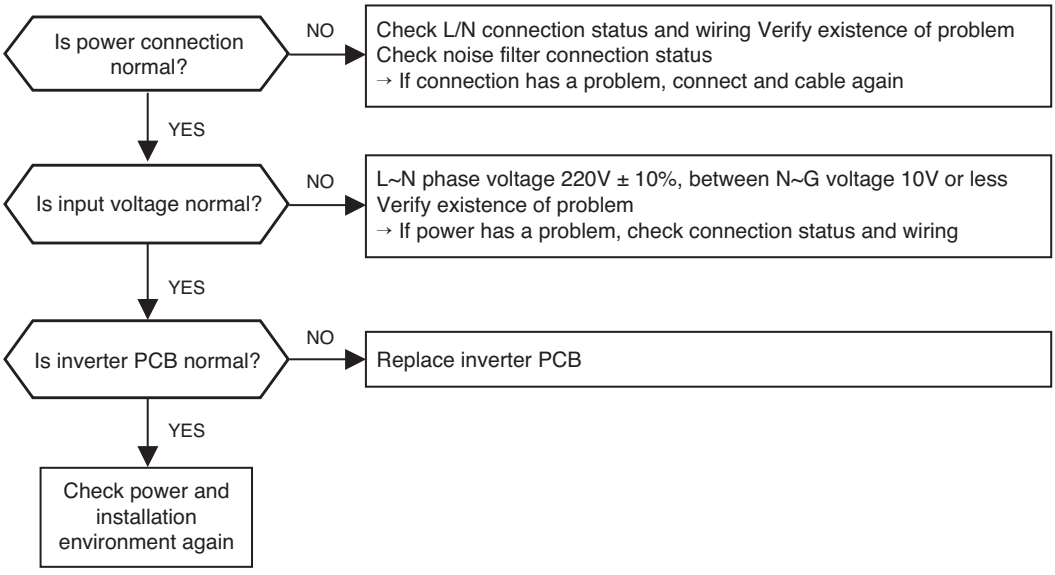
★How to check PFCM module
1. Set multi tester to diode mode
2. Check a short circuit between input signal pins at the bottom of PFC module
3. If there is a short circuit in other pins except No. 4 and 5 pin, replace PCB

⚠CAUTION

PFCM module No. 4 and 5 pins are internally short circuited.

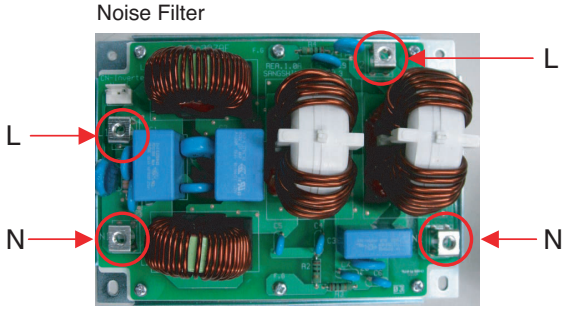
Error No.	Error Type	Error Point	Main Reasons
28	Inverter DC Link high voltage error	Inverter PCB DC link voltage is above 780V	1. Abnormal input voltage (R/S/T/N, L/N) 2. Power connection defect (N phase not connected) 3. Outdoor unit inverter PCB damaged (DC Link voltage detection part)

■ Error diagnosis and countermeasure flow chart



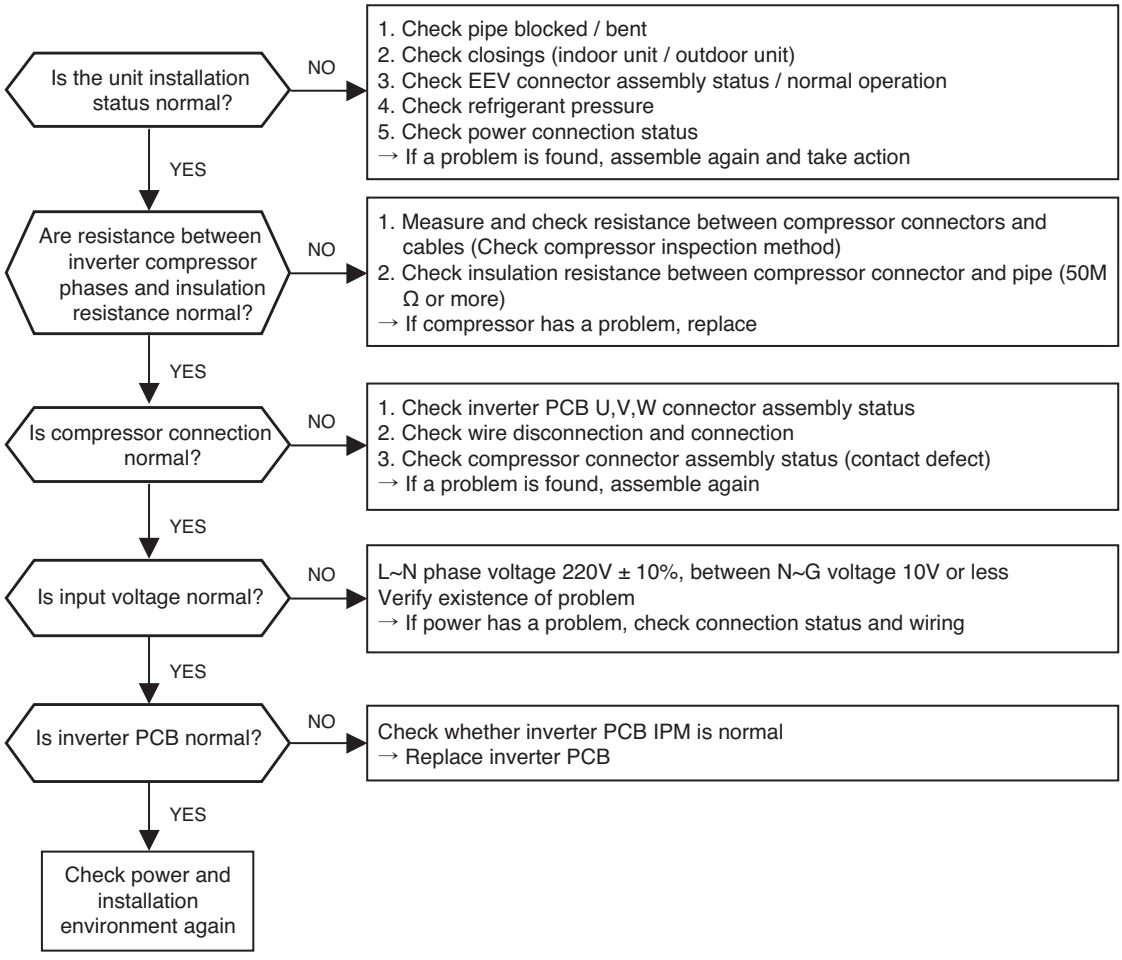
■ Single phase model

Noise Filter



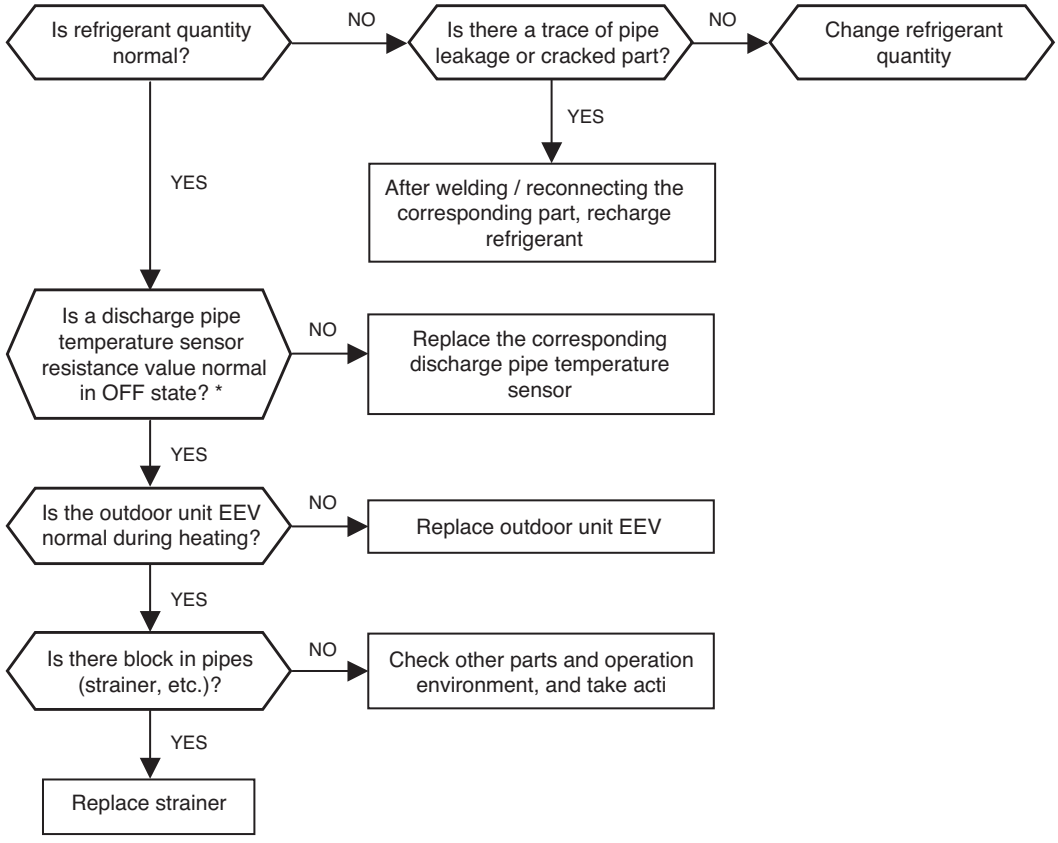
Error No.	Error Type	Error Point	Main Reasons
29	Inverter compressor over-current	Inverter compressor input current set value exceeded 35A peak	1. Overload operation (pipe blocked / closed / EEV locked / excessive refrigerant) 2. Compressor damaged (insulation destroyed / motor damaged) 3. Low input voltage 4. Outdoor unit inverter PCB damaged

■ Error diagnosis and countermeasure flow chart



Error No.	Error Type	Error Point	Main Reasons
32	Excessive rise of inverter compressor discharge temperature	Excessive rise of inverter compressor discharge temperature, causing compressor OFF	1. Inverter compressor discharge pipe temperature sensor defect 2. Refrigerant insufficient / leakage 3. EEV fault

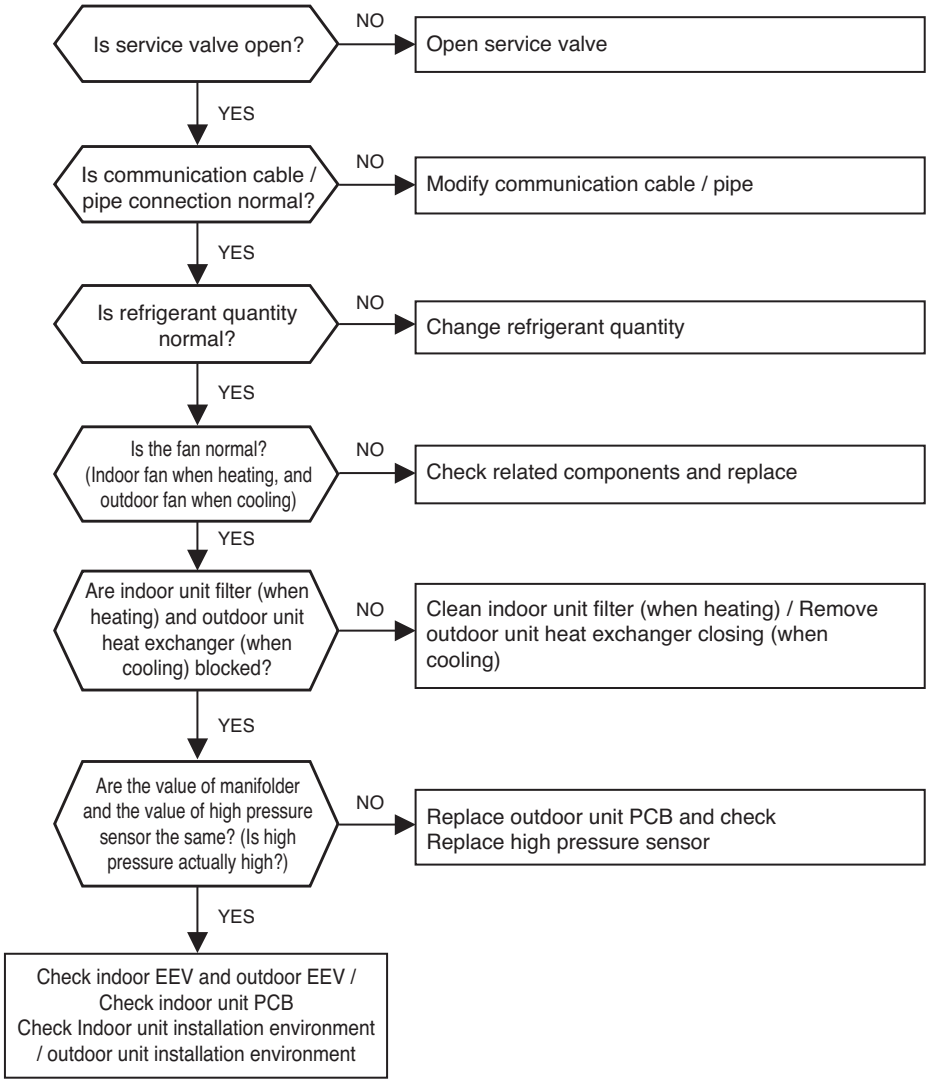
■ Error diagnosis and countermeasure flow chart



*Discharge pipe temperature sensor : 10°C(50°F) = 362kΩ, 25°C (77°F) = 200kΩ,
50°C (122°F) = 82kΩ, 100°C (212°F) = 18.5kΩ

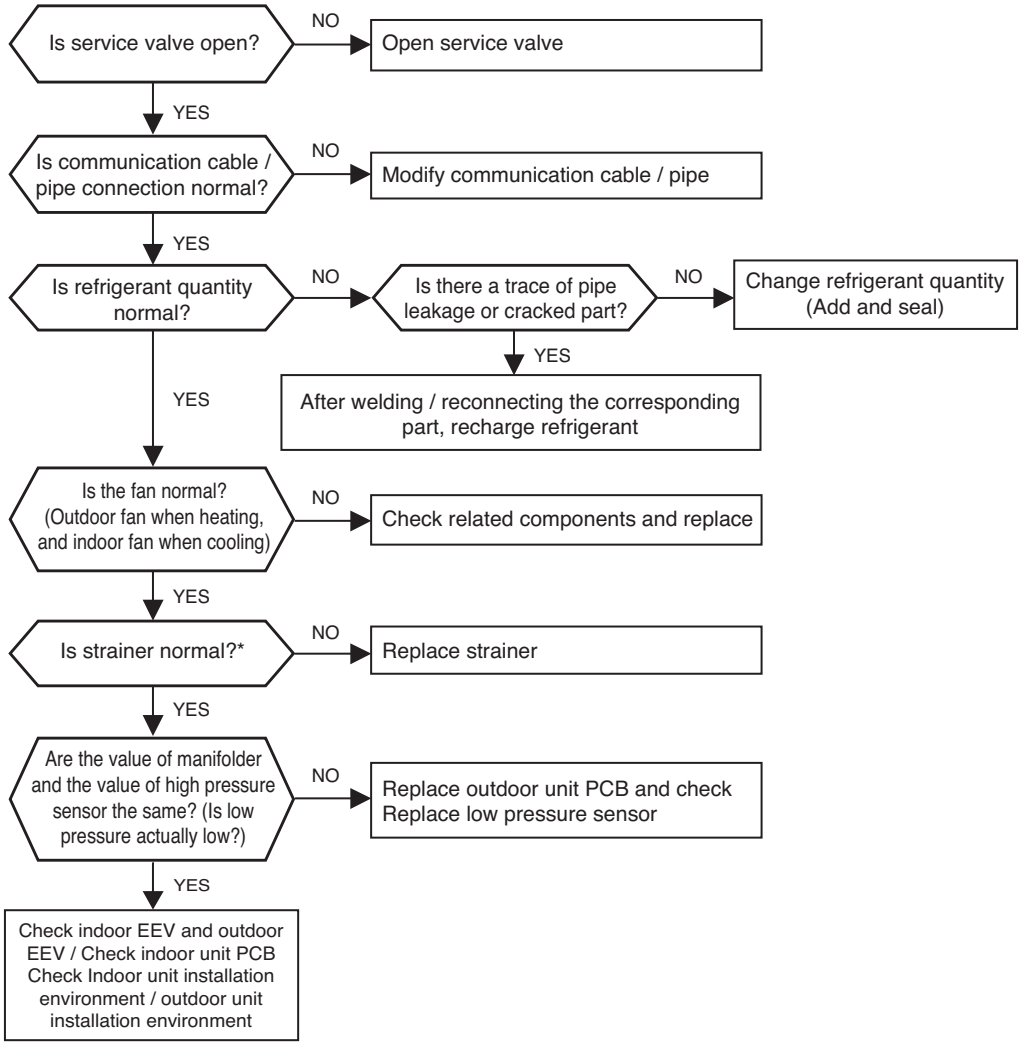
Error No.	Error Type	Error Point	Main Reasons
34	Excessive rise of high pressure of inverter compressor	Excessive rise of high pressure of inverter compressor, causing compressor OFF(10 times) Error by repeated occurrence	1. High pressure sensor failure 2. Indoor unit fan or outdoor unit fan failure 3. Refrigerant pipe damage causing pipe deformation 4. Refrigerant excessive recharge 5. Indoor EEV defect (during cooling) Indoor / outdoor EEV defect (during heating) 6. During the closing (during cooling, outdoor unit closed / during heating, indoor filter blocked) 7. Service valve blocked 8. Outdoor unit PCB defect 9. Thermistor defect of indoor unit 10. Hot gas valve defect

■ Error diagnosis and countermeasure flow chart



Error No.	Error Type	Error Point	Main Reasons
35	Excessive drop of low pressure of inverter compressor	Excessive drop of low pressure of inverter compressor, causing compressor OFF(3 times in sequence)	1. Low pressure sensor failure 2. indoor unit fan or outdoor unit fan failure 3. Refrigerant insufficient/leakage 4. Refrigerant pipe damage causing pipe deformation 5. Indoor EEV defect (during cooling) Indoor / outdoor EEV defect (during heating) 6. During the closing (during cooling, outdoor unit closed / during heating, indoor filter blocked) 7. Service valve blocked 8. Outdoor unit PCB defect 9. Thermistor defect of indoor unit

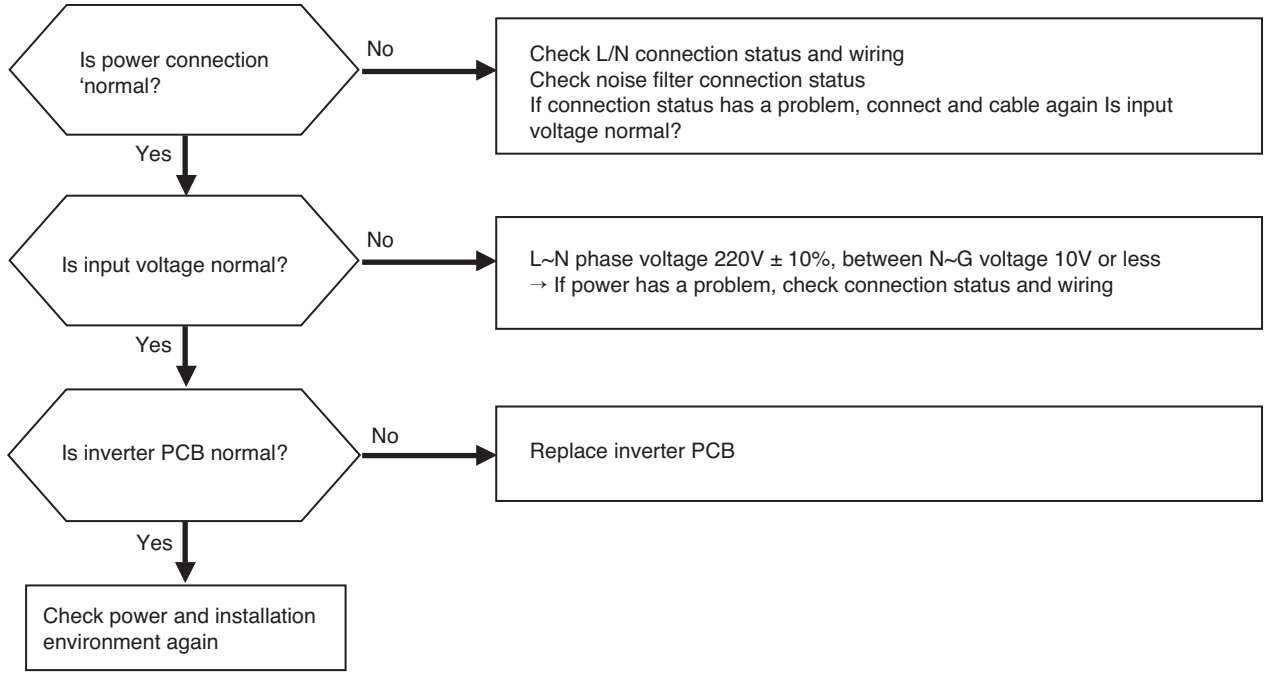
■ Error diagnosis and countermeasure flow chart



* If there is a big difference in the temperature between front and back of the strainer, being able to see the freezing, or if the temperature difference is verified, strainer being blocked shall be doubted.

