CONFIDENTIAL

Multi Air Conditioner
SVC MANUAL(General)

MODEL : Multi-Inverter Type

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

1. Safety Precautions

	Read the precautions in this manual carefully before operating the unit.		This appliance is filled with flammable refrigerant (R32)
	This symbol indicates that the Operation Manual should be read carefully.		This symbol indicates that a service personnel should be handling this equipment with reference to the Installation Manual.

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**

1.1 Safety Precautions 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.	

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 repaire the product with wet hands. Hoding 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.	
The appliance shall be stored so as to prevent mechanical damage from occurring	
Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification. Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.	
Keep any required ventilation openings clear of obstruction	
• The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.	
• The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation	
• Compliance with national gas regulations shall be observed	

• Refrigerant tubing shall be protected or enclosed to avoid damage.	
• The installation of pipe-work shall be kept to a minimum • When flared joints are reused indoors, the flare part shall be re-fabricated. • When mechanical connectors are reused indoors, sealing parts shall be renewed.	
• Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. • Do not pierce or burn. • Be aware that refrigerants may not contain an odour. • Ducts connected to an appliance shall not contain an ignition source. • Two or more people must lift and transport the product. Avoid personal injury. • Periodic (more than once/year) cleaning of the dust or salt particles stuck on the heat exchanger by using water. • Dismantling the unit, treatment of the refrigerant oil and eventual parts should be done in accordance with local and national standards.	
Checks to the area Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.	
Work procedure Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.	
General work area All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.	
Checking for presence of refrigerant The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.	
Presence of fire extinguisher If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.	

No ignition sources No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.	
Ventilated area Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.	
Checks to the refrigeration equipment Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using flammable refrigerants: - The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed - The ventilation machinery and outlets are operating adequately and are not obstructed - If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant - Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected - Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.	
Checks to electrical devices Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.	

Initial safety checks shall include - Capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking. - No live electrical components and wiring are exposed While charging, recovering or purging the system. - Continuity of earth bonding	
Repairs to sealed components During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation. Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc. Ensure that apparatus is mounted securely. Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications **NOTE:** The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.	
Repair to intrinsically safe components Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak	
Cabling Check Cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of ageing or continual vibration from sources such as compressors or fans.	
Detection of flammable refrigerants Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.	
• Mechanical connections shall be accessible for maintenance purposes.	
• Ducts connected to an appliance shall not contain an ignition source.	

Leak detection methods The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.	
Removal and evacuation When breaking into the refrigerant circuit to make repairs – or for any other purpose - conventional procedures shall be used. However, it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to: - Remove refrigerant - Purge the circuit with inert gas - Evacuate - Purge again with inert gas - Open the circuit by cutting or brazing. The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be “flushed” with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task. Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place. Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.	
Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during normal operations shall be protected against mechanical damage.	
A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts.	

Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system. Prior to recharging the system it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.
b) Isolate system electrically.
c) Before attempting the procedure ensure that: • mechanical handling equipment is available, if required, for handling refrigerant cylinders; • all personal protective equipment is available and being used correctly; • the recovery process is supervised at all times by a competent person; • recovery equipment and cylinders conform to the appropriate standards.
d) Pump down refrigerant system, if possible.
e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f) Make sure that cylinder is situated on the scales before recovery takes place.
g) Start the recovery machine and operate in accordance with manufacturer's instructions.
h) Do not overfill cylinders. (No more than 80 % volume liquid charge).
i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

Labelling Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.	
Recovery When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt. The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.	

⚠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.	

⚠CAUTION	
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 tset 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 units

Category	Type	Chassis		Model names Capacity, kW(kBtu/h)						
				1.5 (5)	2.1 (7)	2.5 (9)	3.5 (12)	4.2 (15)	5.0 (18)	7.1 (24)
Wall mounted	Libero-R		SB		AMNW07GRBL0 [MS07AQ NB0]	AMNW09GRBL0 [MS09AQ NB0]	AMNW12GRBL0 [MS12AQ NB0]			
			SC						AMNW18GRCL0 [MS18AQ NC0]	AMNW24GRCL0 [MS24AQ NC0]
	Libero-E		SB	AMNW05GEWA0 [MS05SQ NW0]	AMNW07GEWA0 [MS07SQ NW0]	AMNW09GEBA0 [MS09SQ NB0]	AMNW12GEBA0 [MS12SQ NB0]	AMNW15GEBA0 [MS15SQ NB0]		
			SC						AMNW18GECA0 [MS18SQ NC0]	AMNW24GECA0 [MS24SQ NC0]
ART COOL	Gallary		SF			AMNH09GAF11 [MA09AH1 NF1]	AMNH12GAF11 [MA12AH1 NF1]			
	Panel		SF			AMNH09GAF*1 [MA09AH* NF1]	AMNH12GAF*1 [MA12AH* NF1]			
ART COOL Mirror			SB		AMNW07GDB*0 [MS07AW* NB0]	AMNW09GDB*0 [MS09AW* NB0]	AMNW12GDB*0 [MS12AW* NB0]			
			SC						AMNW18GDC*0 [MS18AW* NC0]	AMNW24GDC*0 [MS24AW* NC0]
Ceiling Cassette	1-Way		TU			AMNH09GTUC0 [MT09AH NU1]	AMNH12GTUC0 [MT11AH NU1]			
	4-Way		TR	AMNH05GTRA0 [MT06AH NR0]	AMNH07GTRA0 [MT08AH NR0]	ATNH09GRLE2 [CT09 NR2]	ATNH12GRLE2 [CT12 NR2]			
			TQ						ATNH18GQLE2 [CT18 NQ2]	
			TP							ATNH24GPLE2 [CT24 NP2]
Ceiling & Floor			VE			AVNH09GELA2 [CV09 NE2]	AVNH12GELA2 [CV12 NE2]			
			VJ						UVNH18GJLA2 [CV18 NJ2]	UVNH24GJLA2 [CV24 NJ2]
Ceiling Concealed Duct	High Static Pressure		BH						ABNH18GHLA2 [CB18 NH2]	ABNH24GHLA2 [CB24 NB2]
	Low Static Pressure (Slim)		B1			AMNH09GB1A1 [MB09AHL N12]	AMNH12GB1A1 [MB12AHL N12]			
			B2						AMNH18GB2A1 [MB18AHL N22]	AMNH24GB2A1 [MB24AHL N22]
Console			QA			AQNH09GALA0 [CQ09 NA0]	AQNH2GALA0 [CQ12 NA0]		AQNH18GALA0 [CQ18 NA0]	

* Indicates color of panel – ART COOL : Gold(G), White Silver(H), Blue(B), Gallery(1)
ART COOL Mirror : Mirror(R), Silver(V), White(W)

2.2 Outdoor units

MULTI F™ (1 phase)

Heat pump		A2UW14GFA2 [MU2M15 UL4] Z2UW14GFA0 [MU2R15 UL0]	A2UW16GFA2 [MU2M17 UL4] Z2UW16GFA0 [MU2R17 UL0]
No.of connectable indoor units		Max.2	
Total capacity index of connectable indoor units	kW	6.15	7.03
	kBtu/h	21	24
Power supply		1Ø, 220-240V, 50Hz	
Chassis			

Heat pump		A3UW18GFA2 [MU3M19 UE4] Z3UW18GFA0 [MU3R19 UE0]	A3UW18GFA2 [MU3M19 UE4] Z3UW21GFA0 [MU2R21 UE0]
No.of connectable indoor units		Max.3	
Total capacity index of connectable indoor units	kW	8.79	9.67
	kBtu/h	30	33
Power supply		1Ø, 220-240V, 50Hz	
Chassis			

