



Internal Use Only

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Air Conditioner

SVC MANUAL(General)

CAUTION

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

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Part 1 General Information

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1. 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.
	Dangerous Voltage
	Be sure to provide grounding.

1.1 Cautions in Repair

 WARNING	
Be sure to disconnect all remote electric power supplies before servicing. Internal components and circuit boards are at main potential when the equipment is connected to the power cables. This voltage is extremely dangerous and may cause death or severe injury if come in contact with it.	
Do not touch the discharging refrigerant gas during the repair work. The refrigerant gas can cause frostbite.	
Release the refrigerant gas completely at a well-ventilated place first. Otherwise, when the pipe is disconnected, refrigerant gas or refrigerating machine oil discharges and it can cause injury.	
When the refrigerant gas leaks during work, execute ventilation. If the refrigerant gas touches to a fire, poisonous gas generates. A case of leakage of the refrigerant and the closed room full with gas is dangerous because a shortage of oxygen occurs. Be sure to execute ventilation.	
When removing the front panel or cabinet, execute short-circuit and discharge between high voltage capacitor terminals. If discharge is not executed, an electric shock is caused by high voltage resulted in a death or injury.	
Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shocks.	

Part 1 General Information

Do not use a defective or underrated circuit breaker. Use the correctly rated breaker and fuse. Otherwise there is a risk of fire or electric shock.	
Install the panel and the cover of control box securely. Otherwise there is risk of fire or electric shock due to dust, water etc.	
Indoor/outdoor wiring connections must be secured tightly and the cable should be routed properly so that there is no force pulling the cable from the connection terminals. Improper or loose connections can cause heat generation or fire.	
Do not touch, operate, or repair the product with wet hands. Holding the plug by hand when taking out. Otherwise there is risk of electric shock or fire.	
Use a vacuum pump or Inert (nitrogen) gas when doing leakage test or air purge. Do not compress air or Oxygen and Do not use Flammable gases. Otherwise, it may cause fire or explosion. - There is the risk of death, injury, fire or explosion.	
Do not turn on the breaker or power under condition that front panel, cabinet, top cover, control box cover are removed or opened. - Otherwise, it may cause fire, electric shock, explosion or death.	

⚠ CAUTION	
Be sure to earth the air conditioner with an earthing conductor connected to the earthing terminal.	
Conduct repair works after checking that the refrigerating cycle section has cooled down sufficiently. Otherwise, working on the unit, the hot refrigerating cycle section can cause burns.	
Do not tilt the unit when removing panels. Otherwise, the water inside the unit can spill and wet floor.	
Do not use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.	

1.2 Inspections after Repair

⚠ WARNING	
Check to see if the terminal block is not dirty or loose. If terminal block is dust or loose it can cause an electrical shock or fire.	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances. otherwise, it can cause an electrical shock, excessive heat generation or fire.	
Do not insert hands or other objects through the air inlet or outlet while the product is operating. There are sharp and moving parts that could cause personal injury.	
Do not block the inlet or outlet of air flow. It may cause product failure	

⚠ CAUTION	
Check to see if the parts are mounted correctly and wires are connected. Improper installation and connections can cause an electric shock or an injury.	
Check the installation platform or frame has corroded. Corroded installation platform or frame can cause the unit to fall, resulting in injury.	
Be sure to check the earth wire is correctly connected.	
After the work has finished, be sure to do an insulation test to check the resistance is 2[Mohm] or more between the charge section and the non-charge metal section (Earth position). If the resistance value is low, a disaster such as a leak or electric shock is caused at user's side.	
Check the drainage of the indoor unit after the repair. If drainage is faulty the water to enter the room and wet floor.	

2. Model Line Up

2.1 Indoor unit

Category		Chassis Name	Capacity Index [kW (kBtu/h)]	
			23.0 (85)	20.0 (70)
Ceiling Concealed Duct	High Static Pressure	B9	ABNW85GB9A0 [UB85 N94]	ABNW70GB9A0 [UB70 N94]

- Ceiling Concealed Duct –High static pressure

ABNW85GB9A0 [UB85 N94]
ABNW70GB9A0 [UB70 N94]

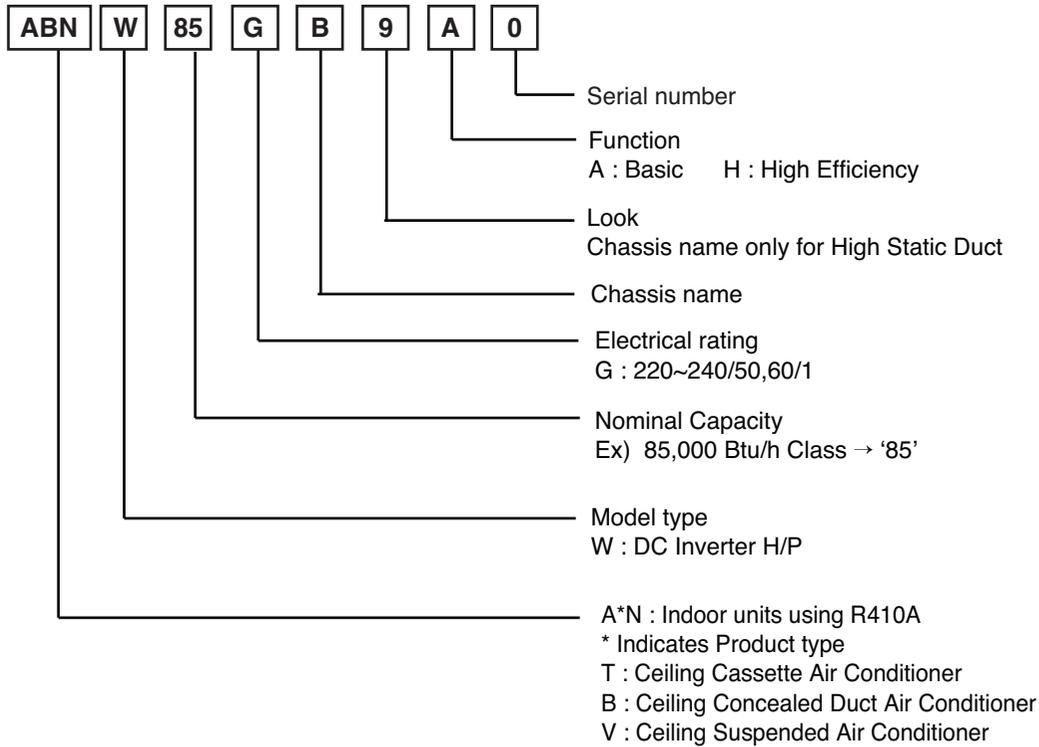


2.2 Outdoor unit

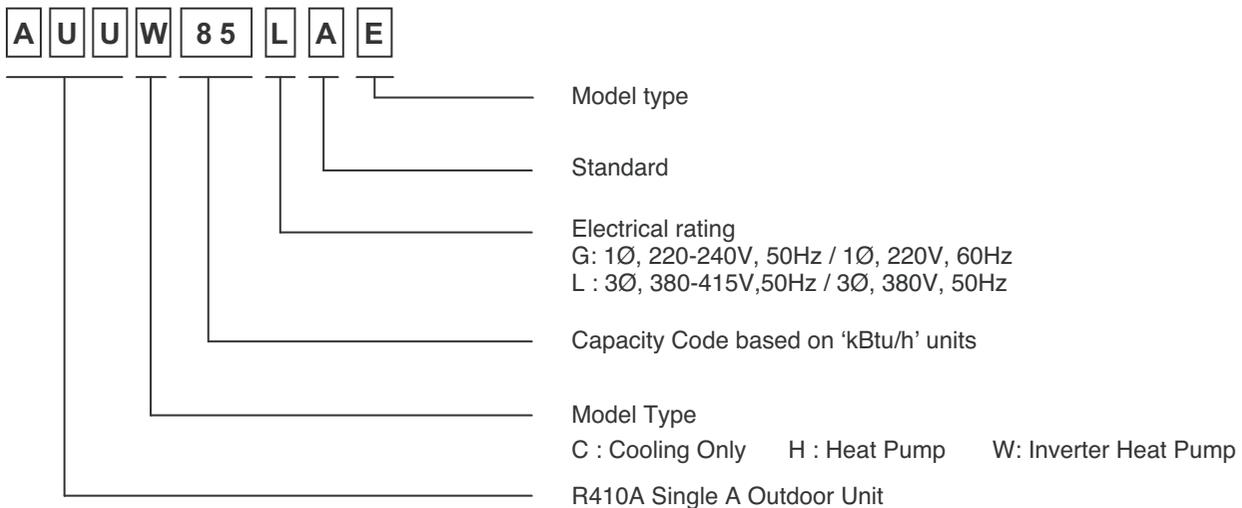
DC Inverter	AUUW85LAE [UU85W U74]	AUUW70LAE [UU70W U34]
No. of connectable indoor units	1 ~ 4	1 ~ 4
Total capacity index of connectable indoor units(kW)	23.0	20.0
Power supply	3Ø, 380 - 415V, 50Hz	3Ø, 380 - 415V, 50Hz
Chassis		

3. Nomenclature

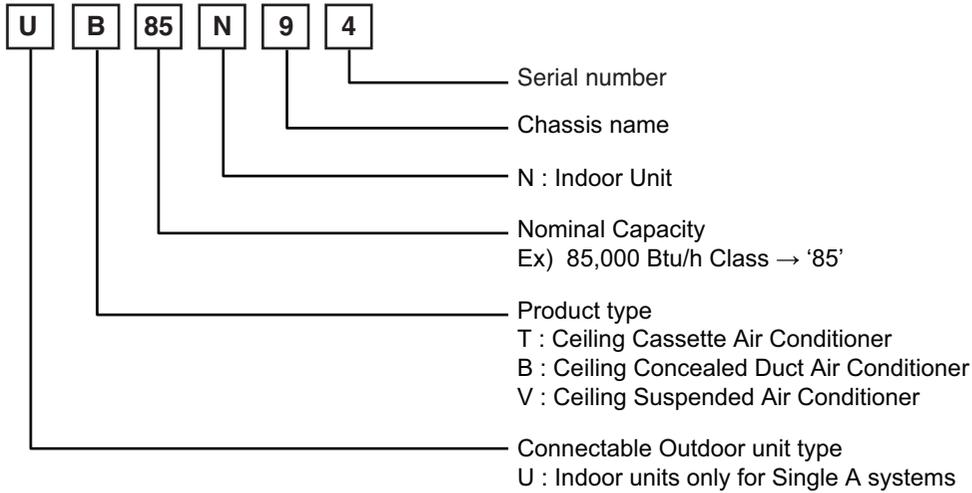
3.1 Indoor Unit(Global)



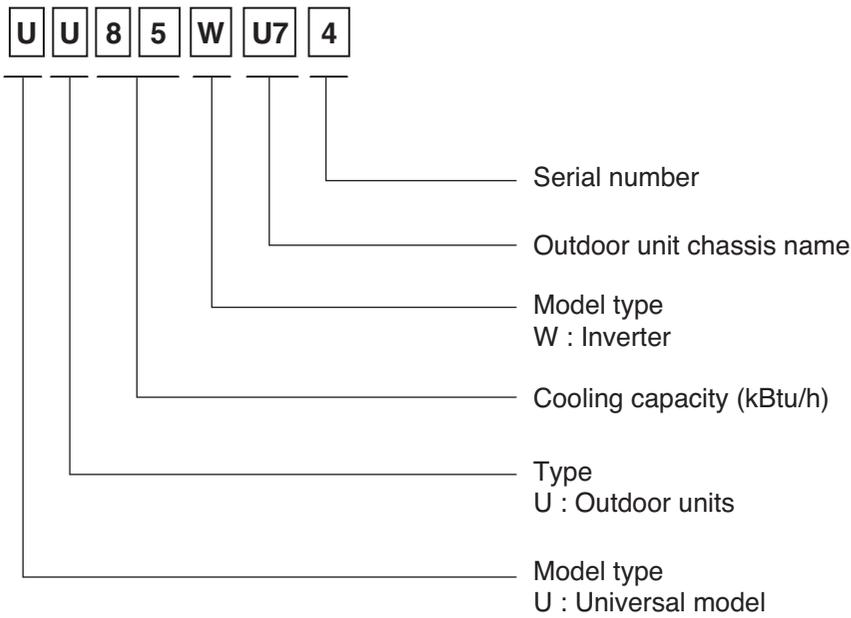
3.2 Outdoor Unit(Global)



3.3 Indoor Unit(Europe)



3.4 Outdoor Unit(Europe)



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1. List of Functions & Accessory

1. Ceiling Concealed Duct - High static pressure

Category	Functions	ABNW85GB9A0 [UB85 N94], ABNW70GB9A0 [UB70 N94]
Air flow	Air supply outlet	1
	Airflow direction control (left & right)	X
	Airflow direction control (up & down)	X
	Auto swing (left & right)	X
	Auto swing (up & down)	X
	Airflow steps (fan/cool/heat)	3 / 3 / 3
	Chaos wind(auto wind)	X
	Jet cool/heat	X / X
	Swirl wind	X
Air purifying	Triple filter (Deodorizing)	X
	Plasma air purifier	X
	Allergy Safe filter	X
	Long-life prefilter (washable / anti-fungus)	O
Installation	Drain pump	ABDP9
	E.S.P. control*	O
	Electric heater	X
	High ceiling operation*	X
	Auto Elevation Grille*	X
Reliability	Hot start	O
	Self diagnosis	O
	Soft dry operation	O
Convenience	Auto changeover**	O
	Auto cleaning	X
	Auto operation(artificial intelligence)**	O
	Auto Restart	O
	Child lock*	O
	Forced operation	X
	Group control*	O
	Sleep mode	X
	Timer(on/off)	O
	Timer(weekly)*	O
Individual control	Two thermistor control*	O
	Standard Wired remote controller	O
	Deluxe wired remote controller	X
	Simple wired remote controller	X
	Simple Wired remote controller(for hotel use)	X
Network function	Wireless remote controller	PQWRHQ0FDB
	General central controller (Non LGAP)	X
	Network Solution(LGAP)	O
	Dry contact	PQDSA(1)/PQDSB(1) / PQDSBC
Special function kit	PI 485(for Indoor Unit)	X
	Zone controller	ABZCA
	CTI(Communication transfer interface)	X
Others	Electronic thermostat	X
	Remote temperature sensor	PQRSTA0
	Group control wrie	PZCWRCG3
	Telecom shelter controller	X

Note

1. * : These functions need to connect the wired remote controller.

2. ** : Auto Changeover function can be operated when connected with Single A.

Auto Operation function can be operated whne connected with Mutli F/FDX.

3. Group control, Dry Contact, Auto Changeover functions are not available for units which are connected with synchro models.

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

DC Inverter High Efficiency model (3Ø)

Category	Functions	AUUW85LAE [UU85W U74]	AUUW70LAE [UU70W U34]
Reliability	Defrost / Deicing		O
	High pressure switch		X
	Low pressure switch		X
	Phase protection		O
	Restart delay (3-minutes)		O
	Self diagnosis		O
	Soft start		O
	Test function		X
Convenience	Night Silent Operation		O
Network function	Network solution(LGAP)		O

Device	AUUW85LAE [UU85W U74]	AUUW70LAE [UU70W U34]
Central Controller	AC Ez	PQCSZ250S0
	AC Smart II	PQCSW320A1E
	Option Kit (SD card type)	PQCSE341A0 / PQCSE342A0
	ACP(Advanced Control Platform)	PQCPA11A0E / PQCPB11A0E
	AC Manager	PQCSS520A0E
	PI485	PMNFP14A0/PMNFP14A1
	DO(Digital Output) Kit	PQNFP00T0
BNU (Building Network Unit)	LONWORKS Gateway	PQNFB16A1
	BACnet Gateway	PQNFB17B0
Installation	Y branch	X
	Header branch	X
	Air Guide	X
ODU Dry Contact		O (On/off control)
Low Ambient Kit		O (Logical operation)

[Note]

• O: Applied, • X: Not applied

Accessory model name : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separate package.

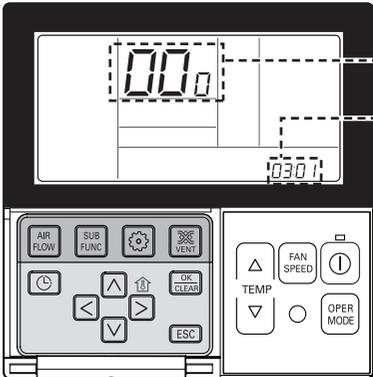
2. Installation Functions

2.1 E.S.P. (External Static Pressure) Setting

How to Set E.S.P. on the remote controller?

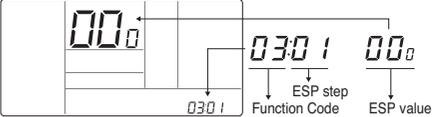
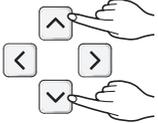
This is the function that decides the strength of the wind for each wind level and because this function is to make the installation easier.

- If you set ESP incorrectly, the air conditioner may malfunction.
- This setting must be carried out by a certificated-technician.



ESP value

Function code, ESP code

<p>1 If pressing  button long for 3 seconds, it enters into remote controller setter setup mode. - If pressing once shortly, it enters into user setup mode. Please press more than 3 seconds for sure.</p> 	<p>4 Move to ESP value setting by pressing  button. (It is 000 when delivering from the warehouse.)</p> 
<p>2 If entering into ESP setup mode by using  button, it indicates as the picture below.</p> 	<p>5 Press   button to setup ESP value. (It is possible to setup ESP value from 1 to 255, and 1 is the smallest and 255 is the biggest.)</p> 
<p>3 Select ESP fan step by pressing   button. (01: very low, 02: low, 03: medium, 04: high, 05: very high)</p> 	<p>6 Select ESP fan step again by using   button and setup ESP value, as No. 4 and 5, that corresponds each wind flow</p>
<p>8 Press  button to exit. * After setup, it automatically gets out of setup mode if there is no button input for 25 seconds. * When exiting without pressing set button, the manipulated value is not reflected.</p>	<p>7 Press  button to save.</p> 

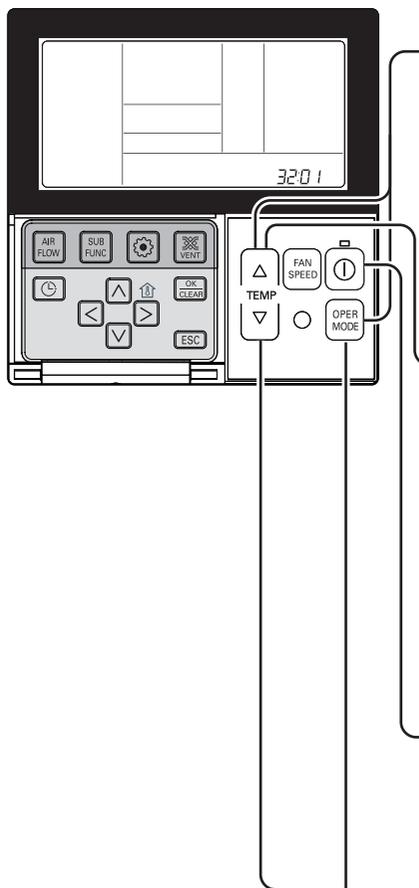
- When setting ESP value on the product without very weak wind or power wind function, it may not work.
- Please be careful not to change the ESP value for each fan step.
- It does not work to setup ESP value for very low/power step for some products.
- ESP value is available for specific range belongs to the product.

Installer Setting - Static Pressure Step Setting

This function is applied to only duct type. Setting this in other cases will cause malfunction.

This function is only available on some products.

This is the function that static pressure of the product is divided in 11 steps for setting.



1 When pressing the  button and  button simultaneously for more than 3 seconds, the system will be entered into the installer setting mode.

- After entering into the installer setting mode, select the static pressure step setting code value by pressing the  button.

* Static pressure step setting code value : 32

2 Select the desired setting value with the temperature up(s), down(t) button.


 Function Code Existing condition

00: use static pressure (code 06) set value
01~ 11: static pressure step (code 32) set value

3 When pressing  button, currently established static pressure value will be set up.

4 When pressing the  button and  button simultaneously for more than 3 seconds after the setting has been completed, the setting mode will be released.

- If there isn't any button input for more than 25 seconds, the installer setting mode will also be released.

- Static Pressure (Code 06) setting will not be used if Static Pressure Step (Code 32) setting is being used.
- For the static pressure value for each step, refer to the next page Table. 1

E.S.P. setting value (reference)

Table 1

Model	Step	CMM	Static Pressure[mmAq(Pa)]										
			6(59)	7(69)	8(78)	9(88)	10(98)	12(118)	13(127)	14(137)	15(147)	16(157)	18(176)
			Setting Value										
			32:01	32:02	32:03	32:04	32:05	32:06	32:07	32:08	32:09	32:10	32:11
ABNW85GB9A0 [UB85 N94]	LOW	64	74	75	76	78	79	82	84	86	89	91	95
	MID	72	78	79	80	82	83	87	89	91	94	96	100
	HIGH	80	82	84	86	88	90	93	95	97	100	101	105

Model	Step	CMM	Static Pressure[mmAq(Pa)]										
			6(59)	7(69)	8(78)	9(88)	10(98)	12(118)	13(127)	14(137)	15(147)	16(157)	18(176)
			Setting Value										
			32:01	32:02	32:03	32:04	32:05	32:06	32:07	32:08	32:09	32:10	32:11
ABNW70GB9A0 [UB70 N94]	LOW	60	70	72	74	76	78	81	82	85	86	88	91
	MID	65	74	76	78	80	82	85	86	89	90	92	95
	HIGH	70	78	80	82	84	86	90	91	93	94	96	99

NOTE

1. Be sure to set the value referring table 1. Unexpected set value will cause mal-function.
2. Table 1 is based at 230V. According to the fluctuation of voltage, air flow rate varies.
3. Factory Set(External Static Pressure) each Model

Model	Factory set (E.S.P.) mmAq(Pa)
ABNW85GB9A0 [UB85 N94] ABNW70GB9A0 [UB70.N94]	13 (127)

* If it is zero static pressure, please set value below Maximum value.

Model	Maximum value
ABNW85GB9A0 [UB85 N94] ABNW70GB9A0 [UB70.N94]	105

3. Reliability

3.1 Hot start

- When heating is started, the indoor fan is stopped or very slow to prevent the cold air carry out
- When the temp. of heat exchanger reach 30°C(model by model), indoor fan is started.

3.2 Self-diagnosis Function

- The air conditioner installed can self-diagnosed its error status and then transmits the result to the central control. Therefore, a rapid countermeasure against failure of the air conditioner allows easy management and increases the usage life of air conditioner.
- Refer to trouble shooting guide.

3.3 Soft dry operation

- When the dehumidification operation input by the remote control is received, the intake air temperature is detected and the setting temp is automatically set according to the intake air temperature.

Intake air Temp.	Setting Temp.
$26^{\circ}\text{C} \leq \text{intake air temp.}$	25°C
$24^{\circ}\text{C} \leq \text{intake air temp.} < 26^{\circ}\text{C}$	intake air temp. -1°C
$22^{\circ}\text{C} \leq \text{intake air temp.} < 24^{\circ}\text{C}$	intake air temp. -0.5°C
$18^{\circ}\text{C} \leq \text{intake air temp.} < 22^{\circ}\text{C}$	intake air temp.
intake air temp. < 18°C	18°C

- While compressor off, the indoor fan repeats low airflow speed and stop.
- While the intake air temp is between compressor on temp. and compressor off temp., 10-min dehumidification operation and 4-min compressor off repeat.

Compressor ON Temp. → Setting Temp+0.5°C

Compressor OFF Temp. → Setting Temp-0.5°C

- In 10-min dehumidification operation, the indoor fan operates with the low airflow speed.

4. Convenience Functions & Controls

4.1 Cooling & heating Operations

4.1.1 Cooling Mode

- Operating frequency of compressor depends on the load condition, like the difference between the room temp. and the set temp., frequency restrictions.
- If the compressor operates at some frequency, the operating frequency of compressor cannot be changed within 30 seconds. (not emergency conditions)
- Compressor turned off when
 - intake air temperature is in between $\pm 0.5^{\circ}\text{C}$ of the setting temp. limit for three minutes continuously.
 - intake air temperature reaches below 1.0°C of the temperature of setting temp..
- Compressors three minutes time delay.
 - After compressor off, the compressor can restart minimum 3 minutes later.

4.1.2 Heating Mode

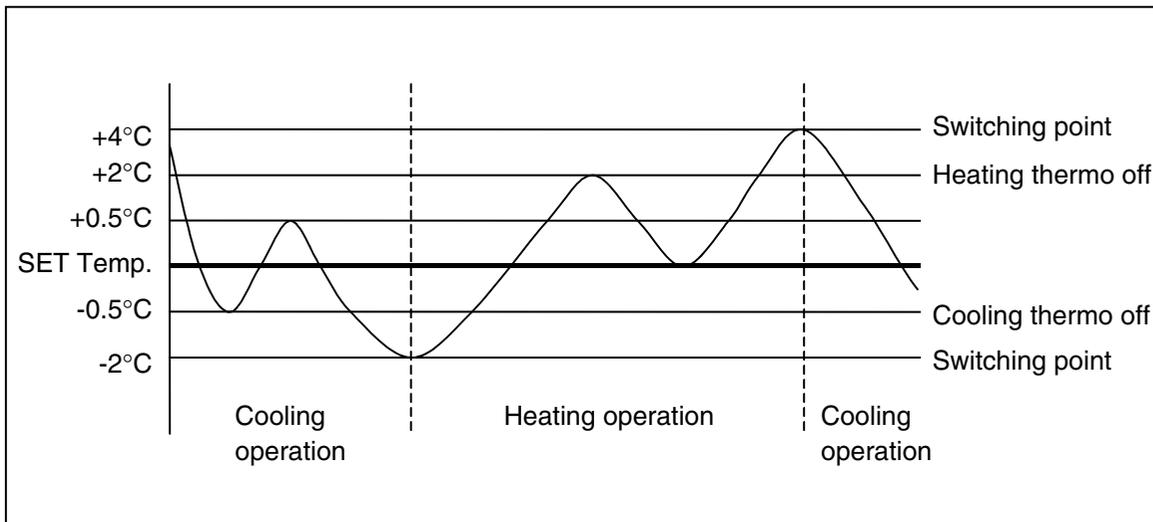
- Operating frequency of compressor depend on the load condition, The difference between the room temp. and set temp., frequency restrictions.
- If compressor operates at some frequency, the operating frequency of compressor cannot be changed within 30 seconds.
- Condition of compressor turned off
 - When intake air temperature reaches $+4^{\circ}\text{C}$ above the setting temperature.
- Condition of compressor turned on
 - When intake air temperature reaches $+2^{\circ}\text{C}$ above the setting temperature.
- * Condition of indoor fan turned off
 - While in compressor on : indoor pipe temp. $< 20^{\circ}\text{C}$
 - While in compressor off : indoor pipe temp. $< 30^{\circ}\text{C}$
- While in defrost control, between the indoor and outdoor fans are turned off.
- Compressor 2minutes delay
 - After compressor off, the compressor can restart minimum 2 minutes later.

NOTE: Some Models are different by temperature of thermo ON/OFF.

CST/Duct/CVT type indoor unit matched with Universal Outdoor unit	CST/ Duct/CVT type indoor unit matched with Single Outdoor unit/Multi Outdoor unit/Multi V Outdoor unit
Thermo ON : $+2^{\circ}\text{C}$ above setting temp. Thermo OFF : $+4^{\circ}\text{C}$ above setting temp.	Thermo ON : Setting temp. Thermo OFF : $+3^{\circ}\text{C}$ above setting temp.

4.2 Auto changeover operation

- The air conditioner changes the operation mode automatically to keep indoor temperature.
- When room temperature vary over $\pm 2^{\circ}\text{C}$ with respect to setting temperature, air conditioner keeps the room temperature in $\pm 2^{\circ}\text{C}$ with respect to setting temperature by auto change mode.