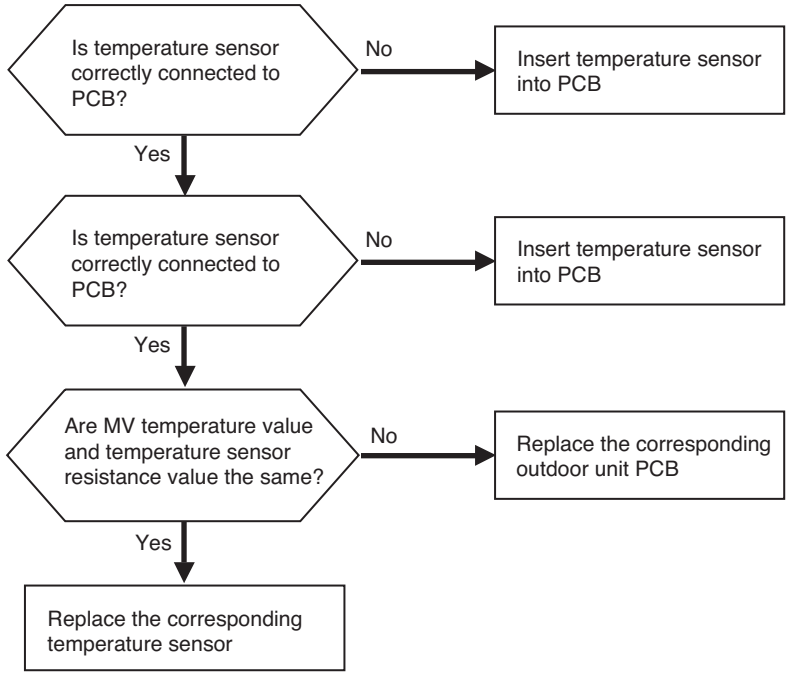
Error No.	Error Type	Error Point	Main Reasons
40	Inverter compressor CT sensor defect	At the initial state of power supply, Micom input voltage goes out of 2.5V ±0.3V	1. Abnormal input voltage (T,N) 2. DC power damaged (DC5V power) 3. Outdoor unit inverter PCB damaged (CT detection part)

■ Error diagnosis and countermeasure flow chart



Error No.	Error Type	Error Point	Main Reasons
41	Inverter compressor discharge pipe temperature sensor defect	Inverter compressor discharge temperature sensor disconnection or short circuit	1. Inverter compressor discharge pipe temperature sensor connection fault 2. Inverter compressor discharge pipe temperature sensor defect (Open/Short) 3. Outdoor unit PCB defect

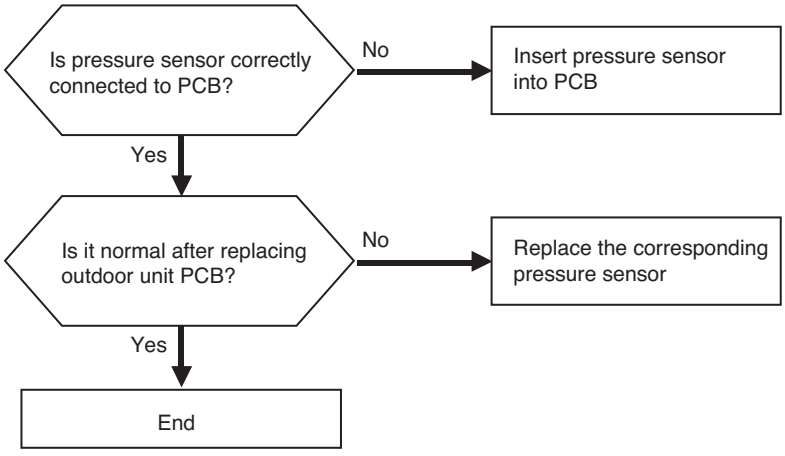
■ Error diagnosis and countermeasure flow chart



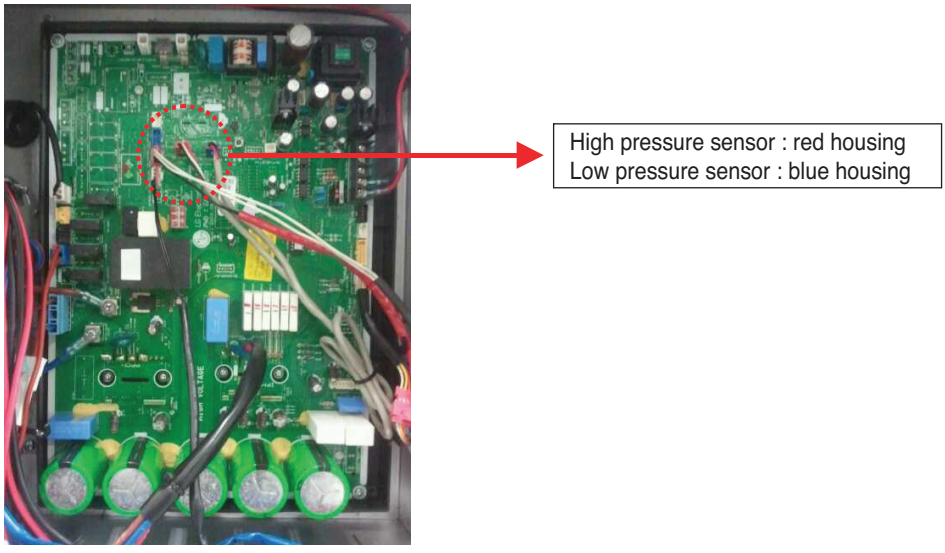
* If it is 5 MΩ or more (open) or 2 kΩ or less (short), error occurs.
  If the resistance value of the temperature sensor changes according to temperature, and the following resistance values are displayed based on the current temperature, it is normal. (±5% error)
  Discharge pipe temperature sensor : 10°C(50°F) = 362kΩ, 25°C (77°F) = 200kΩ, 50°C (122°F) = 82kΩ, 100°C (212°F) = 18.5kΩ

Error No.	Error Type	Error Point	Main Reasons
42	Low pressure sensor defect of inverter compressor	Abnormal measure-ment value of sensor resistance (Open / Short)	1. Low pressure sensor connection fault 2. Low pressure sensor defect (Open / Short) 3. Outdoor unit PCB defect
43	High pressure sensor defect of inverter compressor	Abnormal measure-ment value of sensor resistance (Open / Short)	1. High pressure sensor connection fault 2. High pressure sensor defect (Open / Short) 3. Outdoor unit PCB defect

■ Error diagnosis and countermeasure flow chart



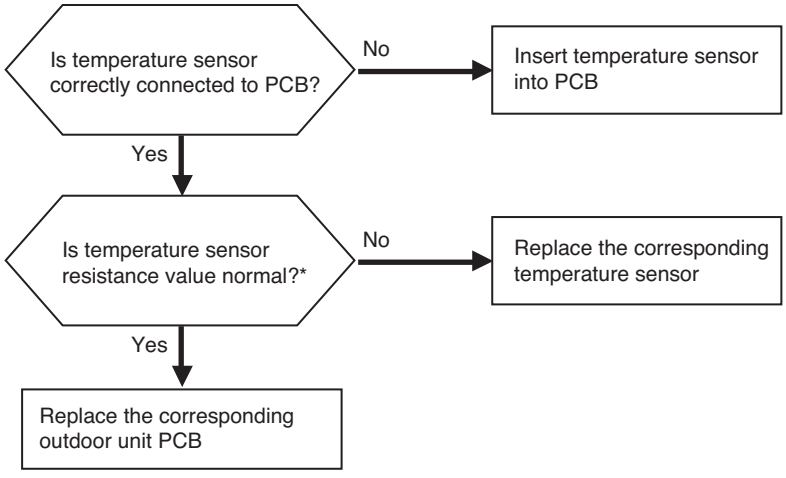
Checking high/
low pressure sensor connection



❈ Shapes may be different for each model.

Error No.	Error Type	Error Point	Main Reasons
44	Inverter inside air temperature sensor defect	Abnormal measurement value of temperature sensor resistance (Open / Short)	1. Inverter inside air temperature sensor connection fault 2. Inverter inside air temperature sensor defect (Open / Short) 3. Outdoor unit PCB defect
46	Inverter compressor suction pipe temperature sensor defect	Abnormal measurement value of temperature sensor resistance (Open / Short)	1. Inverter compressor suction pipe temperature sensor connection fault 2. Inverter compressor suction pipe temperature sensor defect (Open/Short) 3. Outdoor unit PCB defect

■ Error diagnosis and countermeasure flow chart



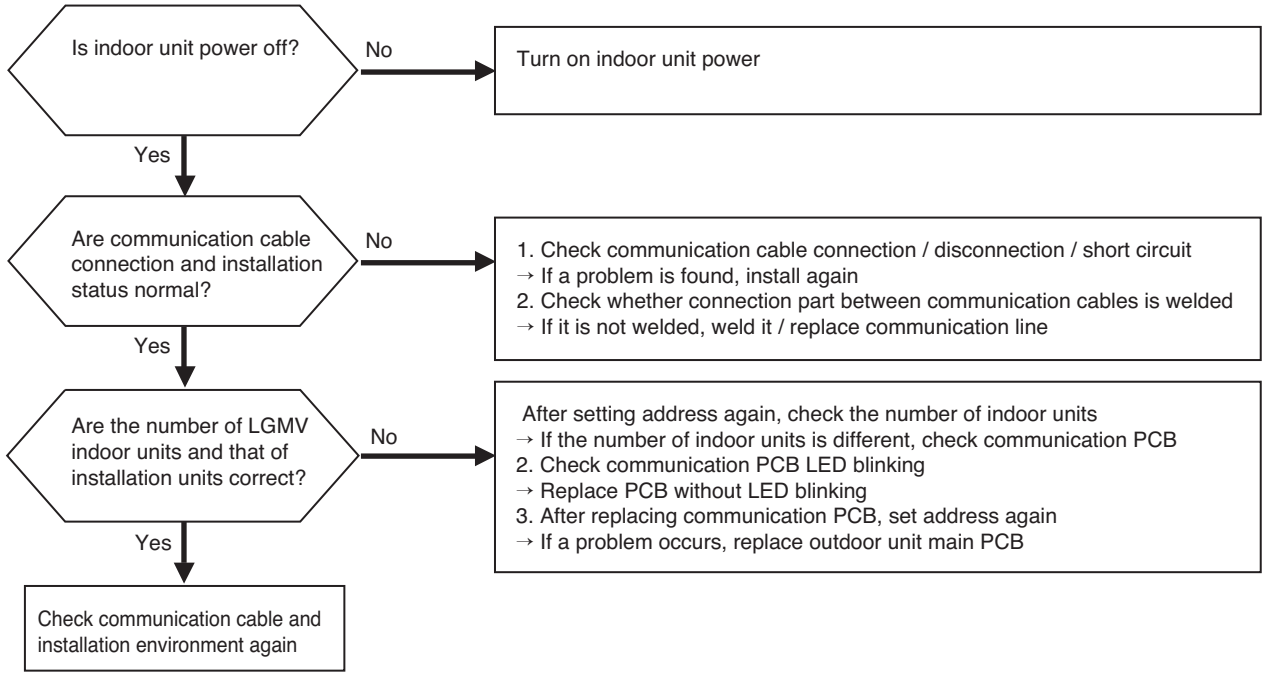
* If it is 100 kΩ or more (open) or 100Ω or less (short), error occurs.
If the resistance value of the temperature sensor changes according to temperature, and the following resistance values are displayed based on the current temperature, it is normal. (±5% error)

Inside air temperature sensor : 10°C(50°F) = 20.7kΩ, 25°C (77°F) = 10kΩ, 50°C (122°F) = 3.4kΩ

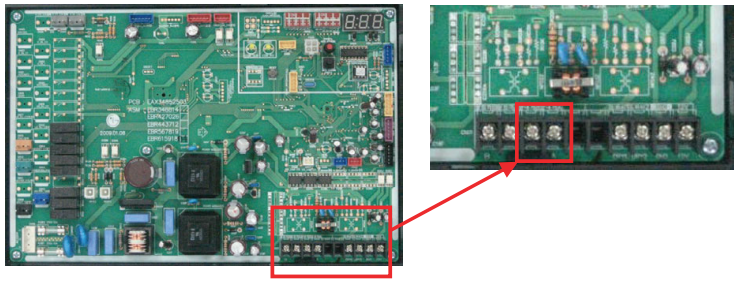
Suction pipe temperature sensor : 10°C(50°F) = 10kΩ, 25°C (77°F) = 5kΩ, 50°C (122°F) = 1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
53	Communication error (indoor unit → outdoor unit main PCB)	Outdoor unit main PCB does not receive signal from indoor unit	1. Communication cable is not connected 2. Communication cable disconnected or short circuited 3. Indoor unit power Off 4. Outdoor unit main PCB defect / indoor unit PCB defect 5. Connection fault between communication cables (welding not done)

■ Error diagnosis and countermeasure flow chart



Communication between outdoor unit and indoor unit



Defect cases

Indoor unit communication PCB

❊ Shapes may be different for each model.

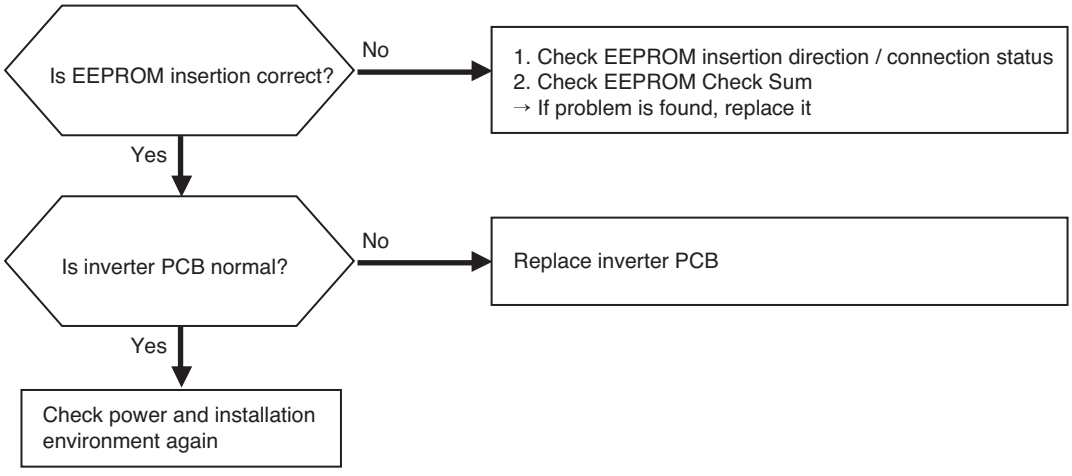
For CH53, most of the errors are indoor unit power defect and error with CH05, and it does not actually affect indoor unit operation itself.
So check with the same method as CH05, and check with the above flow diagram by additionally referring to the following items.

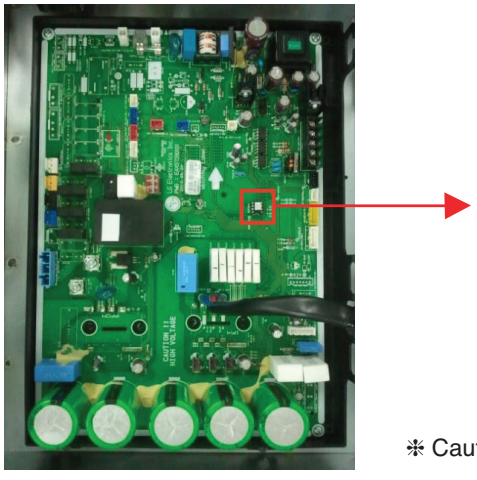
- If the number of indoor units checked during auto addressing and that of indoor units checked during LGMV verification are the same, Check the number of indoor unit communications, and verify whether LED of communication PCB in the corresponding indoor unit blinks.
  If it does not blink, replacing communication PCB shall be considered.
- If the number of indoor units checked during auto addressing and that of indoor units checked during LGMV verification are different,
  1. Check whether power is applied to indoor unit.
  2. If there is no problem in all indoor unit power, auto addressing shall be performed again.
  3. If there is still a problem after auto addressing, consider to replace indoor unit PCB without auto addressing or communication PCB.

* During the replacement of indoor unit PCB, perform auto addressing, and if there is a central controller, input a central control address of indoor unit, and during the replacement of communication PCB, the above work is not necessary.

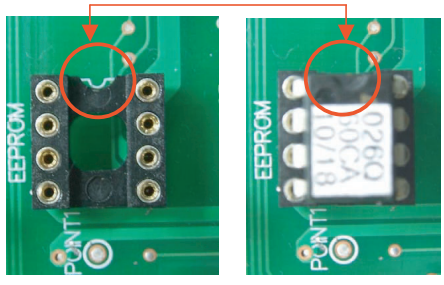
Error No.	Error Type	Error Point	Main Reasons
60	Inverter PCB EEPROM error	EEPROM access error and Check Sum error	1. EEPROM contact defect/ wrong insertion 2. Different EEPROM version 3. Outdoor unit inverter PCB damaged

■ Error diagnosis and countermeasure flow chart





Correct insertion direction of inverter EEPROM

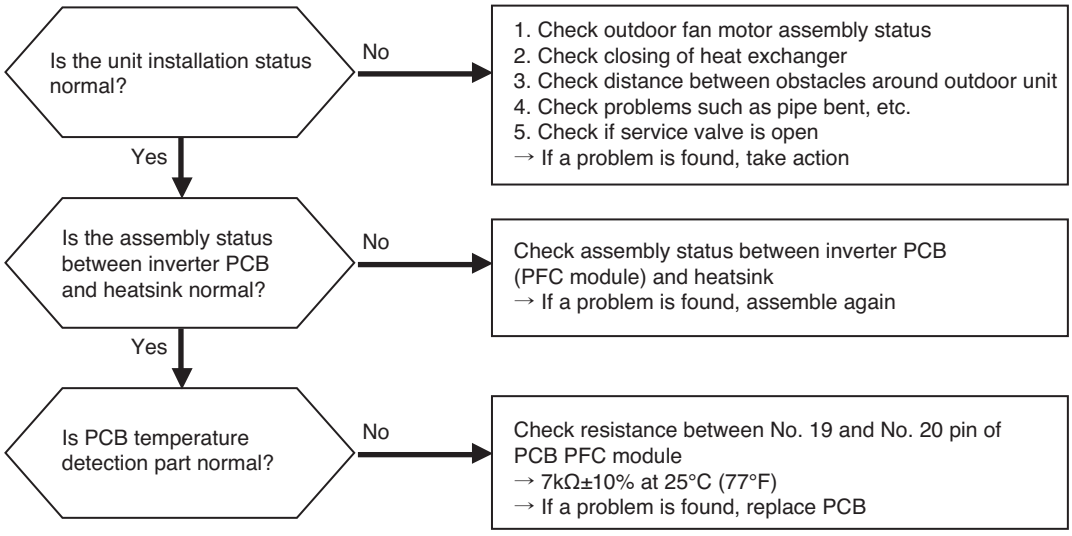


❊ Caution: Make sure to replace after turning off the power

❊ Shapes may be different for each model.