Heat pump		A4UW24GFA2 [MU4M25 U44] Z4UW24GFA0 [MU4R25 U40]	A4UW24GFA2 [MU4M25 U44] Z3UW21GFA0 [MU2R21 UE0]
No.of connectable indoor units		Max.4	
Total capacity index of connectable indoor units	kW	11.4	12
	kBtu/h	39	41
Power supply		1Ø, 220-240V, 50Hz	
Chassis			

Heat pump		A5UW30GFA2 [MU5M30 U44] Z5UW30GFA0 [MU5R30 U40]	A5UW40GFA0 [MU5M40 U42]
No.of connectable indoor units		Max.5	
Total capacity index of connectable indoor units	kW	14.1	15.2
	kBtu/h	48	52
Power supply		1Ø, 220-240V, 50Hz	
Chassis			

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MULTI F DX™ (1 phase)

Heat pump		A7UW40GFA0 [FM40AH U42]	A8UW48GFA0 [FM48AH U32]	A9UW56GFA0 [FM56AH U32]
No.of connectable indoor units		Max.7	Max.8	Max.9
Total capacity index of connectable indoor units	kW	15.2	18.5	21.4
	kBtu/h	52	63	73
Power supply		1Ø, 220-240V, 50Hz		
Chassis				

MULTI F DX™ (3 phase)

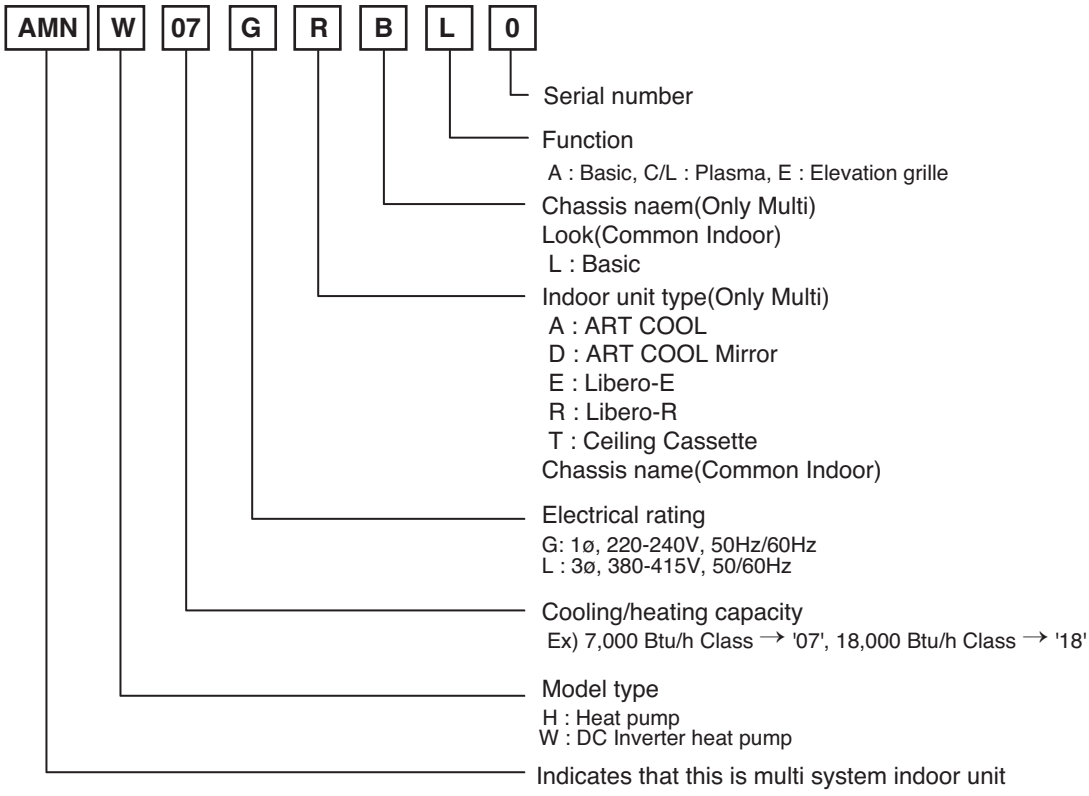
Heat pump		A7UW42LFA0 [FM41AH U32]	A8UW48LFA0 [FM49AH U32]	A9UW56LFA0 [FM54AH U32]
No.of connectable indoor units		Max.7	Max.8	Max.9
Total capacity index of connectable indoor units	kW	15.8	18.5	21.4
	kBtu/h	54	63	73
Power supply		3Ø, 380-415V, 50Hz		
Chassis				

2.3 BD(Branch distributor) units

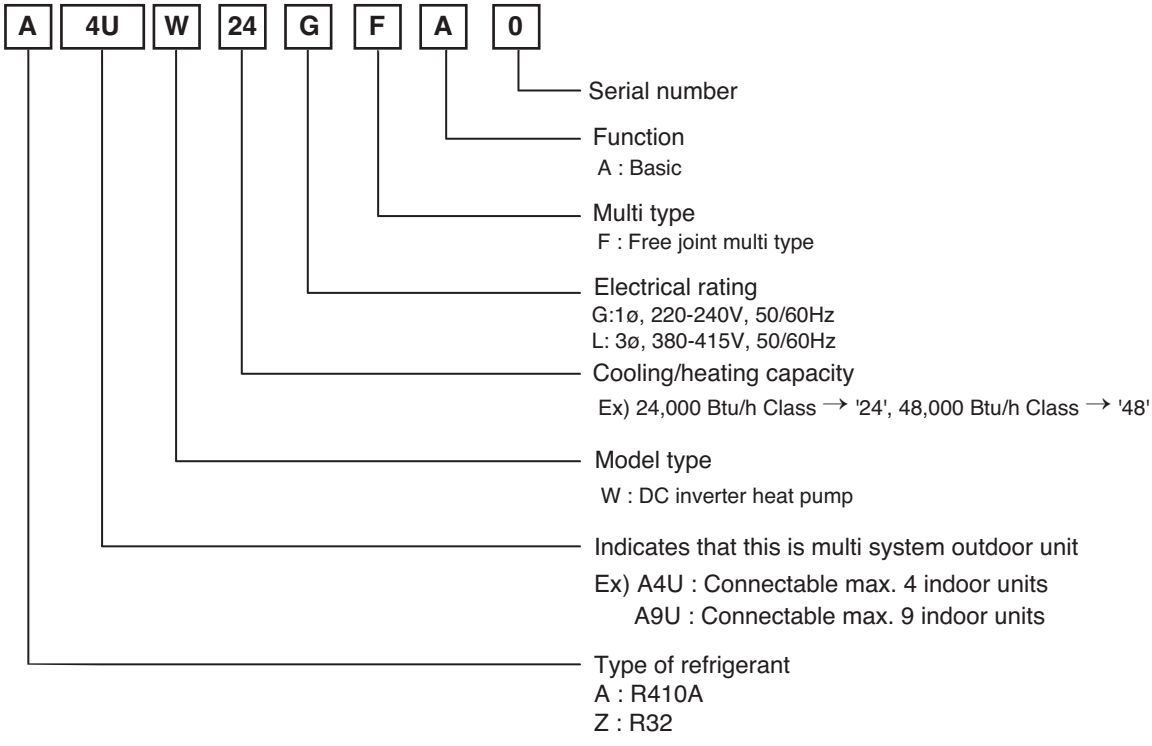
No. of connectable indoor units		Max. 2	Max. 3	Max. 4
Model name		PMBD3620	PMBD3630	PMBD3640
Connectable indoor unit capacity	kW	1.5~7.0	1.5~7.0	1.5~7.0
	kBtu/h	5~24	5~24	5~24
BD unit				