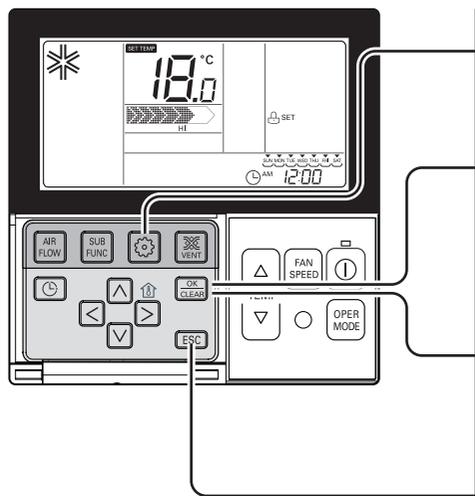


4.3 Auto restart Operation

- Whenever there is electricity failure to the unit, and after resumption of the power, unit will start in the same mode prior to the power failure. Memorized condition are on / off condition, operating mode (cooling/ heating), set temperature and fan speed. The unit will memorize the above conditions and start with same memorized condition.

4.4 Child Lock Function

It is the function to use preventing children or others from careless using.



- 1** Press  button repeatedly until the  is flashing. 
- 2** If moving to 'setup' icon area by using   button, 'setup' icon blinks, and child lock function is setup if pressing  button at that time. 
- 3** When cancelling lock function, if moving to 'cancel' icon by pressing   button and then, pressing  button, child lock function is cancelled.
- 4** Press  button to exit.
 * After setup, it automatically gets out of setup mode if there is no button input for 25 seconds.
 * When exiting without pressing set button, the manipulated value is not reflected.

4.5 Forced operation

- To operate the appliance by force in case when the remote control is lost, the forced operation selection switch is on the main unit of the appliance, and operate the appliance in the standard conditions.
- The operating condition is set according to the outdoor temp. and intake air temperature as follows.

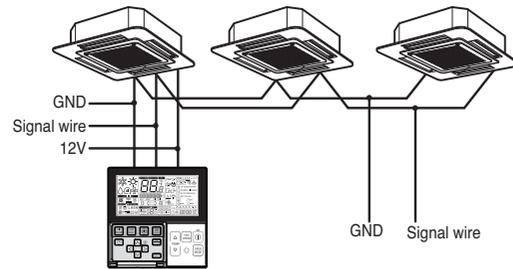
Indoor temp.	Operating Mode	Setting temp.	Setting speed of indoor fan
over 24°C	Cooling	22°C	High speed
21~24°C	Healthy Dehumidification	23°C	
below 21°C	Heating	24°C	

- The unit select the last operation mode in 3 hours.
- Operating procedures when the remote control can't be used is as follows :
 - The operation will be started if the ON/OFF button is pressed.
 - If you want to stop operation, re-press the button.

4.6 Group Control

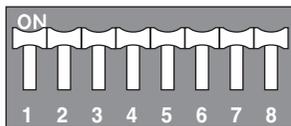
1. When installing more than 2 units of air conditioner to one wired remote controller, please connect as the right figure.

- If it is not event communication indoor unit, set the unit as slave.
- Check for event communication through the product manual.

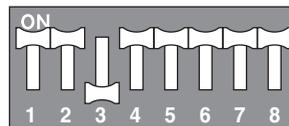


When controlling multiple indoor units with event communication function with one remote controller, you must change the master/slave setting from the indoor unit.

- Indoor units, the master/slave configuration of the product after completion of indoor unit power 'OFF' and then 'ON' the power after 1 minutes elapsed sign up.
- For ceiling type cassette and duct product group, change the switch setting of the indoor PCB.



#3 switch OFF: Master
(Factory default setting)



#3 switch ON: Slave

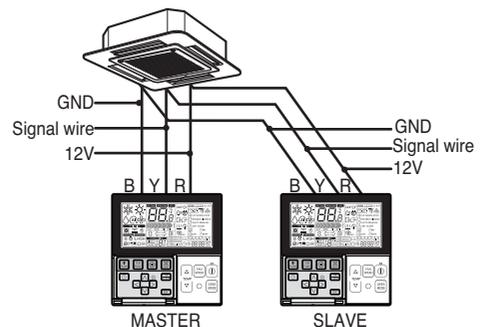
- For wall-mount type and stand type product, change the master/slave setting with the wireless remote controller. (Refer to wireless remote controller manual for detail)

※ When installing 2 remote controllers to one indoor unit with event communication function, set the master/slave of the remote controller. (Refer to remote controller master/slave selection)

When controlling the group, some functions excluding basic operation setting, fan level Min/Mid/Max, remote controller lock setting and time setting may be limited.

2. When installing more than 2 wired remote controllers to one air conditioner, please connect as the right picture.

- When installing more than 2 units of wired remote controller to one air conditioner, set one wired remote controller as master and the others all as slaves, as shown in the right picture.
- You cannot control the group as shown in the right for some products.
- Refer to the product manual for more detail.



<When simultaneously connecting 2 sets of wired remote controller>

- When controlling in groups, set the master/slaver of the remote controller. Refer to Installer setting section on how to set master/slave for more detail.

4.7 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 control while in appliance operation, the operation of the appliance stops.
- While the appliance is on pause, the sleep timer mode cannot be input.
- While in cooling mode operation, 30 min later since the start of the sleep timer, the setting temperature increases by 1°C. After another 30 min elapse, it increases by 1°C again.
- When the sleep timer mode is input while in cooling cycle mode, the airflow speed of the indoor fan is set to the low.
- When the sleep timer mode is input while in heating cycle mode, the airflow speed of the indoor fan is set to the medium.

4.8 Timer(On/Off)

4.8.1 On-Timer Operation

- When the set time is reached after the time is input by the remote control, 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.
While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature.

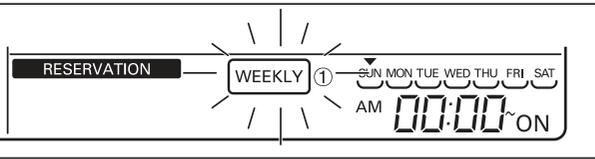
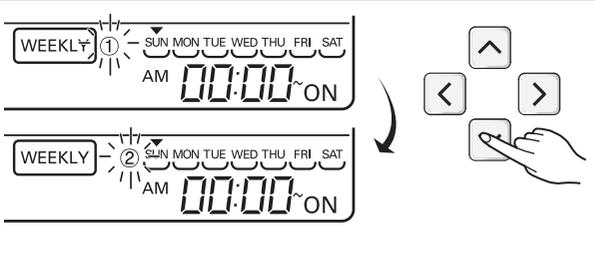
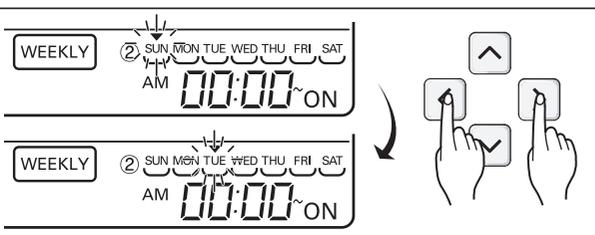
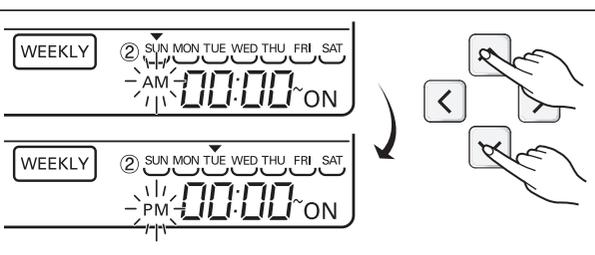
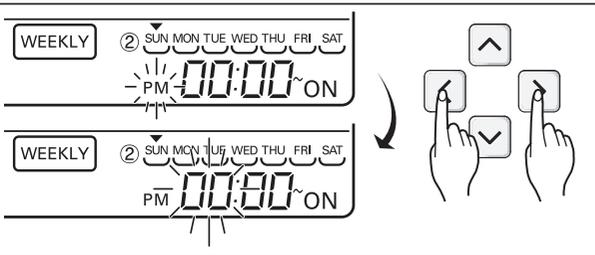
4.8.2 Off-Timer Operation

- When the set time is reached after the time is input by the remote control, 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.

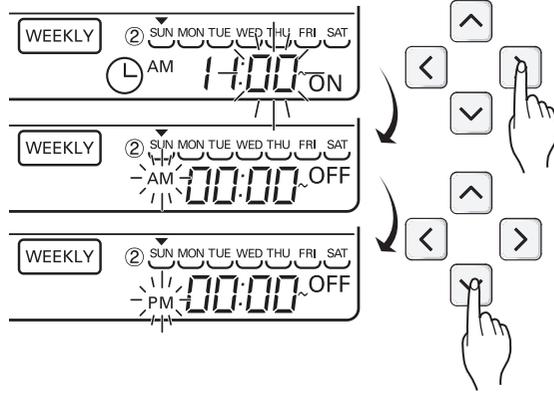
4.9 Weekly Program

You can set the daily reservation in weekly unit.

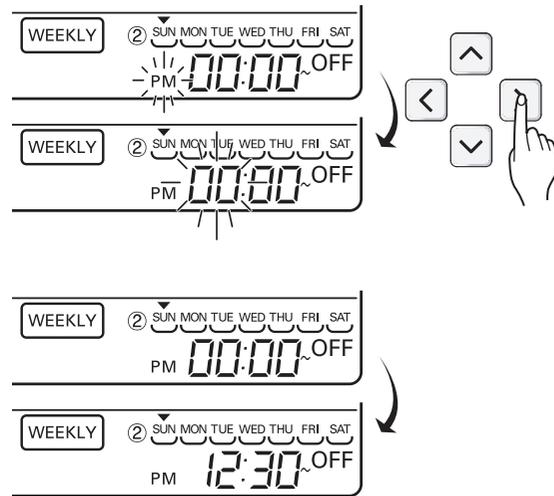
Weekly reservation keeps operating until before you cancel it once you setup

<p>1 Please move to reservation setup mode by pressing reservation button. * You can setup two weekly reservations for one day, and up to fourteen reservations for a week. For example, to setup (Tuesday morning 11:30 turned on ~ afternoon 12:30 turned off), you setup in order below.</p>	
<p>2 Please move to 'weekly' by repeatedly pressing reservation button. 'Weekly' blinks at this time.</p>	
<p>3 Please select weekly reservation or weekly reservation i by using   button. * You can setup two reservations, weekly reservation 1 and weekly reservation 2, for a day.</p>	
<p>4 Please move to 'date' setup part by using   button. If 'date' indication blinks, please setup date. You can setup date from Monday to Sunday.</p>	
<p>5 Please move to 'AM/PM' setup part of turning on by using   button.</p>	
<p>6 Please move to 'hour' setup part of turning on by using   button. - It is the part to setup the time at which air-conditioner is turned on.</p>	
<p>7 Please change time by using   button. - You can setup hour 0~12.</p>	
<p>8 Please move to 'minute' setup part of turning on by using  button.</p>	
<p>9 If 'minute' indication blinks, please setup 'minute' by using   button</p>	

10 Please move to 'AM/PM' setup part of turning off by using button.
 - AM/PM setup is identical with turning on time setup.



11 Please move to 'hour' setup part of turning off by using Right button.
 - It is the part to reserve the time at which air-conditioner is turned off.
 - If 'hour' indication blinks, please setup 'hour'.

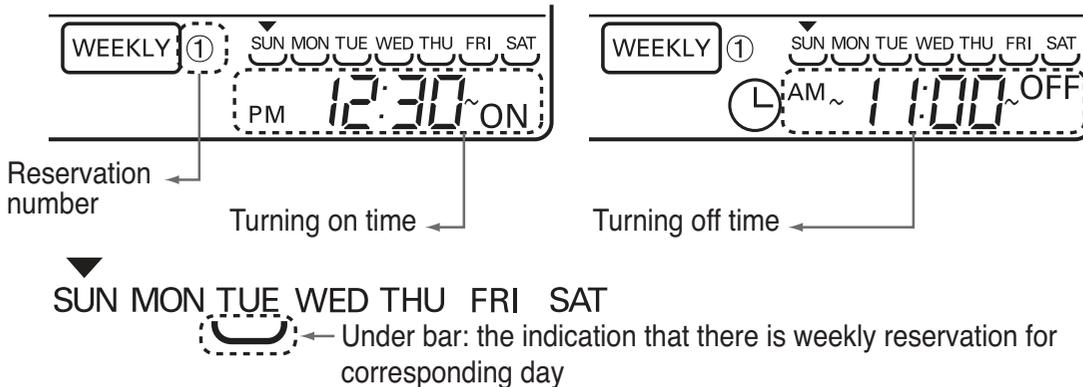


* Please setup 'hour' and 'minute' identically with the method to setup turning on time.

12 If finishing weekly reservation setup, please press setup/cancellation button. Weekly reservation setup for the day that you set is finished.

13 If you setup with the method identical with above by selecting the day that you'd like to setup, it operates weekly reservation.
 If you setup both turning on reservation time and turning off reservation time identically, it doesn't operate reservation drive.

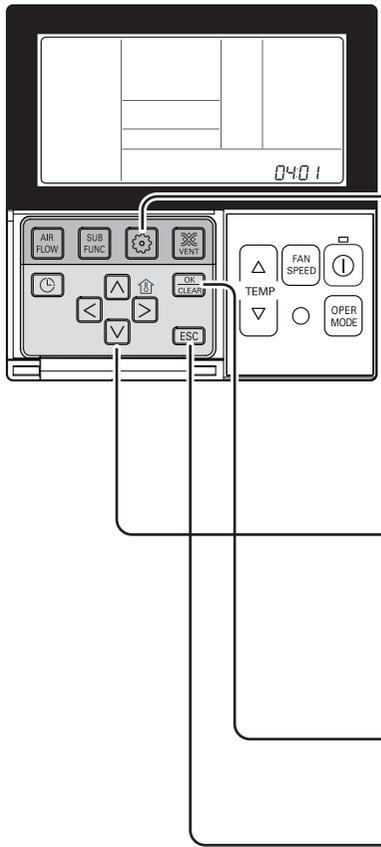
Weekly reservation explanation



* Indoor unit is turned on to desired temperature if it is configured using up/down button during preset of weekly operation time.
 (Temperature selection range : 18°C~30°C)
 - When desired temperature is not set, it is turned on automatically with desired temperature of previous operation.

4.10 Two Thermistor Control

This is the function to select the temperature sensor to judge the room temperature.



1 If pressing  button long for 3 seconds, it enters into remote controller setter setup mode.
- If pressing once shortly, it enters into user setup mode.
Please press more than 3 seconds for sure.

2 If moving to room temperature perception sensor selection menu by pressing  button, it indicates as picture below.

3 Set Thermistor value by pressing   button. (01: Remote Controller, 02: Indoor, 03: 2TH)

4 Press  button to save.

5 Pressing  button will exit settings mode.
* After setup, it automatically gets out of setup mode if there is no button input for 25 seconds.
* When exiting without pressing set button, the manipulated value is not reflected.

<Thermistor Table>

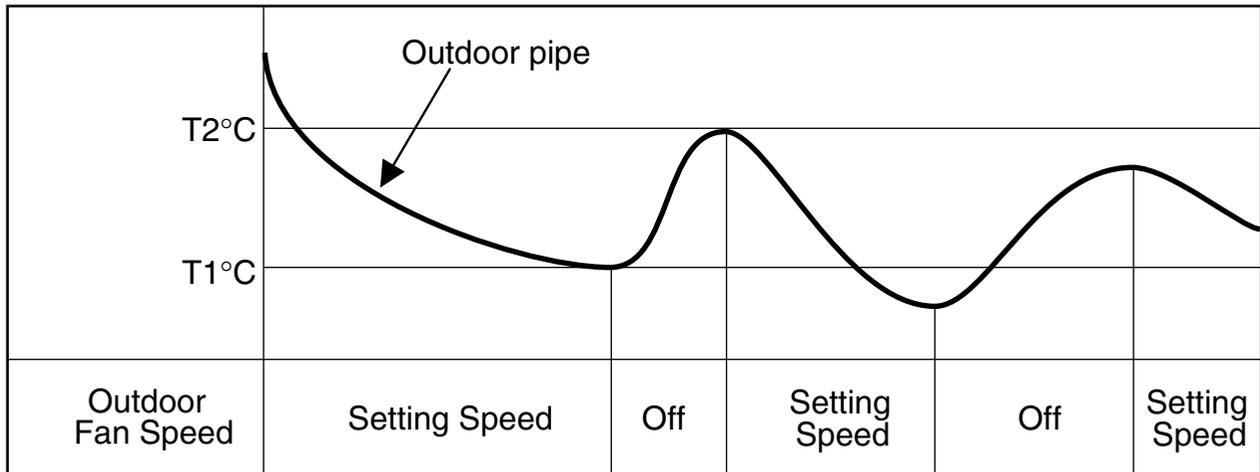
Temperature sensor selection		Function
01	Remote controller	Operation in remote controller temperature sensor
02	Indoor unit	Operation in indoor unit temperature sensor
03	2TH	Cooling Operation of higher temperature by comparing indoor unit's and wired remote controller's temperature. (There are products that operate at a lower temperature.)
		Heating Operation of lower temperature by comparing indoor unit's and wired remote controller's temperature.

* The function of 2TH has different operation characteristics according to the product.

7. Special Function & KIT

Low Ambient control

- This Function is for cooling operating in outdoor low temperature .
- If outdoor temperature drops below certain temperature, liquid back is prevented by reducing outdoor fan speed.
- It can prevent frosting of evaporator and keep cooling operation



Part 3 Basic Control

1. Normal operation.....	27
2 Compressor control	27
3. EEV(Electronic Expansion Valve) control	27

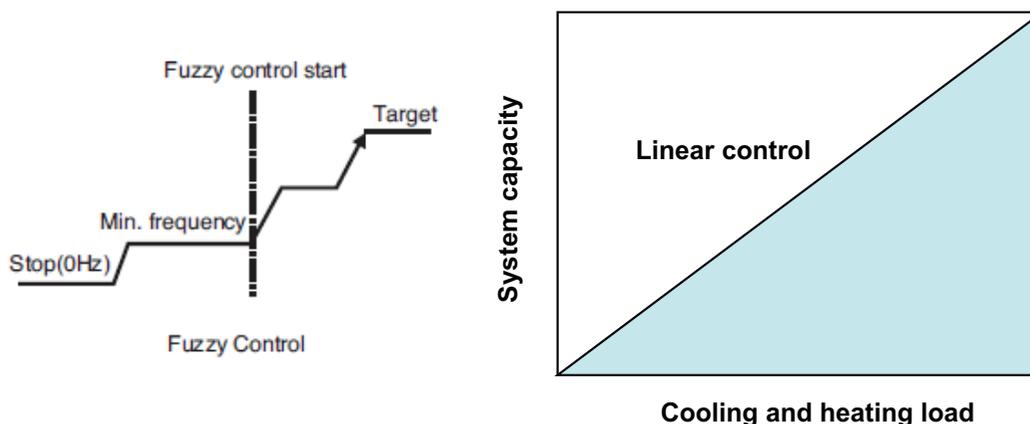
1. Normal operation

Basic principle is to control the rpm of the motor by changing the working frequency of the compressor. Three phase voltage is supplied to the motor and the time for which the voltage will be supplied is controlled by IGBTM (intelligent power module). Switching speed of IGBTM defines the variable frequency input to the motor.

Actuator	Cooling operation	Heating operation	Stop state
Compressor	Fuzzy control	Fuzzy control	Stop
Fan	Fuzzy control	Fuzzy control	Stop
EEV	Super heating fuzzy control	Discharge Temp. Control	Min. Pulse

2. Compressor control

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



Inverter linear control as cooling and heating load increasing

3. EEV(Electronic Expansion Valve) control

EEV operates with fuzzy control rules to keep The degree of superheat (2~3°C) or the target temperature of discharge pipe.

* Cooling mode

The degree of superheat = $T_{suction} - T_{evaporator}$

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

$T_{evaporator}$: evaporation temperature (°C)

* Heating mode

the target temperature of discharge pipe = $T_{condenser} + \alpha$

$T_{condenser}$: condenser temperature (°C)

Part 4 Trouble Shooting

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1. Self-diagnosis Function

1.1 Error Indicator (Indoor)

Error Indicator

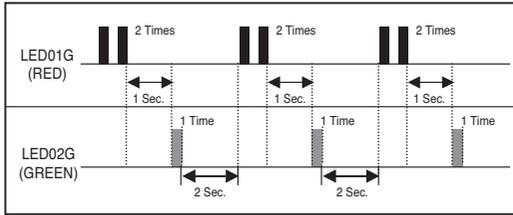
- This function indicates types of failure in self-diagnosis and occurrence of failure for air condition.
- Error mark is displayed on wired remote controller, and 7-segment LED of outdoor unit control board as shown in the table.
- If more than two troubles occur simultaneously, lower number of error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

Indoor Error

Code	Title	Cause of Error
1	Air temperature sensor of Indoor unit	Air temperature sensor of indoor unit is open or short
2	Inlet pipe temperature Sensor of indoor unit	Inlet pipe temperature sensor of indoor unit is open or short
3	Communication error : wired remote controller ↔ indoor unit	Failing to receive wired remote controller signal in indoor unit PCB
4	Drain pump	Malfunction of drain pump
5	Communication error : outdoor unit ↔ indoor unit	Failing to receive outdoor unit signal in indoor unit PCB
6	Outlet pipe temperature sensor of indoor unit	Outlet pipe temperature sensor of indoor unit is open or short
9	Indoor EEPROM Error	In case when the serial number marked on EEPROM of Indoor unit is 0 or FFFFFFFF
10	Abnormal fan motor operation	Disconnecting the fan motor connector/ Failure of indoor fan motor lock

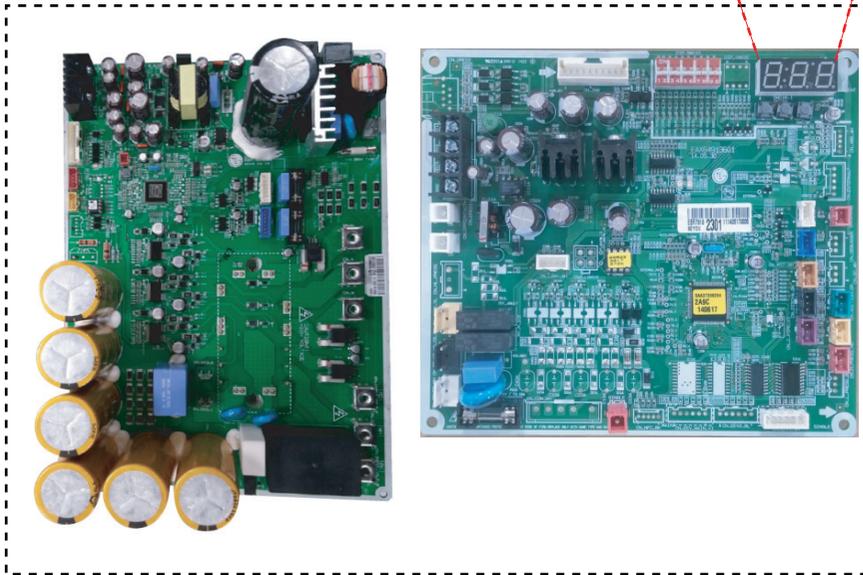
- | |
|---|
| <ul style="list-style-type: none"> • Indoor Fan RPM Up / Down at installation • Remote Control Power is repeated On/Off <p>If this phenomenon is generated, check the condition of N phase wiring</p> |
|---|

1.2 Error Indicator (Outdoor)



Outdoor Error
Ex) CH21 (IGBTM Fault Error)

7 Segment



Part 4 Trouble Shooting

※ Error checking : The errors may be checked on LED of the display parts of wired remote controller and the LED of the controller of outdoor device.

Code	Contents	Operation State	Error Display		
			Cable Remote Controller	Outdoor Device	
				Red LED	Green LED
21	IGBTM Fault Error	Stop	CH21	Flashing 2 times	Flashing 1 time
22	CT 2 Error (Input of Over-Current)	Stop	CH22	Flashing 2 times	Flashing 2 times
23	DC Link Error (High/Low DC Voltage)	Stop	CH23	Flashing 2 times	Flashing 3 times
25	Outdoor Unit Input Voltage High/Low Voltage	Stop	CH25	Flashing 2 times	Flashing 5 times
26	DC Comp Position Detection Error	Stop	CH26	Flashing 2 times	Flashing 6 times
27	PSC/PFC Over-Current Error (HW)	Stop	CH27	Flashing 2 times	Flashing 7 times
29	Comp Phase Over-Current Error	Stop	CH29	Flashing 2 times	Flashing 9 times
32	D-Pipe Overheating Error (INV Comp)	Stop	CH32	Flashing 3 times	Flashing 2 times
40	Outdoor Unit Inverter Compressor CT Sensor Fault	Stop	CH40	Flashing 4 times	-
41	D-Pipe Sensor Error (INV Comp)	Stop	CH41	Flashing 4 times	Flashing 1 time
43	High pressure Sensor Error	Stop	CH43	Flashing 4 times	Flashing 3 time
44	Outdoor Inlet Sensor Error	Stop	CH44	Flashing 4 times	Flashing 4 times

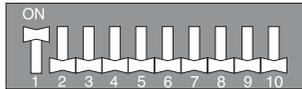
※ Error checking : The errors may be checked on LED of the display parts of wired remote controller and the LED of the controller of outdoor device.

Code	Contents	Operation State	Error Display		
			Cable Remote Controller	Outdoor Device	
				Red LED	Green LED
45	Cond. Pipe Sensor Error	Stop	CH45	Flashing 4 times	Flashing 5 times
46	Suction Pipe Sensor Error	Stop	CH46	Flashing 4 times	Flashing 6 times
48	Cond. Out-Pipe Sensor Error	Stop	CH48	Flashing 4 times	Flashing 8 times
51	Over-Capacity Connection Error	Stop	CH51	Flashing 5 times	Flashing 1 time
53	Communication Error between Outdoor Device ↔ Indoor Device	Stop	CH53	Flashing 5 times	Flashing 3 times
54	Open and Reverse Phase Error	Stop	CH54	Flashing 5 times	Flashing 4 times
60	EEPROM Check Sum Error	Stop	CH60	Flashing 6 times	-
61	Outdoor Device Pipe Overheating Error	Stop	CH61	Flashing 6 times	Flashing 1 time
62	Heat-sink Overheating Error	Stop	CH62	Flashing 6 times	Flashing 2 times
65	Heat-sink Sensor Error	Stop	CH65	Flashing 6 times	Flashing 5 times
67	Outdoor BLDC Fan Lock Error	Stop	CH67	Flashing 6 times	Flashing 7 times
71	Converter CT Sensor Error of Outdoor Unit	Stop	CH71	Flashing 7 times	Flashing 1 time
73	PSC/PFC Over-Current Error (SW)	Stop	CH73	Flashing 7 times	Flashing 3 times

2. Pump Down

Setting Procedure

- 1) Set the Dip Switch as follow after shutting the power source down.

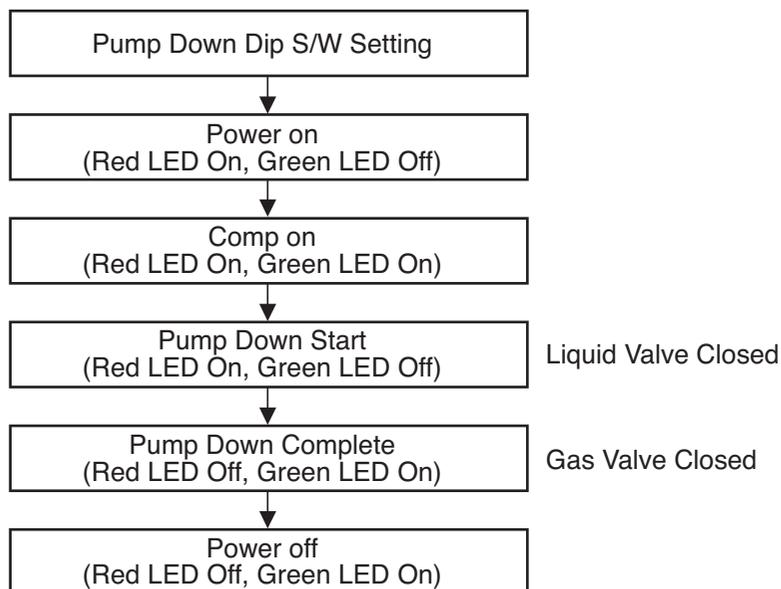


- 2) Reset the power.
- 3) Red LED and Green LED of PCB lights during work.
(The indoor unit is operated by force.)
- 4) If operation is done, Red LED will be turned off.
If operation is not done normally, Red LED will blink.
- 5) Close the Liquid valve only after green LED turned off (7 minutes from the start of the machine).
Then close the gas valve after Green LED on.