Error No.	Error Type	Error Point	Main Reasons
62	Excessive rise of inverter heatsink temperature	Inverter heatsink temperature is above 95°C	1. Overload operation (pipe blocked / closed / EEV defect / excessive refrigerant) 2. Outdoor unit fan locked 3. Connection fault between inverter PCB and heatsink 4. Inverter PCB defect, temperature detection circuit defect

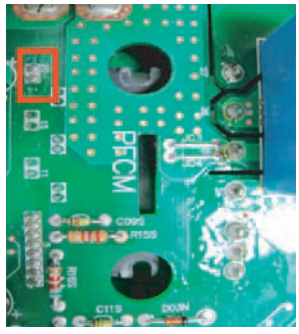
■ Error diagnosis and countermeasure flow chart



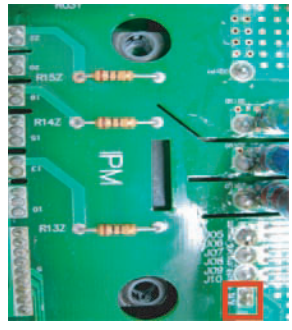
Measuring CT detection part voltage

* How to check PFCM module
1. Set multi tester to diode mode.
2. Check resistance between No. 19 pin and No. 20 pin of PCB PFC module .
3. Resistance value shall be 7kΩ±10% at 25°C (77°F)

PFCM:
Measure resistance between No. 19 and No. 20 pin

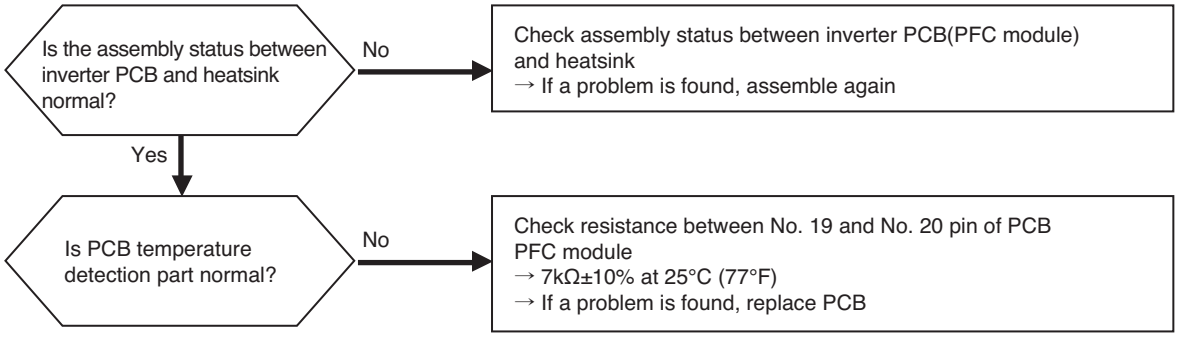


IPM:
Measure resistance between No. 19 and No. 20 pin



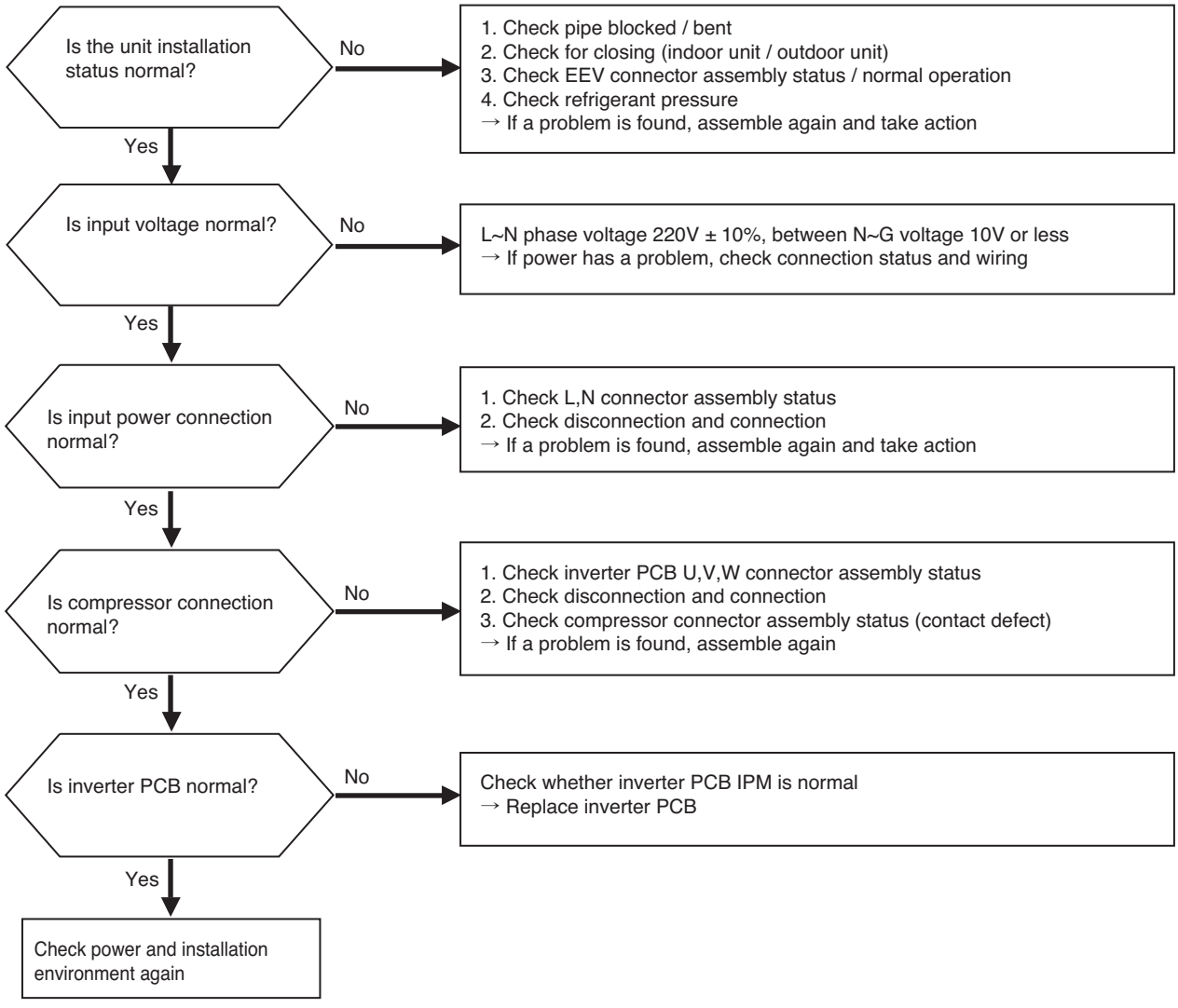
Error No.	Error Type	Error Point	Main Reasons
65	Inverter heatsink temperature sensor defect	Inverter heatsink temperature sensor disconnection or short circuit	1. Assembly status defect between inverter PCB and heatsink 2. Temperature detection part defect (inverter PCB defect)

■ Error diagnosis and countermeasure flow chart

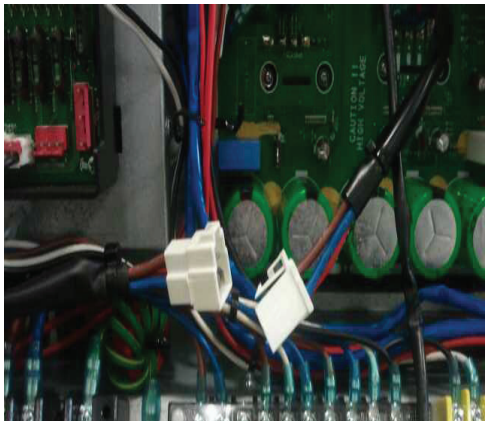


Error No.	Error Type	Error Point	Main Reasons
73	Overcurrent (Peak) detected at inverter input	Inverter PCB input power current value is 50A(Peak) or more for 2ms	1. Overload operation (pipe blocked / outdoor heat exchanger closed / EEV defect / excessive refrigerant) 2. Compressor damaged (insulation destroyed / motor damaged) 3. Abnormal input voltage (L,N) 4. Power cable connection fault 5. Inverter PCB damaged (input current detection part)

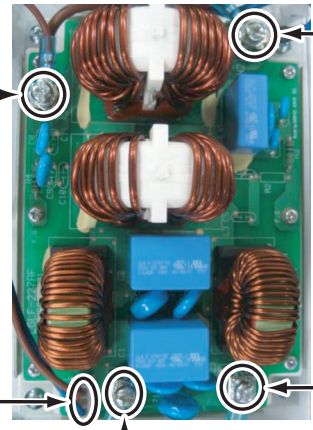
■ Error diagnosis and countermeasure flow chart



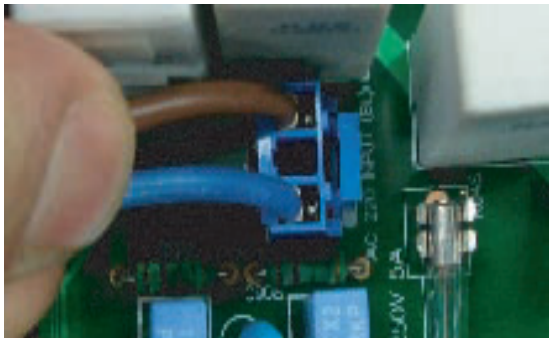
Checking inverter compressor connection



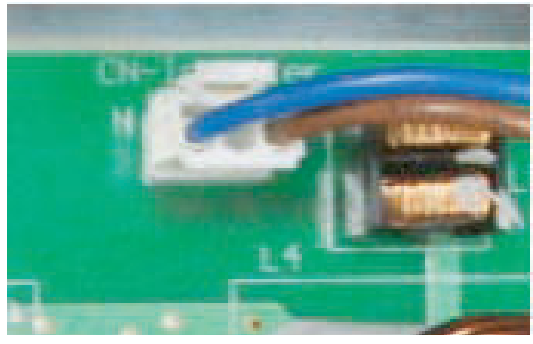
Checking noise filter connection



Checking inverter PCB power connection



Checking connection between noise filter and inverter PCB power



2) Outdoor

Error Indicator

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

Error Display

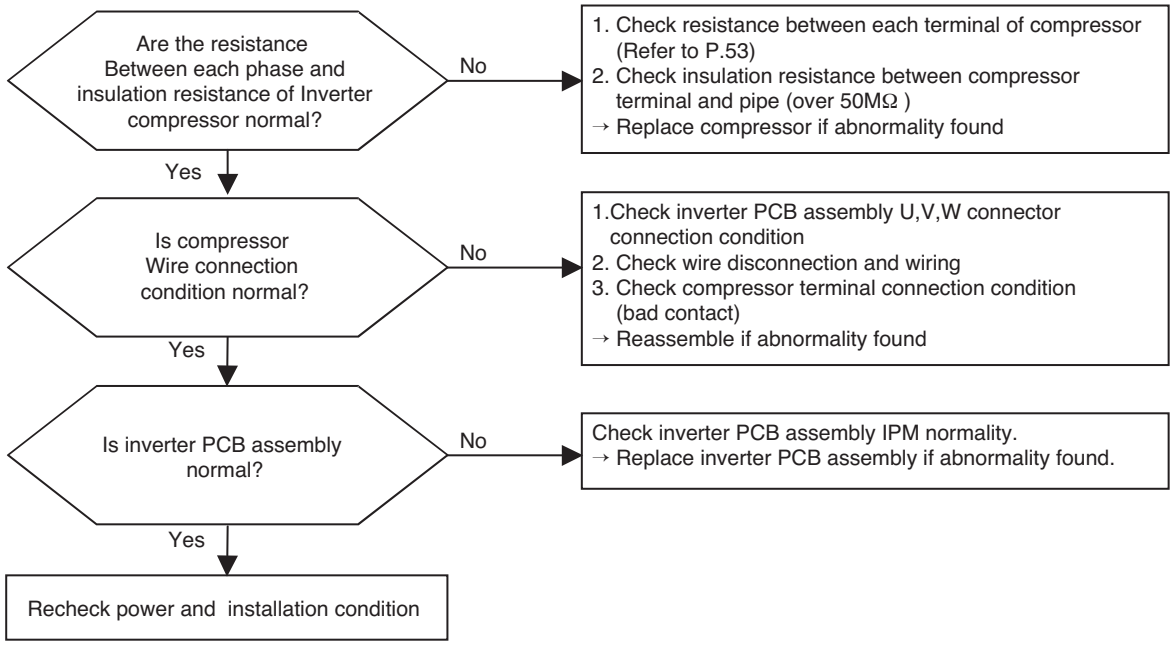
1st,2nd LED of 7-segment indicates error number, 3rd LED indicates unit number.

	Error No.			Error Type	Main Reasons
Outdoor unit related error	2	1	1	Inverter compressor IPM defect	Inverter compressor drive IPM defect / inverter compressor defect
	2	2	1	Inverter compressor overcurrent	Increase of inverter compressor CT value
	2	3	1	Inverter compressor DC Link low voltage	After inverter activation relay is ON, DC voltage recharge defect
	2	4	1	Outdoor Unit High Pressure Switch	System is turned off by outdoor unit high pressure switch.
	2	5	1	High/low Inverter input voltage	Inverter input voltage exceeds the unit limit and lasts for 4 sec. (173V ~ 289V)
	2	6	1	Inverter compressor activation failure	Inverter compressor error, causing initial activation failure
	2	7	1	Inverter PSC/PFC Fault Error	Error by overcurrent at inverter input
	2	8	1	Inverter DC Link high voltage error	Inverter DC voltage recharge, causing compressor OFF
	2	9	1	Inverter compressor overcurrent	Inverter compressor activation failure or increase of CT value
	3	2	1	Excessive rise of inverter compressor discharge temperature	Excessive rise of inverter compressor discharge temperature, causing compressor OFF
	3	4	1	Excessive rise of high pressure of inverter compressor	Excessive rise of high pressure of inverter compressor, causing compressor OFF
	3	5	1	Excessive drop of low pressure of inverter compressor	Excessive drop of low pressure of inverter compressor, causing compressor OFF
	3	6	1	Low pressure ratio error of inverter compressor	High pressure/low pressure ratio of inverter compressor is maintained at below 1.8 for 3 min. or more
	4	0	1	Inverter compressor CT sensor defect	Inverter compressor CT sensor defect
	4	1	1	Inverter compressor discharge pipe temperature sensor defect	Inverter compressor discharge temperature sensor disconnection or short circuit
	4	2	1	Low pressure sensor defect of inverter compressor	Low pressure sensor disconnection or short circuit of inverter compressor
	4	3	1	High pressure sensor defect of inverter compressor	High pressure sensor disconnection or short circuit of inverter compressor
	4	4	1	Inverter inside air temperature sensor defect	Inverter inside air temperature sensor disconnection or short circuit
	4	5	1	Outdoor Unit Heat Exchanger Temperature Sensor Fault	Outdoor Unit Heat Exchanger Temperature Sensor Open or Short

	Error No.	Error Type	Main Reasons
Outdoor unit related error	4 6 1	Inverter compressor suction pipe temperature sensor defect	Inverter compressor suction temperature sensor disconnection or short circuit
	4 9 1	Defective IPM Temperature Sensor	Disconnection or short circuit on IPM temperature sensor of the outdoor unit
	5 2 1	Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Outdoor Unit
	5 3 1	Communication error(indoor unit → outdoor unit main PCB)	Outdoor unit does not receive signal from indoor unit
	5 7 1	Communication error : inverter PCB → Main PCB	Restriction of Outdoor Unit (Inverter PCB)
	6 0 1	Inverter PCB EEPROM error	Inverter PCB EEPROM error
	6 2 1	Excessive rise of inverter heatsink temperature	Inverter PCB heat generation, causing the rise of heatsink temperature
	6 7 1	Outdoor Unit Fan Lock	Restriction of Outdoor Unit Fan
	7 3 1	Overcurrent (Peak) detected at inverter input	Error by overcurrent detection at inverter input
	8 6 1	Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
	8 8 1	PFC PCB EEPROM Error	Communication Fail Between Outdoor Unit PFC MICOM and EEPROM or omitting EEPROM
	1 1 3 1	Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of outdoor unit is open or short
	1 1 5 1	Outdoor Unit Subcooling Outlet Temperature Sensor Error	Outdoor Unit Subcooling Outlet Temperature Sensor open or short
	1 5 1 1	Failure of operation mode conversion at Outdoor Unit	Pressure unbalance between outdoor units

Error No.	Error Type	Error Point	Main Reasons
21	Inverter PCB Assembly 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.Inverter compressor terminal disconnected or loose 5.Inverter PCB assembly damaged 6.ODU input current low

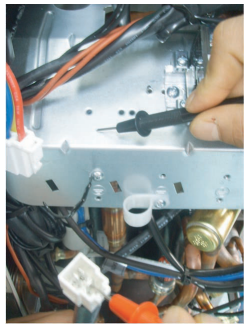
■ Error diagnosis and countermeasure flow chart



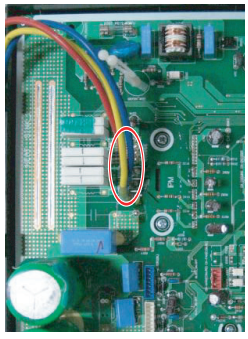
■ 1Ø Model

Measuring resistance between each terminal of compressor

Measuring insulation resistance between Comp output terminal and chassis

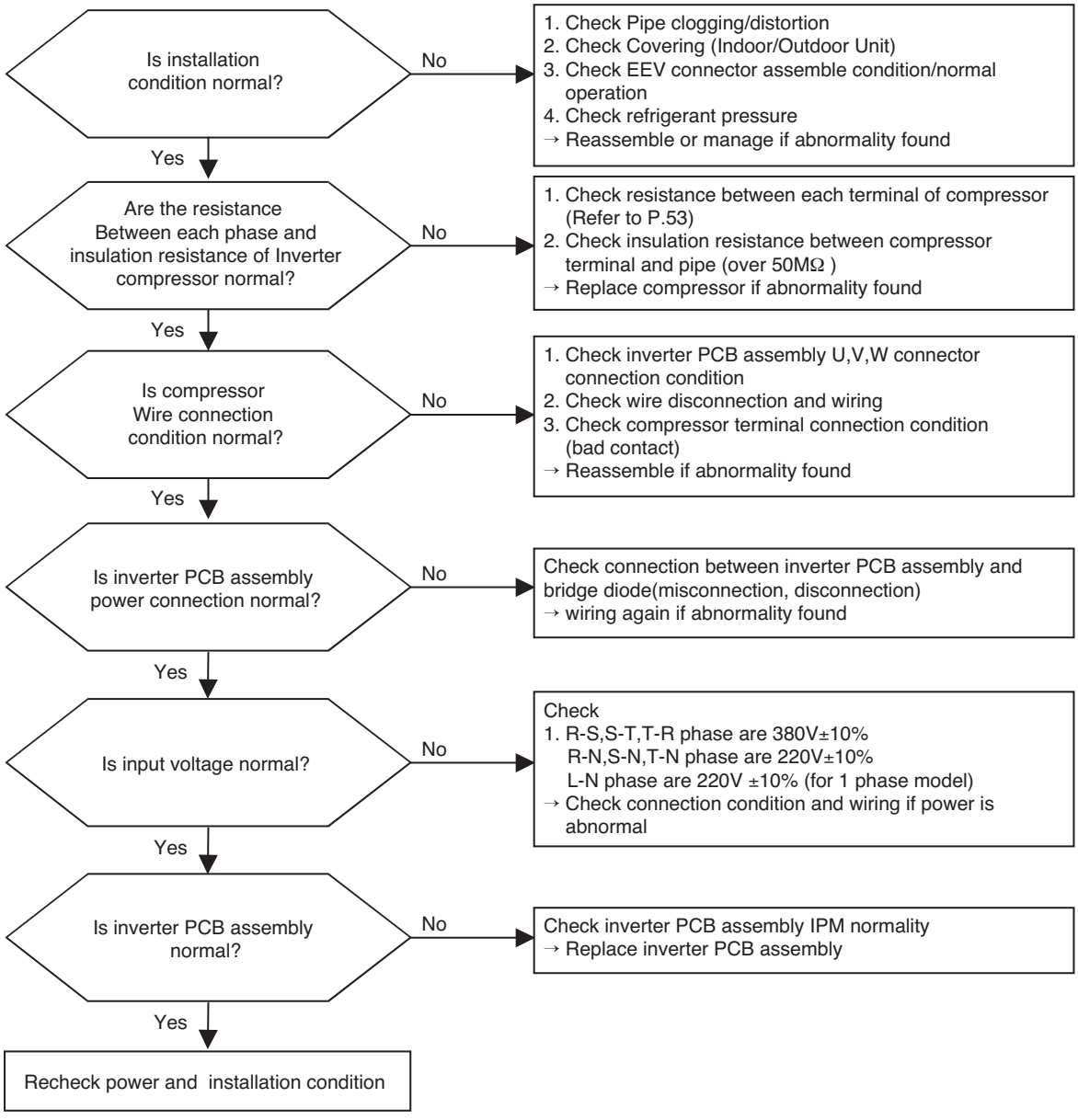


Compressor output terminal joining position



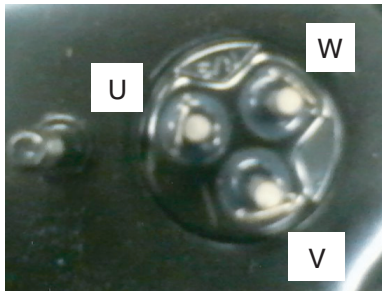
Error No.	Error Type	Error Point	Main Reasons
22	AC Input Current Over Error	Inverter PCB Assembly input power current is over limited value * 1 PHASE : 29A rms	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. Power Line Misconnection 5. Inverter PCB Assembly damage (Input current sensing part)