3. Nomenclature

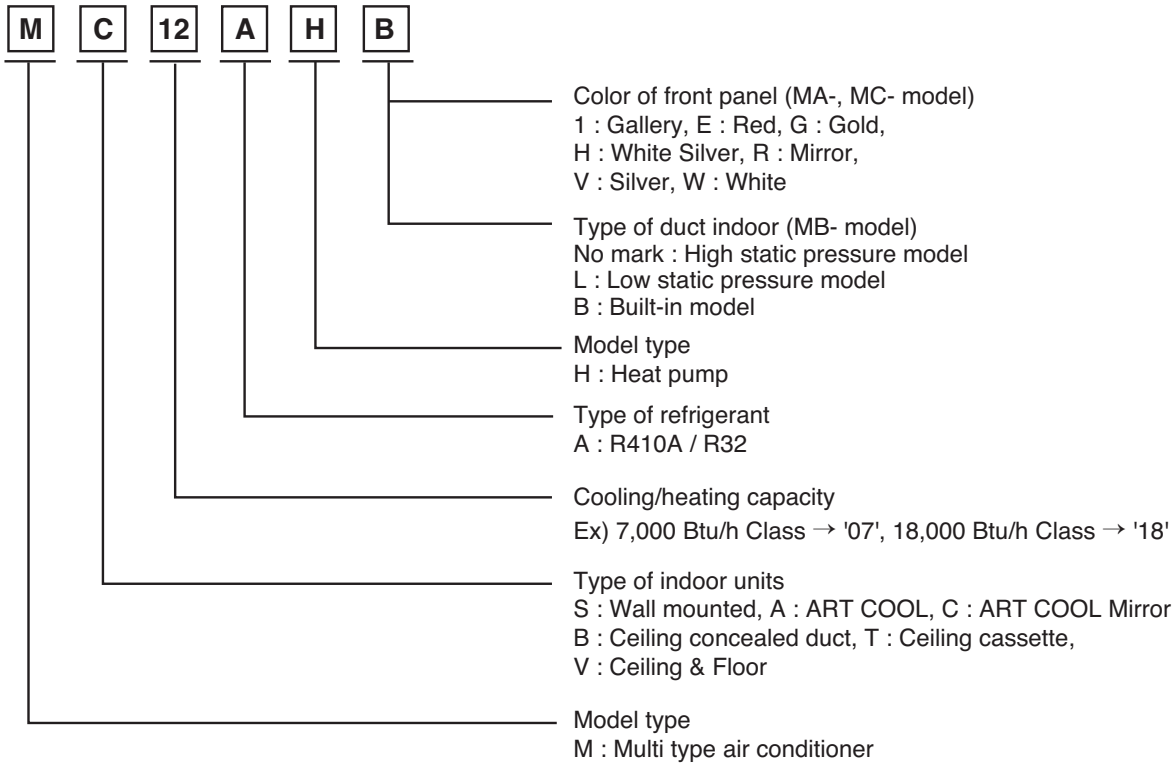
3.1 Indoor Unit(Global)



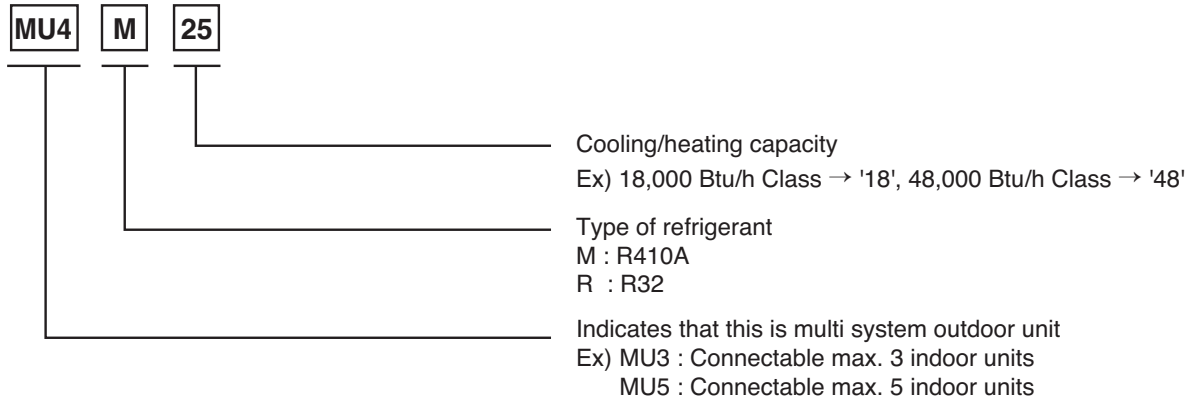
3.2 Outdoor Unit(Global)