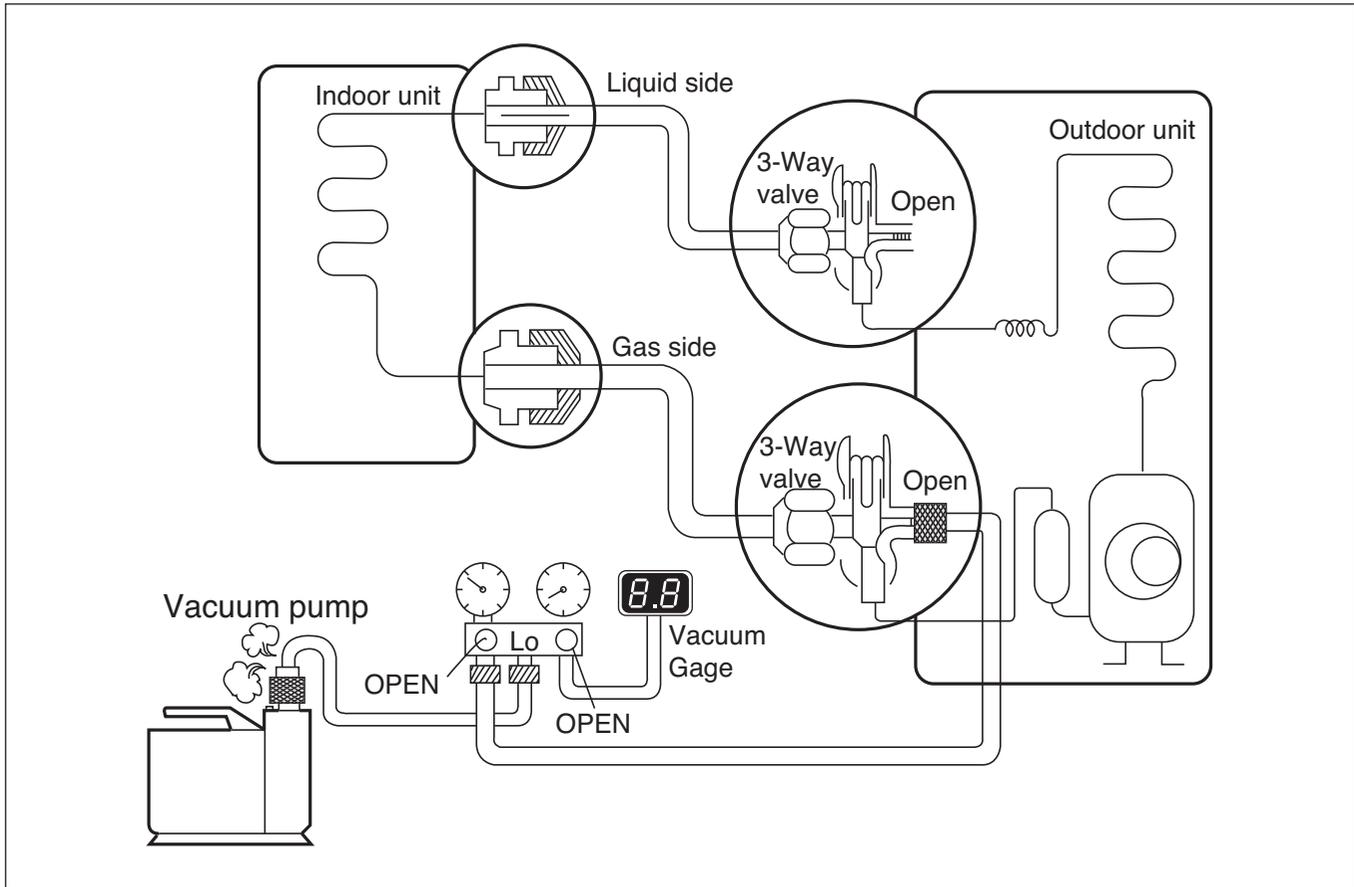


WARNING:

- When the green LED of PCB is on, compressor is going to be off because of low pressure.
- You should return the Dip Switch to operate normally after finishing the operation.
- Improper Pump down will lead to product turn off along with LED (green & red) off with in 20 minutes from the initial start.



3. Evacuation (All amount of refrigerant leaked)



• Procedure

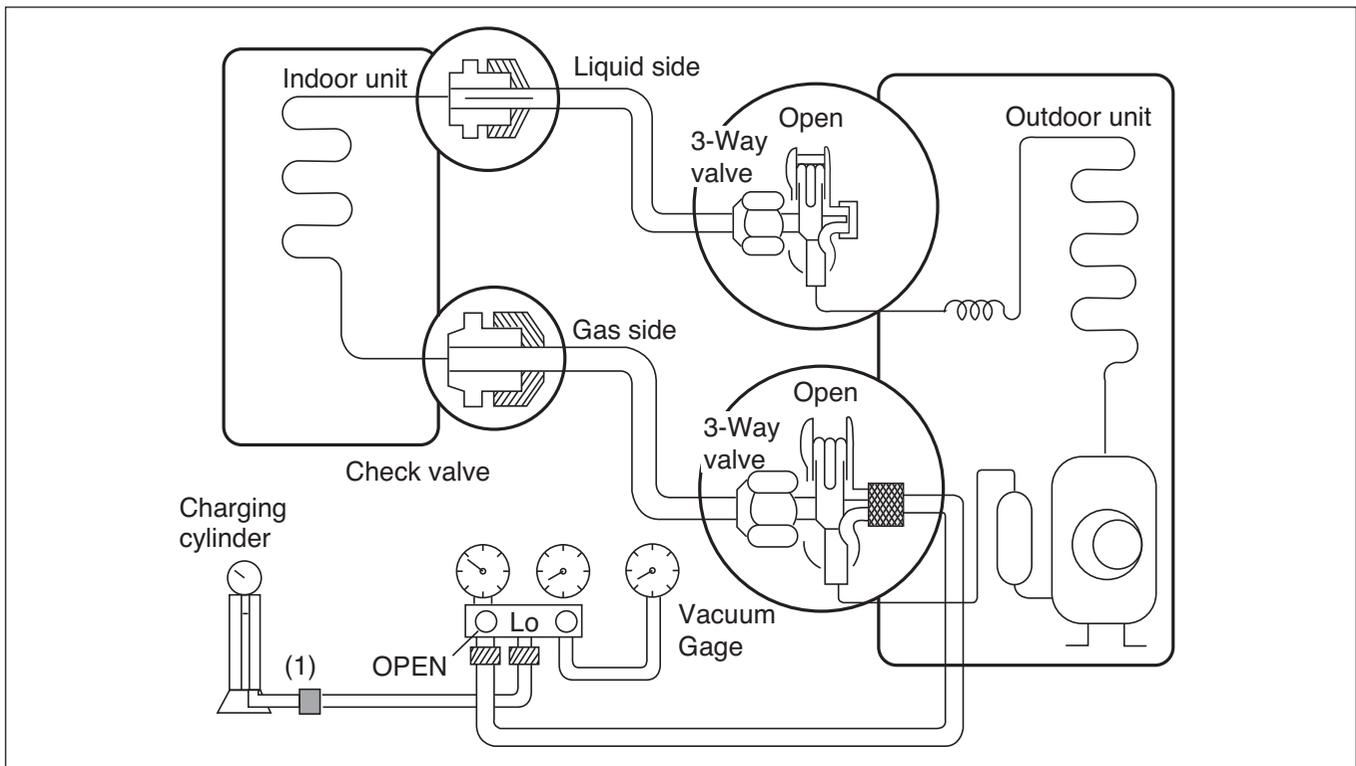
- (1) Connect the vacuum pump to the center hose of charge set center hose
- (2) Evacuation for approximately one hour.
 - Confirm that the gauge needle has moved toward 0.8Torr.
- (3) Close the valve (Lo side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
- (4) Disconnect the charge hose from the vacuum pump.
 - Vacuum pump oil. If the vacuum pump oil becomes dirty or depleted, replenish as needed.

! WARNING

Use a vacuum pump or Inert (nitrogen) gas when doing leakage test or air purge. Do not compress air or Oxygen and do not use Flammable gases. Otherwise, it may cause fire or explosion.

- Otherwise, it may cause personal injury.

4. Gas Charging (After Evacuation)



• Procedure

(1) Connect the charge hose to the charging cylinder.

- Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder.
- If you are using a gas cylinder, also use a scale and reverse the cylinder so that the system can be charged with liquid.

(2) Purge the air from the charge hose.

- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air. (Be careful of the liquid refrigerant). The procedure is the same if using a gas cylinder.

(3) Open the valve (Lo side on the charge set and charge the system with liquid refrigerant.

- If the system can not be charged with the specified amount of refrigerant, it can be charged with a little at a time (approximately 150g each time) while operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure (pumping down-pin).

This is different from previous procedures. Because you are charging with liquid refrigerant from the gas side, absolutely do not attempt to charge with larger amounts of liquid refrigerant while operating the air conditioner.

(4) Immediately disconnect the charge hose from the 3-way valve's service port.

- Stopping partway will allow the gas to be discharged.
- If the system has been charged with liquid refrigerant while operating the air conditioner turn off the air conditioner before disconnecting the hose.

(5) Mount the valve stem nuts and the service port nut.

- Use torque wrench to tighten the service port nut to a torque of 1.8 kg.m.
- Be sure to check for gas leakage.

WARNING

When installing or relocation the unit, make sure that no substance other than the specified refrigerant(R410A) enter the refrigerant circuit.

- Any presence of foreign substance such as air can cause an abnormal pressure rise and may result in explosion or injury.

5. Cycle Part

Trouble analysis

1. Check temperature difference between intake and discharge air, and check for the operating current too.

Case	Symptom	Supposed Caused
Case 1	Temp. difference : approx. 0°C Current : less than 80% of rated current	All amount of refrigerant leaked out. Check refrigeration cycle.
Case 2	Temp. difference : approx. 8°C Current : less than 80% of rated current	Refrigerant leakage Clog of refrigeration cycle Defective Compressor.
Case 3	Temp. difference : less than 8°C Current : over the rated current	Excessive amount of refrigerant
Case 4	Temp. difference : over 8°C	Normal

NOTICE

Temperature difference between intake and discharge air depends on room air humidity. When the room air humidity is relatively higher, temperature difference is smaller. When the room air humidity is relatively lower temperature difference is larger.

2. Check temperature and pressure of refrigeration cycle in cooling mode.

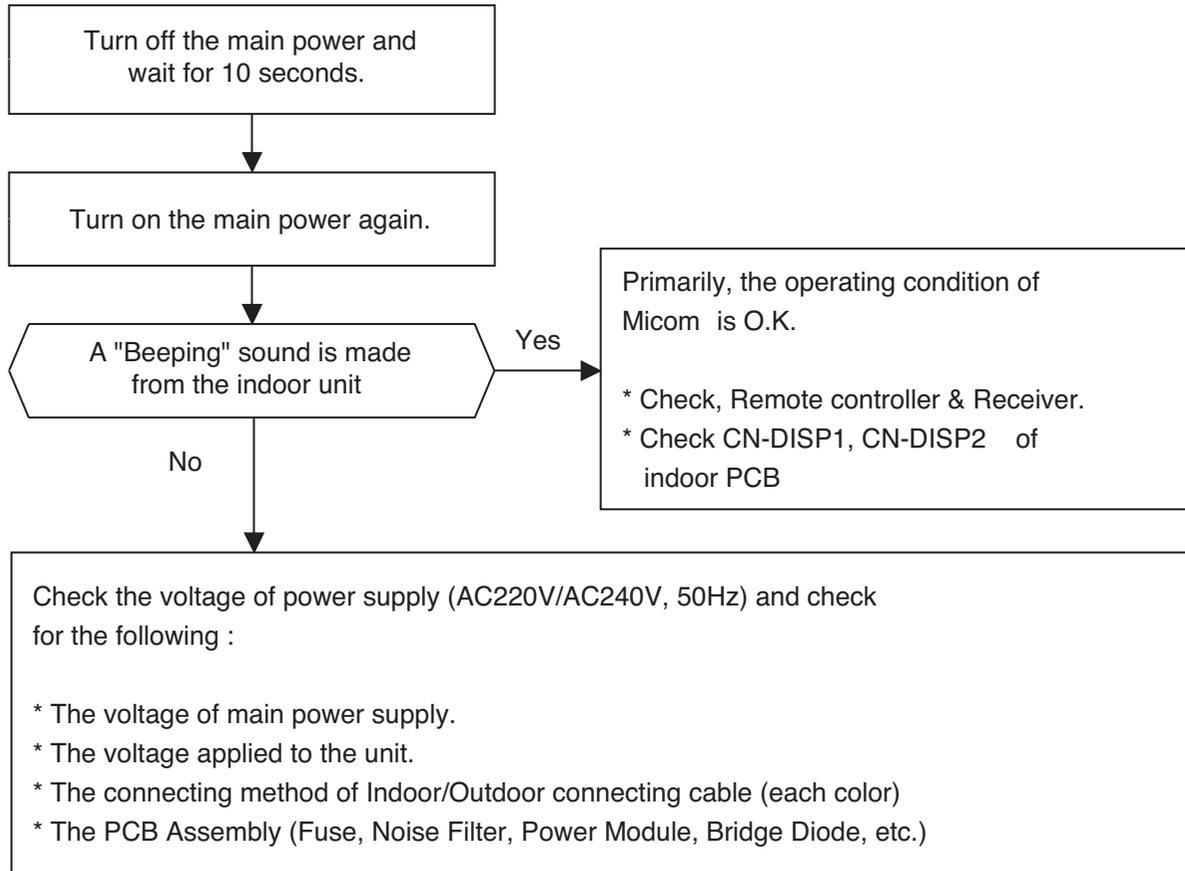
Suction pressure (Compared with the normal value)	Temperature of Discharge Air (Compared with the normal valve)	Cause of Trouble	Description
Higher	High	Defective compressor Defective 4-way reverse valve	Current is low.
	Normal	Excessive amount of refrigerant	High pressure does not quickly rise at the beginning of operation.
Lower	Higher	Insufficient amount of refrigerant (Leakage) Clogging	Current is low.

NOTICE

- The suction pressure is usually 8.5~9.5kg/cm²G(Cooling) at normal condition.(R410A)
- The temperature can be measured by attaching the thermometer to the low pressure tubing and wrap it with putty.

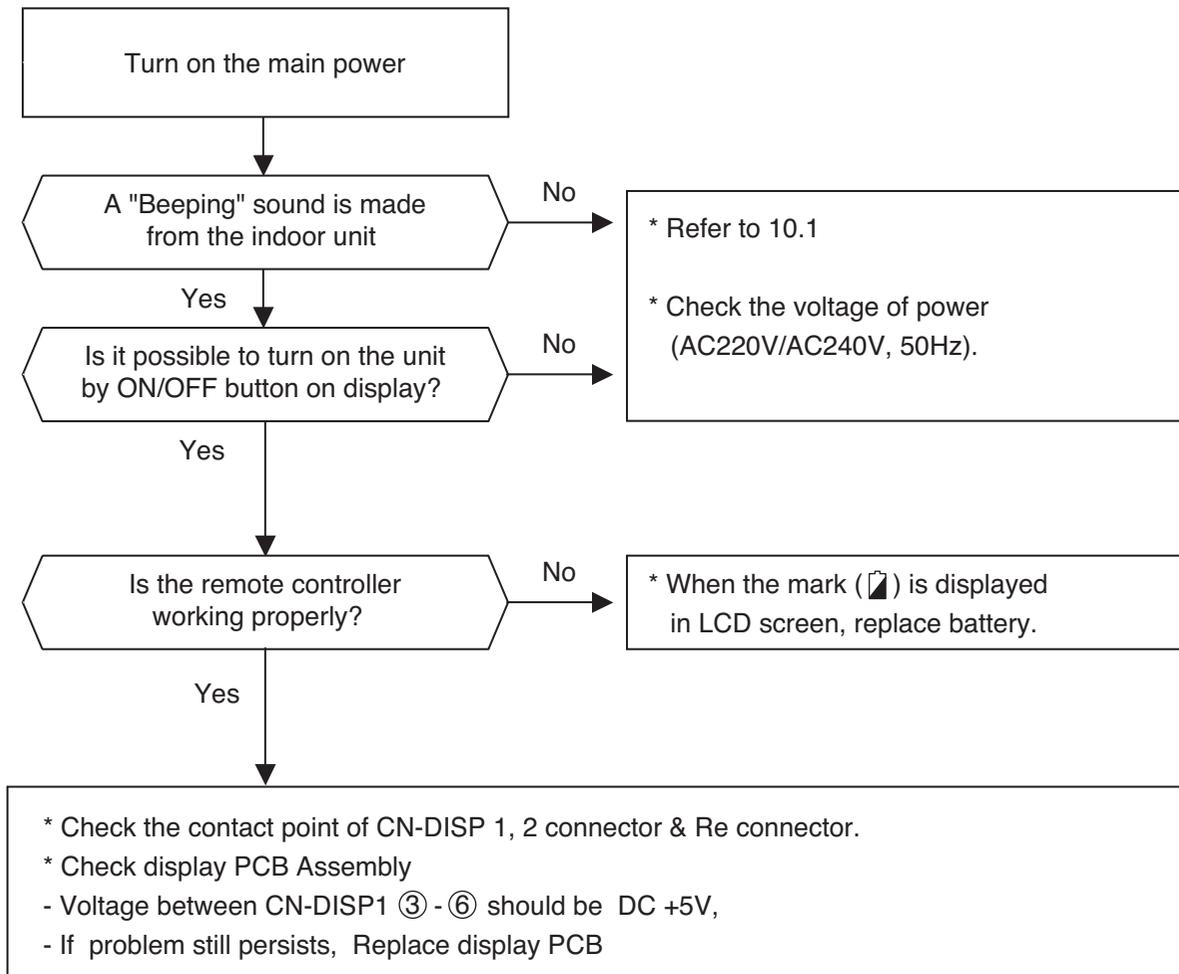
6. Electronic Parts

6.1 The Product doesn't operate at all

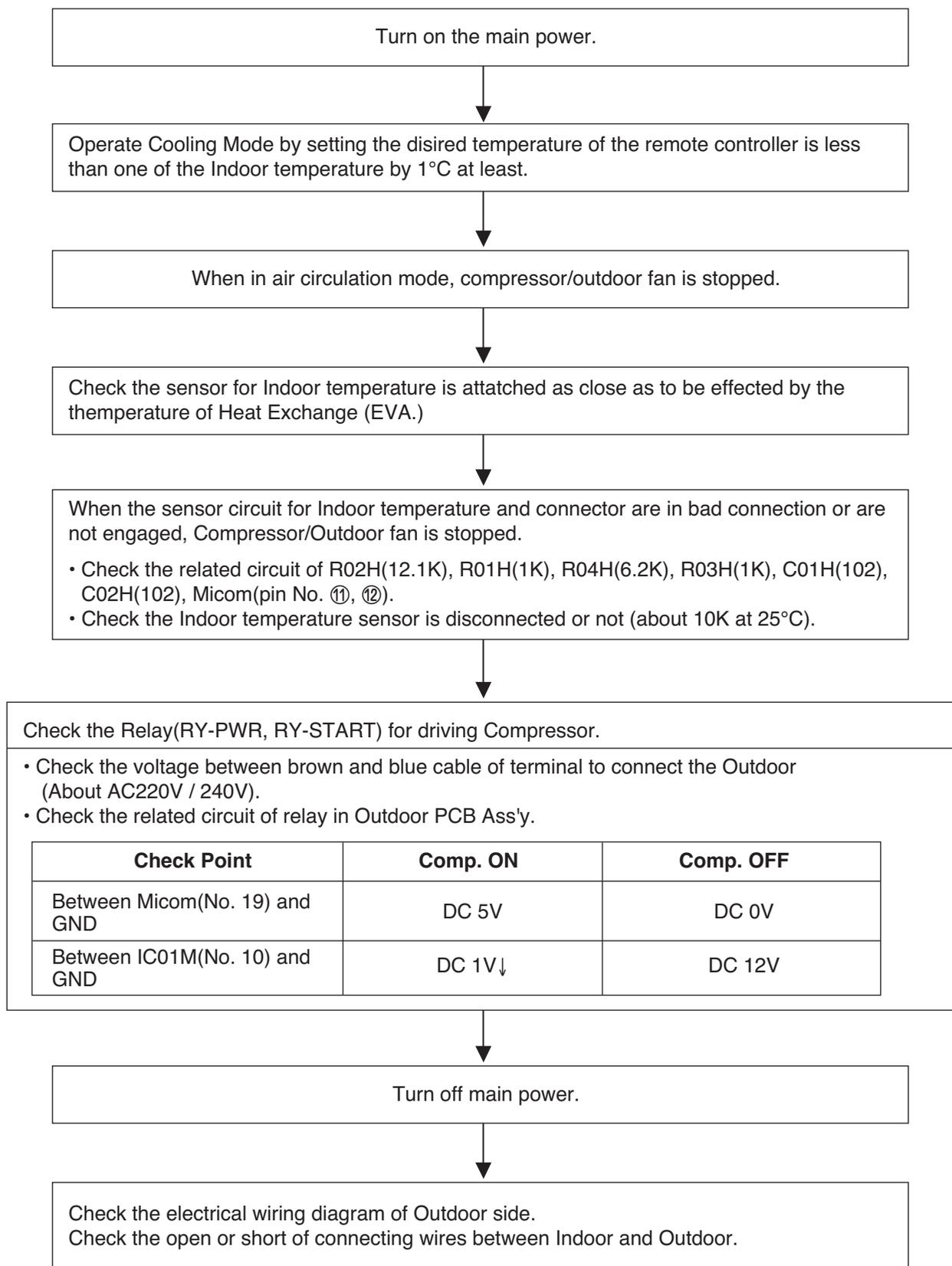


The operation check of the Indoor PCB Assembly		
Procedure	Specification	Remedy
1) The input voltage of power module.	1) AC230V ± 30V : Check the rated voltage	1) Check the power outlet.
2) The output voltage of power module.	2) 12V ± 3V	2) Replace PCB Assembly
4) IC04D(7805)	4) DC5V	4) Replace PCB Assembly
5) IC01A(KIA7036)	5) The voltage of micom pin 19 : DC4.5V↑	5) Replace PCB Assembly

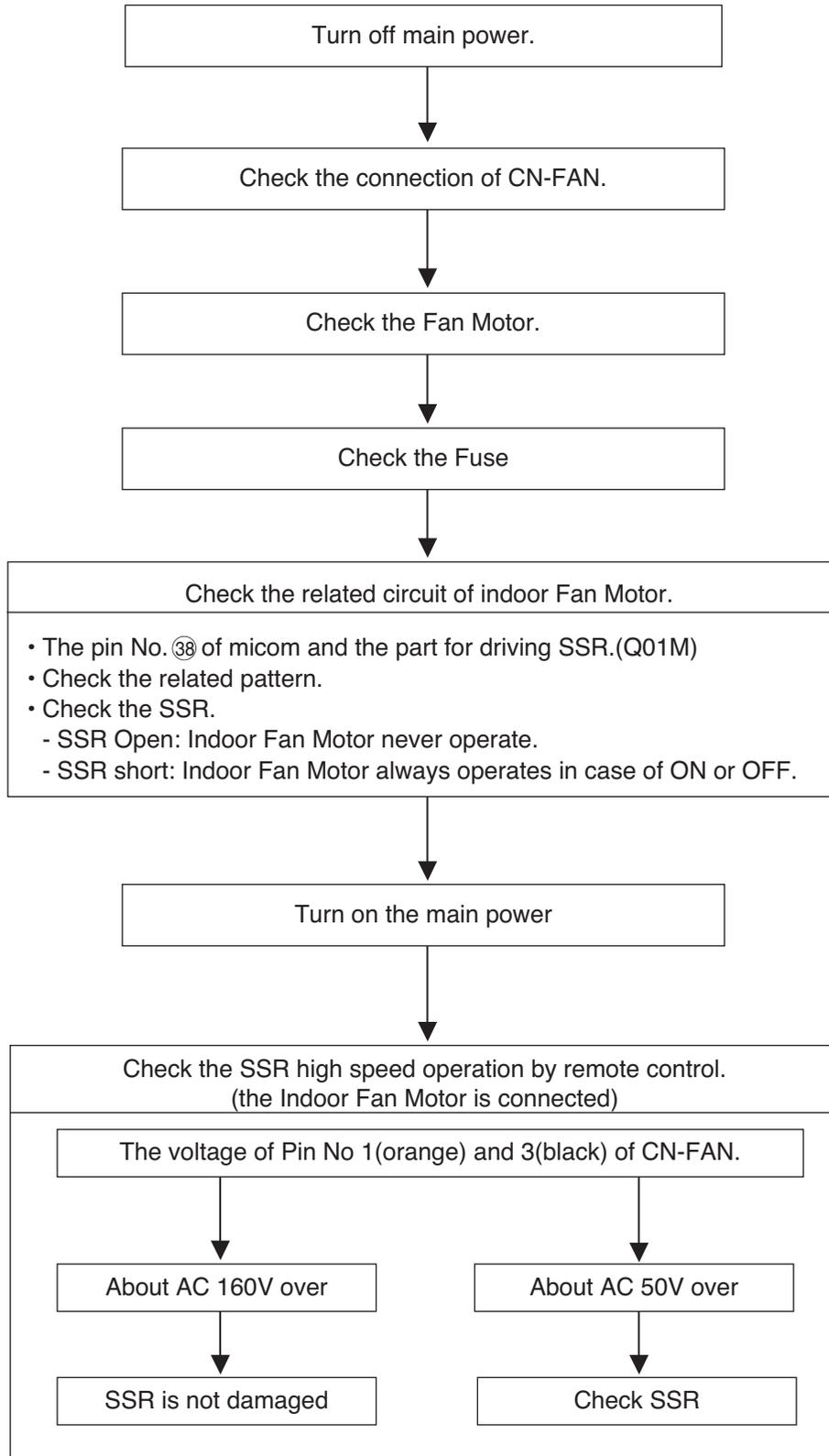
6.2 The Product doesn't operate with the remote controller



6.3 The Compressor/Outdoor Fan are don't operate



6.4 When indoor Fan does not operate.



6.5 Troubleshooting Indoor Error

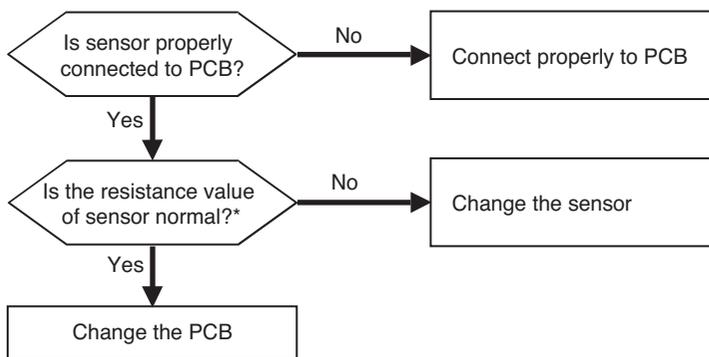
CH 01 (Indoor unit air sensor error)

CH 02 (Indoor unit pipe inlet sensor error)

CH 06 (Indoor unit pipe outlet sensor error)

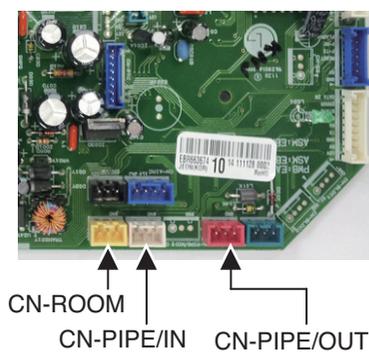
Error No.	Error Type	Error Point	Main Reasons
01	Indoor unit air sensor error	Indoor unit sensor is open/short	1. Indoor unit PCB wrong connection 2. Indoor unit PCB failure 3. Sensor problem (main reason)
02	Indoor unit pipe intake sensor error		
06	Indoor unit pipe outlet sensor error		

■ Error diagnosis and countermeasure flow chart



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

Refer: Resistance value maybe change according to temperature of temp sensor,
It shows according to criteria of current temperature(±5% margin) → Normal
Air temp sensor: 10°C = 20.7kΩ : 25°C= 10kΩ : 50°C= 3.4kΩ
Pipe temp sensor: 10°C = 10kΩ : 25°C= 5kΩ : 50°C= 1.8kΩ



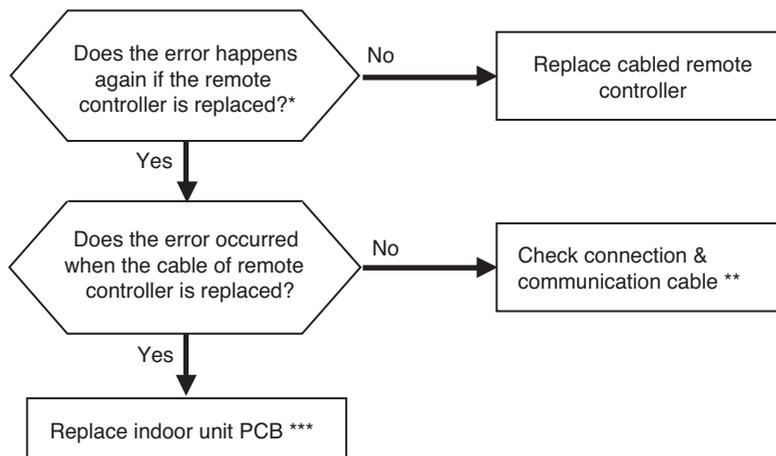
Measure the resistance of outlet pipe temp sensor.