■ Error Diagnosis and Countermeasure Flow Chart

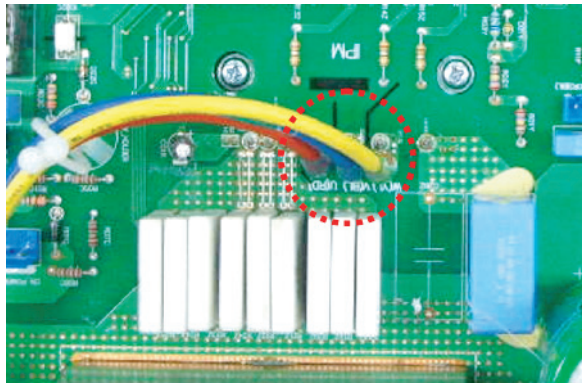


■ 1Ø Model

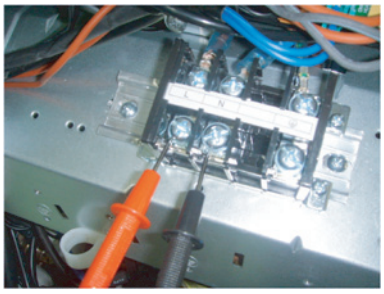
Measuring resistance between each terminal of compressor



Compressor output terminal joining position



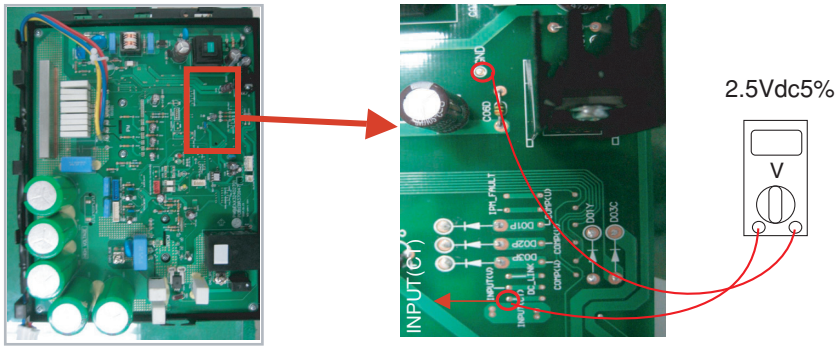
Measuring input voltage



Measuring CT sensing Voltage

■ 1Ø Model

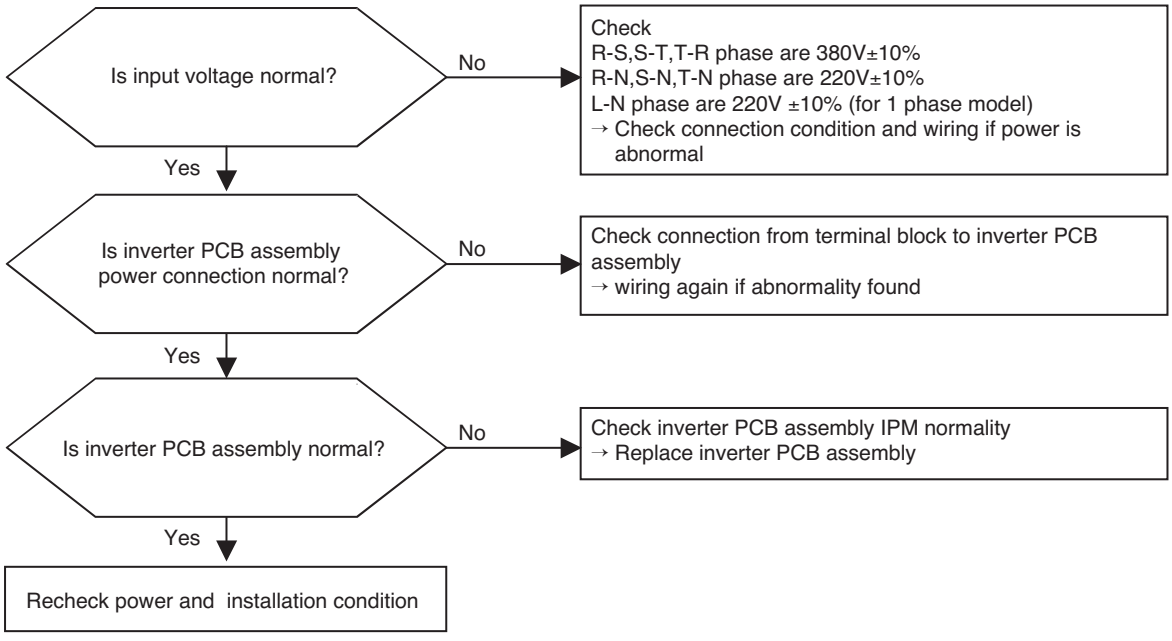
U3 Chassis (2 Fan Model)



<Inverter PCB> <Input Voltage Sensing Check Point>

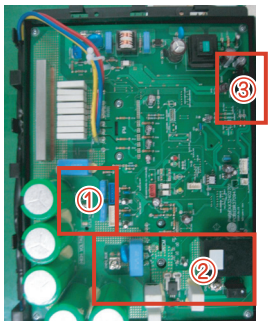
Error No.	Error Type	Error Point	Main Reasons
23	Inverter Compressor DC Link Low Voltage	DC Voltage isn't charged after starting relay on	1. DC Link terminal misconnection/terminal contact fault 2. Starting relay damage 3. Condenser damage 4. Inverter PCB assembly damage (DC Link voltage sensing part) 5. Input voltage low

■ Error Diagnosis and Countermeasure Flow Chart

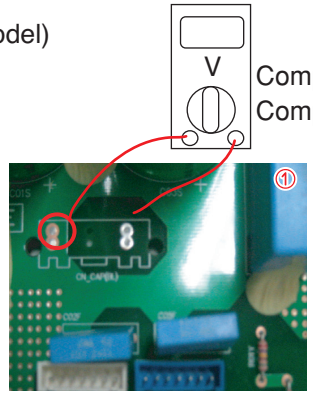


■ 1Ø Model

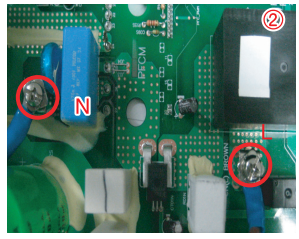
U3 Chassis (2 Fan Model)



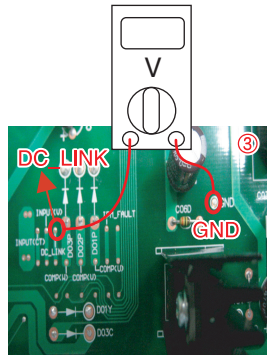
<Inverter PCB>



Comp off : 280V
Comp on : 340V
<DC Link Voltage Check Point>

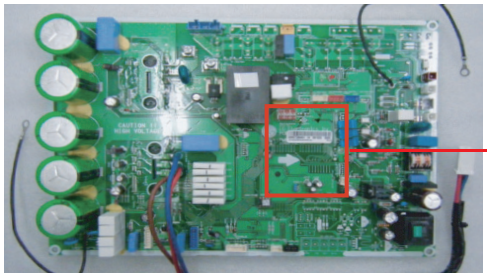


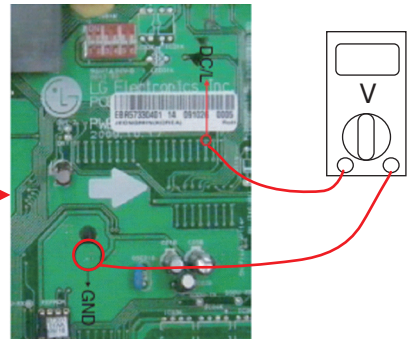
<Connection Check Point>



<DC_LINK Sensing Check Point>

U4 Chassis (1 Fan Model)

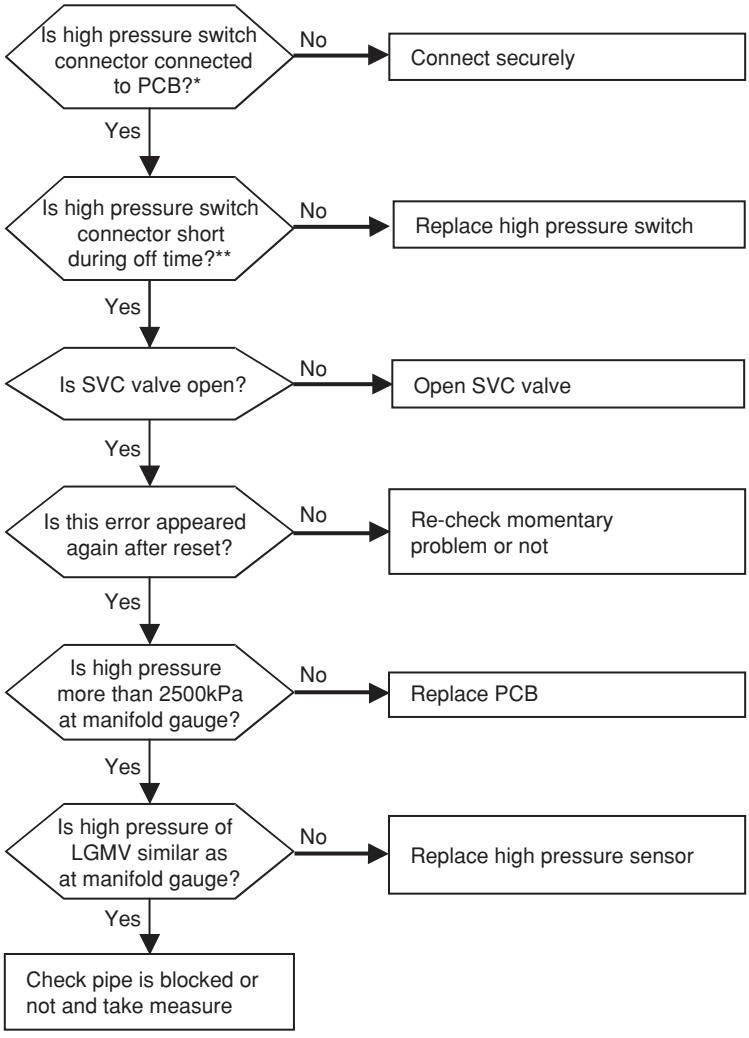




2.4Vdc~2.8Vdc

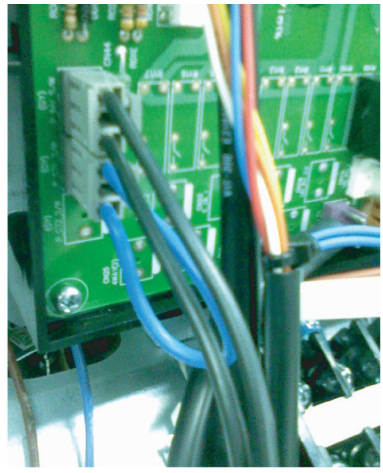
Error No.	Error Type	Error Point	Main Reasons
24	Excessive rise of discharge pressure in outdoor compressor	Compressor off due to the high pressure switch in outdoor unit	1. Defective high pressure switch 2. Defective fan of indoor unit or outdoor unit 3. Check valve of compressor clogged 4. Pipe distortion due to the pipe damage 5. Refrigerant overcharge 6. Defective EEV at the indoor or outdoor unit . 7. Covering or clogging(Outdoor covering during the cooling mode /Indoor unit filter clogging during the heating mode) 8. SVC valve clogging 9. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart

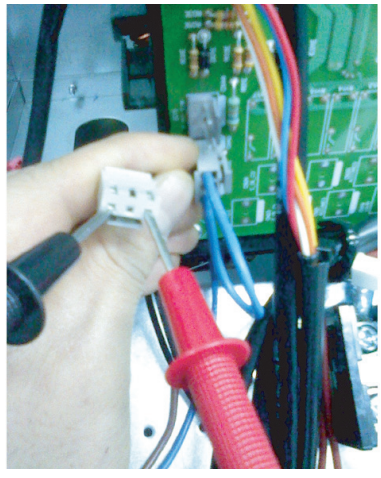


*Connector location of high pressure switch at PCB

Main PCB

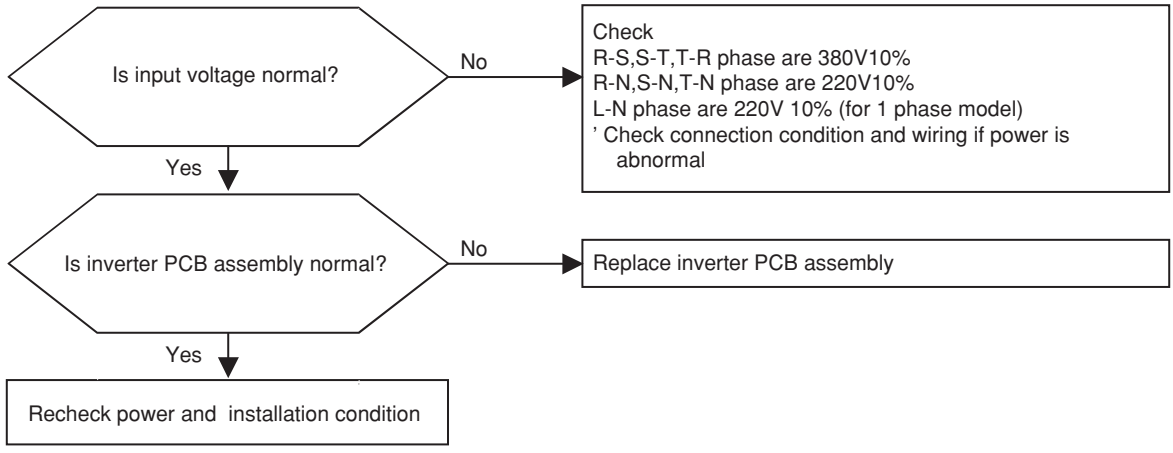


**Checking short or not at connector of high pressure switch



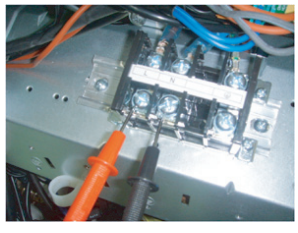
Error No.	Error Type	Error Point	Main Reasons
25	Input Voltage high/low	Input voltage is over limited value of the product (173V or less, 289V or more)	1. Input voltage abnormal (R-N or T-N)(L-N) 2. Outdoor unit inverter PCB assembly damage (input voltage sensing part)

■ Error Diagnosis and Countermeasure Flow Chart

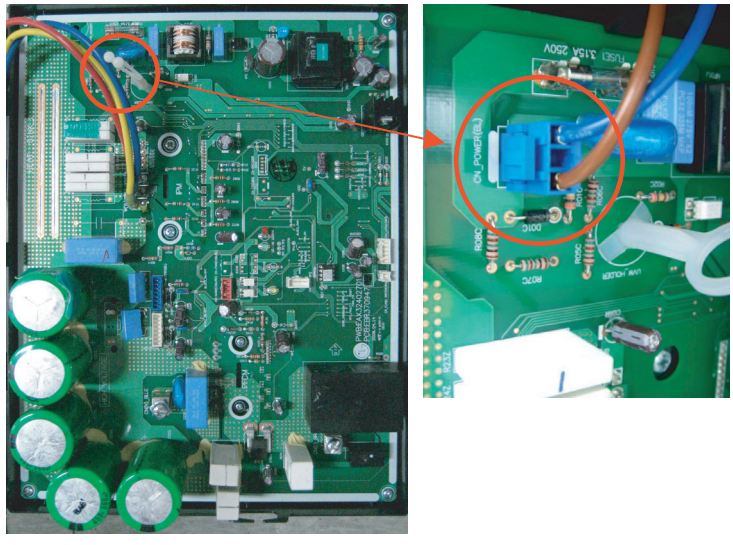


■ 1Ø Model
U3 Chassis (2 Fan Model)

Measuring input voltage



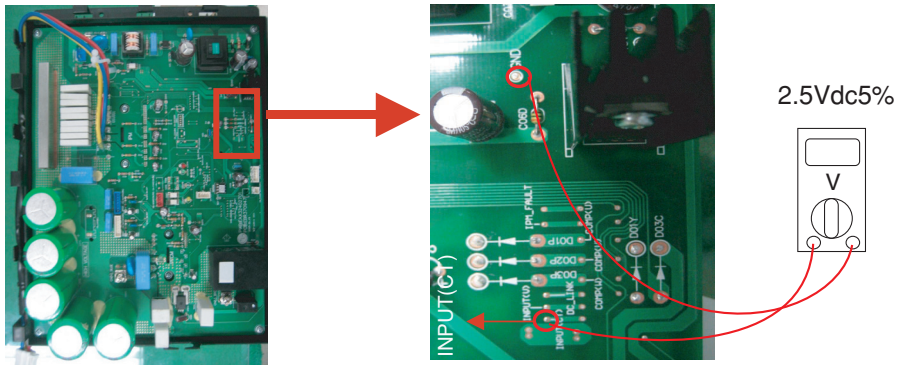
Inverter PCB assembly power wiring



Measuring Input Voltage Sensing

■ 1Ø Model

U3 Chassis (2 Fan Model)