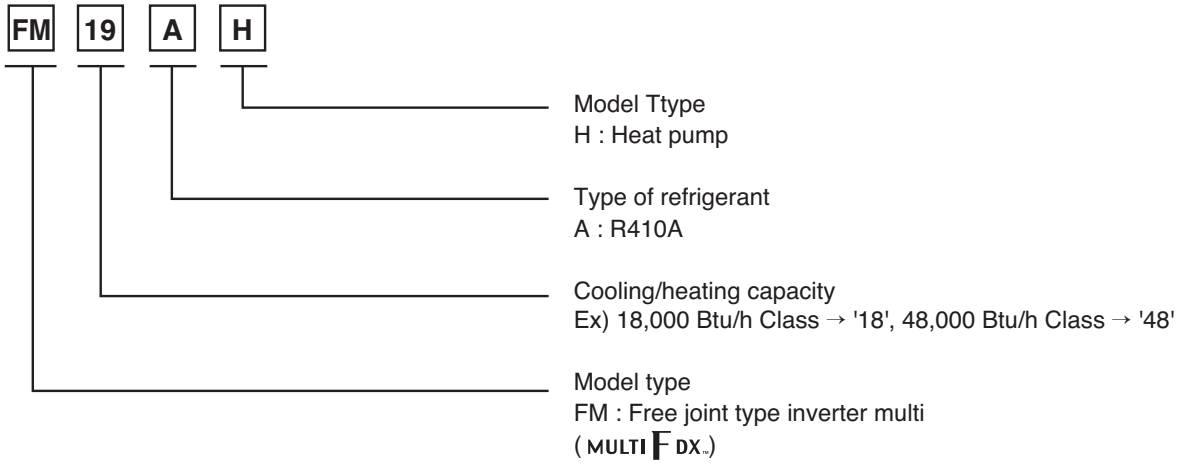


3.3 Indoor Unit(Europe)

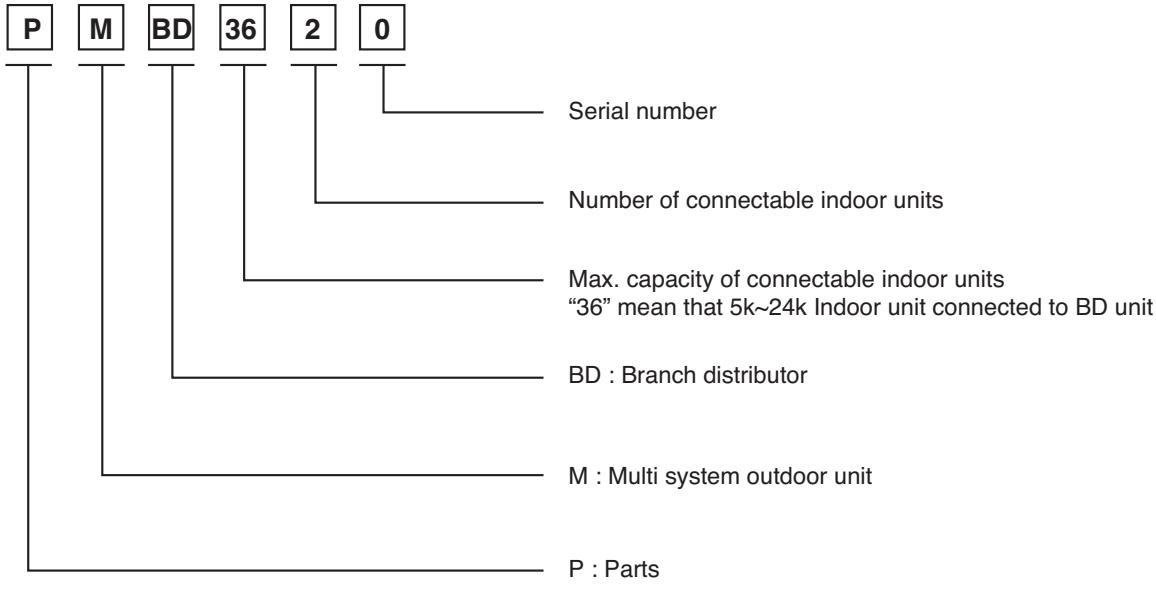


3.4 Outdoor Unit(Europe)





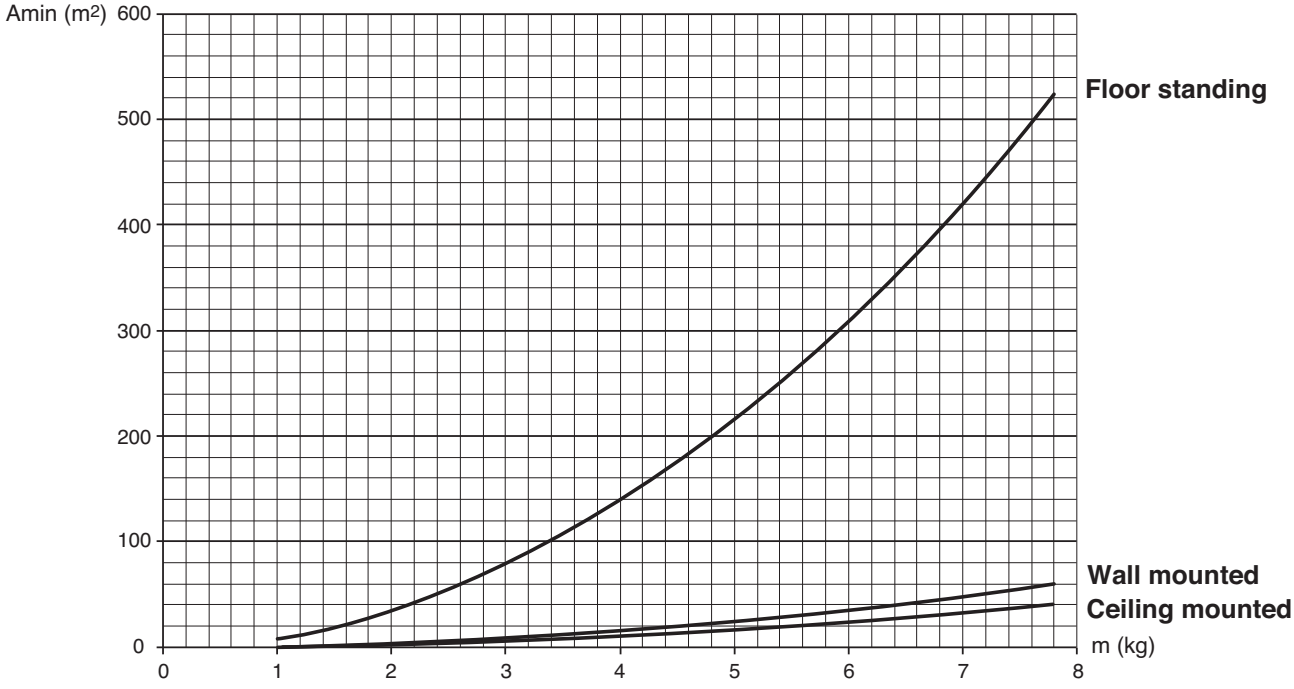
2.5 BD units(Global)



Minimum floor area

• The appliance shall be installed, operated and stored in a room with a floor area larger than the minimum area.

• Use the graph of table to determine the minimum area.



• m : Total refrigerant amount in the system

• Total refrigerant amount : factory refrigerant charge + additional refrigerant amount

• Amin : minimum area for installation

Floor standing		Floor location		Wall mounted		Wall mounted		Ceiling Mounted		Ceiling Mounted	
m (kg)	Amin (m^2)	m (kg)	Amin (m^2)	m (kg)	Amin (m^2)	m (kg)	Amin (m^2)	m (kg)	Amin (m^2)	m (kg)	Amin (m^2)
< 1.224	-	4.6	181.56	< 1.224	-	4.6	20.17	< 1.224	-	4.6	13.50
1.4	16.82	4.8	197.70	1.4	1.87	4.8	21.97	1.4	1.25	4.8	14.70
1.6	21.97	5	214.51	1.6	2.44	5	23.83	1.6	1.63	5	15.96
1.8	27.80	5.2	232.02	1.8	3.09	5.2	25.78	1.8	2.07	5.2	17.26
2	34.32	5.4	250.21	2	3.81	5.4	27.80	2	2.55	5.4	18.61
2.2	41.53	5.6	269.09	2.2	4.61	5.6	29.90	2.2	3.09	5.6	20.01
2.4	49.42	5.8	288.65	2.4	5.49	5.8	32.07	2.4	3.68	5.8	21.47
2.6	58.00	6	308.90	2.6	6.44	6	34.32	2.6	4.31	6	22.98
2.8	67.27	6.2	329.84	2.8	7.47	6.2	36.65	2.8	5.00	6.2	24.53
3	77.22	6.4	351.46	3	8.58	6.4	39.05	3	5.74	6.4	26.14
3.2	87.86	6.6	373.77	3.2	9.76	6.6	41.53	3.2	6.54	6.6	27.80
3.4	99.19	6.8	396.76	3.4	11.02	6.8	44.08	3.4	7.38	6.8	29.51
3.6	111.20	7	420.45	3.6	12.36	7	46.72	3.6	8.27	7	31.27
3.8	123.90	7.2	444.81	3.8	13.77	7.2	49.42	3.8	9.22	7.2	33.09
4	137.29	7.4	469.87	4	15.25	7.4	52.21	4	10.21	7.4	34.95
4.2	151.36	7.6	495.61	4.2	16.82	7.6	55.07	4.2	11.26	7.6	36.86
4.4	166.12	7.8	522.04	4.4	18.46	7.8	58.00	4.4	12.36	7.8	38.83

Part 2 Functions & Controls

1. List of Functions & Accessory

1.1 List of Functions

• Indoor

Category	Functions	Remark
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)	X
Installation	Drain pump	X
	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)	X
	Auto Restart	O
	Child lock	O
	Forced operation	X
	Group control	X
	Sleep mode	O
	Timer(on/off)	O
	Timer(weekly)	O
	Two thermistor control	O
Individual control	Standard Wired remote controller	PQRCVSL0QW
	Deluxe wired remote controller	PDRCUDB0
	Simple wired remote controller	X
	Simple Wired remote controller(for hotel use)	X
	Wireless remote controller	PQWRHDF0(does work with PQRCVSLOQW only)
CAC network function	General central controller (Non LGAP)	X
	Network Solution(LGAP)	O
	Dry contact	PQDSA/PQDSA1/PQDSB/PQDSB1
	PDI(power distribution indicator)	X
	PI 485	X
Special function kit	Damper Controller(4 Zone Controller)	PBDC40
	CTI(Communication transfer interface)	X
	Electronic thermostat	X
Others	Remote temperature sensor	PQRSTA0
	Telecom shelter controller	X
	RF controller	PQRFA0

[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.