6.5 Troubleshooting Indoor Error

CH 03 (No communication between cabled remote controller & indoor unit)

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

■ Error diagnosis and countermeasure flow chart



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

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

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



CN-REMO



Checking communication cable connection status

6.5 Troubleshooting Indoor Error

CH 09 (Indoor unit EEPROM error)

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

■ Error diagnosis and countermeasure flow chart

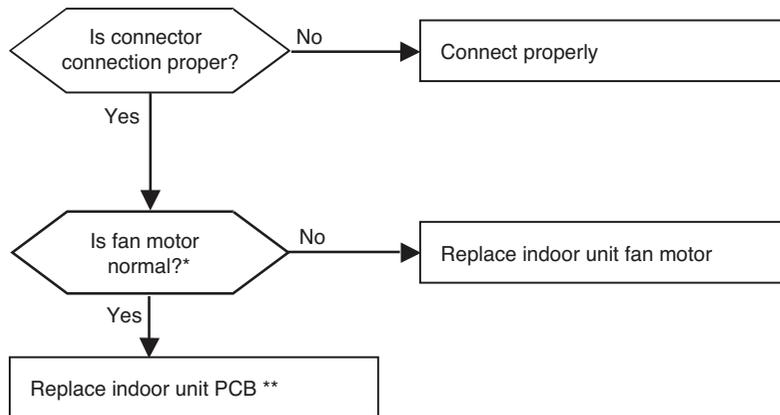
- Replace the indoor unit PCB, and then make sure to perform Auto addressing and input the address of central control

6.5 Troubleshooting Indoor Error

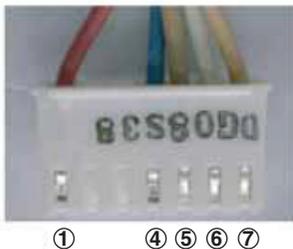
CH 10 (Indoor unit BLDC fan motor failure)

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

■ Error diagnosis and countermeasure flow chart



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



Each terminal with the tester

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

<Checking connection state of fan motor connector>



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

(Notice: The connection of motor connector to PCB should be done under no power supplying to PCB)

6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

Items		Contents
Purpose		Protection of the IGBTM parts and compressor in the PCB assembly from over-current.
Condition for Generation		Generation when over-current is detected in IGBTM.
Expected Causes	Installation & Overload	Outdoor device shielding, closing of a SVC valve, under/over charging of refrigerant, infiltration of water into refrigerant, outdoor fan fault, EEV (Electric Expansion Valve) fault, fault of a temperature sensor or its connection, blocking of an indoor device filter, and bending/blocking of a pipe.
	Compressor	Open/Short of the coil in the compressor, insulation breaking between the coil in the compressor and the pipe or panel, damage of compressor with abrasion, and compressor connection fault.
	PCB Assembly	IGBTM part fault, fault-signal detection circuit fault, compressor current detection circuit fault, and DC link detection circuit fault.
	Others	Improper power input, IGBTM connection fault, and insufficient distance between heat sink and control panel.

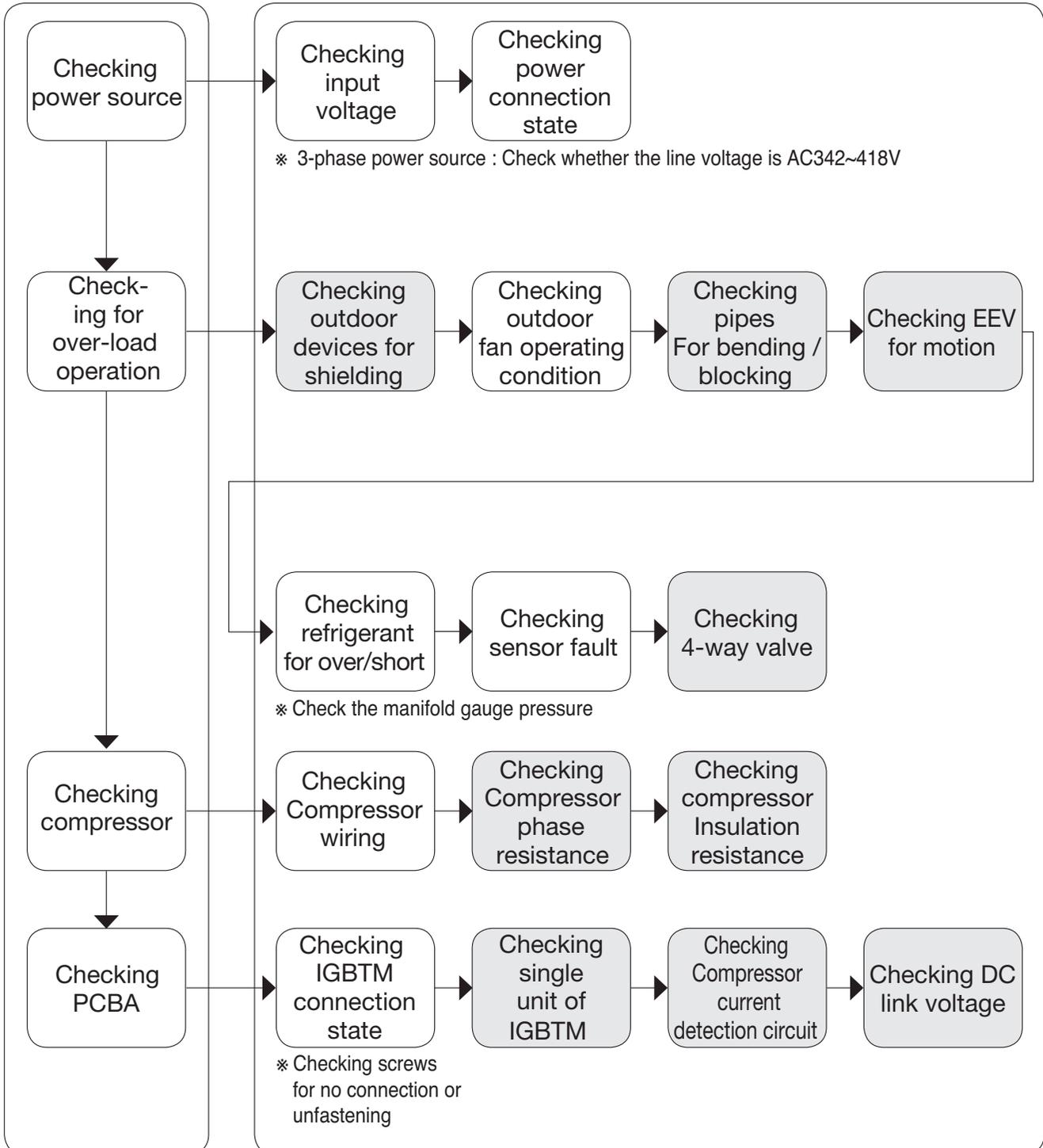
6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

Flow of trouble diagnosis

Items for checking

Sub-items for checking



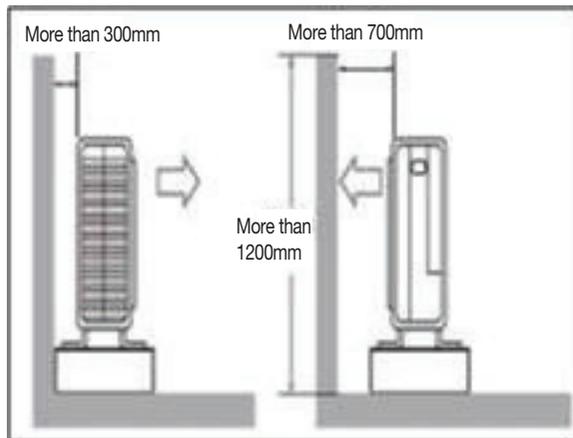
6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

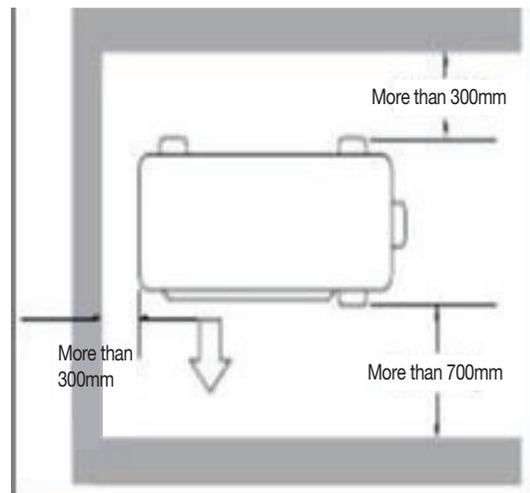
Checking outdoor devices for shielding

Cause of Trouble	Condition	Mechanism of Fault Generation
Whirlwind	Blocking of the front part of outdoor devices	Frequent turning-off of the compressor : Inflow of high-temperature air generated by outdoor fans into the air conditioner → Wrong influence to the system in over-load state
	Installation of outdoor devices in narrow space	
Shielding	Blocking of the lateral suction point on the wall of the outdoor devices Foreign substances in the heat exchanger and obstacles in the surrounding	Frequent turning-off of the compressor : Elevation of the pipe temperature due to reduced wind velocity → Wrong influence to the system in over-load state
Corrosion	Possible infiltration of moisture / highly humid area	Corrosion of heat exchanger → Reduced operation efficiency → Transfer of troubles to other parts

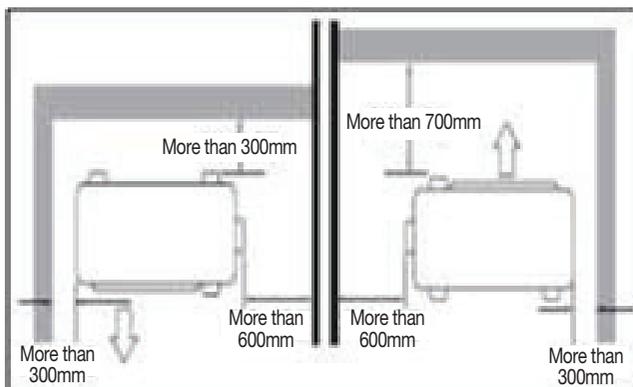
■ When the front/back has a wall (1 side)



■ When the front/back/left/right have walls (3 sides)



■ When the front/back/left/right have walls (2 sides)



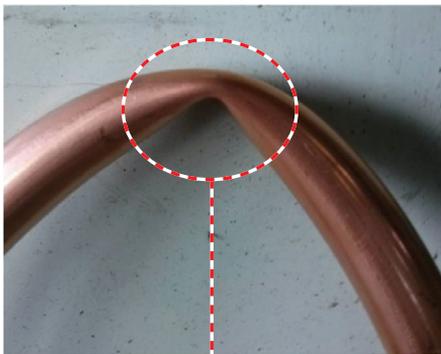
6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

Generation of refrigerant flow disturbance

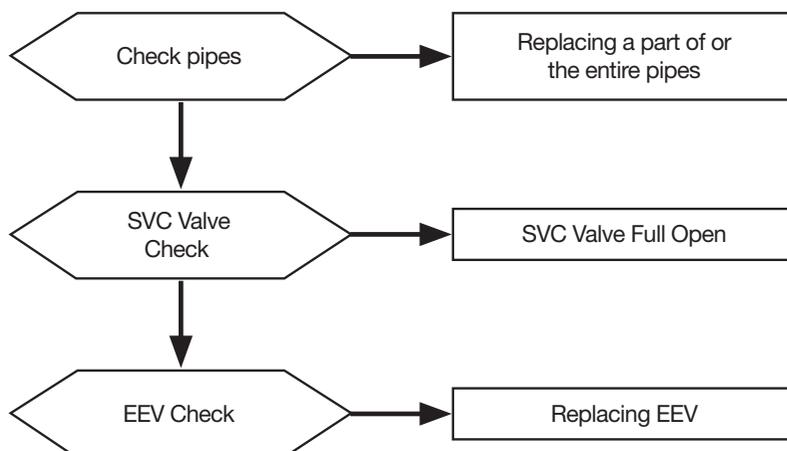
Cause of Trouble	Condition	Mechanism of Fault Generation
Generation of refrigerant flow disturbance	Bending/Blocking of a pipe EEV fault Closing of SVC Valve	Freezing of indoor device → Reduced evaporation temperature due to excessive expansion of refrigerant. Weak heating and cooling → Insufficient flow of refrigerant Frequent turning on/off of the compressor by the high/low pressure protection logic → Accumulated refrigerant elevates the temperature and reduces the pressure. Wrong oil collection elevates the outlet temperature of the compressor and damages the compressor.

■ Bending/Blocking of a pipe



Bending of a pipe

■ Checking SVC Valve



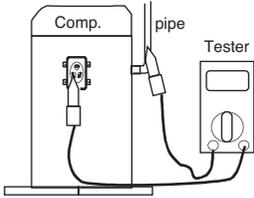
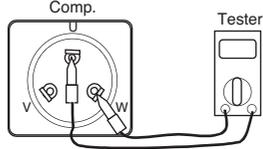
※ EEV Checking Method :
Check the opening/closing sound of EEV when the power is applied for the first time.

6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

Checking compressor phase resistance

Purpose	Judgment of the fault of the compressor.	Items for checking	<ol style="list-style-type: none"> 1. Measurement of insulation resistance between the compressor and panel. 2. Measurement of phase resistance. 3. Wiring Check.
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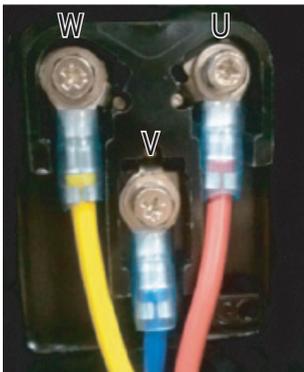
No.	Checking Item	Symptom	Countermeasure												
1	Is how long power on during operation?	<ol style="list-style-type: none"> 1) Power on for 12 hours or more 2) Power on for 12 hours or less 	<p>* Go to No.2.</p> <p>* Go to No.2 after applying power for designated time (12 hours).</p>												
2	<p>Does failure appears again when starting operation?</p> <p>Method to measure insulation resistance</p>  <p style="text-align: center;">Figure 1.</p> <p>Method to measure coil resistance</p>  <p style="text-align: center;">Figure 2.</p>	<ol style="list-style-type: none"> 1) The compressor stops and same error appears again. 2) If output voltage of the inverter is stably output. Note 1) 3) If output voltage of the inverter is unstable or it is 0V. (When incapable of using a digital tester) 	<p>* Check IGBTM may fail.</p> <p>* Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor.</p> <p>* Insulation resistor : 50MΩ or more</p> <p>* Coil resistor (below table)</p> <p>JBA068MAF</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Temp</th> <th>25°C</th> <th>75°C</th> </tr> </thead> <tbody> <tr> <td>U-V</td> <td>0.163 ± 7% Ω</td> <td>0.195 ± 7% Ω</td> </tr> <tr> <td>V-W</td> <td>0.163 ± 7% Ω</td> <td>0.195 ± 7% Ω</td> </tr> <tr> <td>W-U</td> <td>0.163 ± 7% Ω</td> <td>0.195 ± 7% Ω</td> </tr> </tbody> </table>	Temp	25°C	75°C	U-V	0.163 ± 7% Ω	0.195 ± 7% Ω	V-W	0.163 ± 7% Ω	0.195 ± 7% Ω	W-U	0.163 ± 7% Ω	0.195 ± 7% Ω
Temp	25°C	75°C													
U-V	0.163 ± 7% Ω	0.195 ± 7% Ω													
V-W	0.163 ± 7% Ω	0.195 ± 7% Ω													
W-U	0.163 ± 7% Ω	0.195 ± 7% Ω													
			<p>* Check the IGBTM. If the IGBTM is normal, replace the inverter board.</p> <p>* Check coil resistor and insulation resistor.</p>												

Purpose	Judgment of the fault of the compressor.	Items for checking	1. Measurement of insulation resistance between the compressor and panel. 2. Measurement of phase resistance. 3. Wiring Check.
---------	--	--------------------	--

■ **How to check the compressor wiring error**

1. Check Inv. PCB U,V,W connector connection condition
2. Check wire disconnection and wiring
3. Check compressor terminal connection condition(bad contact)
Reassemble if abnormality found

※ U(Red), V(Blue), W(Yellow)



[Compressor]



[Inverter PCB]

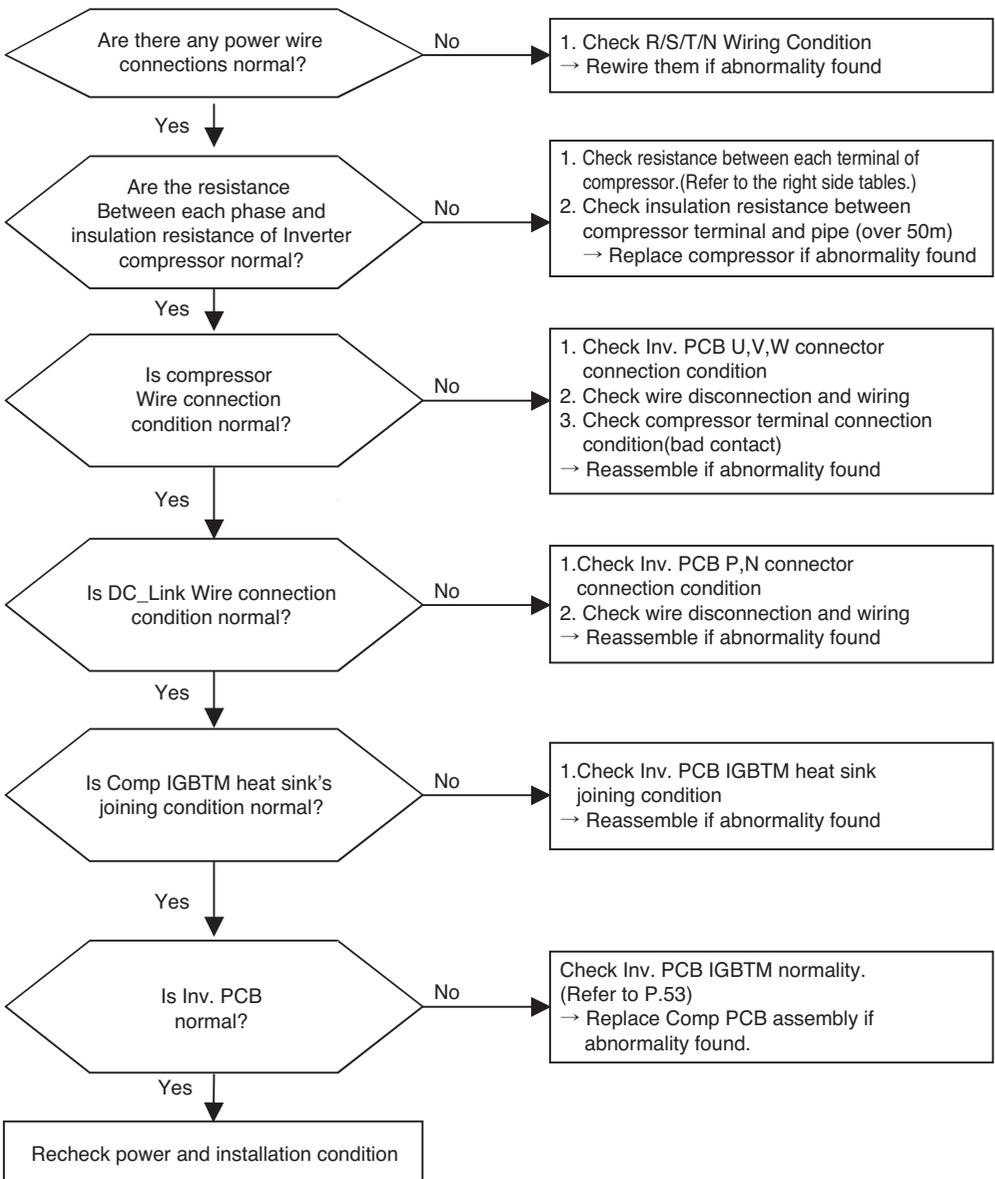
6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

IGBTM Check

Purpose	Judgment of the IGBTM part fault of PCB assembly.	Main Reasons	<ol style="list-style-type: none"> 1. Over current detection at Inverter compressor(U,V,W) 2. Compressor damaged (insulation damaged/Motor damaged) 3. IGBTM overheating (Heat sink disassembled) 4. Inverter compressor terminal disconnected or loose 5. Inverter PCB assembly damaged 6. ODU input current low
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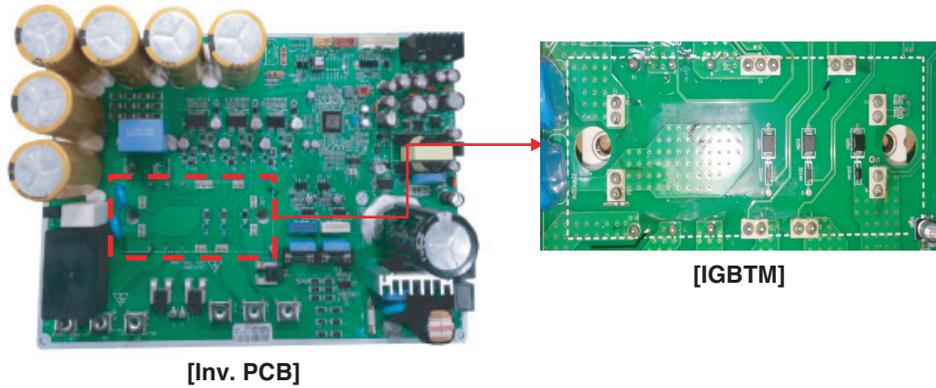
■ Error diagnosis and countermeasure flow chart



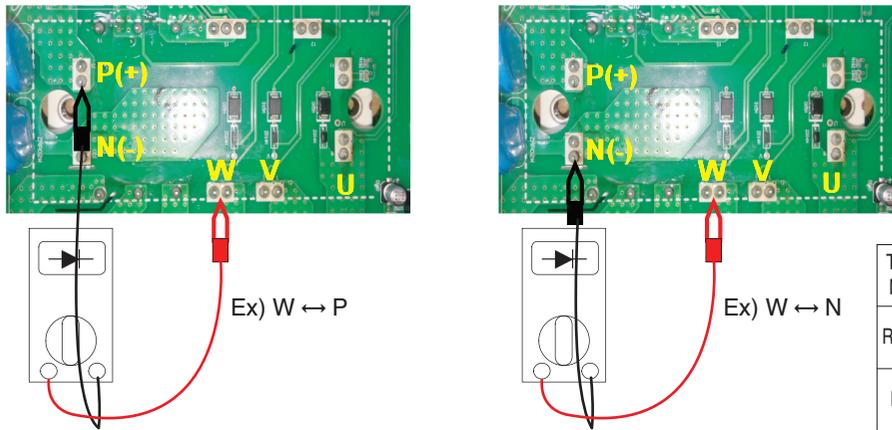
JBA068MAF

Temp	25°C	75°C
U-V	0.163 ± 7% Ω	0.195 ± 7% Ω
V-W	0.163 ± 7% Ω	0.195 ± 7% Ω
W-U	0.163 ± 7% Ω	0.195 ± 7% Ω

* Position of IGBTM in Inv. PCB

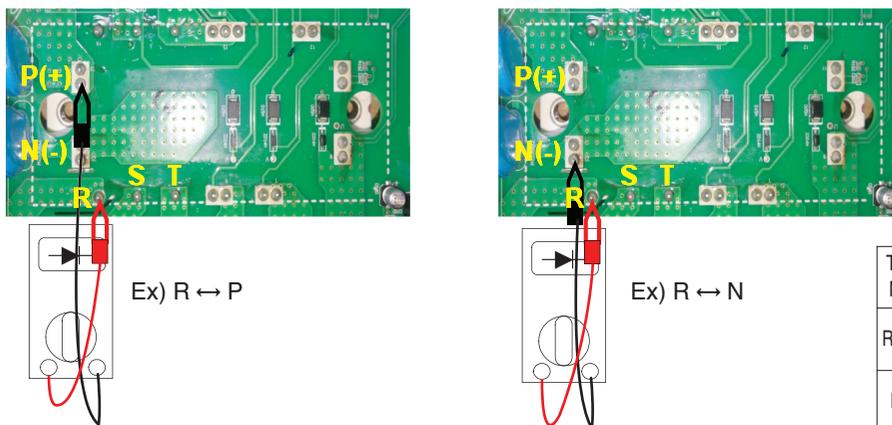


* Check Inv. PCB IGBTM normality



Tester Mode	Check Point	Result	Action
Resistor	P ↔ U / P ↔ V / P ↔ W	0 Ω (Short) or Hundreds MΩ (Open)	Replace Inv. PCB
	U ↔ N / V ↔ N / W ↔ N		
Diode	P ↔ U / P ↔ V / P ↔ W	0.4 V ~ 0.6 V	
	U ↔ N / V ↔ N / W ↔ N		

* Check Inv. PCB Bridge Diode normality



Tester Mode	Check Point	Result	Action
Resistor	P ↔ L1 / P ↔ L2 / P ↔ L3	0 Ω (Short) or Hundreds MΩ (Open)	Replace Inv. PCB
	L1 ↔ N / L2 ↔ N / L3 ↔ N		
Diode	P ↔ L1 / P ↔ L2 / P ↔ L3	0.4 V ~ 0.6 V	
	L1 ↔ N / L2 ↔ N / L3 ↔ N		

6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

4-Way Valve Check

Purpose	Judge whether the 4-way valve part has any fault.	Items for checking	1. Check the working voltage of the 4-way valve. 2. Check the 4-way valve coil resistance.
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■ Checking the output voltage of CN-4way (refer to next page)

1. Set the tester in AC Voltage Mode and check the current.
2. Check the output voltage between both ends of CN-4Way Connector.
3. The standard of normal voltage is $220V \pm 10\%$.
4. If the measurement is different from the standard, replace PCBA.

※ The measurement should be made at the time to start heating mode operation and at the time of standby after operation.