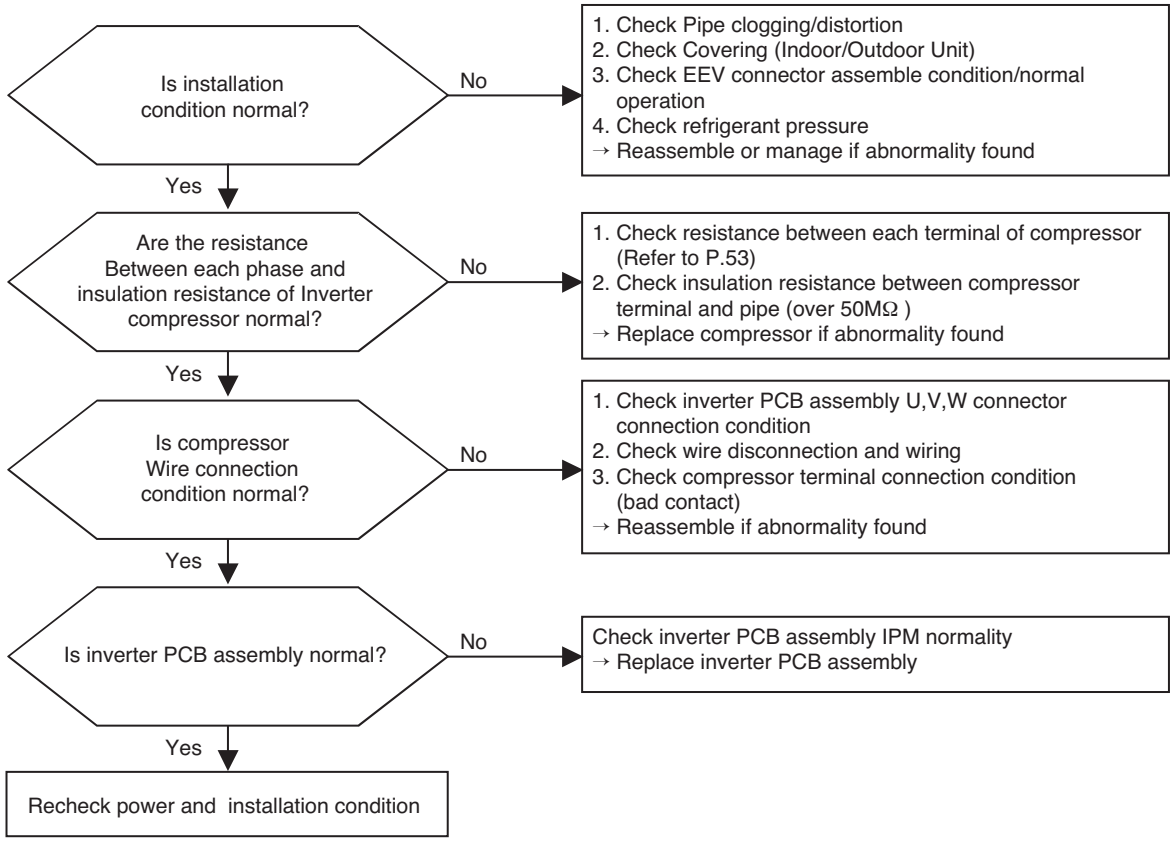


<Inverter PCB>

<Input Voltage Sensing Check Point>

Error No.	Error Type	Error Point	Main Reasons
26	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. ODU inverter PCB damage (CT)

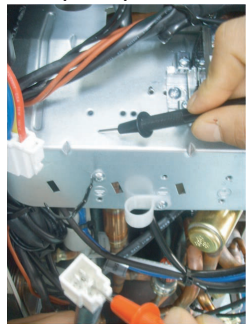
■ Error Diagnosis and Countermeasure Flow Chart



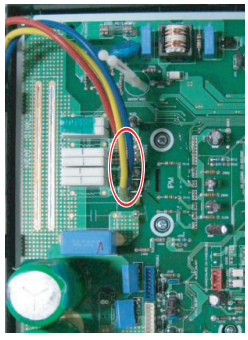
■ 1Ø Model

Measuring resistance between each terminal of compressor

Measuring insulation resistance between Comp output terminal and chassis

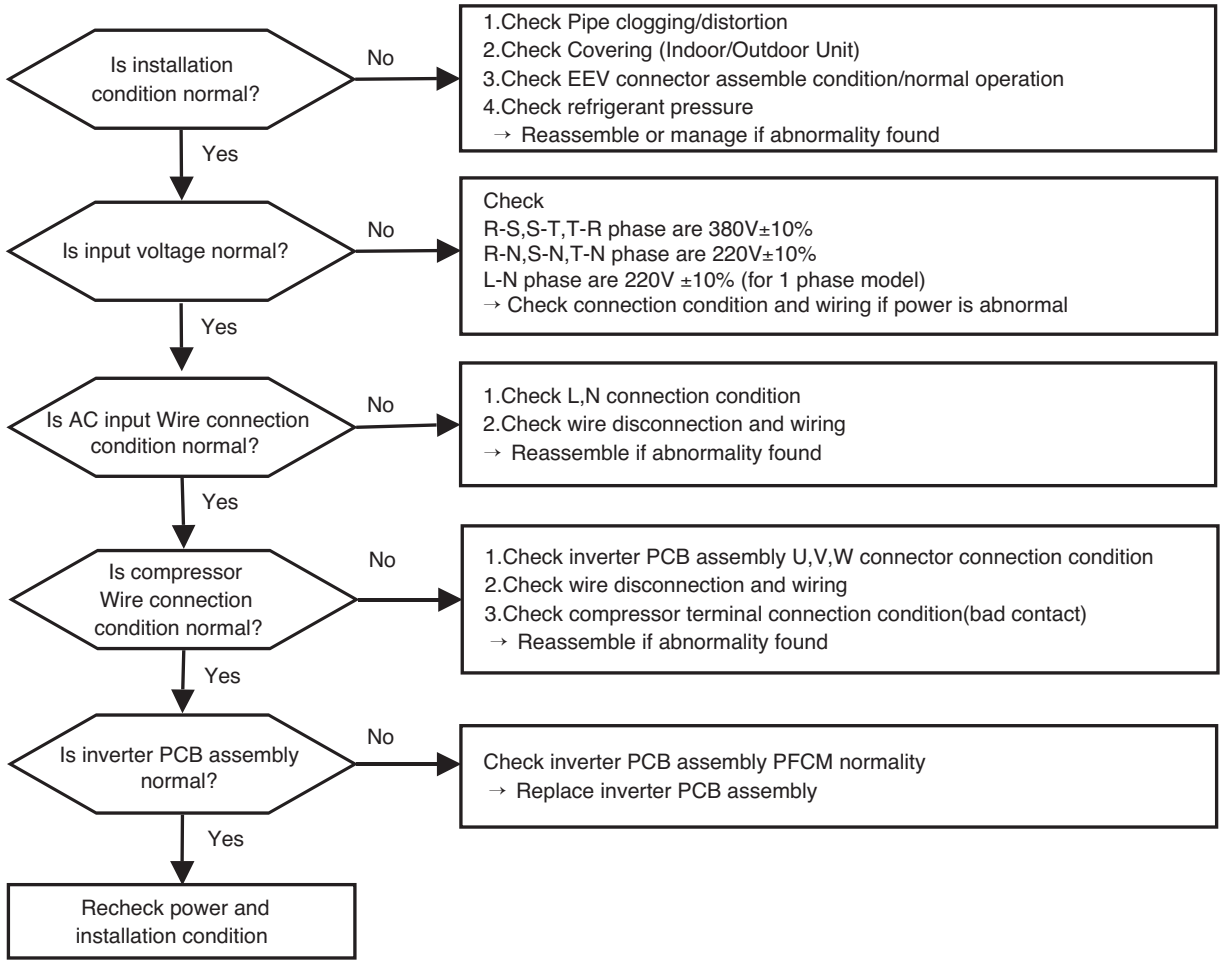


Compressor output terminal joining position



Error No.	Error Type	Error Point	Main Reasons
27	AC input instant over current error	Inverter PCB input power current is over * 1 PHASE : 100A peak	1.Overload operation (Pipe clogging/ Covering/EEV defect/Ref. overcharge) 2.Compressor damage (Insulation damage/Motor damage) 3.Input voltage abnormal (L,N)(R,S,T,N) 4.Power line assemble condition abnormal 5.Inverter PCB assembly Damage (input current sensing part)

■ Error Diagnosis and Countermeasure Flow Chart



Measuring Method

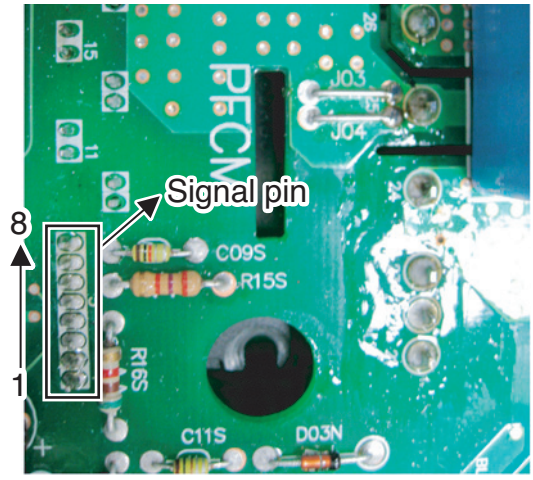
■ 1Ø Model

❈ PFCM Moudle checking method

① Set the multi tester to diode mode.

② Check short between input signal pin which are placed below PFC Module

③ Replace PCB assembly if it is short between pins except No.4,5 pins.

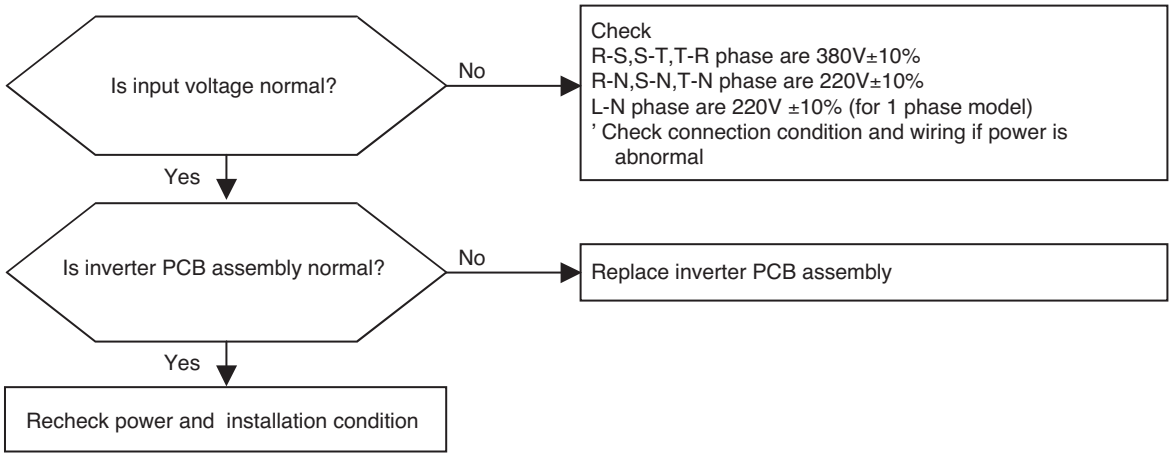


⚠ CAUTION

PFCM module No.4,5 pins are internal short state.

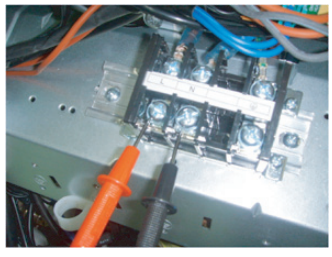
Error No.	Error Type	Error Point	Main Reasons
28	Inverter DC link high voltage error	Inv PCB DC link voltage supplied over 780V	1. Input voltage abnormal (L~N)(R,S,T,N) 2. ODU inverter PCB damage (DC Link voltage sensing part)

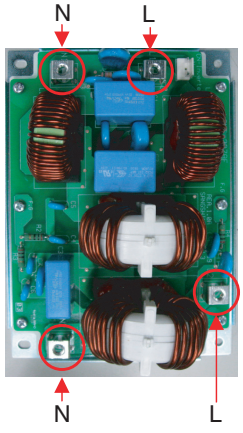
■ Error Diagnosis and Countermeasure Flow Chart



■ 1Ø Model

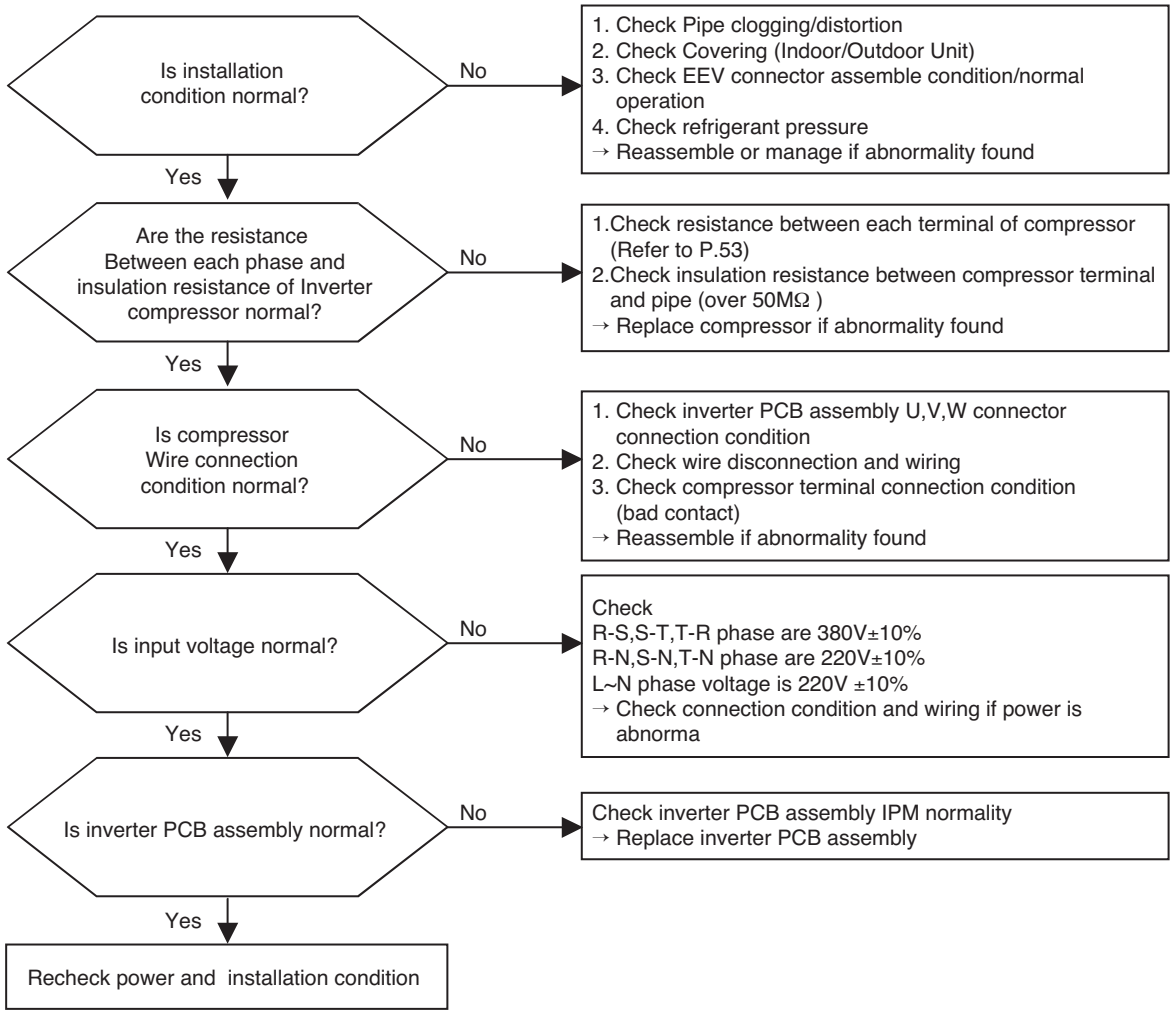
Measuring input voltage



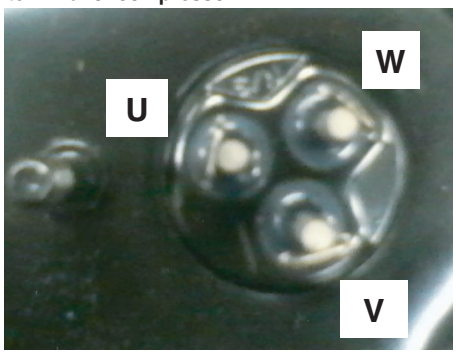


Error No.	Error Type	Error Point	Main Reasons
29	Inverter compressor over current	Inverter compressor input current is over * 1 PHASE : 35A peak	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU inverter PCB assembly damage

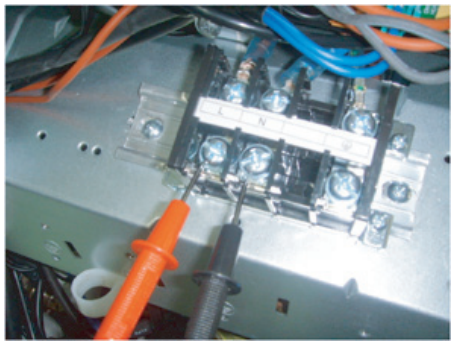
■ Error Diagnosis and Countermeasure Flow Chart



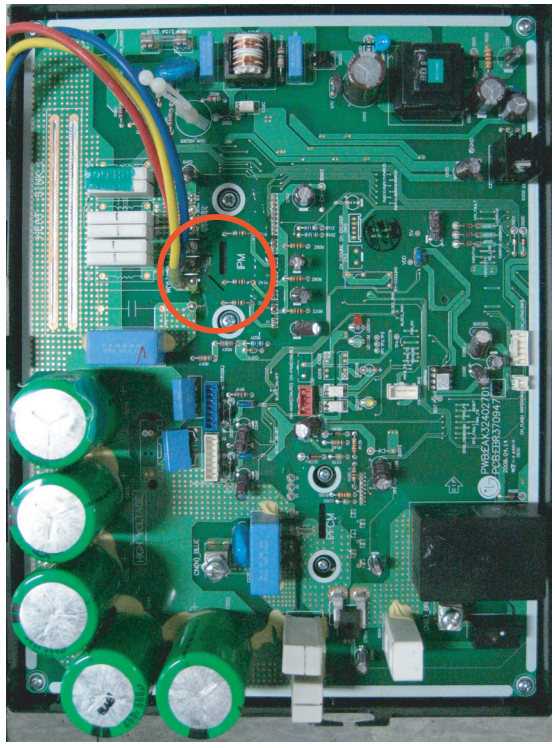
Measuring resistance between each terminal of compressor