• Outdoor

Category	Functions	Z2UW14GFA0 [MU2R15 UL0] Z2UW16GFA0 [MU2R17 UL0]	Z3UW18GFA0 [MU3R19 UE0] Z3UW21GFA0 [MU3R21 UE0] Z4UW24GFA0 [MU4R25 U40] Z4UW27GFA0 [MU4R27 U40] Z5UW30GFA0 [MU5R30 U40]
Reliability	Defrost / Deicing	O	O
	High pressure switch	O	O
	Low pressure switch	X	X
	Phase protection	X	X
	Restart delay (3-minutes)	O	O
	Self diagnosis	O	O
	Soft start	O	O
Convenience	Test function	O	O
	Night Silent Operation	O	O
	Wiring Error Check	O	O
	Peak Control	O	O
	Mode Lock	O	O
	Forced Cooling Operation (Outdoor Unit)	O	O
	SLC (Smart Load Control)	X	O
Network function	Network soluation(LGAP)	X	O
ODU Dry Contact (On/off control only)		X	X

[Note]

○ : Applied, × : Not applied

* Option : Model name & price are different according to options, and assembled in factory with main unit.
  Accessory model name : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separate package.

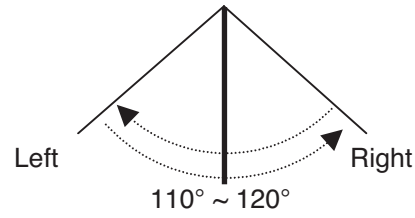
1.2 List of Accessory

Category		Product	Remark	Z2UW14GFA0 [MU2R15 UL0] Z2UW16GFA0 [MU2R17 UL0]	Z3UW18GFA0 [MU3R19 UE0] Z3UW21GFA0 [MU3R21 UE0] Z4UW24GFA0 [MU4R25 U40] Z4UW27GFA0 [MU4R27 U40] Z5UW30GFA0 [MU5R30 U40]
Central Controller	Simple	PQCSZ250S0	AC EZ	X	O
	AC Ez Touch	PACEZA000	AC Ez Touch	X	O
	AC Smart	PACS4B000	AC Smart IV	X	O
	ACP	PACP4B000	ACP IV	X	O
	AC Manager	PACM4B000	AC Manager IV	X	O
		PACM5A000	AC Manager 5	X	O
Gateway	ODU PI485	PMNFP14A1	PI 485 Gateway	X	O
		PMNFP14A0	PI 485 Gateway	X	O
		PV485N000	PI 485 Gateway	X	X
	Low Ambient Kit	AQLA	-	X	X
		PRVC2	From MULTI V 4 series	X	X
		-	Logical Operation	O	O
	AHU Comm. Kit	PRCKA1	Return / Room Air Control	X	X
		PUDCA0	Supply Air Control by DDC (For SINGLE SPLIT)	X	X
		PRDCA0	Supply Air Control by DDC (For MULTI V)	X	X
	BACnet	PQNFB17C0	ACP BACnet	X	O
	Lonworks	PLNWKB000	ACP Lonworks	X	O
	Lon Translator	PLNTRN000	Lon Translator	X	X
ETC	PDI	PPWRDB000	PDI Standard	X	O
		PQNUD1S40	PDI Premium	X	O
	ACS IO Module	PEXPMB000	-	X	X

2. Air flow

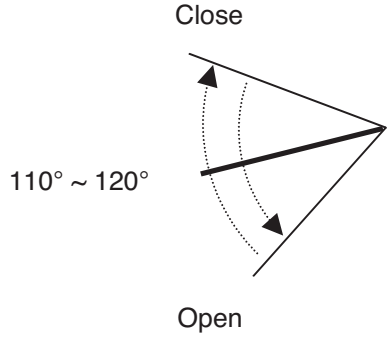
2.1 Auto swing (left & right)

• By the horizontal airflow direction control key input, the left/right louver automatically operates with the auto swing or it is fixed to the desired direction.



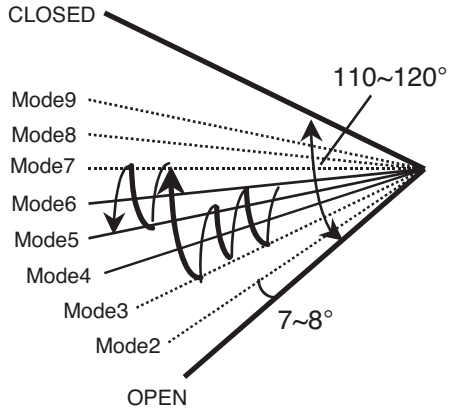
2.2 Auto swing (up & down)

• By the auto swing key input, the upper/lower vane automatically operates with the auto swing or it is fixed to the desired direction.



2.3 Chaos swing (up/down)

• By the Chaos swing key input, the upper/lower vane automatically operates with the chaos swing or it is fixed to the desired direction.



NOTE: Some Models are different by swing width and swing pattern.

2.4 Air flow step

- Indoor fan motor control have 6 steps.
- Air volume is controlled "SH", "H", "Med", Low" by remote controller.
- "LL" step is selected automatically in Hot start operation.

Step	Discription
LL	Very low, In heating mode
L	Low
M	Med
H	High
SH	Super high
Auto	Chaos wind

2.5 Chaos wind (auto wind)

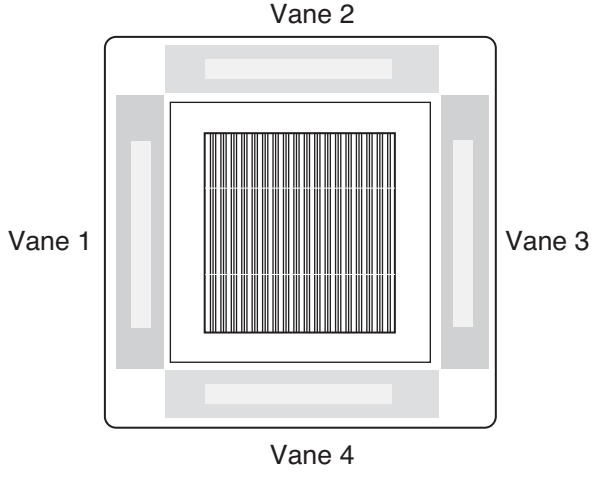
- When "Auto" step selected and then operated, the high, medium, or low speed of the airflow mode is operated for 2~15 second randomly by the Chaos Simulation

2.6 Jet Cool Mode Operation

- While in heating mode or Fuzzy operation, the Jet Cool key cannot be input.
  When it is input while in the other mode operation (cooling, dehumidification, ventilation), the Jet Cool mode is operated.
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min. at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C.
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- When the Jet Cool key is input, the upper/lower vanes are reset to those of the initial cooling mode and then operated in order that the air outflow could reach further.