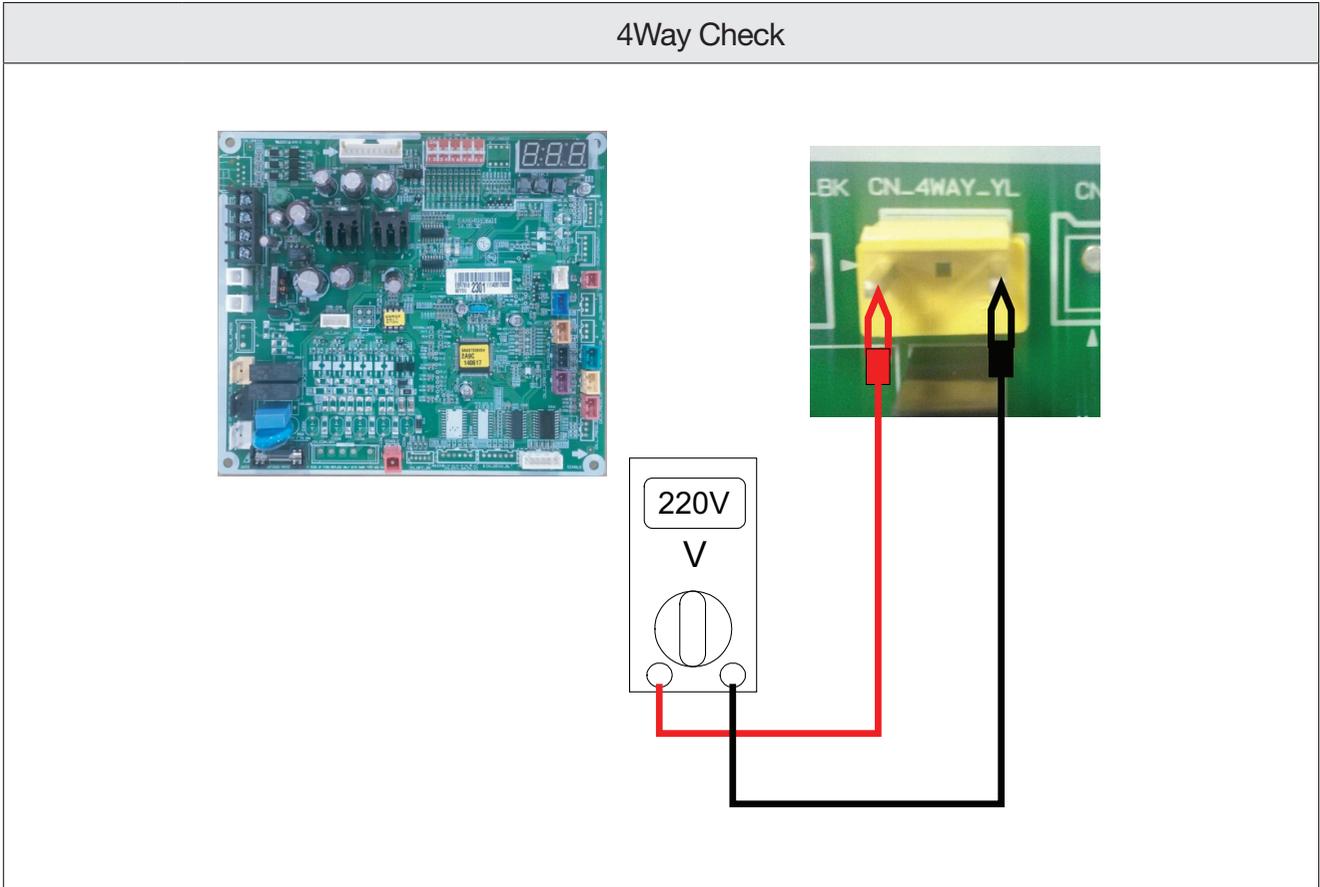
■ Check the 4-way.valve coil resistance.

1. Set the tester in Resistance Mode and check the current.
2. Measure the resistance between the both ends of a single unit of 4-Way valve coil.
3. The standard of normal resistance is $1.4 \text{ k}\Omega \pm 10\%$.
4. If the measurement is different from the standard, replace 4-Way valve coil.

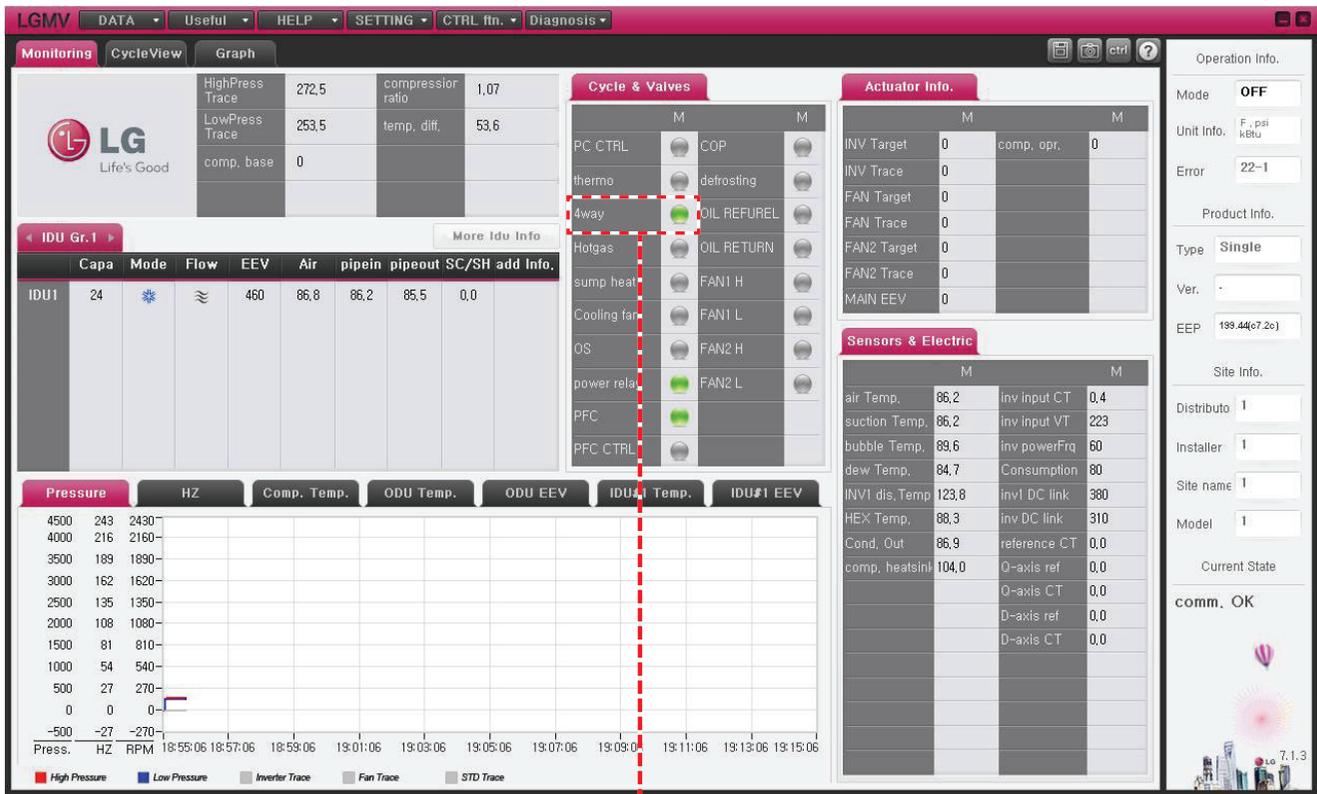


! Caution : When the measurement is made in the state that the electricity is applied, check the tester for being in the measurement mode and be careful to avoid possible short of the parts other than the measuring part.

■ 4-Way Check Point



■ LGMV Display

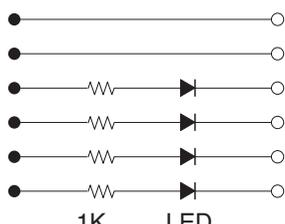


When Heating, LED turn on
When Cooling, LED turn off

6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

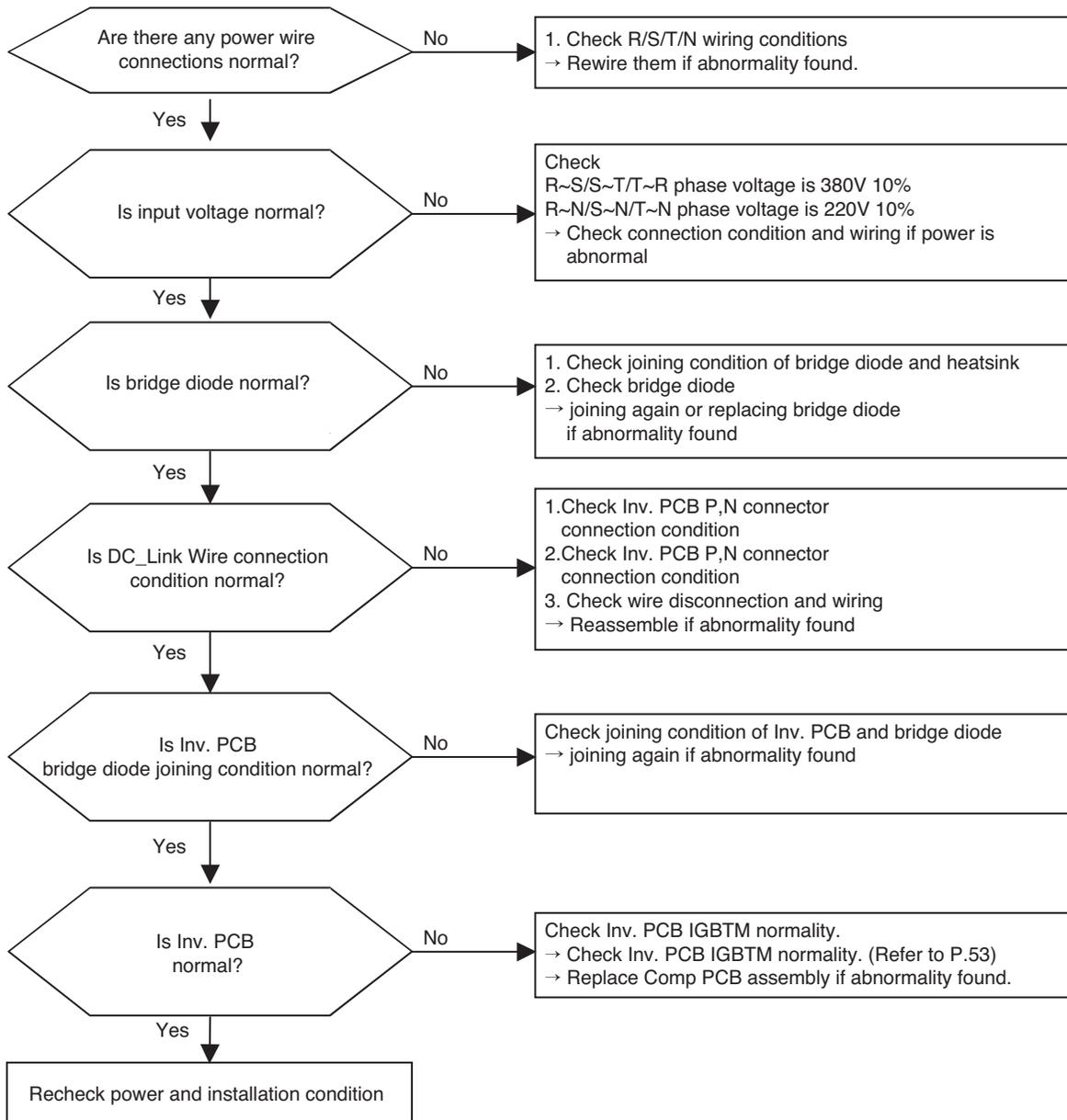
EEV Check

Failure mode	Diagnosis	Repair process
Microcomputer Driving circuit failure	<p>1. Disconnect the EEV connector form control board and connect testing LED</p>  <p>2. Main power ON, pulse signal is out from EEV for 17 sec. If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal</p>	Check and replace outdoor unit control board
EEV locking	1. If EEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace EEV
EEV Motor coil short or misconnection	<p>1. Check the resistance between coil terminal (red-white, red-yellow, red-orange, red-blue)</p> <p>2. If the estimated resistance value is in $52\pm 3\Omega$ then the EEV is normal</p>	Replace EEV

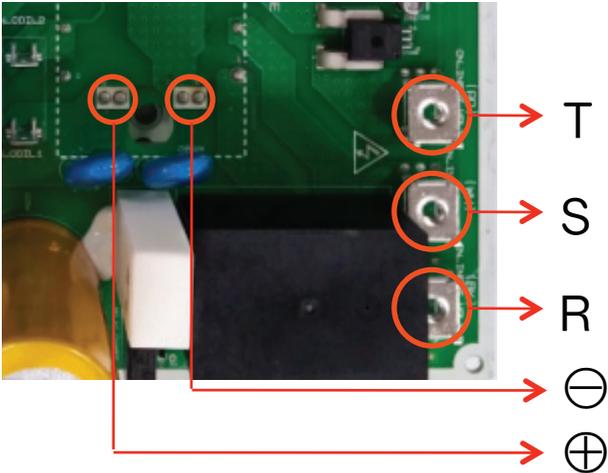
6.6 Troubleshooting Outdoor Error

CH 21 (DC Peak / Comp IGBTM Fault)

■ Error Diagnosis and Countermeasure Flow Chart



* Check DC_Link Connector joining condition



* Measuring input voltage



6.6 Troubleshooting Outdoor Error

CH 22 (Input of Over Current)

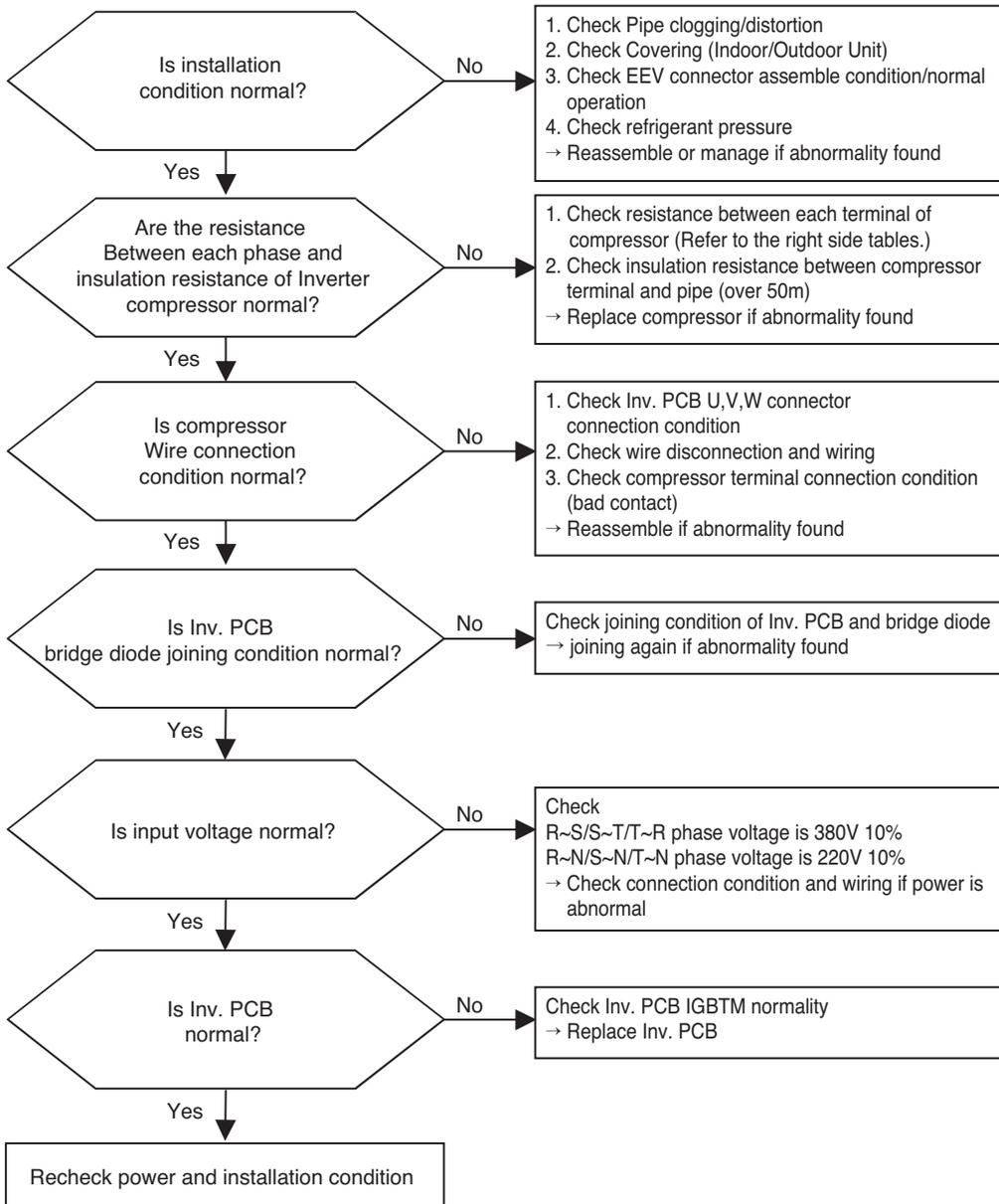
Items		Contents
Purpose		Prevention of the damage of PCBA, wire, and connector caused by over-current
Condition for Generation		The detected current exceeds the standard.
Expected Causes	Installation & Overload	Installation fault, closing of SVC valve, under/over charging with refrigerant, infiltration of water into refrigerant, outdoor device shielding, outdoor fan fault, EEV valve fault, and sensor fault or assembling error.
	Compressor	Short between compressor coil and sash, abrasion of compressor, and short/opening of compressor coil.
	PCB Assembly	Input current detection circuit fault.
	Others	Input of low-voltage.

6.6 Troubleshooting Outdoor Error

CH 22 (Input of Over Current)

Flow of trouble diagnosis

■ Error Diagnosis and Countermeasure Flow Chart



JBA068MAF

Temp	25°C	75°C
U-V	0.163 ± 7% Ω	0.195 ± 7% Ω
V-W	0.163 ± 7% Ω	0.195 ± 7% Ω
W-U	0.163 ± 7% Ω	0.195 ± 7% Ω

Part 4 Trouble Shooting

* Measuring resistance between each terminal of compressor



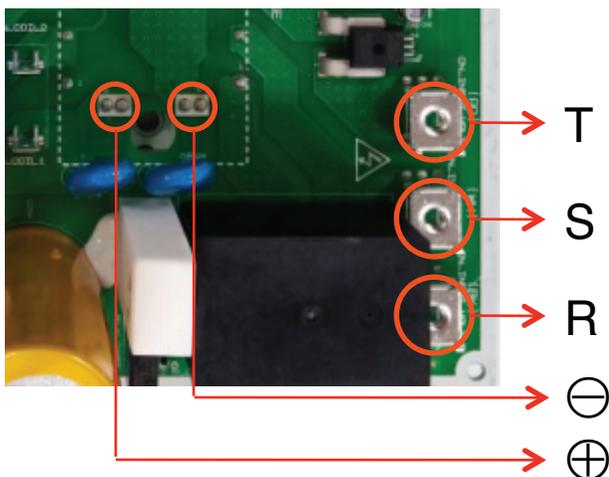
* Measuring input voltage



* Compressor wire connector connection



* Check DC_Link Connector joining condition



6.6 Troubleshooting Outdoor Error

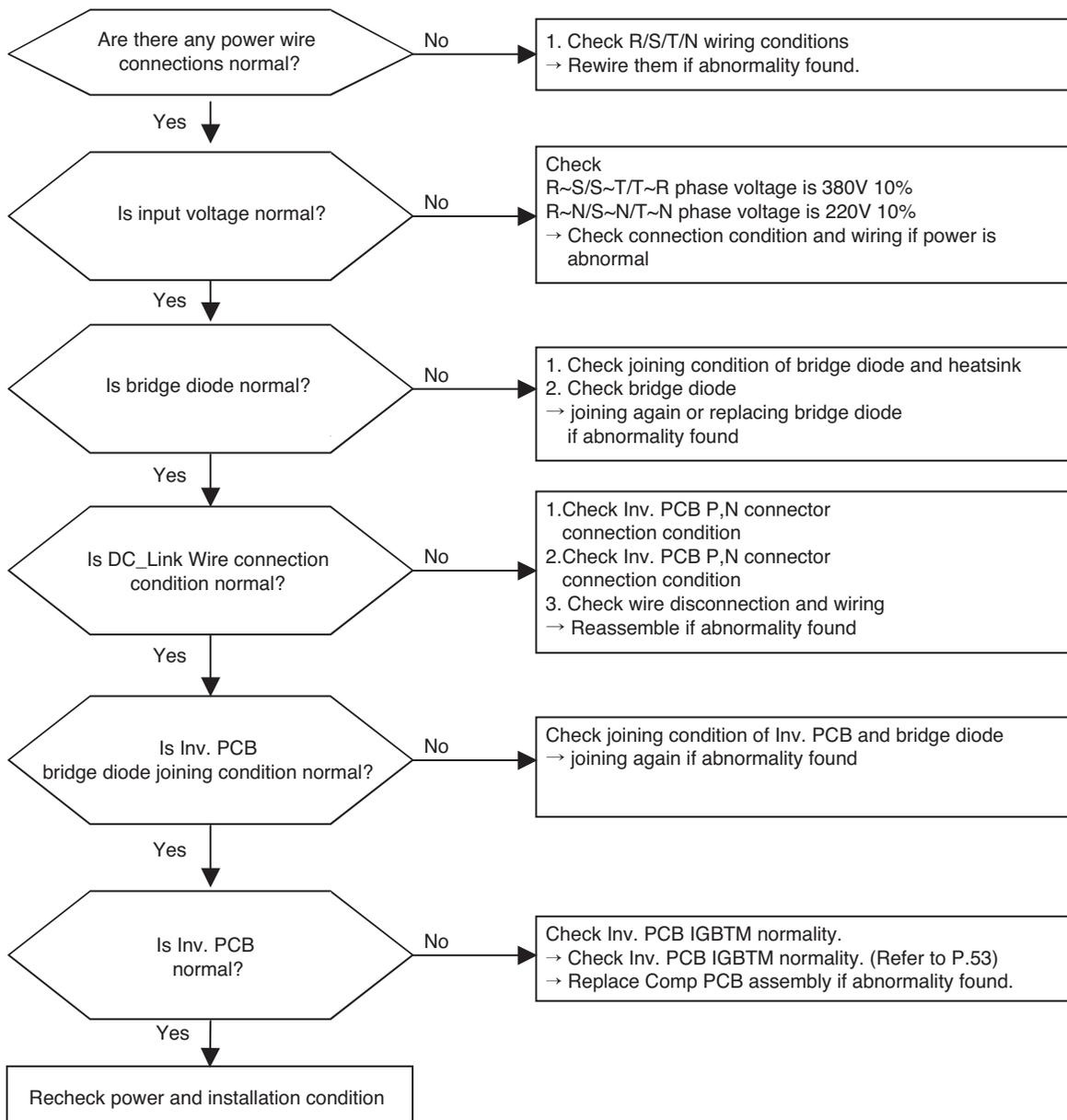
CH 23 (DC Link Voltage Low)

Items		Contents
Purpose		Securing the credibility of the compressor lifetime against the generation of over-current at the compressor part in the DC Link Low Voltage condition.
Condition for Generation		Detected DC Link Voltage is less than the standard.
Expected Causes	Installation	Installation fault and input of low-voltage power
	PCB Assembly	Damage of DC link voltage detection circuit and reactor terminal connection error

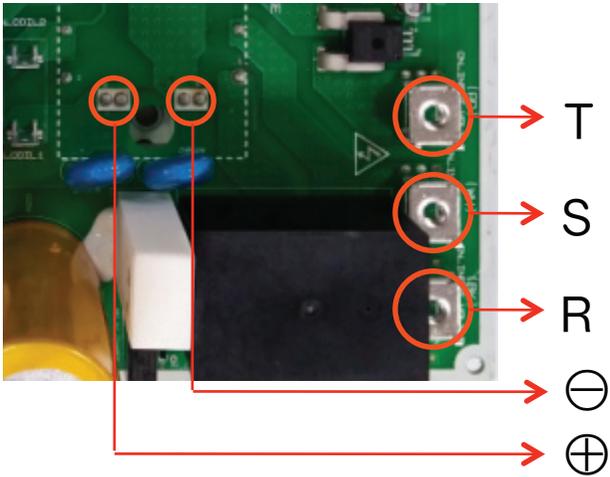
6.6 Troubleshooting Outdoor Error

CH 23 (DC Link Voltage Low)

Flow of trouble diagnosis



* Check DC_Link Connector joining condition



* Measuring input voltage

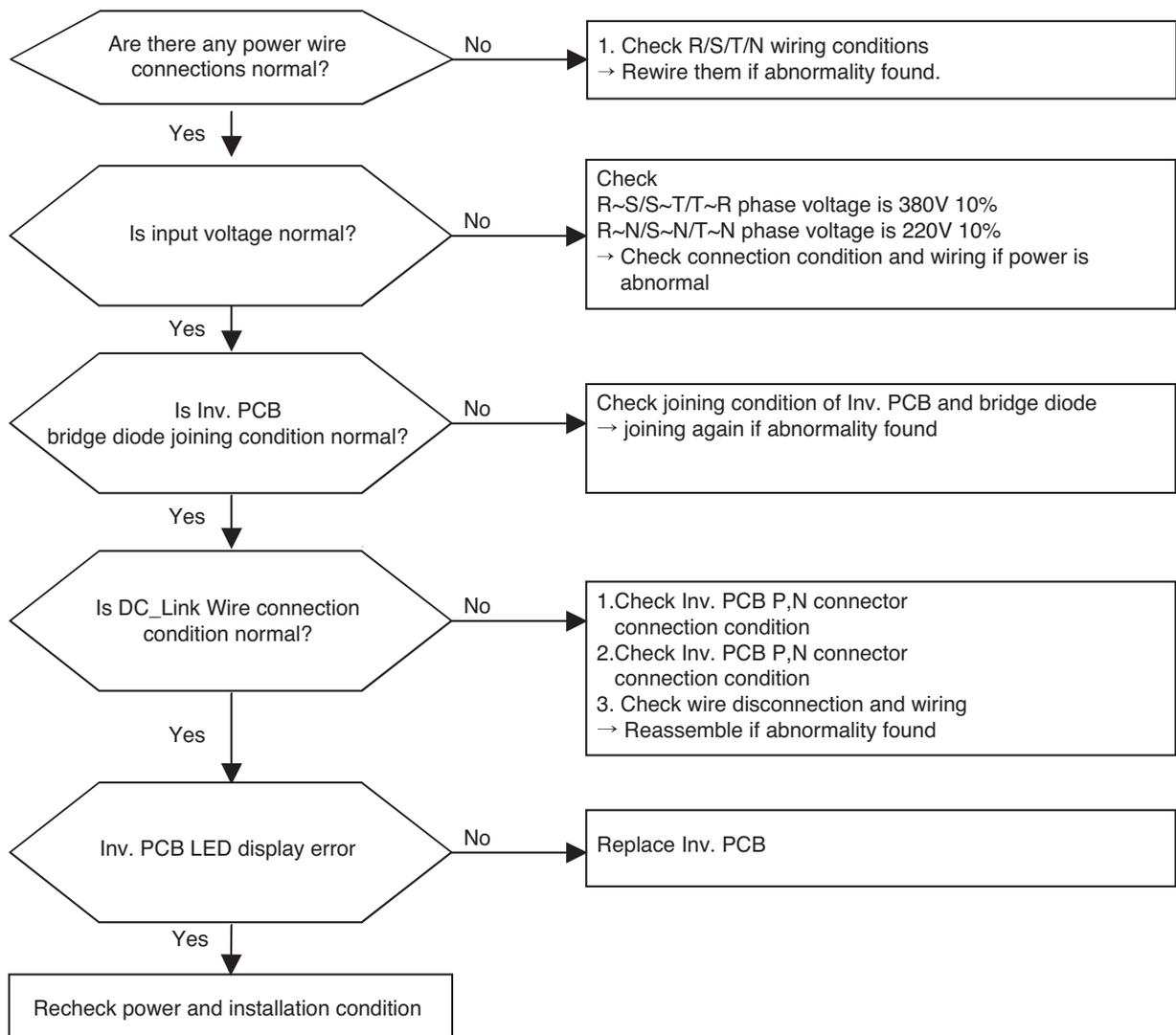


6.6 Troubleshooting Outdoor Error

CH 25 (Input Voltage high/low)

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) 2. Outdoor unit Inv. PCB damage (input voltage sensing part) 3. N phase line disconnection