Measuring input voltage

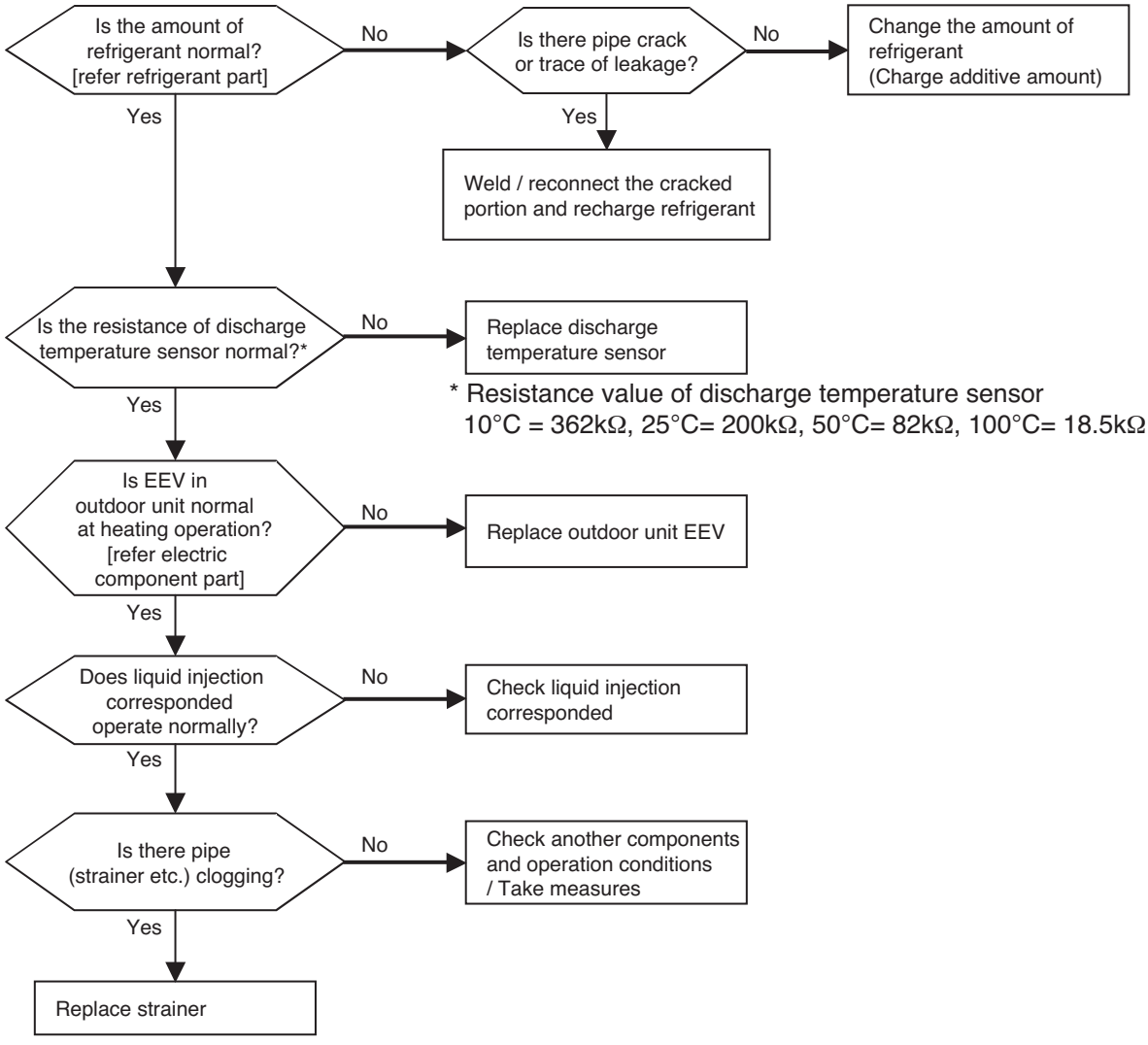


Compressor output terminal joining position



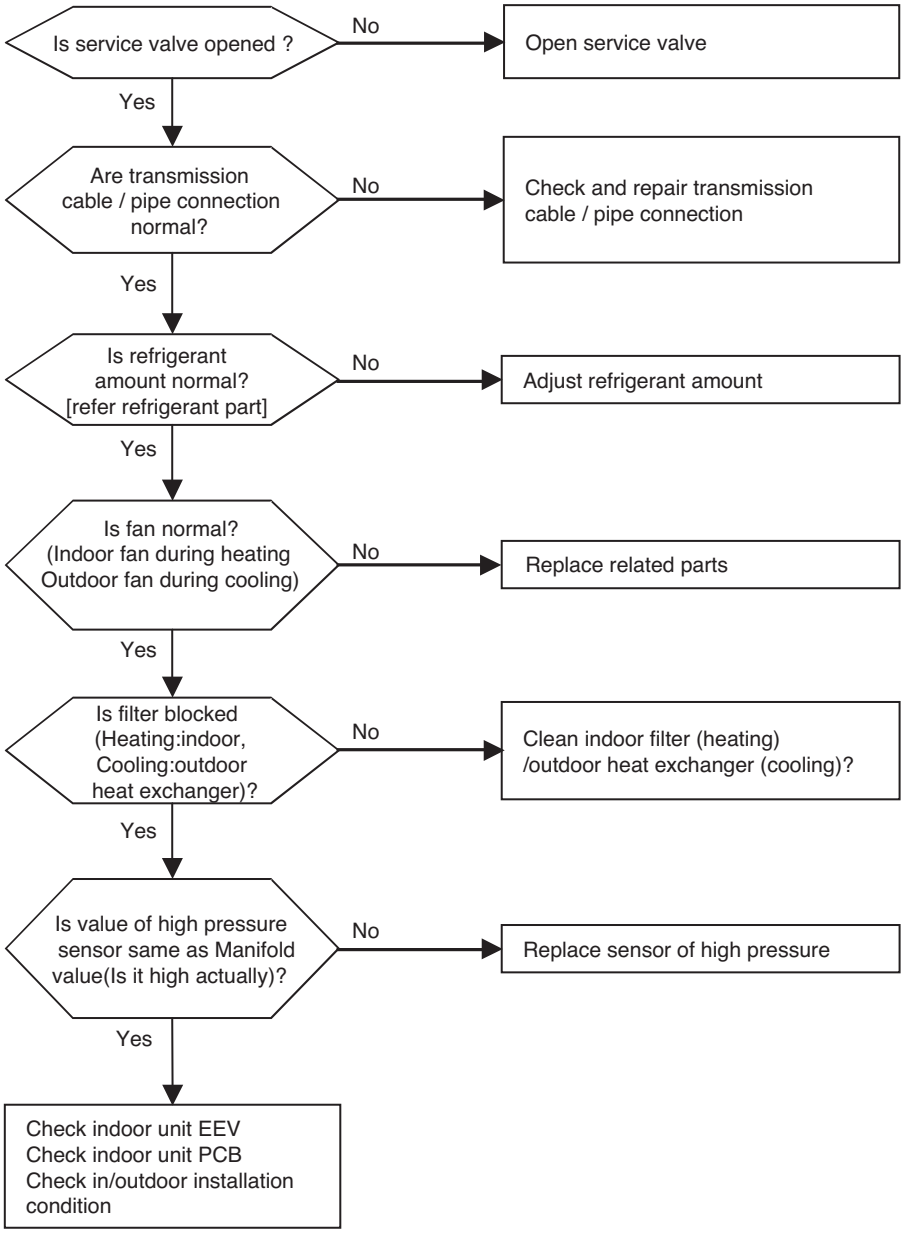
Error No.	Error Type	Error Point	Main Reasons
32	Over-increase discharge temperature of inverter compressor at main outdoor unit	Compressor is off because of over-increase discharge temperature of inverter compressor	1. Temperature sensor defect of inverter compressor discharge pipe 2. Refrigerant shortage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

■ Error diagnosis and countermeasure flow chart



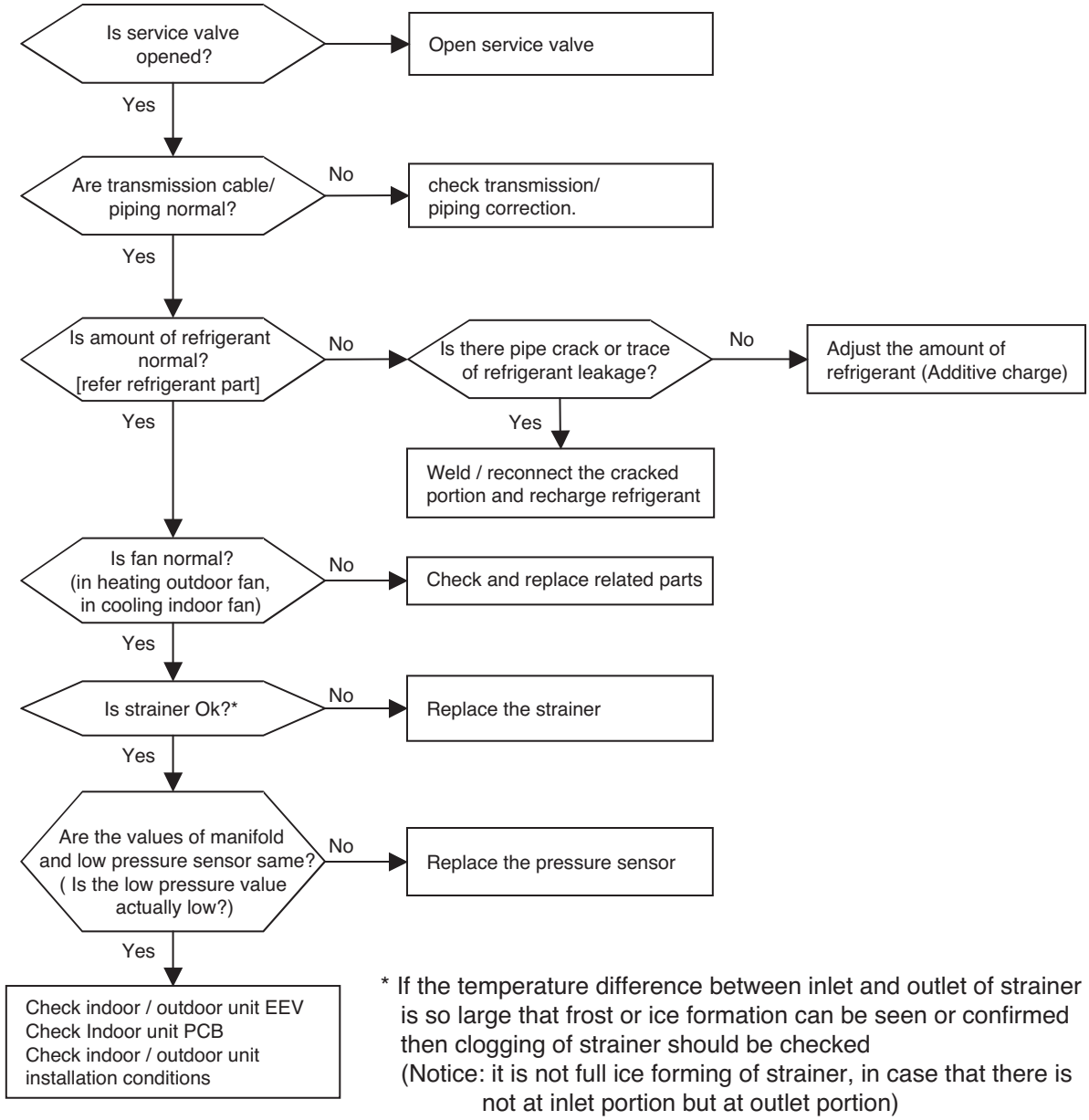
Error No.	Error Type	Error Point	Main Reasons
34	Over-increase of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to over-increase of high pressure by high pressure sensor	1. Defect of high pressure sensor 2. Defect of indoor or outdoor unit fan 3. Deformation because of damage of refrigerant pipe 4. Over-charged refrigerant 5. Defective indoor / outdoor unit EEV 6. When blocked - Outdoor unit is blocked during cooling - Indoor unit filter is blocked during heating 7. SVC valve is clogged 8. PCB defect of outdoor unit 10. Indoor unit pipe temperature sensor defect

■ Error diagnosis and countermeasure flow chart



Error No.	Error Type	Error Point	Main Reasons
35	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	1. Defective low pressure sensor 2. Defective outdoor/indoor unit fan 3. Refrigerant shortage/leakage 4. Deformation because of damage of refrigerant pipe 5. Defective indoor / outdoor unit EEV 6. Covering / clogging (outdoor unit covering during the cooling mode/ indoor unit filter clogging during heating mode) 7. SVC valve clogging 8. Defective outdoor unit PCB 9. Defective indoor unit pipe sensor

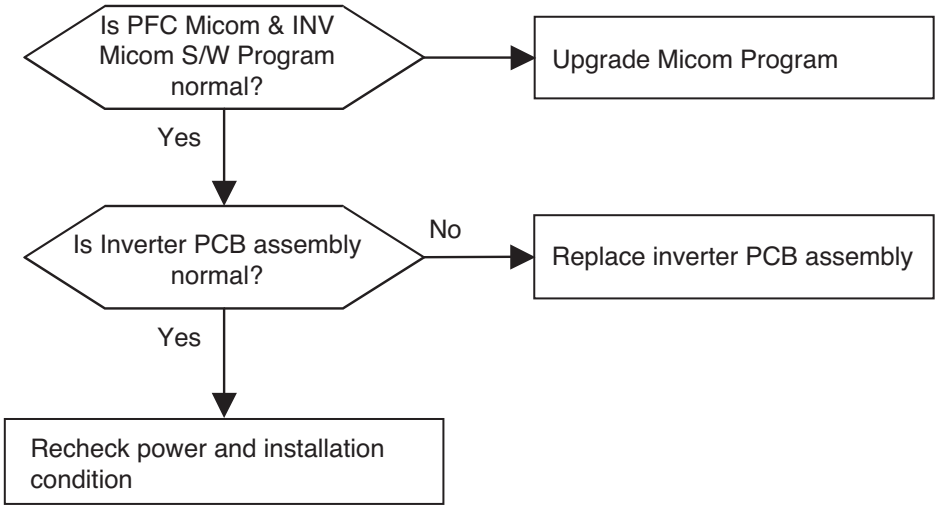
■ Error diagnosis and countermeasure flow chart



* If the temperature difference between inlet and outlet of strainer is so large that frost or ice formation can be seen or confirmed then clogging of strainer should be checked
(Notice: it is not full ice forming of strainer, in case that there is not at inlet portion but at outlet portion)

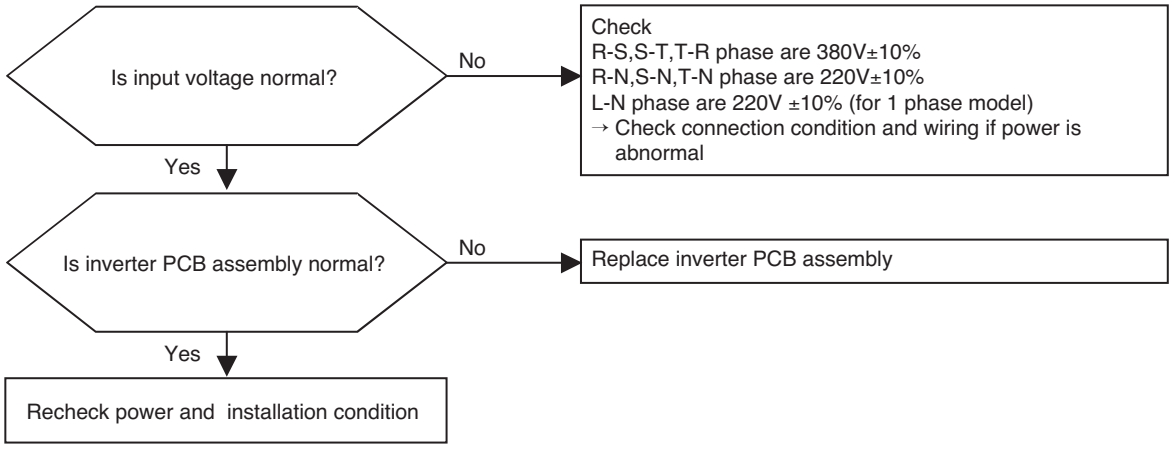
Error No.	Error Type	Error Point	Main Reasons
39	Transmission Error Between (PFC Micom → INV Micom)	Communication Error Between PFC Micom and INV Micom.	1. Micom defect/Circuit defect 2. Different Micom S/W Version 3. ODU inverter PCB assembly damage

■ Error diagnosis and countermeasure flow chart



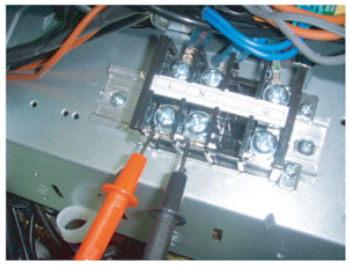
Error No.	Error Type	Error Point	Main Reasons
40	CT sensor error	Micom input voltage isn't within 2.5V ±0.3V at initial state of power supply	1. Input voltage abnormal (T-N) 2. ODU inverter PCB damage (CT sensing part)

■ Error Diagnosis and Countermeasure Flow Chart



■ 1Φ Model

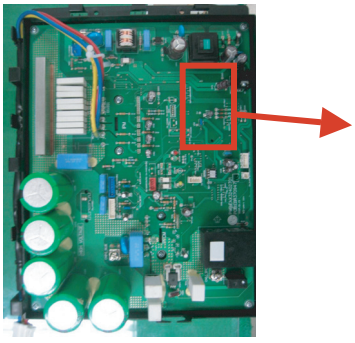
Measuring input voltage



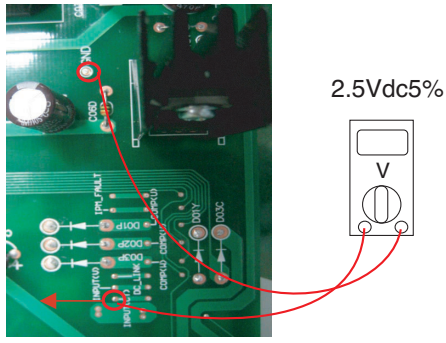
Measuring CT sensing Voltage

■ 1Ø Model

U3 Chassis (2 Fan Model)



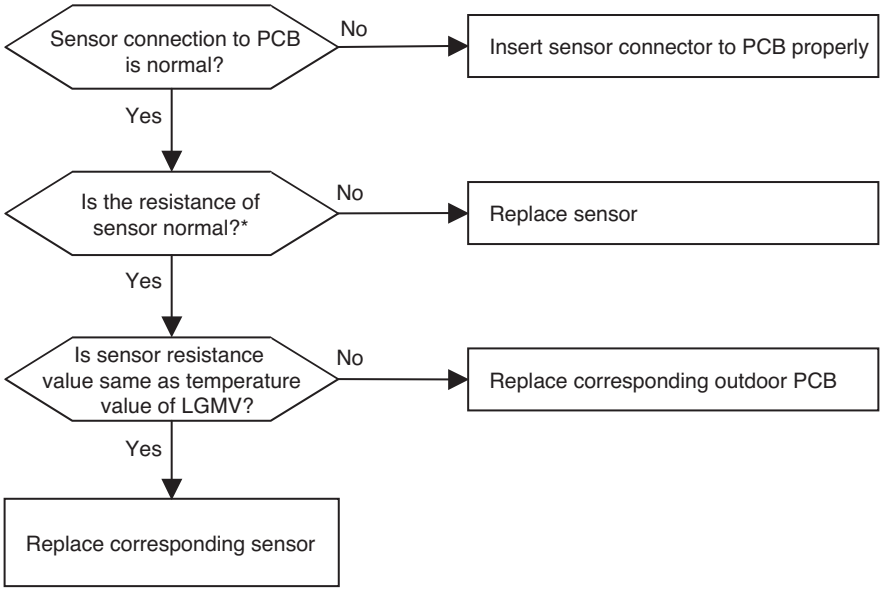
<Inverter PCB>



<Input Voltage Sensing Check Point>

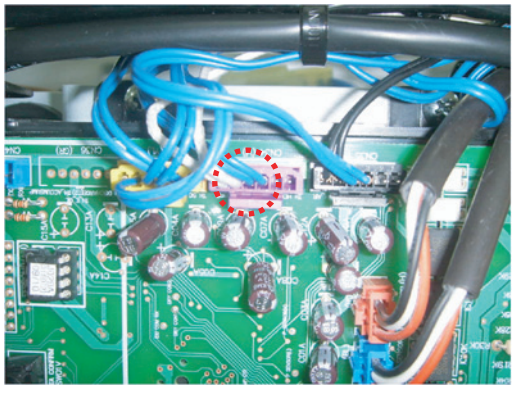
Error No.	Error Type	Error Point	Main Reasons
41	Compressor discharge pipe temperature sensor error	Sensor measurement valve is abnormal (Open/Short)	1. Defective connection of the compressor discharge pipe temperature sensor 2. Defective discharge pipe compressor sensor of the compressor (open/short)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

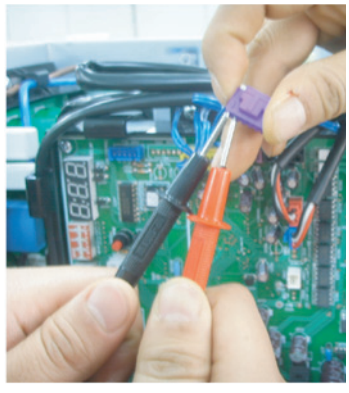
■ Error diagnosis and countermeasure flow chart



* Error is generated if the resistance is more than 5MΩ(open) and less than 2kΩ (short)