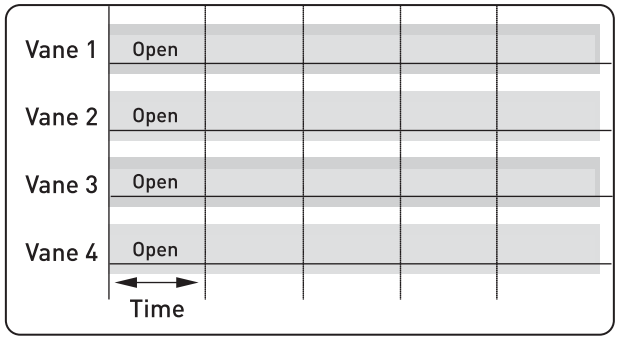
2.7 Swirl wind Swing

- It is the function for comfort cooling/heating operation.
- The diagonal two louvers are opened the more larger than the other louvers. After one minute, it is opposite.

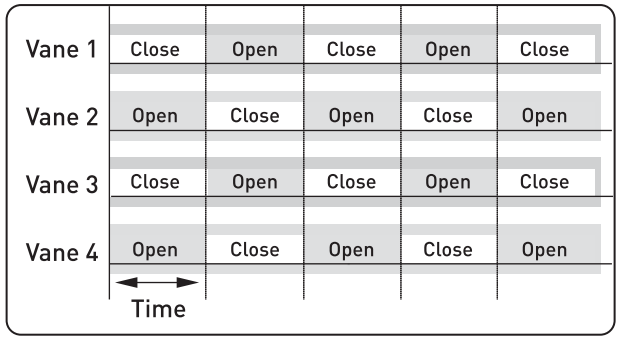


- Comparison of Air Flow Types

4-Open (conventional)



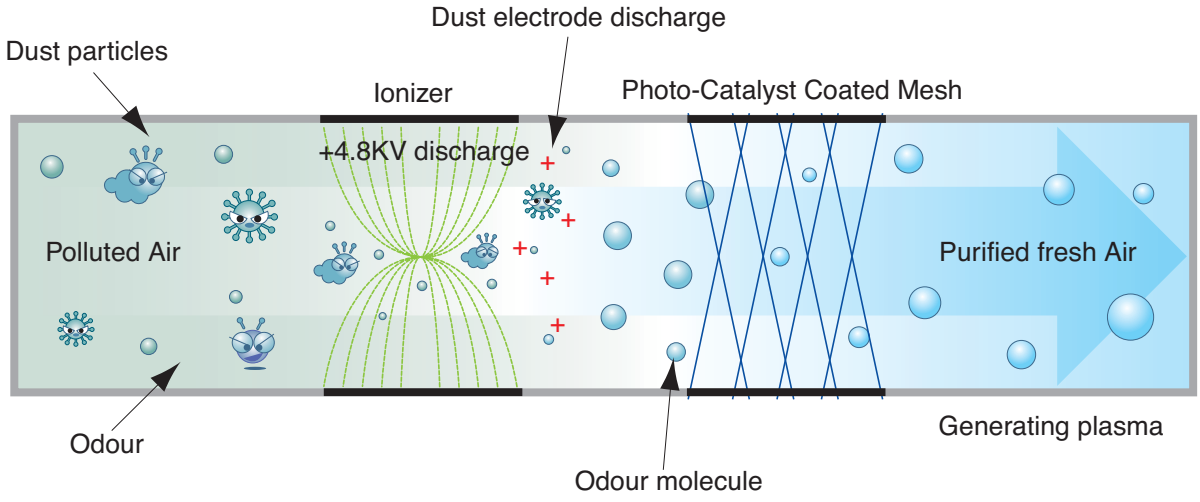
Swirl Swing (New)

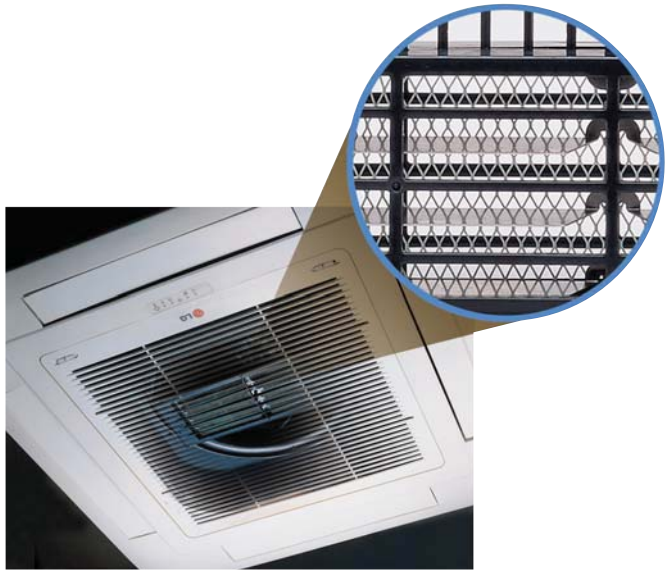


3. Air purifying

3.1 PLASMA Air Purifying System

The PLASMA Air Purifying System not only removes microscopic contaminants and dust, but also removes house mites, pollen, and pet fur to help prevent allergic diseases like asthma. This filter that can be used over and over again by simply washing with water.

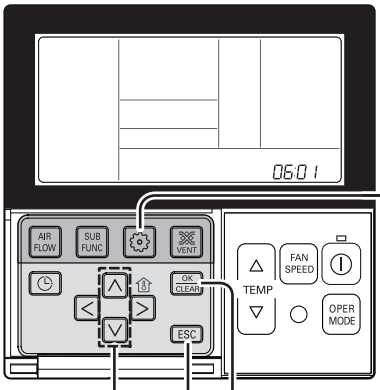




4. Installation Functions

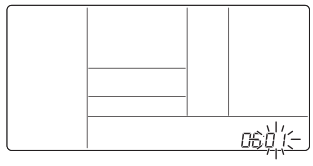
4.1 E.S.P. (External Static Pressure) Setting

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



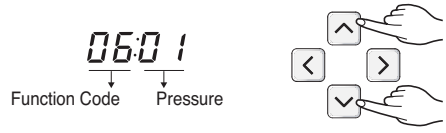
1 Press ⚙ button for 4 seconds to enter the installer setting mode until timer segment displays “01:01”.

2 If pressing ⚙ button repeatedly, it moves to static pressure selection menu as picture below.



3 Select static pressure by pressing ∧ ∨ button.

(01:V-H, 02:F-H, 03:V-L, 04:F-L)



4 Press OK CLEAR button to save.

5 Pressing ESC button will exit settings mode.

❊ After setup, it automatically gets out of setup mode if there is no button input for 25 seconds.

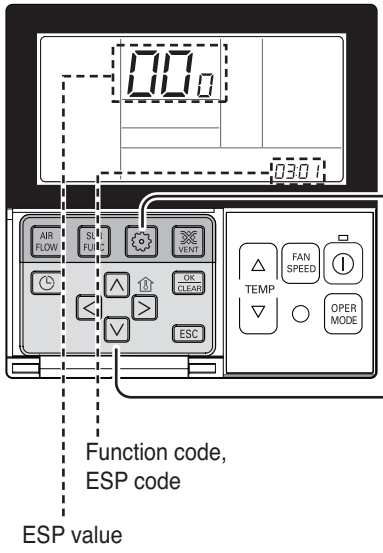
❊ When exiting without pressing set button, the manipulated value is not reflected.