■ Error Diagnosis and Countermeasure Flow Chart



6.6 Troubleshooting Outdoor Error

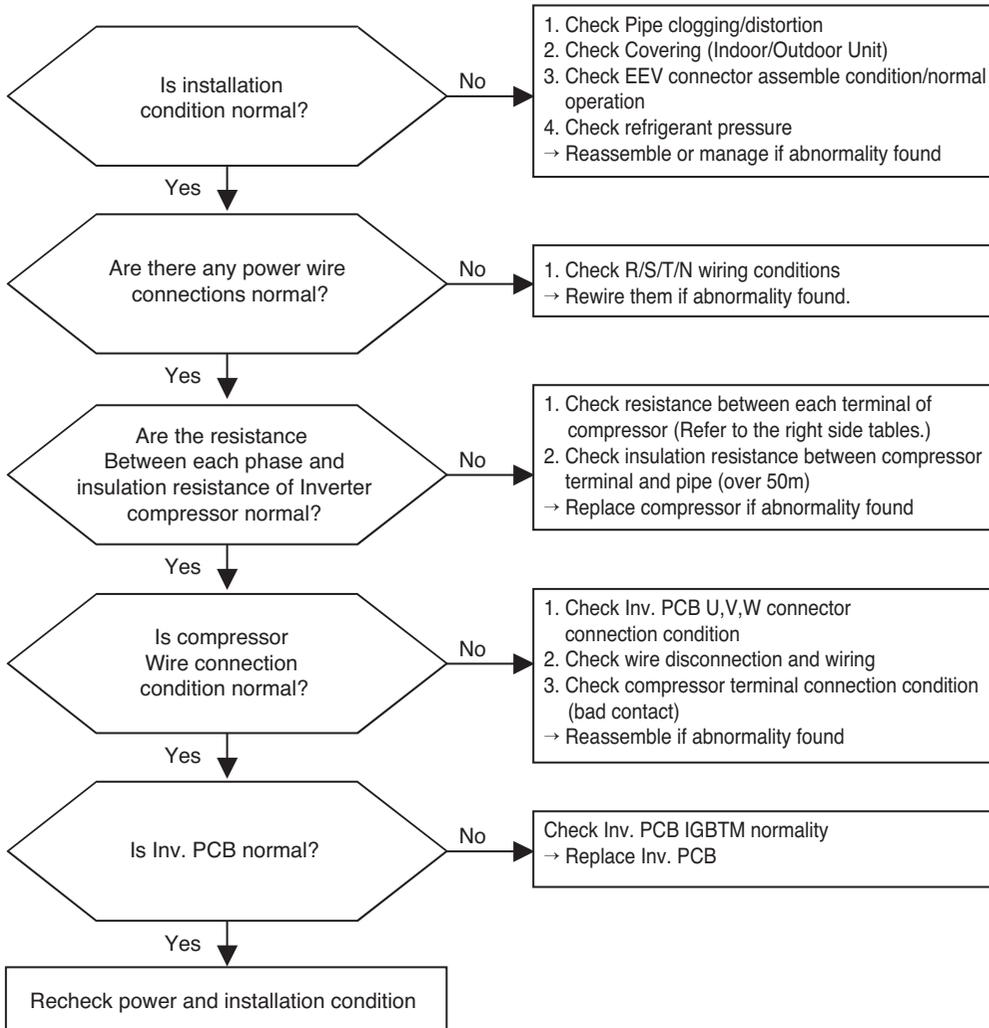
CH 26 (Compressor Starting Failure)

Items		Contents
Purpose		Restarting of the compressor when it does not properly work.
Condition for Generation		① The compressor current exceeds the standard at initial starting. ② The compressor current does not reach the standard at initial starting. ③ The compressor frequency does not reach the standard at initial starting.
Expected Causes	Installation & Overload	Closing of SVC valve, under/over charging with refrigerant, infiltration of water into refrigerant, outdoor device shielding, outdoor fan fault, EEV valve fault, and sensor fault or assembling error
	Compressor	Open/Short of the coil in the compressor, insulation breaking between the coil in the compressor and the sash, damage of compressor with abrasion, and compressor connection fault
	PCB Assembly	IGBTM parts fault, compressor current detection circuit fault, and DC link detection circuit fault
	Others	Input of abnormal power, IGBTM connection fault, and power connection fault

6.6 Troubleshooting Outdoor Error

CH 26 (Compressor Starting Failure)

Flow of trouble diagnosis



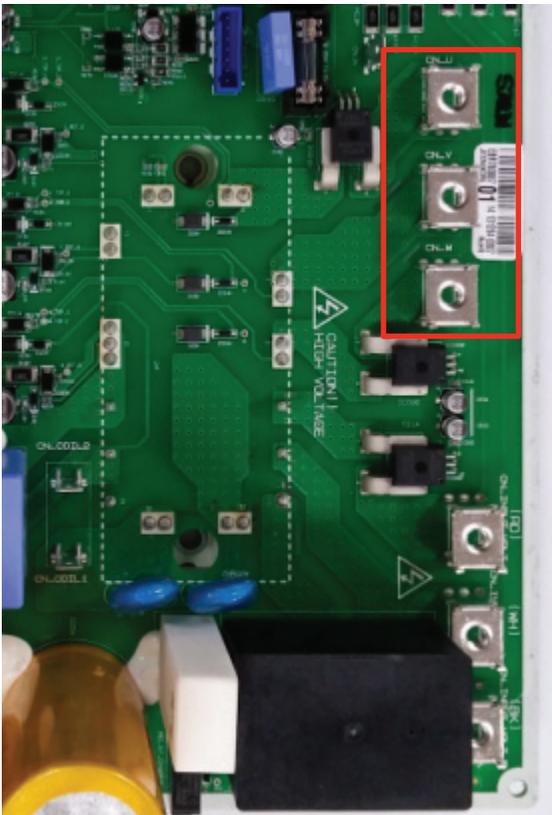
JBA068MAF

Temp	25°C	75°C
U-V	0.163 ± 7% Ω	0.195 ± 7% Ω
V-W	0.163 ± 7% Ω	0.195 ± 7% Ω
W-U	0.163 ± 7% Ω	0.195 ± 7% Ω

* Measuring resistance
between each terminal of
compressor



* Compressor wire connection



6.6 Troubleshooting Outdoor Error

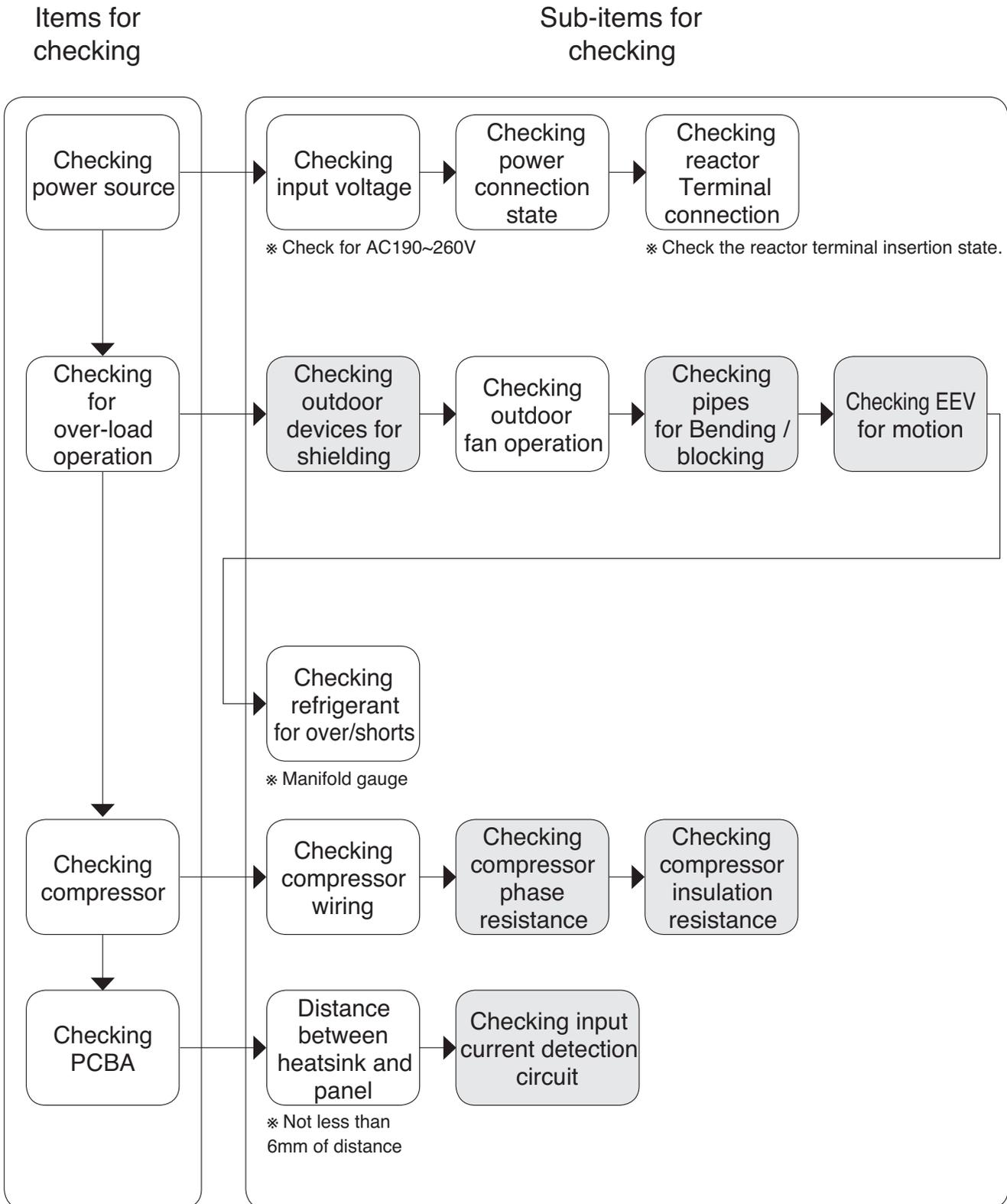
CH 27/73 (PSC/PFC Fault Error)

Items		Contents
Purpose		Prevention of the damage of PCBA, wire, and connector caused by over-current
Condition for Generation		Transfer of signals with detection of the flow of over-current in PSC/PFC
Expected Causes	Installation & Overload	Transfer of signals with detection of the flow of over-current in PSC/PFC, Outdoor device shielding
	Compressor	Open/Short of the coil in the compressor, insulation breaking between the coil in the compressor and the sash, damage of compressor with abrasion, and compressor connection fault
	PCB Assembly	Damage of PSCM/PFCM and input current detection circuit fault
	Others	Input of abnormal power, power connection fault, reactor terminal connection fault, and faulty distance between heatsink and sash

6.6 Troubleshooting Outdoor Error

CH 27/73 (PSC/PFC Fault Error)

Flow of trouble diagnosis



6.6 Troubleshooting Outdoor Error

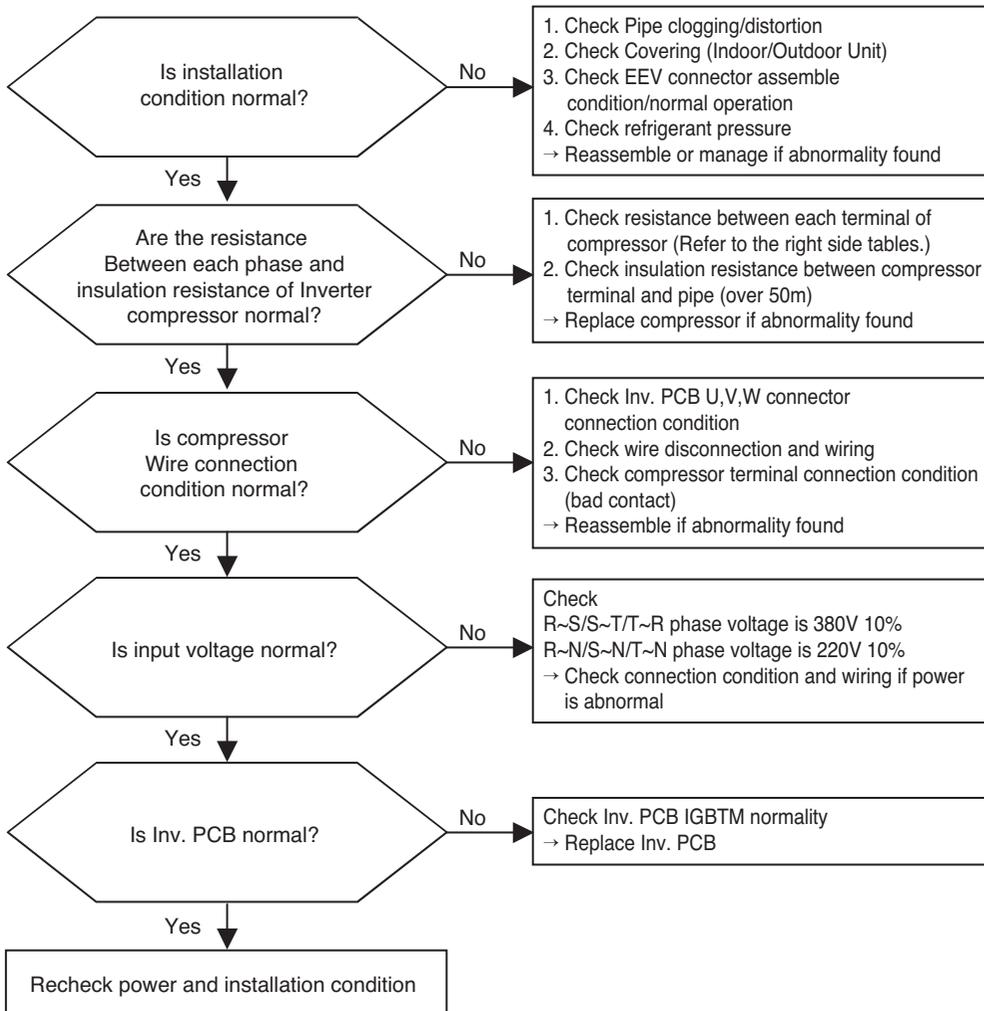
CH 29 (Compressor Over Current)

Items		Contents
Purpose		Protection of IGBTM and compressor in the PCB assembly from over-current.
Condition for Generation		Increased compressor current exceeding the standard.
Expected Causes	Installation & Overload	Transfer of signals with detection of the flow of over-current in PSC/PFC, blocking of a outdoor unit.
	Compressor	Open/Short of the coil in the compressor, insulation breaking between the coil in the compressor and the sash, damage of compressor with abrasion, and compressor connection fault
	PCB Assembly	Compressor current detection circuit fault, DC link detection circuit fault, and fault of single unit of IGBTM
	Others	Input of abnormal power and power connection fault

6.6 Troubleshooting Outdoor Error

CH 29 (Compressor Over Current)

Flow of trouble diagnosis



JBA068MAF

Temp	25°C	75°C
U-V	0.163 ± 7% Ω	0.195 ± 7% Ω
V-W	0.163 ± 7% Ω	0.195 ± 7% Ω
W-U	0.163 ± 7% Ω	0.195 ± 7% Ω

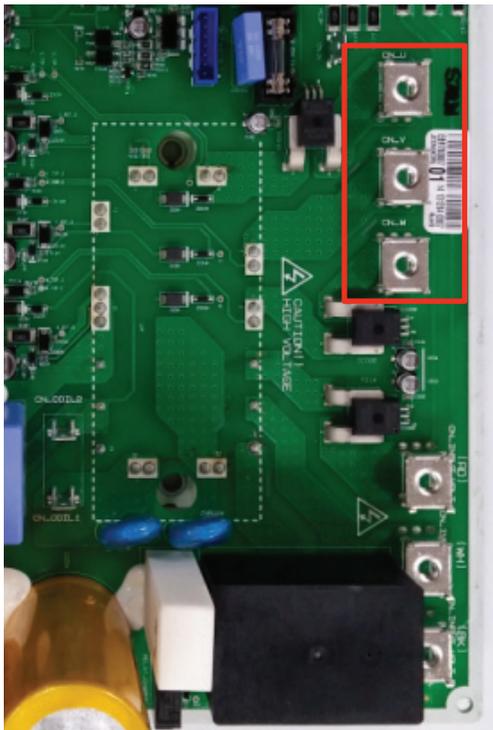
* Measuring resistance between each terminal of compressor



* Measuring input voltage



* Compressor wire connection



6.6 Troubleshooting Outdoor Error

CH 32 (Discharge pipe overheating error of Inverter)

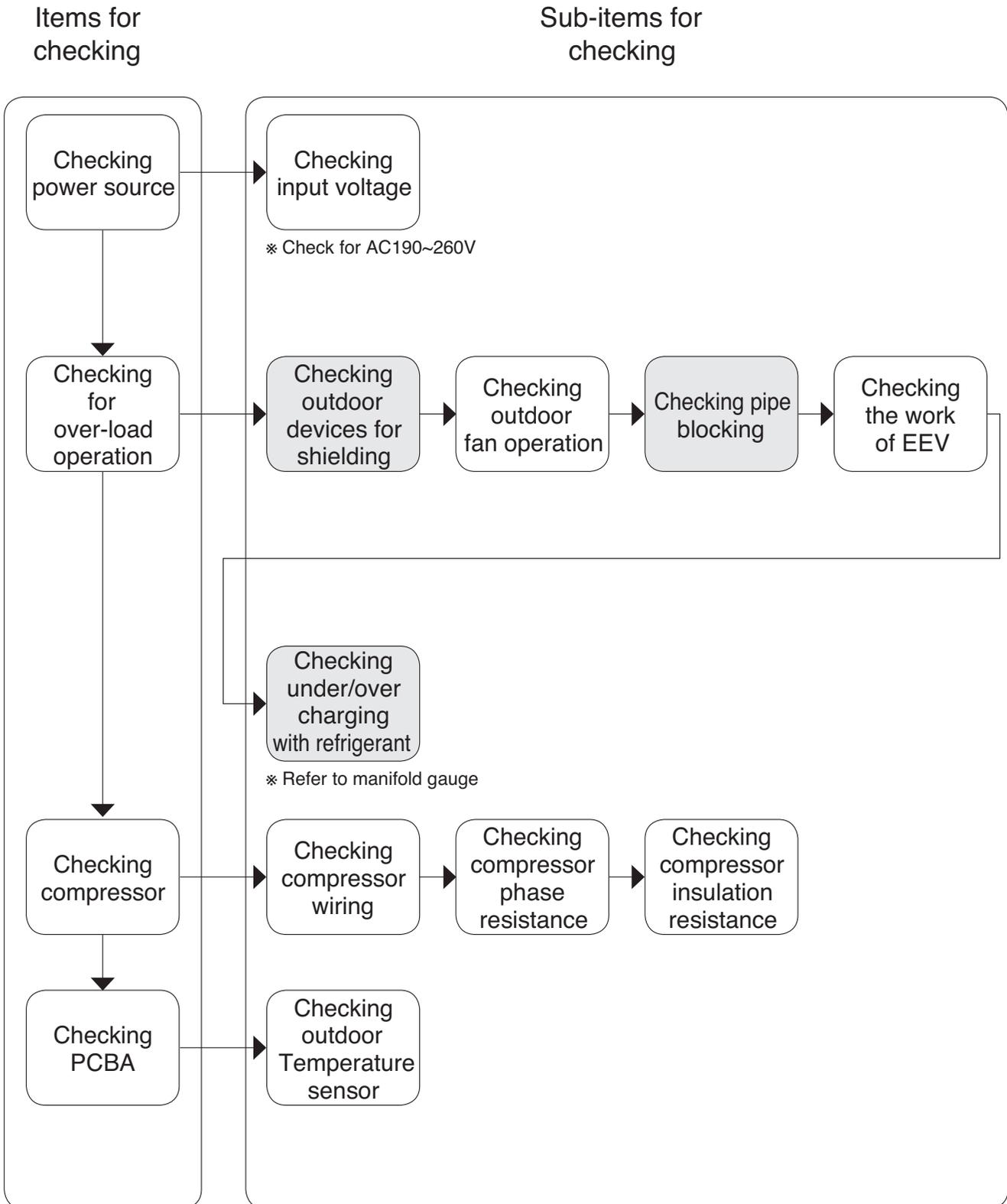
Items		Contents
Purpose		Possible damage of compressor and piping due to high discharge temperature
Condition for Generation		The discharge temperature is elevated exceeding the standard.
Expected Causes	Installation	Installation fault, closing of SVC valve, under/over charging with refrigerant, and infiltration of moisture into refrigerant
	Overload	Outdoor device shielding, outdoor fan fault, and EEV valve fault
	Compressor	Short between compressor coil and sash, abrasion of compressor, and short/opening of compressor coil
	PCB Assembly	Compressor current and DC link voltage detection circuit fault
	Sensor	Discharge temperature sensor fault

※ IPM (Intelligent Power Module) : The part to control the inverter compressor

6.6 Troubleshooting Outdoor Error

CH 32 (Discharge pipe overheating error of Inverter)

Flow of trouble diagnosis

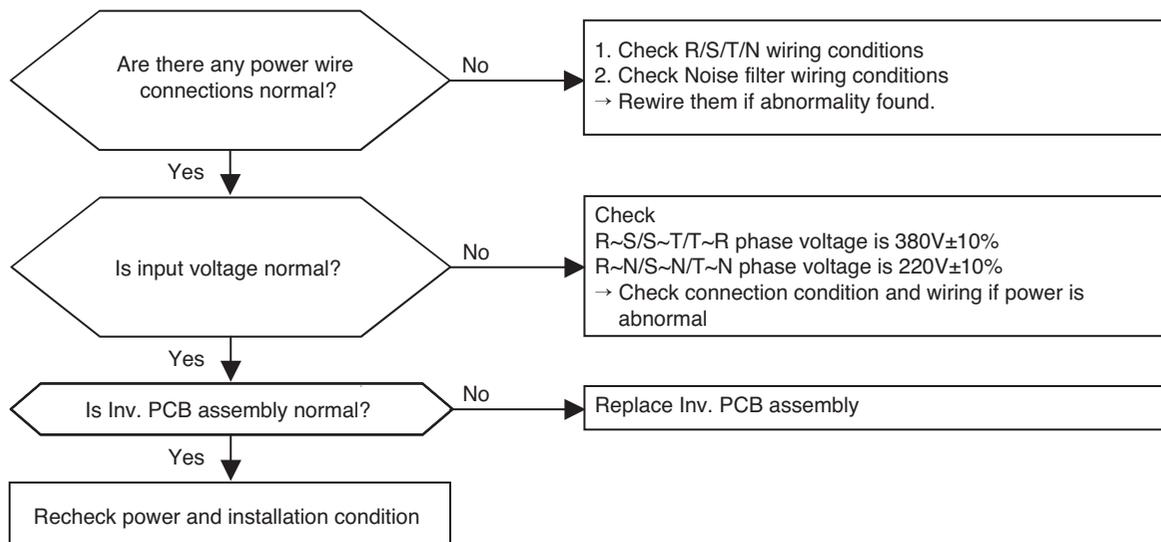


6.6 Troubleshooting Outdoor Error

CH 40 (Inverter compressor CT sensor error)

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

■ Error Diagnosis and Countermeasure Flow Chart



* Measuring input voltage



* Inv. PCB assembly



6.6 Troubleshooting Outdoor Error

Checking Temperature Sensor Open/Short

Items	Contents
Purpose	Prevention of reception of wrong temperature value from the temperature sensor
Condition for Generation	Condition for Generation Damage of temperature sensor (Short / Open)

■ Cause of Temperature Sensor Error

Classification	Causes in Detail
PCB Assembly	Connector open, damaged insulation of sash, damage of the wire coating of temperature sensors

Code No.	Details of Errors
41	Inverter Discharge temperature sensor Open/Short
43	High pressure Sensor Error
44	Outdoor air temperature sensor Open/Short
45	Outdoor piping temperature sensor Open/Short
46	Outdoor suction temperature sensor Open/Short
48	Cond. Out-Pipe temperature Sensor Error

1. Uses of sensors

: Control of compressor and cycle

2. Kinds of Sensors (See corresponding pages)

Outlet : $200K\Omega \pm 10\%$

Piping : $5K\Omega \pm 10\%$

Air : $10K\Omega \pm 10\%$

(Based on 25°C of surrounding temperature)

3. Sensor insulation resistance

: The resistance between the sash and sensor terminal should be not less than 1M Ω .