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

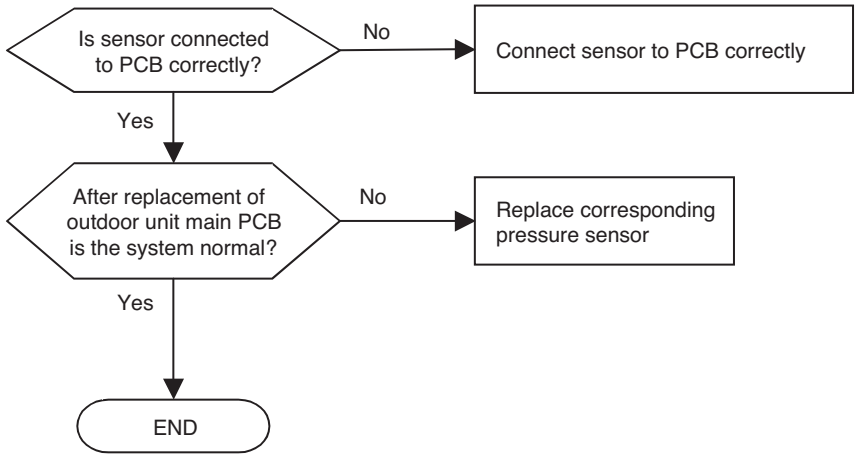


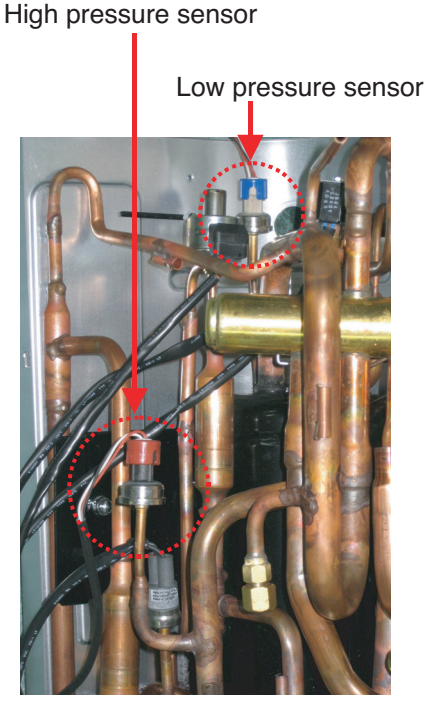


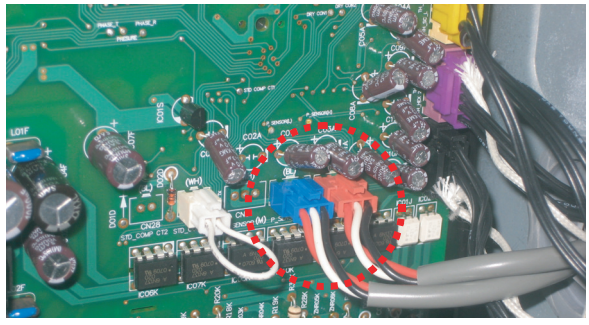
Check the resistance inverter compressor discharge temperature sensor

Error No.	Error Type	Error Point	Main Reasons
42	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
43	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

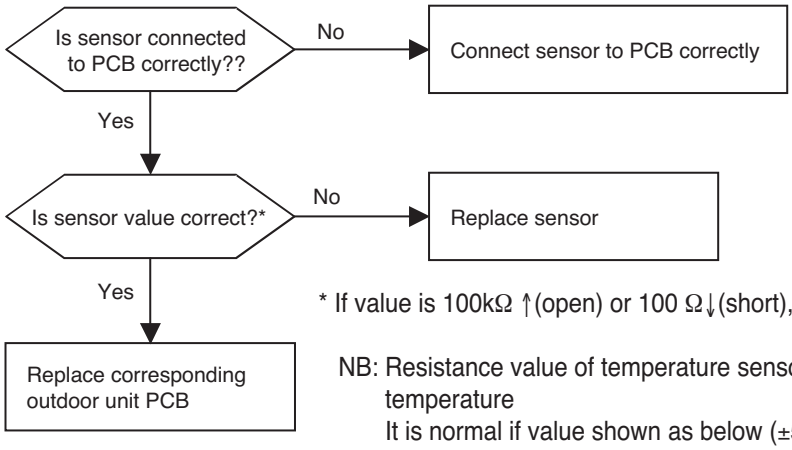






Error No.	Error Type	Error Point	Main Reasons
44	Sensor error of outdoor air temperature	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
45	Outdoor unit heat exchanger temperature sensor error	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
46	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

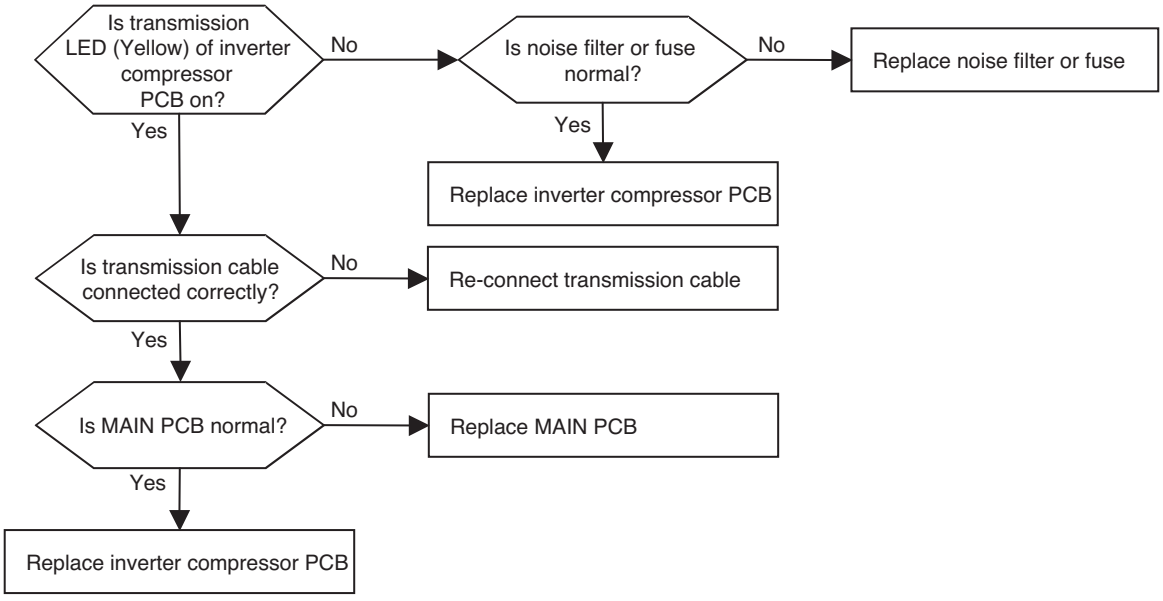


* If value is 100kΩ ↑(open) or 100 Ω↓(short), error occurs

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

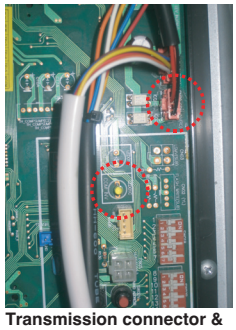
Error No.	Error Type	Error Point	Main Reasons
52	Transmission error between (Inverter PCB ➔ Main PCB)	Main controller can't receive signal from inverter controller	1. Power cable or transmission cable is not connected 2. Defect of outdoor Main fuse/Noise Filter 3. Defect of outdoor Main / inverter PCB

■ Error diagnosis and countermeasure flow chart

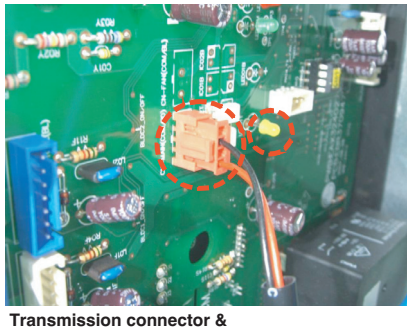


■ 1Ø Model

The method of checking MAIN PCB and inverter compressor PCB (If normal, transmission LED blinks)



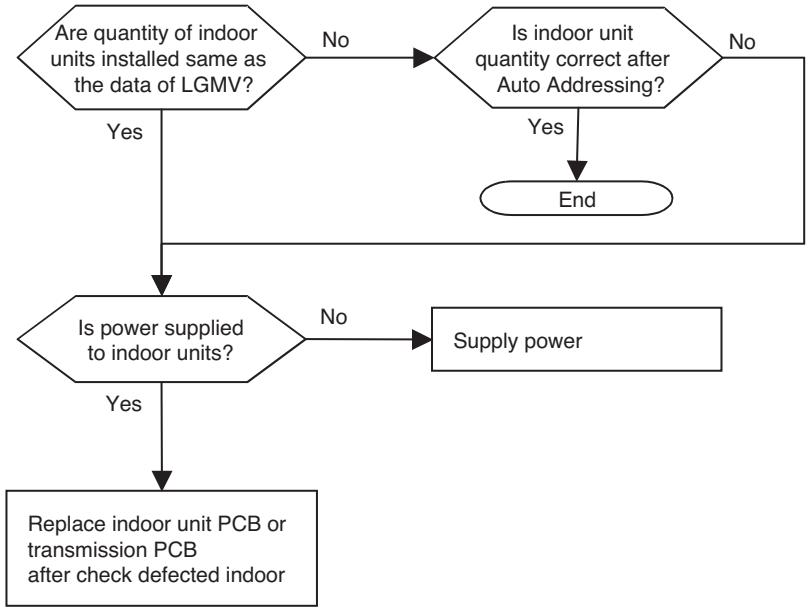
Transmission connector & LED in MAIN PCB



Transmission connector & LED in inverter compressor PCB

Error No.	Error Type	Error Point	Main Reasons
53	Transmission error (Indoor unit ➔ Main PCB)	In case Main PCB can't receive signal from indoor unit	1. Transmission cables are not connected 2. Transmission cables are short / open 3. Defect of outdoor Main / indoor PCB

■ Error diagnosis and countermeasure flow chart



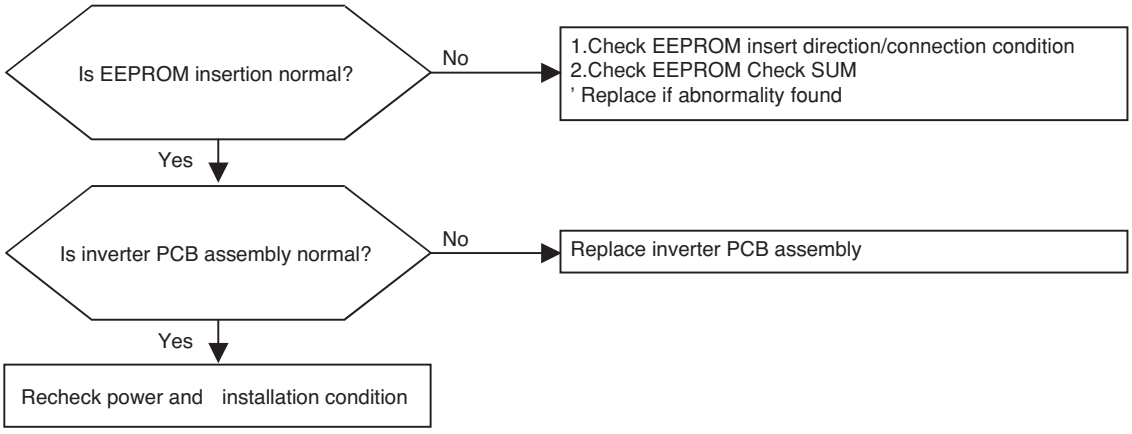
In case of CH53, almost happened with CH05, the indoor units not operated actually are normal so check with same method of CH05. and additionally check as shown as below and above flow chart

- Although the quantity of indoor units installed is same as LGMV data there may be a few indoor units with which the number of transmission is not increased with LGMV
- Although the quantity of indoor units installed is not same as LGMV data, and if transmission 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 transmission cable or power cable
  ② fault of power / PCB / transmission cable
  ③ duplication of indoor unit number
- If transmission 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

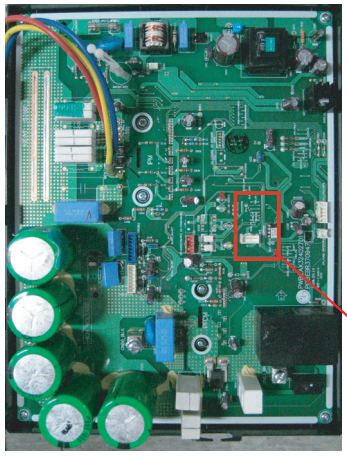
- After replacement of indoor unit PCB, Auto Addressing should be done, if central controller is installed then the central control address also should be input.
  In case that only transmission PCB is replaced above process is not needed

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

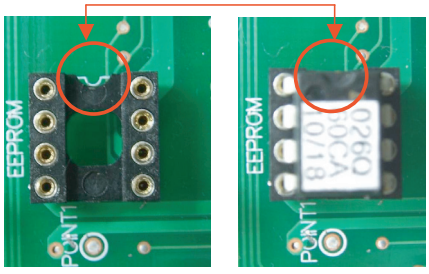
■ Error Diagnosis and Countermeasure Flow Chart



1Ø Model



Right inserting direction of inverter EEPROM

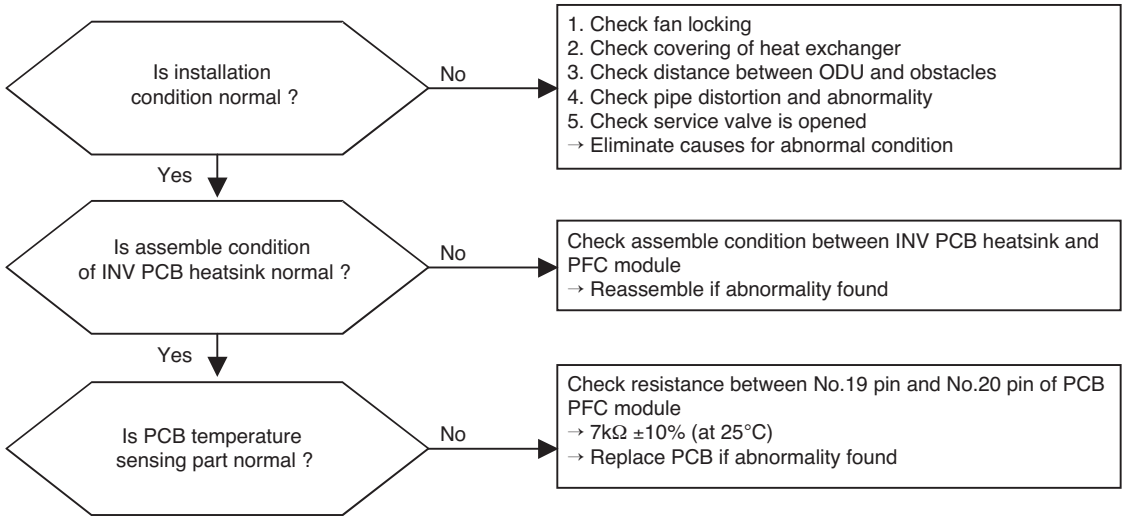


❉ Note : Replace after power off

EEPROM enlarged picture

Error No.	Error Type	Error Point	Main Reasons
62	Heatsink High error	Inverter PCB heatsink temperature is over 95˚C	1. Cooling Fan not operating. 2. Overload operation (Pipe clogging/ Covering/EEV defect/Ref. overcharge) 3. ODU fan locking 4. Heatsink assembly of INV PCB assemble condition abnormal 5. Defect of temperature sensing circuit part defect of INV PCB

■ Error Diagnosis and Countermeasure Flow Chart



Measuring CT sensing Voltage

■ 1Ø Model

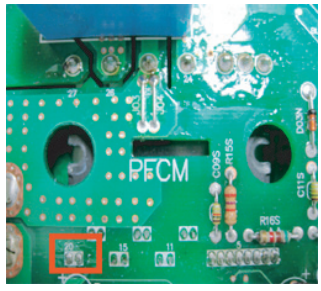
❊ PFCM Module checking method

① Set the multi tester to diode mode.

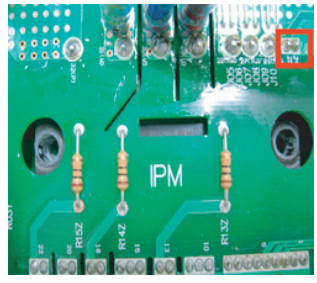
② Check resistance between No.19 pin and No.20 pin of PCB PFC module

③ Resistance value should be in 7kΩ ±10%.(at 25°C).

PFCM :
Measuring resistance
between No.19,20 pin

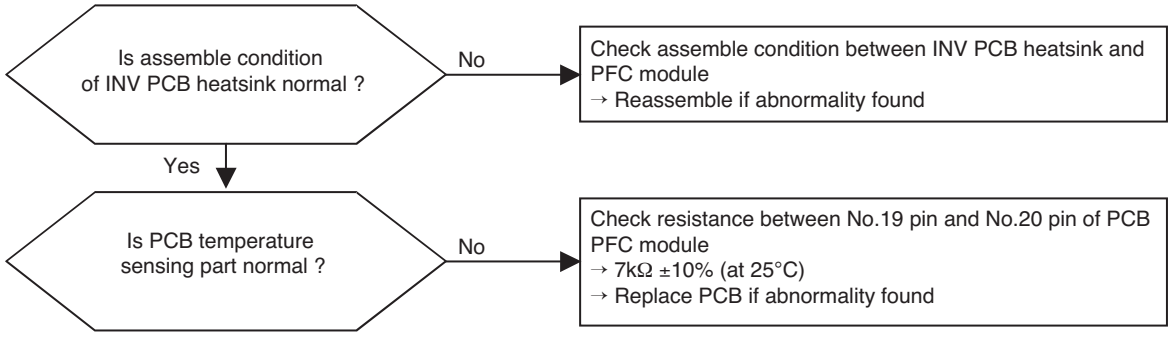


IPM :
Measuring resistance
between No.19,20 pin



Error No.	Error Type	Error Point	Main Reasons
65	Heatsink TH error	Inverter PCB heatsink sensor is open or short	1. Heatsink assembly of INV PCB assemble condition abnormal 2. Defect of temperature sensing circuit part defect of INV PCB

■ Error Diagnosis and Countermeasure Flow Chart



Check method

■ 1Ø Model

❊ PFCM Module checking method

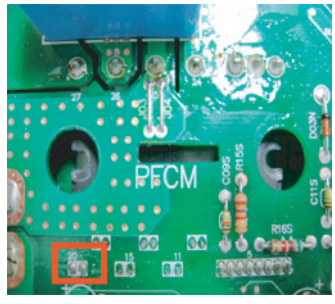
① Set the multi tester to diode mode.

② Check resistance between No.19 pin and No.20 pin of PCB PFC module

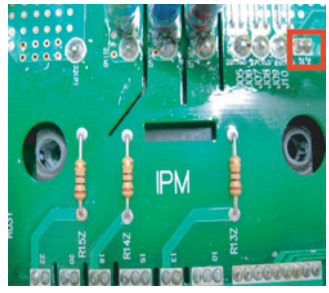
③ Resistance value should be in 7kΩ ±10%.(at 25°C).