<Static Pressure Setting Table>

Pressure selection		Function	
		Zone state	ESP standard value
01	V-H	Variable	High
02	F-H	Fixed	High
03	V-L	Variable	Low
04	F-L	Fixed	Low

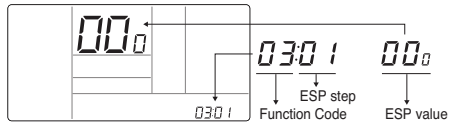
This is the function that decides the strength of the wind for each wind level and because this function is to make the installation easier.

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

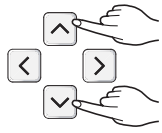


1 If pressing [⚙] button long for 3 seconds, it enters into remote controller setter setup mode.
- If pressing once shortly, it enters into user setup mode.
  Please press more than 3 seconds for sure.

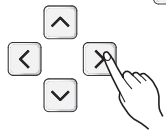
2 If entering into ESP setup mode by using [⚙] button, it indicates as the picture below.



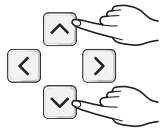
3 Select ESP fan step by pressing [∧] [∨] button. (01: very low, 02: low, 03: medium, 04: high, 05: very high)



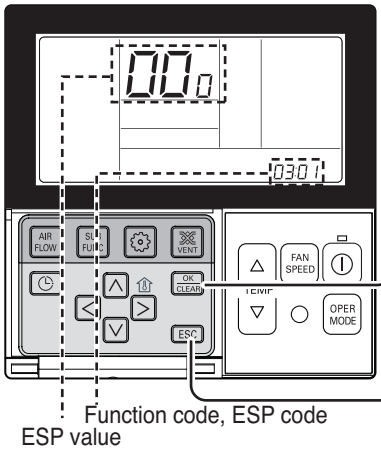
4 Move to ESP value setting by pressing [>] button.
(It is 000 when delivering from the warehouse.)



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.)



• When setting ESP value on the product without very weak wind or power wind function, it may not work.



6 Select ESP fan step again by using [<] [>] button and setup ESP value, as No. 4 and 5, that corresponds each wind flow

7 Press [OK CLEAR] button to save.

8 Press [ESC] 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.

• 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.

E.S.P. setting value (reference)

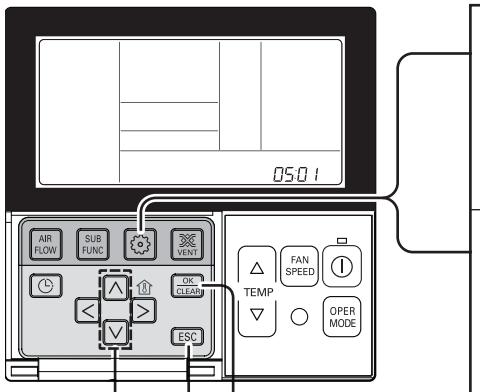
Static pressure(mmAq)		0	1	2	3	4
Model name	**Step(Hi/Med/Lo)**	**Setting value**				
AMNH09GB1A2 [MB09AHL N12]	8.5 CMM	75	84	94	104	114
	7.5 CMM	69	77	88	99	110
	6.5 CMM	62	71	83	95	106
AMNH12GB1A2 [MB12AHL N12]	9.5 CMM	82	90	99	109	118
	8.5 CMM	75	84	94	104	114
	7.5 CMM	69	77	88	99	110
AMNH18GB2A2 [MB18AHL N22]	15 CMM	90	97	105	114	122
	13.5 CMM	82	90	99	109	119
	11.5 CMM	75	84	93	103	114
AMNH24GB2A2 [MB24AHL N22]	17 CMM	110	117	125	129	-
	15 CMM	100	107	115	121	127
	13.5 CMM	90	97	105	114	122

[Notes]

1. To get the desired Airflow & E.S.P. combination from the table set the matching value from the table. Value other than that in table will not give the combinations of airflow & E.S.P. which are mentioned in the table.
2. Table data is based at 230V. According to the fluctuation of voltage, air flow rate varies.

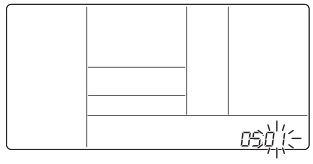
4.2 High Ceiling operation

This function is to adjust FAN Airflow rate according to ceiling height (For ceiling type product)



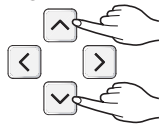
1 If pressing ⚙ button long for 3 seconds, it enters into remote controller setter setup mode.
- If pressing once shortly, it enters into user setup mode. Please press more than 3 seconds for sure.

2 If moving to ceiling height selection menu by pressing ⚙ button, it indicates as picture below.



3 Select ceiling height value by pressing ^ v button. (01:Low, 02:Medium, 03:High, 04:Very high)

05:01
Function Code Thermistor setting



4 Press OK CLEAR button to save.

05:01

5 Pressing ESC 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.

<Ceiling Height Selection Table>

Ceiling Height Level		Description
01	Low	Decrease the indoor airflow rate 1 step from standard level
02	Medium	Set the indoor airflow rate as standard level
03	High	Increase indoor airflow rate 1 step from standard level
04	Very high	Increase indoor airflow rate 2 steps from standard level

- Ceiling height setting is available only for some products.
- Ceiling height of 'Very high' function may not exist depending on the indoor unit.
- Refer to the product manual for more details.

5. Reliability

5.1 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.

5.2 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.

5.3 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°C ≤ intake air temp.	25°C
24°C ≤ intake air temp.< 26°C	intake air temp. -1°C
22°C ≤ intake air temp. < 24°C	intake air temp. -0.5°C
18°C ≤ intake air temp. < 22°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.

6. Convenience Functions & Controls

6.1 Cooling & heating Operations

6.1.1 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 ±0.5°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.

6.1.2 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°C above the setting temperature.
- Condition of compressor turned on
  - When intake air temperature reaches +2°C above the setting temperature.

* Condition of indoor fan turned off
- While in compressor on : indoor pipe temp. < 20°C
- While in compressor off : indoor pipe temp. < 30°C

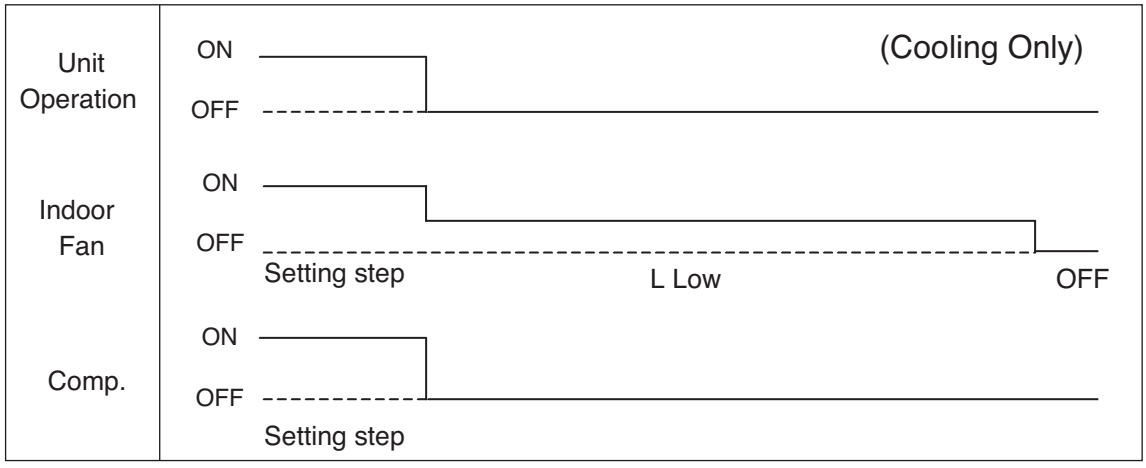
- While in defrost control, between the indoor and outdoor fans are turned off.
- Compressor 2minutes delay
  - After compressor off, the compressor can restart minimum 2 minutes later.