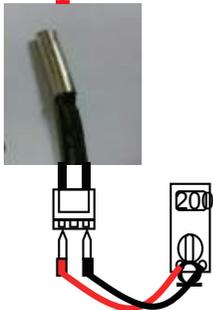
6.6 Troubleshooting Outdoor Error

Sensor Checking Methods

Purpose	Checking single units of sensors for fault	Items for checking	Measurement of the unique resistance by sensor temperature.
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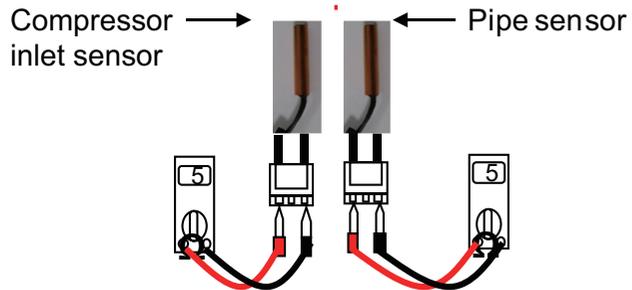
① Compressor discharge sensor

- Position : Outlet of compressor
- Sensor value : $200\text{k}\Omega \pm 10\%$
(Based on 25°C)



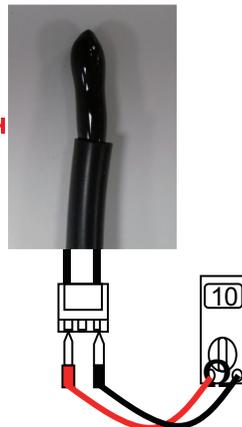
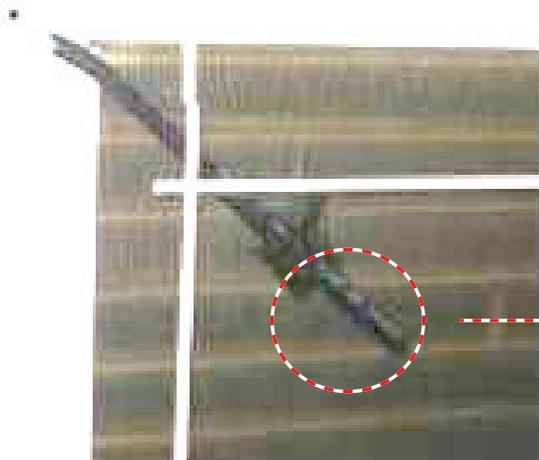
② Pipe sensor

- Position : Compressor inlet and pipe
- Sensor value : $5\text{k}\Omega \pm 10\%$
(Based on 25°C)



③ Outdoor temperature sensor

- Position : Rear part of outdoor device
- Sensor value : $10\text{k}\Omega \pm 10\%$
(Based on 25°C)

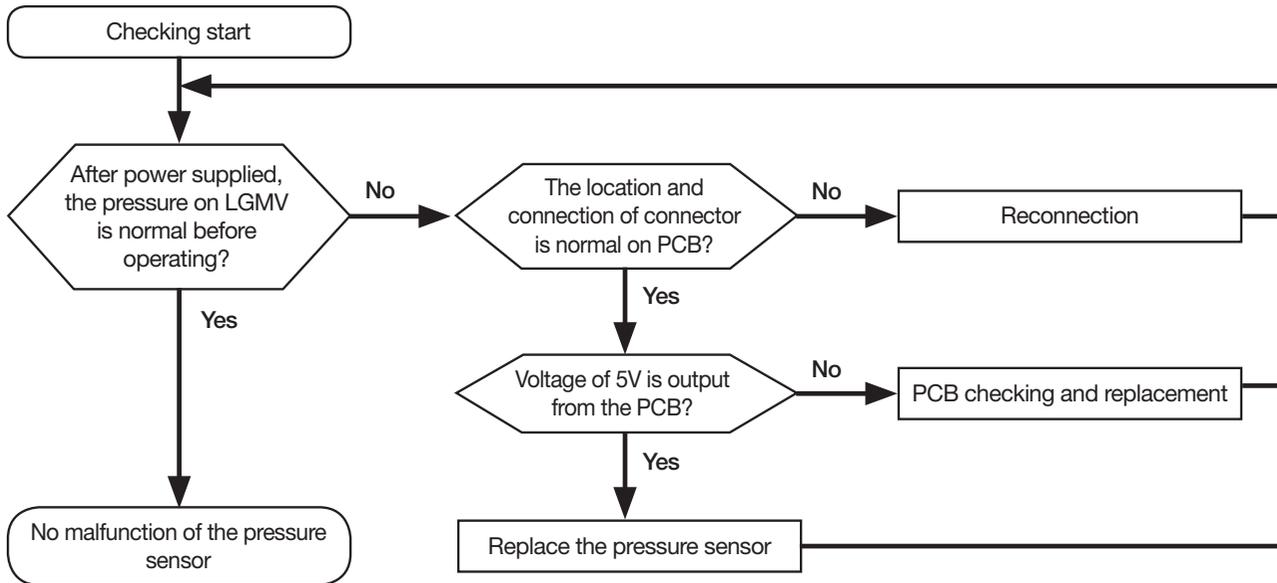


6.6 Troubleshooting Outdoor Error

Purpose	Checking single units of sensors for fault	Items for checking	Measurement of the unique resistance by sensor temperature.
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④ Pressure sensor

– Position : Outlet of 4-way valve (based on cooling mode)

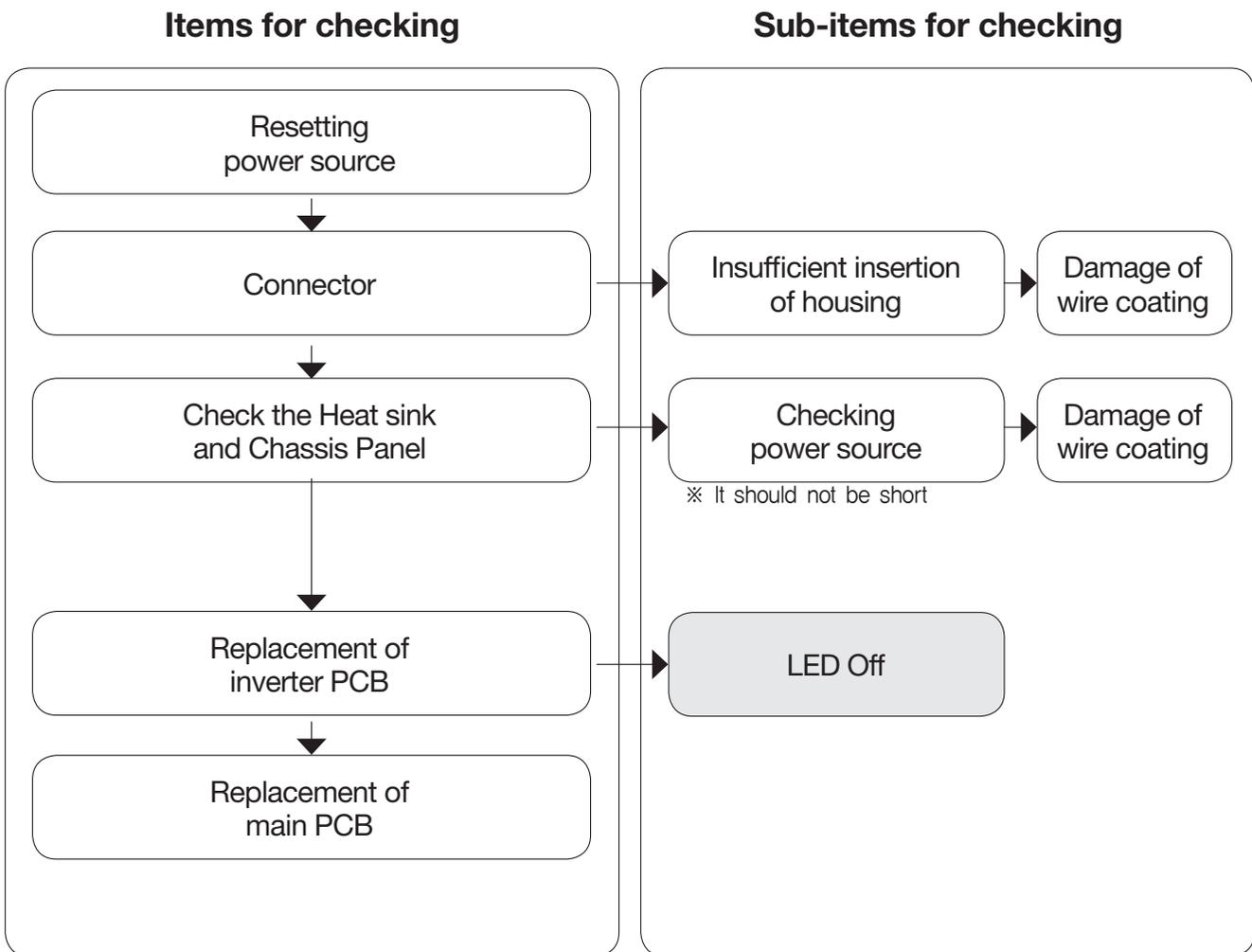


6.6 Troubleshooting Outdoor Error

CH 52 (PCB Communication Error)

Items	Contents
Purpose	Checking the communication state between Main PCB and Inverter PCB
Condition for Generation	Generation of noise source interfering with communication

Resetting power source: Wait for 3 minutes after turning the power of the product off.

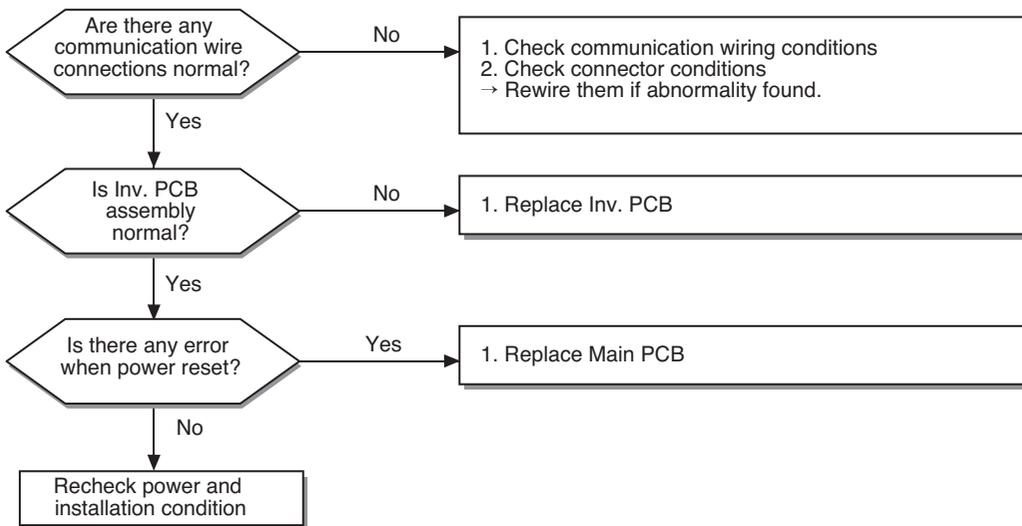


6.6 Troubleshooting Outdoor Error

CH 52 (PCB Communication Error)

Environment interfering PCB communication

Purpose	Installation environment interfering the communication	Items for checking	Checking method of faulty points
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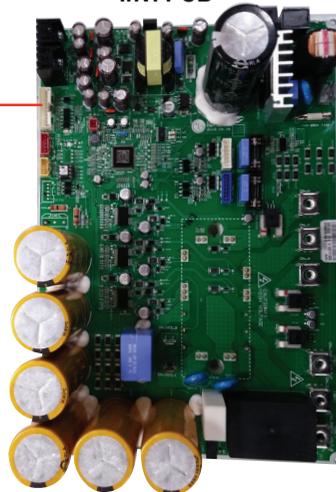


Main PCB



Communication wire

Inv. PCB



OK



NG

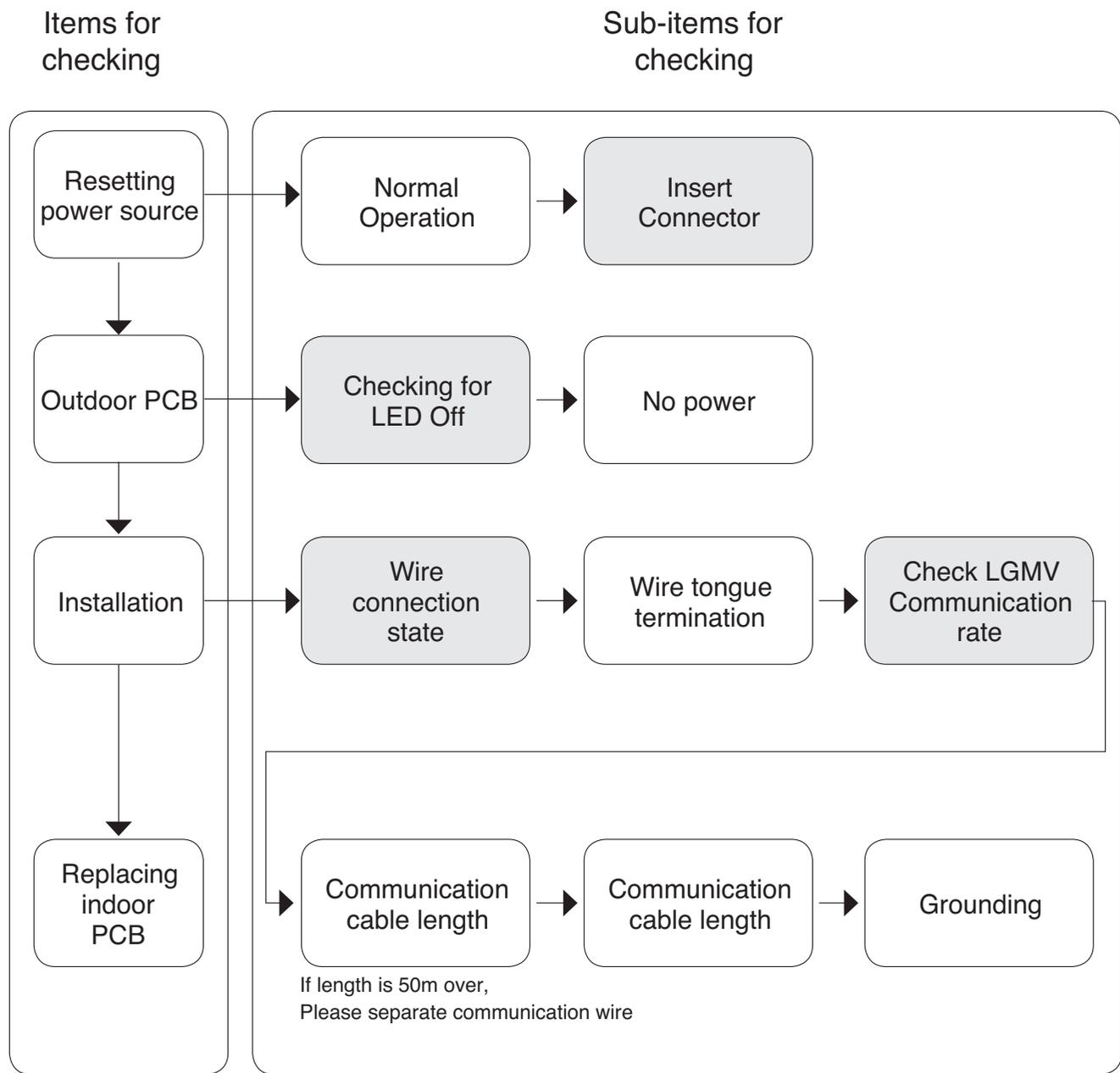


6.6 Troubleshooting Outdoor Error

CH 05/53 (Indoor/Outdoor Device Communication Error) → Detection by indoor devices

Items	Contents
Purpose	Checking for smooth data sending/receiving between indoor/outdoor devices
Condition for Generation	Damage and installation of outdoor device PCB

Resetting power source: Wait for 3 minutes after turning the power of the product off.



6.6 Troubleshooting Outdoor Error

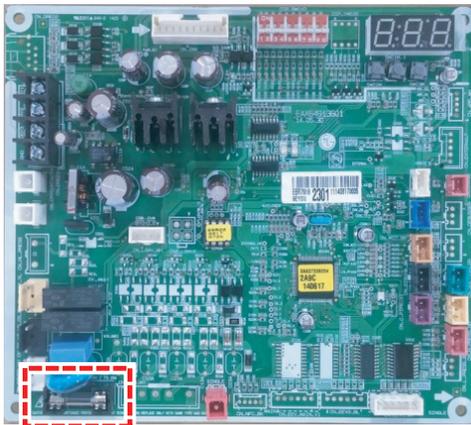
CH 05/53 (Indoor/Outdoor Device Communication Error) → Detection by indoor devices

Checking Method of Outdoor PCB

Purpose	Checking whether outdoor PCB is normal	Items for checking	Lighting of LED, fuse damage, and reactor connection error
---------	--	--------------------	--

- ① Check reactor connection state.
- ② Check fuse state
- ③ Check whether outdoor PCB LED is lighted.

Fuse Point



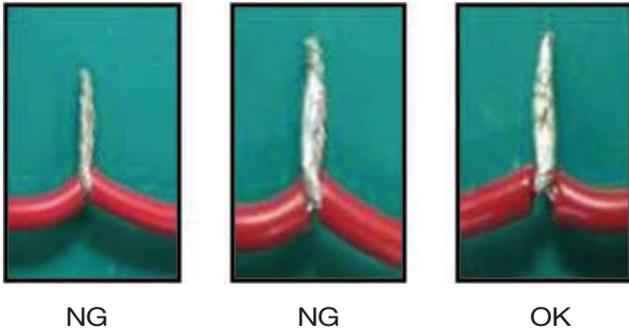
6.6 Troubleshooting Outdoor Error

CH 05/53 (Indoor/Outdoor Device Communication Error) → Detection by indoor devices

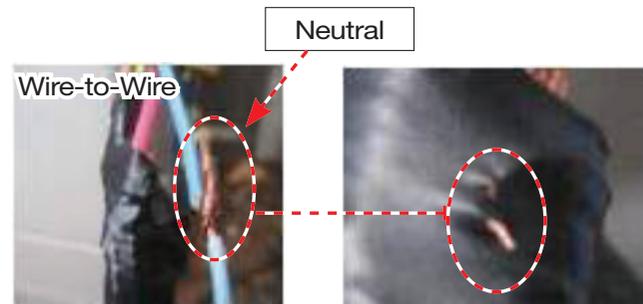
Installation environment interfering with the communication of indoor/outdoor devices

Purpose	Installation environment interfering the communication	Items for checking	Check installation error points
---------	--	--------------------	---------------------------------

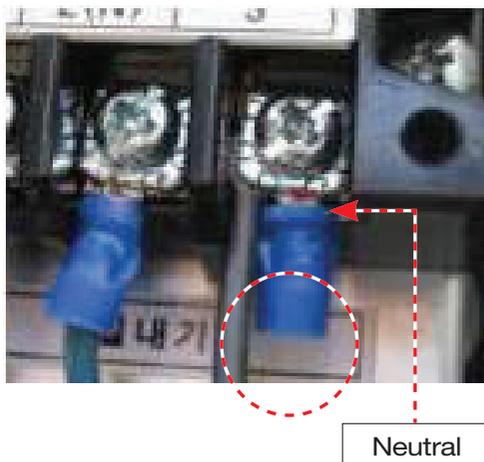
- ① The communication lines of the indoor /outdoor devices are installed by wire-to-wire method.
: In case of additional connection, connect the wires with soldering as shown below.



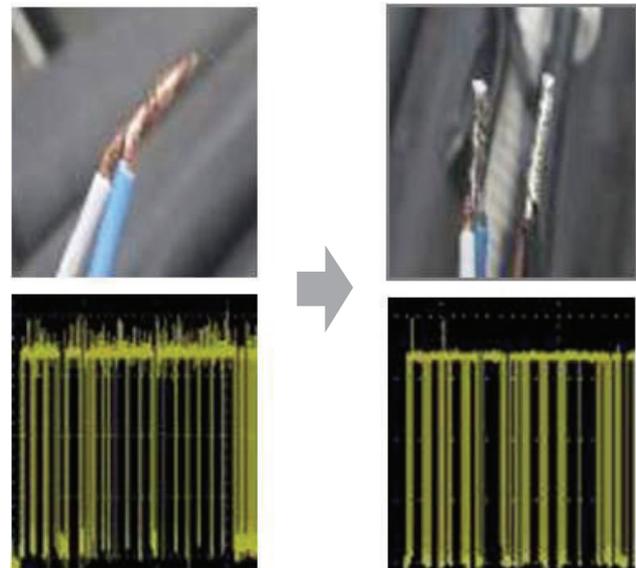
- ③ The cut section of the wire passes the insulation tape and causes a short with another wire.



- ② Wire tongue-termination fault.



- ④ Communication noise by oxidized wire arrangement : Soldering is required.



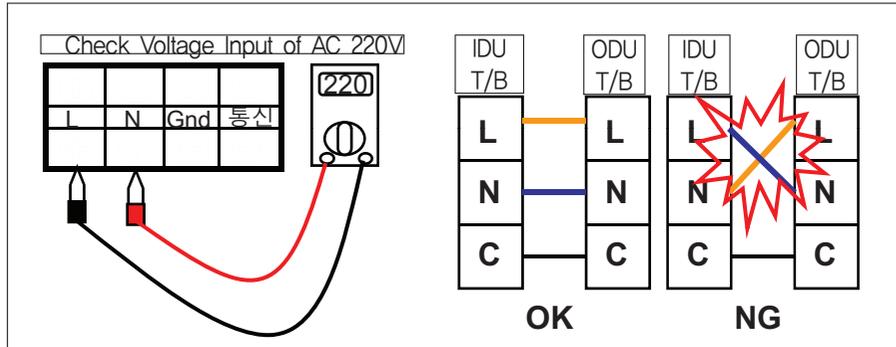
Part 4 Trouble Shooting

- 1) Check Voltage Input of AC 220V, Indoor & Outdoor Communication

When Input AC 220V,

- Check AC 220V Live ↔ Neutral, Indoor & Outdoor
- Otherwise, arrange the Communication Wire, Check AC 220V

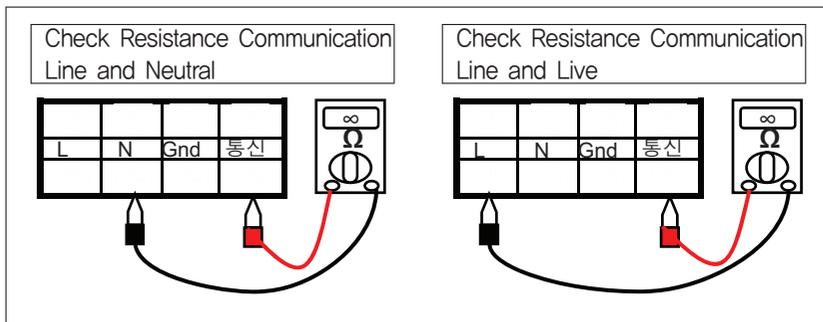
Equipment : Multi-Meter
Test Mode : AC Voltage
Indoor & Outdoor Terminal block



- 2) Check electric short Communication Line and Power Line

After Removing Power Line Wire and Communication Line Wire, Check the voltages

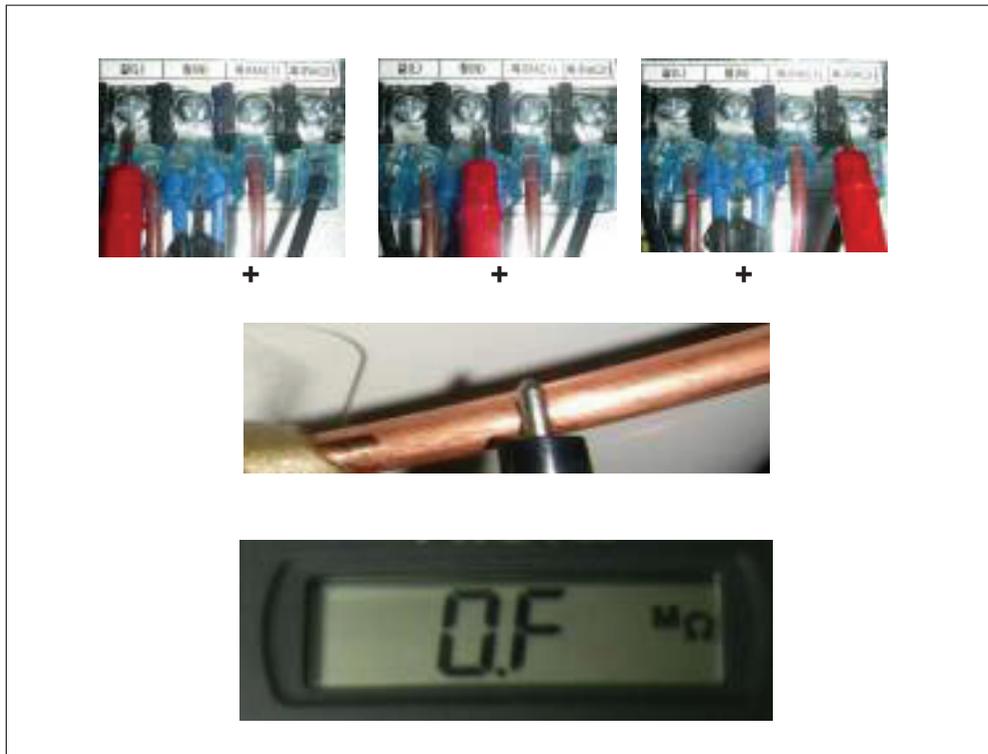
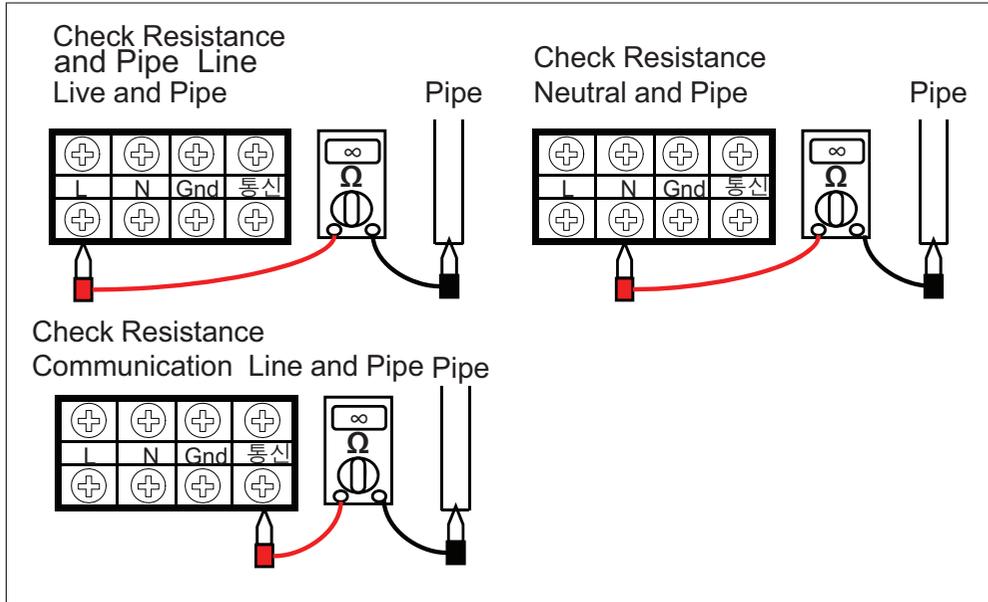
- Check resistance Communication ↔ Live should be infinite
- Check resistance Communication ↔ Neutral should be infinite
- Check resistance Communication ↔ Gnd should be infinite



3) Check electric leakage Communication Line and Pipe

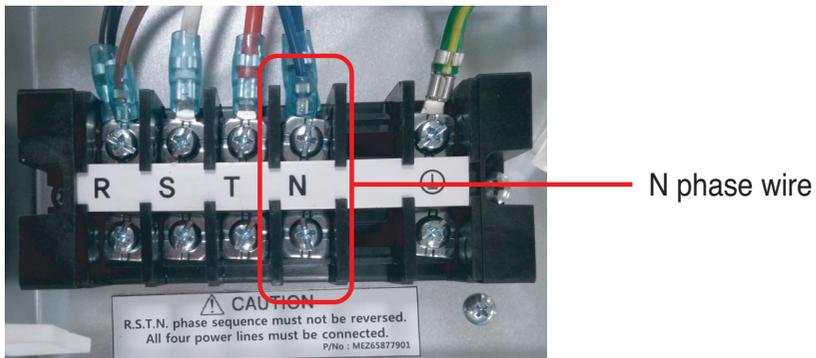
After Removing Power Line Wire and Communication Line Wire, Check the voltages

- Check Infinite Resistance between Power /Communication Line and Pipe Line



4) Check the condition of N wire connection

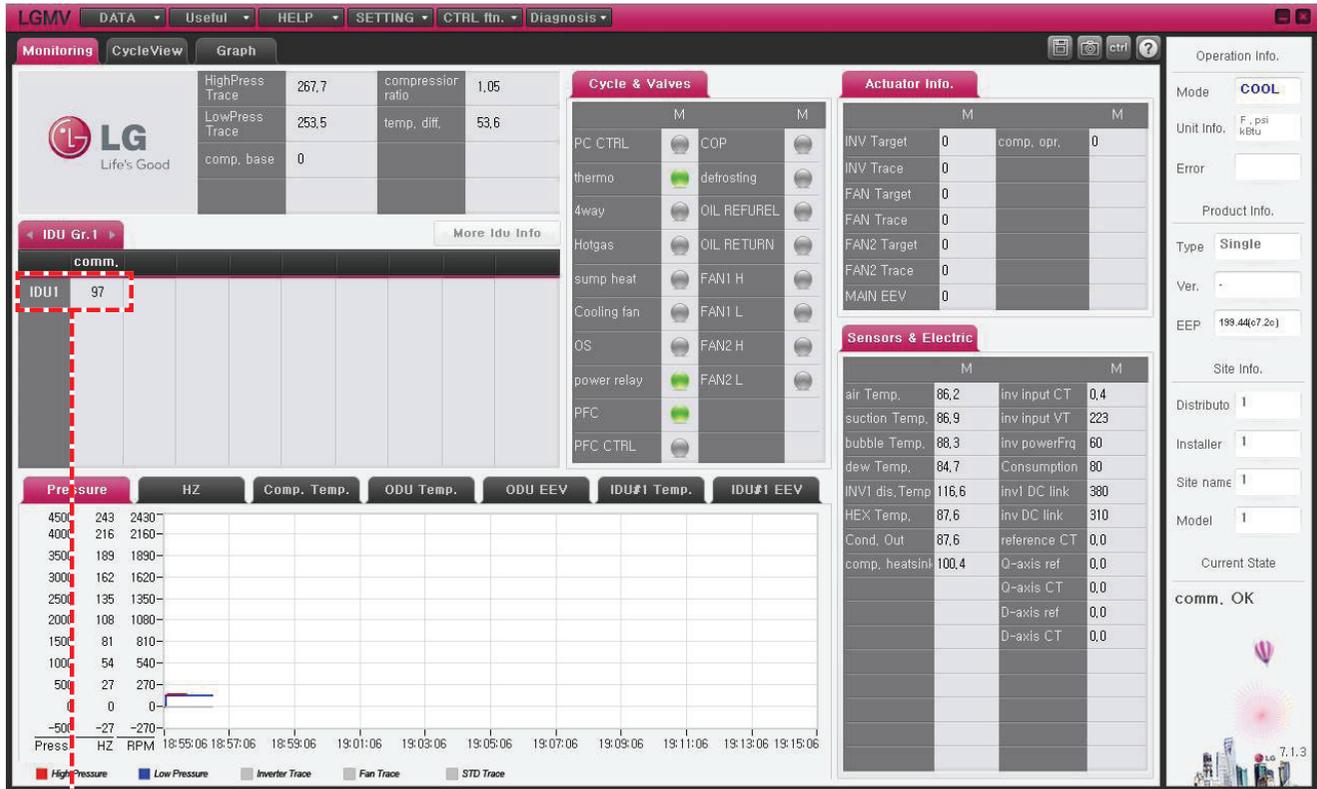
- If N phase wiring is bad, correct the N phase wire and check the generation of CH53 one more