④ Check PFC Module No.19,20 and IPM Module Pin soldering condition

PFCM :
Measuring resistance between No.19,20 pin

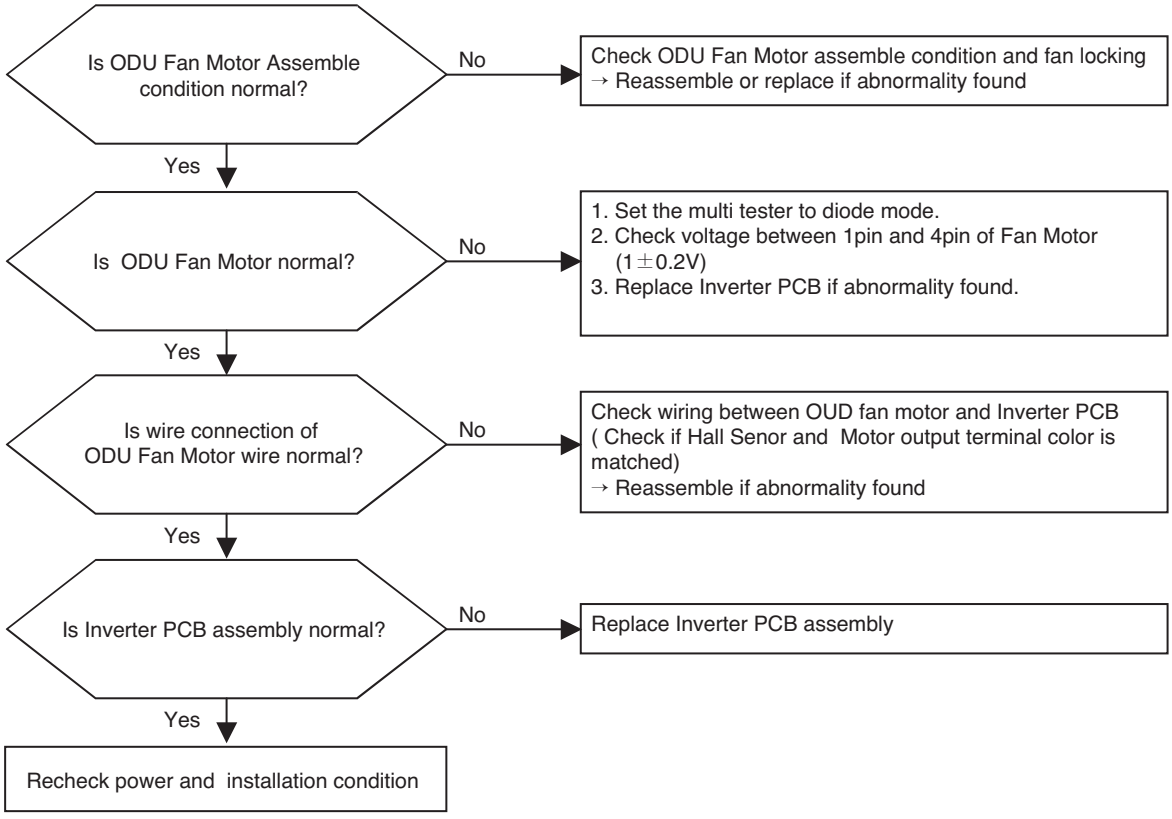


IPM :
Measuring resistance between No.19,20 pin

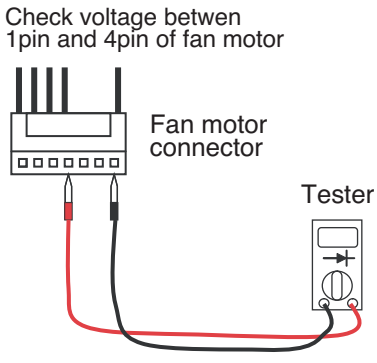


Error No.	Error Type	Error Point	Main Reasons
67	Fan Lock Error	Fan RPM is 10RPM or less for 5 sec. when ODU fan starts or 40 RPM or less after fan starting.	1. Fan motor defect / assembly condition abnormal 2. Wrong connection of fan motor connector 3. Reversing rotation after RPM target apply 4. Inverter PCB assembly defect

■ Error Diagnosis and Countermeasure Flow Chart

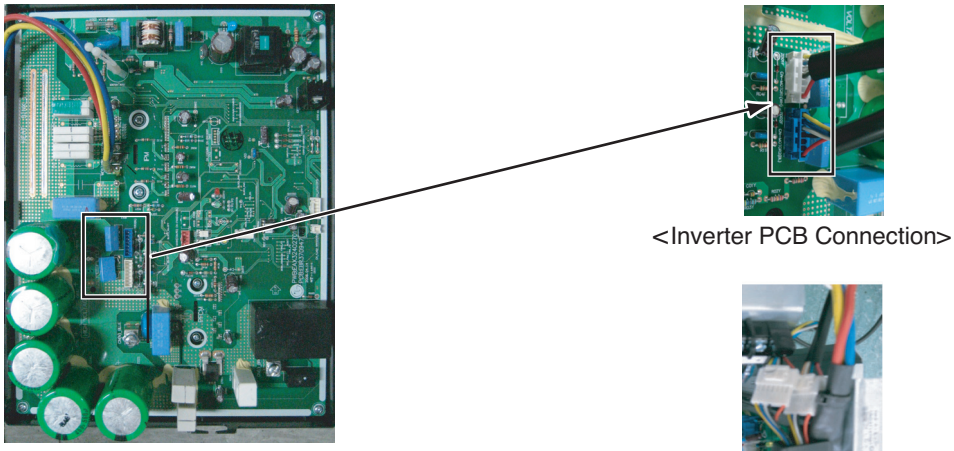


• Fan Motor resistance measuring between each phase



Fan connection Check method

■ 1Ø Model



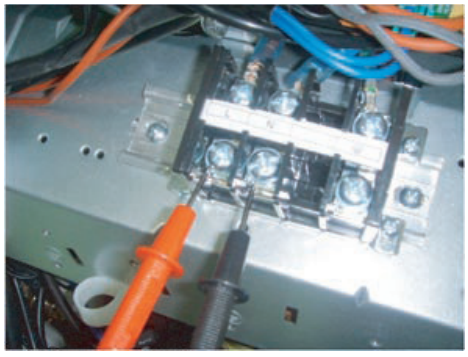
<Inverter PCB Connection>

<Fan Motor Middle Connector>

Error No.	Error Type	Error Point	Main Reasons
73	AC input instant over current error (Matter of software)	Inverter PCB input power current is over 2ms * 1 PHASE : 48A peak	1.Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2.Compressor damage(Insulation damage/Motor damage) 3.Input voltage abnormal (L,N) (R,S,T,N) 4.Power line assemble condition abnormal 5.Inverter PCB assembly damage(input current sensing part)

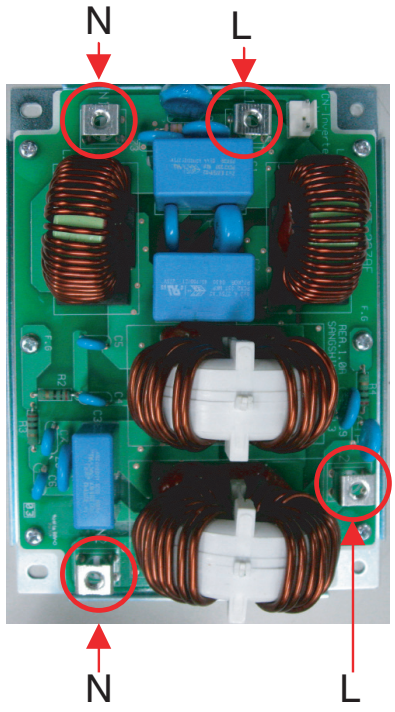
■ 1Ø Model

Measuring input voltage

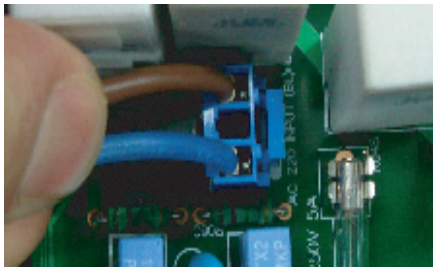


Compressor Wire Connection

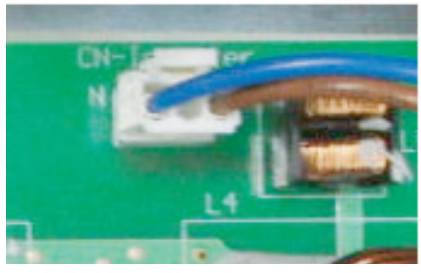
Noise filter wiring



Inverter PCB assembly/Wiring power to inverter PCB on Noise filter



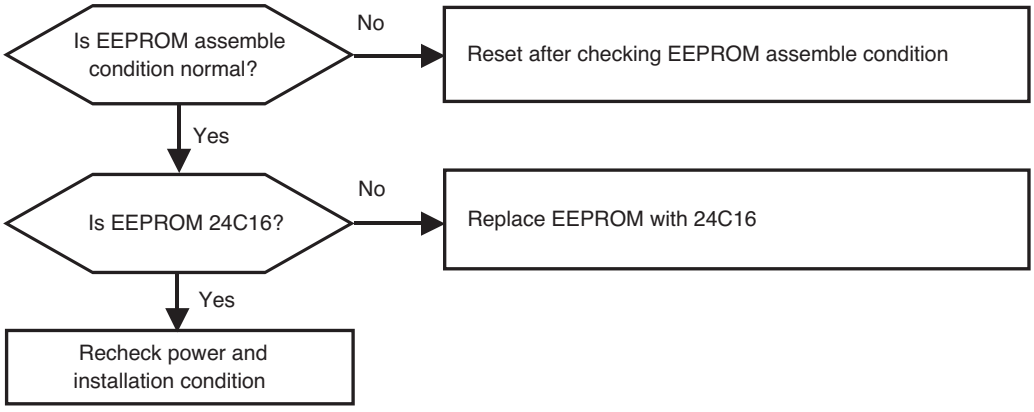
Inverter PCB assembly power connection

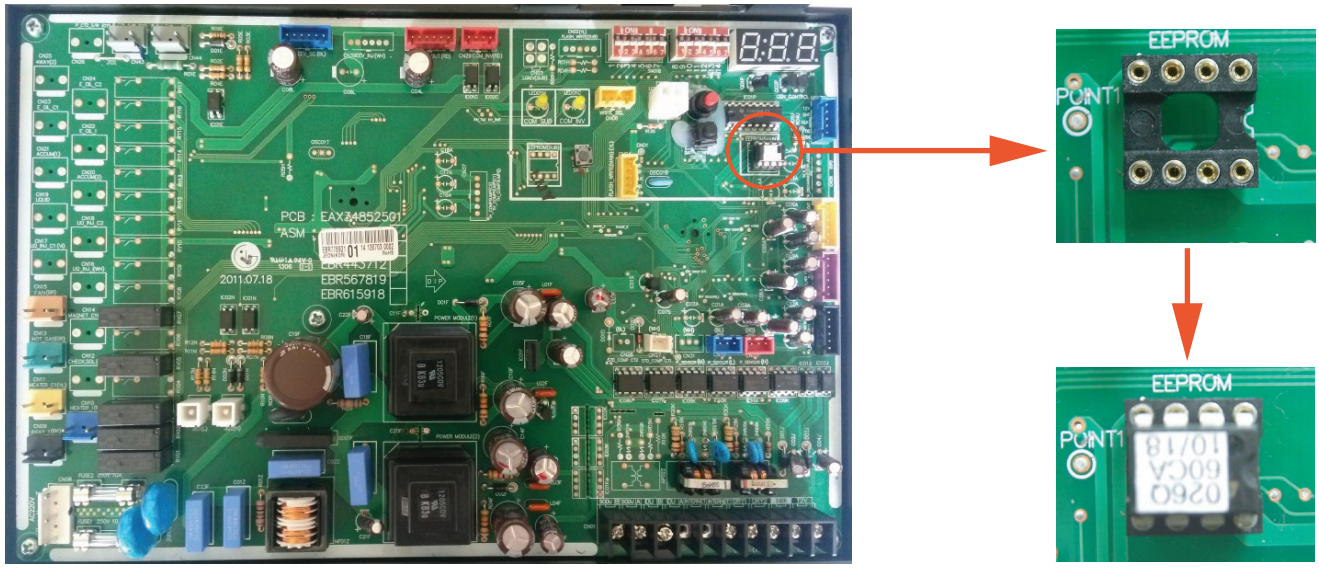


Noise filter power connection

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

■ Error Diagnosis and Countermeasure Flow Chart



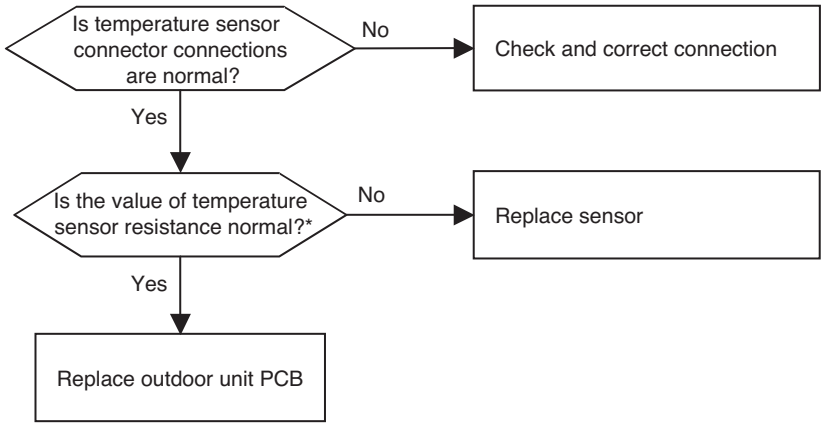


Note : Replace after power off.

Error No.	Error Type	Error Point	Main Reasons
113	Outdoor unit 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 outdoor unit PCB

Error No.	Error Type	Error Point	Main Reasons
115	Outdoor unit sub-cooling outlet temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connecter connection 2. Defective temperature sensor (Open/Short) 3. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart

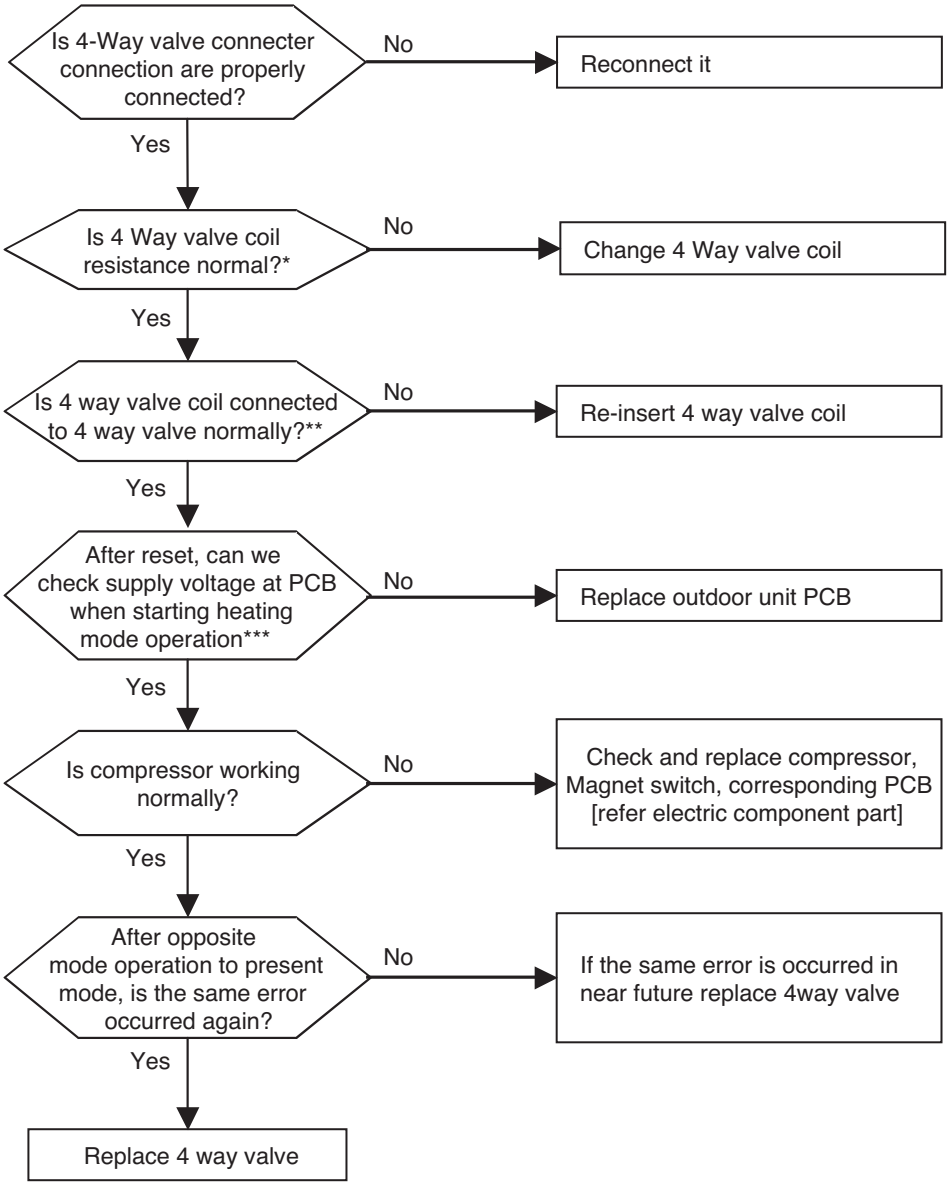


* Sensor resistance 100 kΩ over (open) or 100 Ω below (short) will generate error

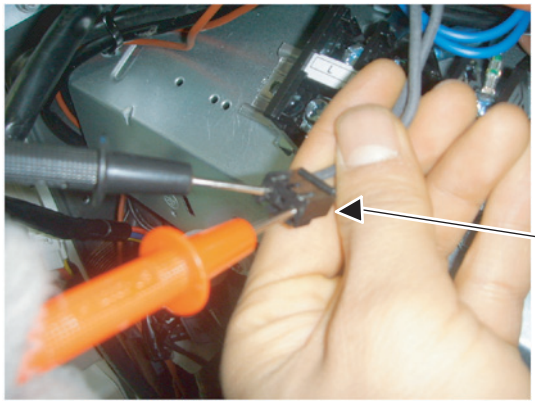
Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to outdoor unit temperature by referring below table (±5% tolerance)
Air temperature sensor: 10°C = 20.7kΩ : 25°C = 10kΩ : 50°C= 3.4kΩ
Pipe temperature sensor: 10°C = 10kΩ : 25°C = 5kΩ : 50°C= 1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
151	Function error of outdoor 4way (reversing valve)	Function error of 4way (reversing valve) in Main	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

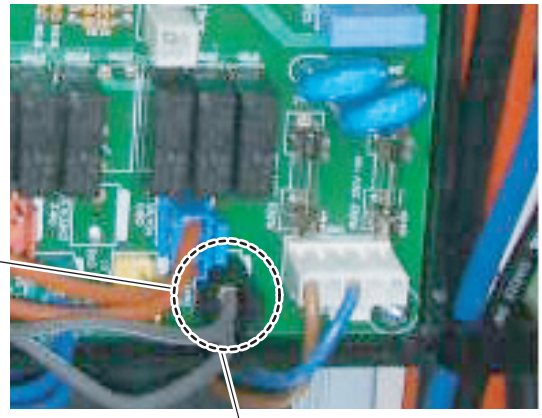
■ Error diagnosis and countermeasure flow chart



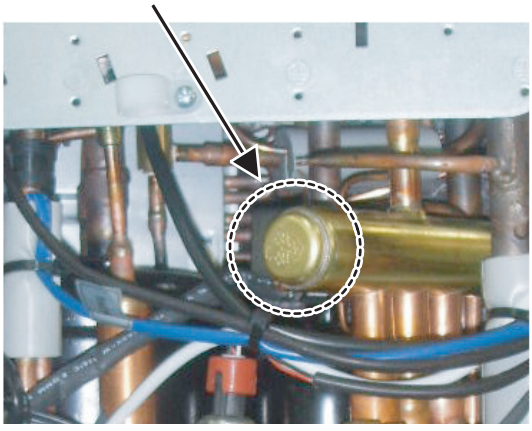
* Measure the resistance of 4way valve



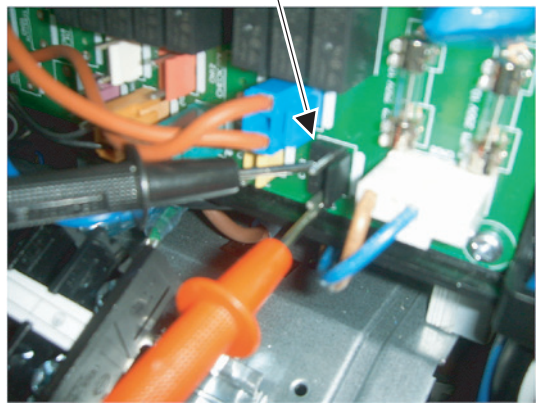
Location of 4way valve connector on Main PCB(marked as 4way,CN09)



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



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



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