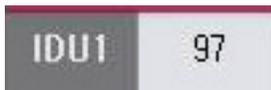
6.6 Troubleshooting Outdoor Error

CH 05/53 (Indoor/Outdoor Device Communication Error) → Detection by indoor devices

Check LGMV Communication rate



Communication rate (Normally 90% ↑)



6.6 Troubleshooting Outdoor Error

CH 05/53 (Indoor/Outdoor Device Communication Error) → Detection by indoor devices

How to measure for Environment Noise

- **Applied Model : Multi/Single Outdoor PCBA**
(Refer to PCB P/no of attached file)
- **Applied S/No : ~ 301xxxxxx (~ Jan, 2013)**

1. Symptom

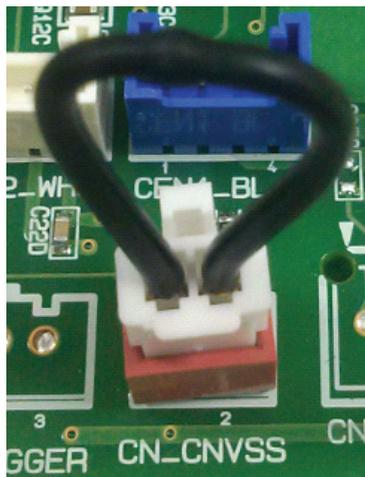
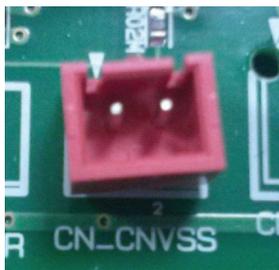
- Outdoor unit cannot communicate with Indoor unit.
- Outdoor reset then work normal.
: It happens intermittently
- LEDs for showing power-on and communication status are not on or not blinking in outdoor inverter PCBA

2. Causes

- Noise disturb the outdoor unit communication with indoor unit

3. Improvement

- Inserting small connector with capacitor in Inverter PCBA of Outdoor Unit
 - 1) Connector can be applied to the list(PCBA P/No) on the next page
 - 2) Guide where you put it on the next page
- It helps outdoor unit communicate with indoor unit better than before and reduce the noise level



Connector with capacitor in CN_FLASH and CN_CNVS

[Phenomenon]



- 1) Red LED off
- 2) Red LED turn on but not blinking

[PCBA P/NO]

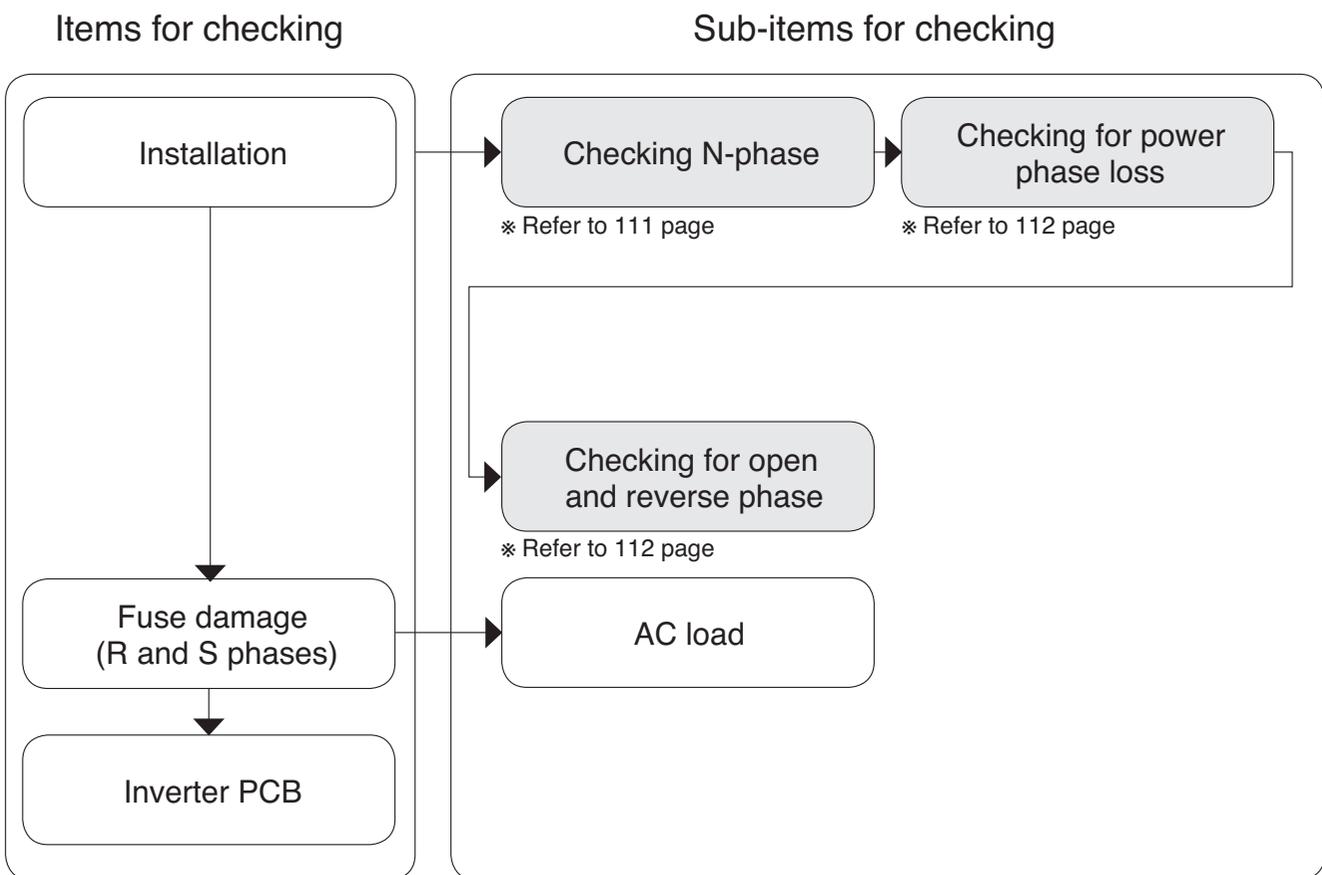
<p>EBR79182301</p>	
<p>EBR78088701</p>	

6.6 Troubleshooting Outdoor Error

CH 54 (Open and Reverse Phase Error)

Items	Contents
Purpose	Prevention of phase unbalance and prevention of reverse rotation of constant-rate compressor
Condition for Generation	Main power wiring fault

Resetting power source: Wait for 3 minutes after turning the power of the product off.

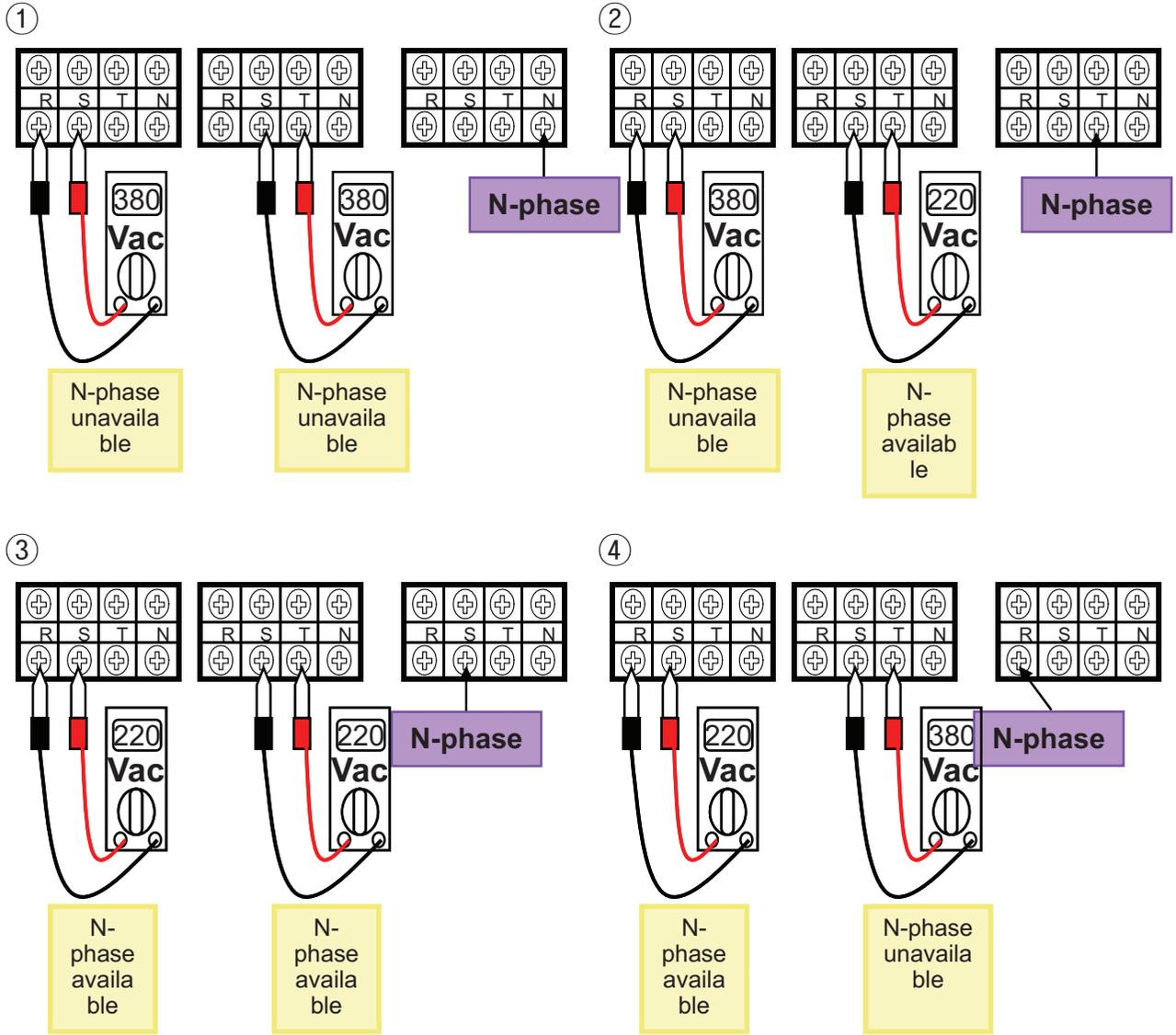


6.6 Troubleshooting Outdoor Error

CH 54 (Open and Reverse Phase Error)

Judgment method of N-phase wiring error

Set the tester in AC voltage measurement mode (The part having wave pattern)

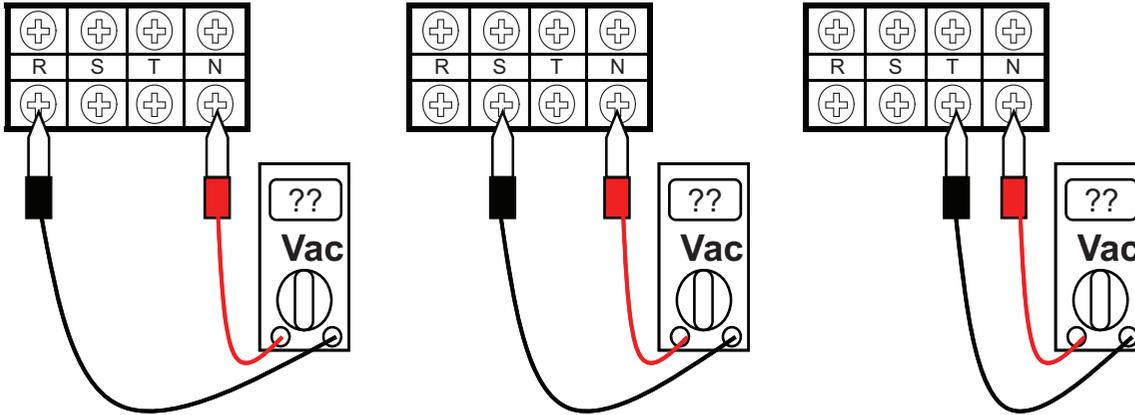


6.6 Troubleshooting Outdoor Error

CH 54 (Open and Reverse Phase Error)

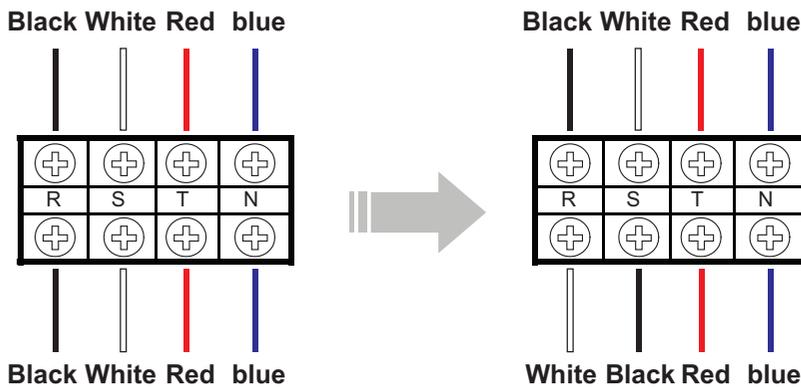
Judgment Method of R,S,T phase loss

- Set the tester in AC voltage measurement mode (The part having wave pattern)
- The part that does not generate voltage was upgraded.
- Power module requires checking.



Judgment method of open and reverse phase of R,S,T

- Operation with replacement of R and S phases only



6.6 Troubleshooting Outdoor Error

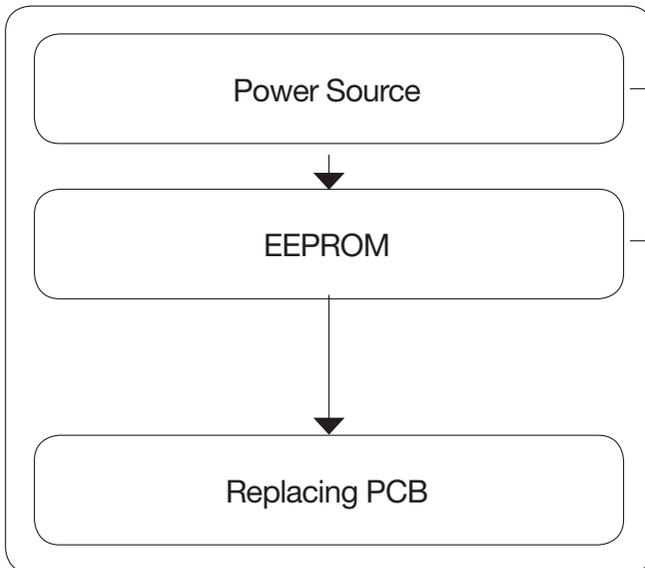
CH 60 (EEPROM Fault)

- EEPROM : IC containing the operation data suitable to the product

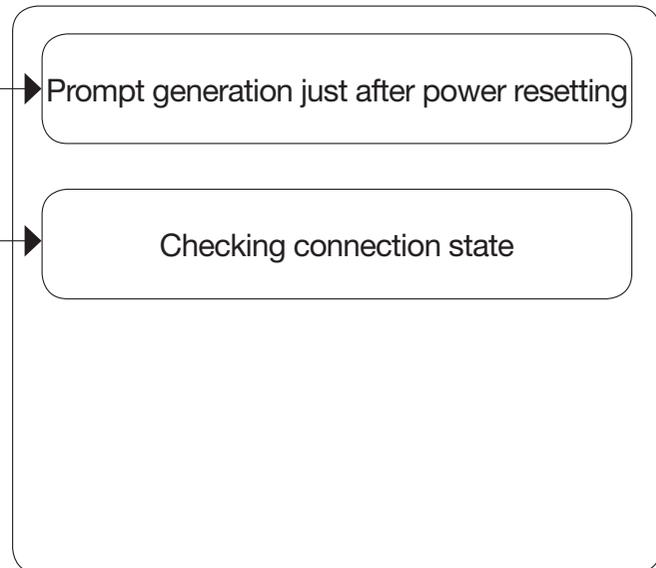
Items	Contents
Purpose	Prevention of application of wrong cycle data
Condition for Generation	Judgment of the error caused by noise and the fault of EEPROM connection

Resetting power source: Wait for 3 minutes after turning the power of the product off.

Items for checking

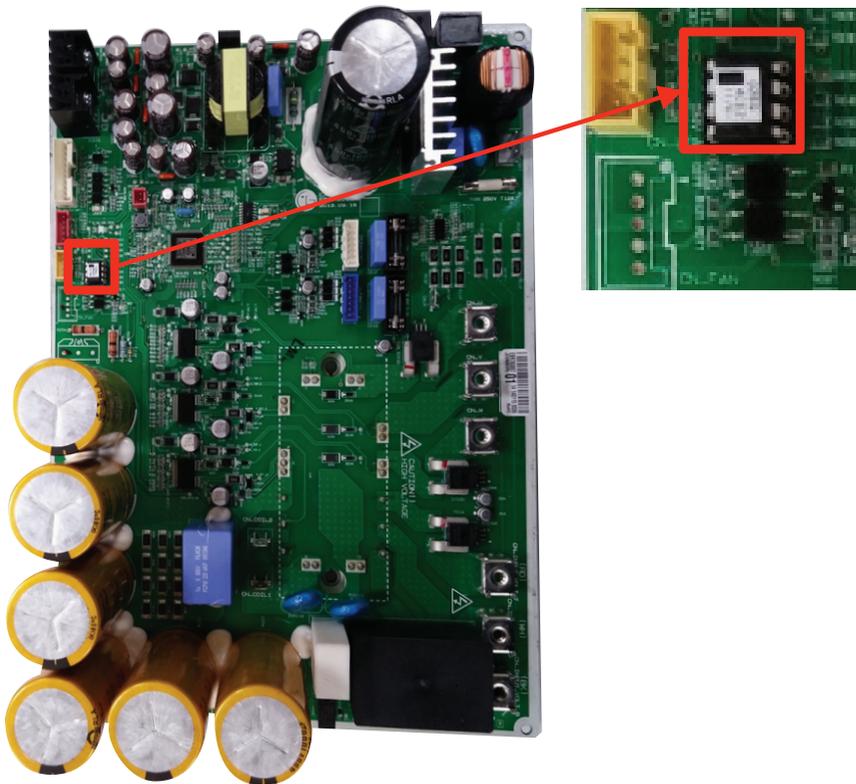


Sub-items for checking



■ How to check the EEPROM assembling state of outdoor devices

- ① Check the direction of EEPROM
(Shape of marking line and direction of EEPROM)
- ② Check whether EEPROM is perfectly adhered.
- ③ Check whether EEPROM lead is put out of the outlet.

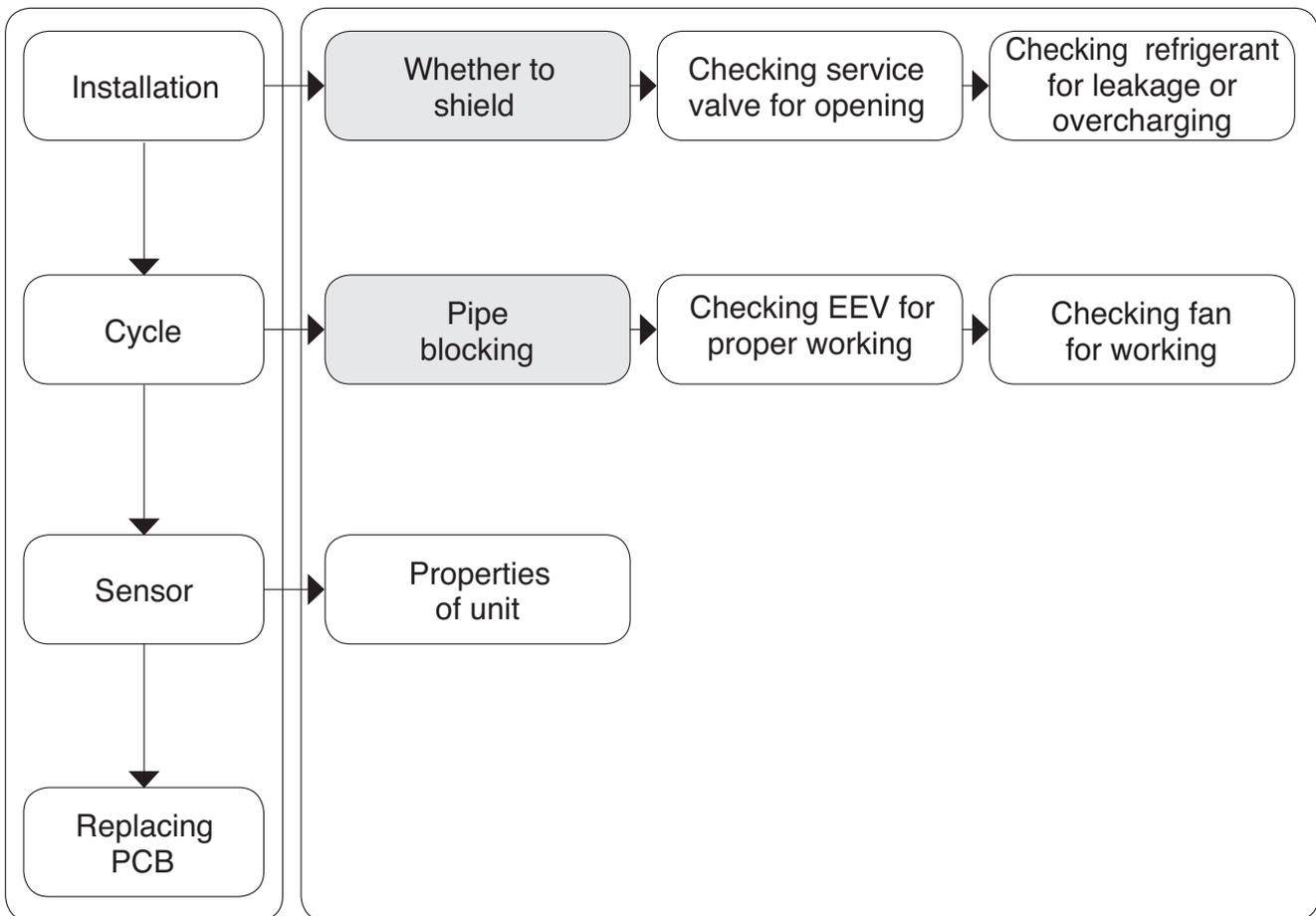


6.6 Troubleshooting Outdoor Error

CH 61 (Condenser High Error)

Items	Contents
Purpose	Protection of compressor from elevated pressure and judgment whether to start defrosting
Condition for Generation	Shielding environment, cycle disorder, and sensor unit fault

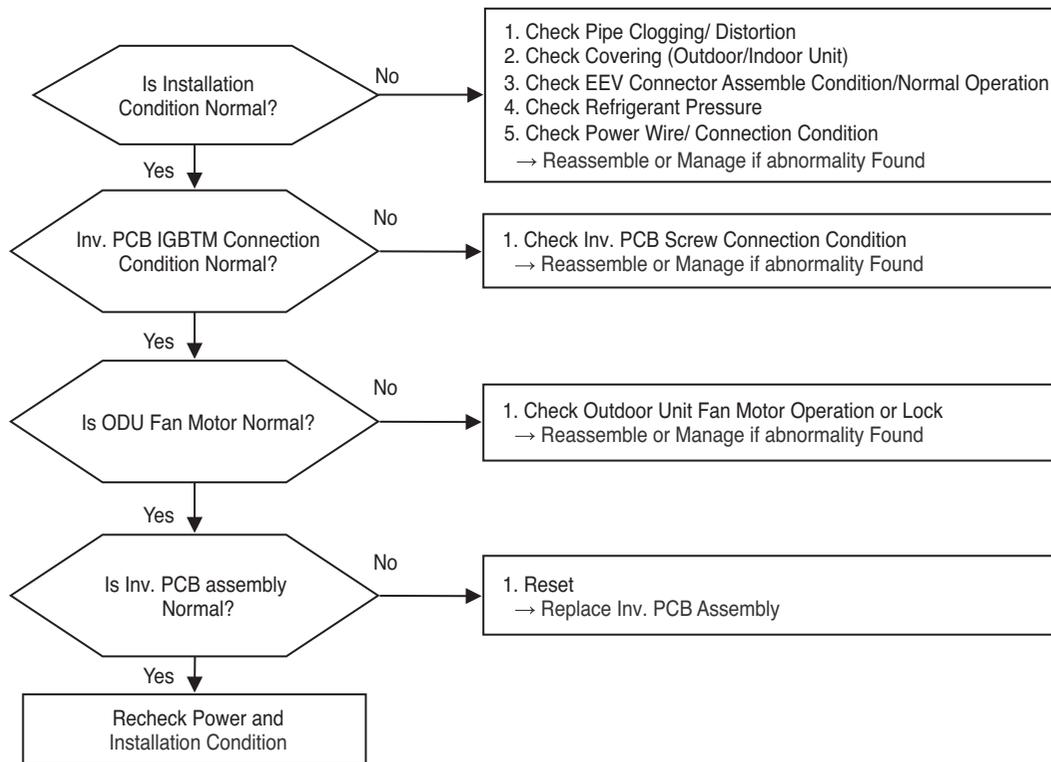
Resetting power source: Wait for 3 minutes after turning the power of the product off.



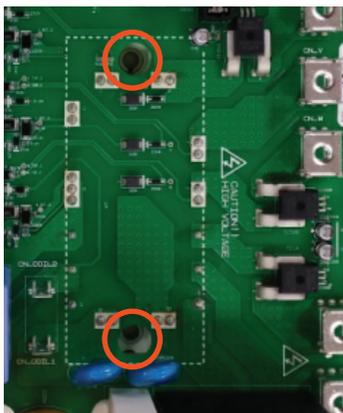
6.6 Troubleshooting Outdoor Error

CH 62 (Heat sink High Error)

■ Error diagnosis and countermeasure flow chart



■ Check Inv. PCB Screw Connection Condition



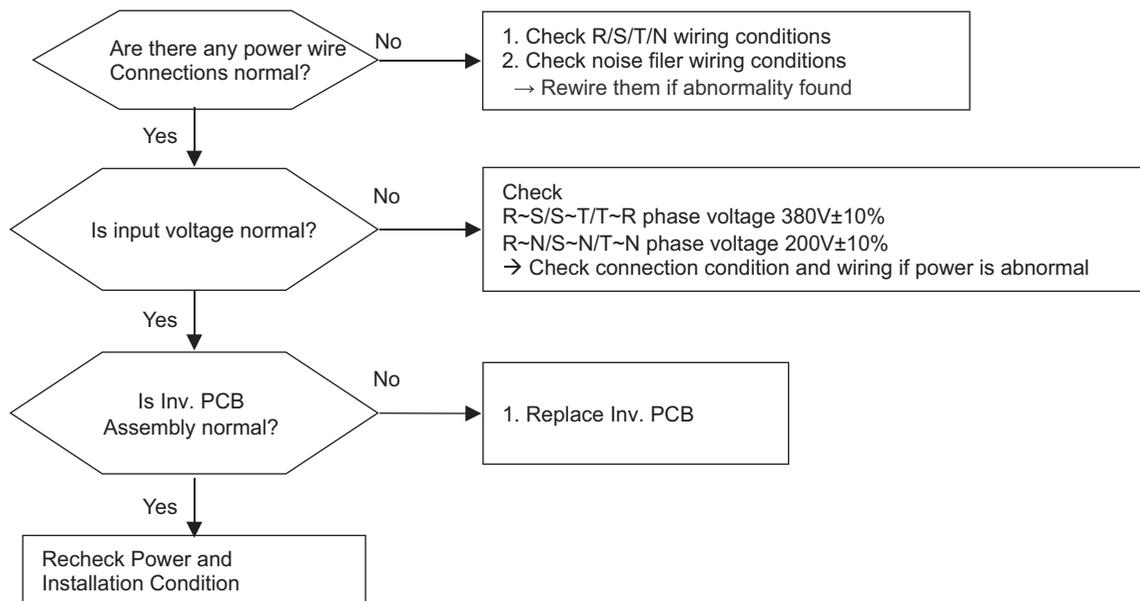
Check Screw Connection Condition

6.6 Troubleshooting Outdoor Error

CH 71 (Inv. CT Sensor Error)

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

■ Error diagnosis and countermeasure flow chart



* Measuring input voltage



* Inv. PCB assembly





P/NO : MFL67478319

February, 2015