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 °C above setting temp. Thermo OFF : +4 °C above setting temp.	Thermo ON : Setting temp. Thermo OFF : +3 °C above setting temp.

6.2 Auto cleaning operation

- Function used to perform Self Cleaning to prevent the Unit from Fungus and bad odor.
- Used after the Cooling Operation before turning the unit off, clean the Evaporator and keep it dry for the next operation.
- The function is easy to operate as it is accessed through the Remote controller.



6.3 Auto Operation (Artificial Intelligence)

- When any of operation mode is not selected like the moment of the power on or when 3 hrs has passed since the operation off, the operation mode is selected.
- When determining the operation mode, the compressor, the outdoor fan, and the 4 way valve are off and only the indoor fan is operated for 15 seconds. Then an operation mode is selected according to the intake air temp at that moment as follows.
  24°C ≤ Inatake Air Temp ➔ Fuzzy Operation for Cooling
  21°C ≤ Inatake Air Temp < 24°C ➔ Fuzzy Operation for Dehumidification
  Inatake Air Temp < 21°C ➔ Fuzzy Operation for Heating
- If any of the operation modes among cooling / dehumidification / heating mode operations is carried out for 10 second or longer before Fuzzy operation, the mode before Fuzzy operation is operated.

6.3.1 Fuzzy Operation for Cooling

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.
  Compressor ON Temp ➔ Setting Temp + 0.5°C
  Compressor OFF Temp ➔ Setting Temp + 0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.
  26°C≤ Intake Air Temp ➔ 25°C
  24°C≤ Intake Air Temp<26°C ➔ Intake Air Temp + 1°C
  22°C≤ Intake Air Temp<24°C ➔ Intake Air Temp + 0.5°C
  18°C≤ Intake Air Temp<22°C ➔ Intake Air Temp
  Intake Air Temp<18°C ➔ 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature.

6.3.2 Fuzzy Operation for Dehumidification

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.
  Compressor ON Temp ➔ Setting Temp + 0.5°C
  Compressor OFF Temp ➔ Setting Temp+0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.
  26°C ≤ Intake Air Temp ➔ 25°C
  24°C ≤ Intake Air Temp<26°C ➔ Intake Air Temp+1°C
  22°C ≤ Intake Air Temp<24°C ➔ Intake Air Temp+0.5°C
  18°C ≤ Intake Air Temp<22°C ➔ Intake Air Temp
  Intake Air Temp<18°C ➔ 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan repeats the low airflow speed or pause as in dehumidification operation.

6.3.3 Fuzzy Operation for Heating

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 3°C or more above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.
  Compressor ON Temp ➔ Setting Temp
  Compressor OFF Temp ➔ Setting Temp + 3°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.
  20°C≤Intake Air Temp ➔ Intake Air Temp + 0.5°C
  Intake Air Temp<20°C ➔ 20°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is set to the high or the medium according to the intake air temperature and the setting temperature.

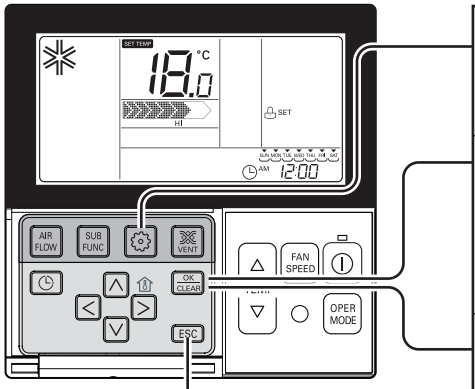
Notes: The Temp. of Comp. Turn ON and OFF is different in heating mode and fuzzy operation for heating. Please, refer page 11

6.4 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.

6.5 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 OK CLEAR button at that time.

3 When cancelling lock function, if moving to 'cancel' icon by pressing ◁ ▷ button and then, pressing OK CLEAR button, child lock function is cancelled.

4 Press ESC 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.

6.6 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.

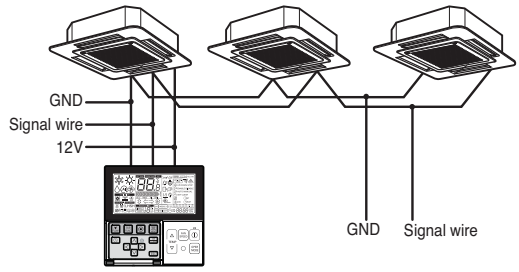
• Operating procedures when the remote control can't be used is as follows :

- The operation will be started if the ON/OFF button is pressed.
- If you want to stop operation, re-press the button.

6.7 Group Control

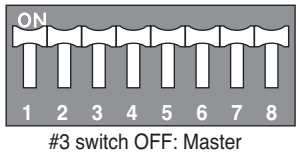
1. When installing more than 2 units of air conditioner to one wired remote controller, please connect as the right figure.

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

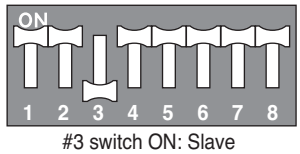


When controlling multiple indoor units with event communication function with one remote controller, you must change the master/slave setting from the indoor unit.

- 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)



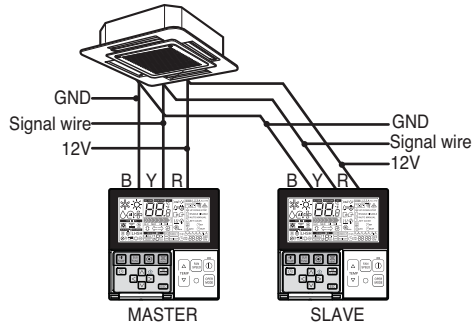
#3 switch ON: Slave

- 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.

6.8 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.

6.9 Timer(On/Off)

6.9.1 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.

6.9.2 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.

6.10 Weekly Program

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

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

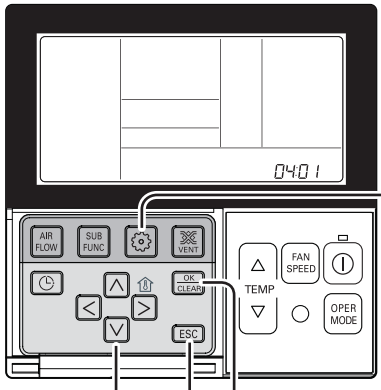
- No need to turn the unit On/OFF manually during working days.
  On/Off time is scheduled in micom of the wired remote control.

Operation Time Table (Example)

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

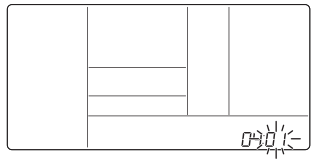
6.11 Two Thermistor Control

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

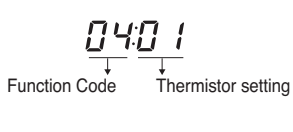


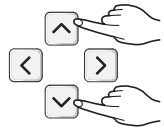
1 If pressing ⚙ button long for 3 seconds, it enters into remote controller setter setup mode.
- If pressing once shortly, it enters into user setup mode. Please press more than 3 seconds for sure.

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 OK CLEAR button to save.

5 Pressing ESC 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>

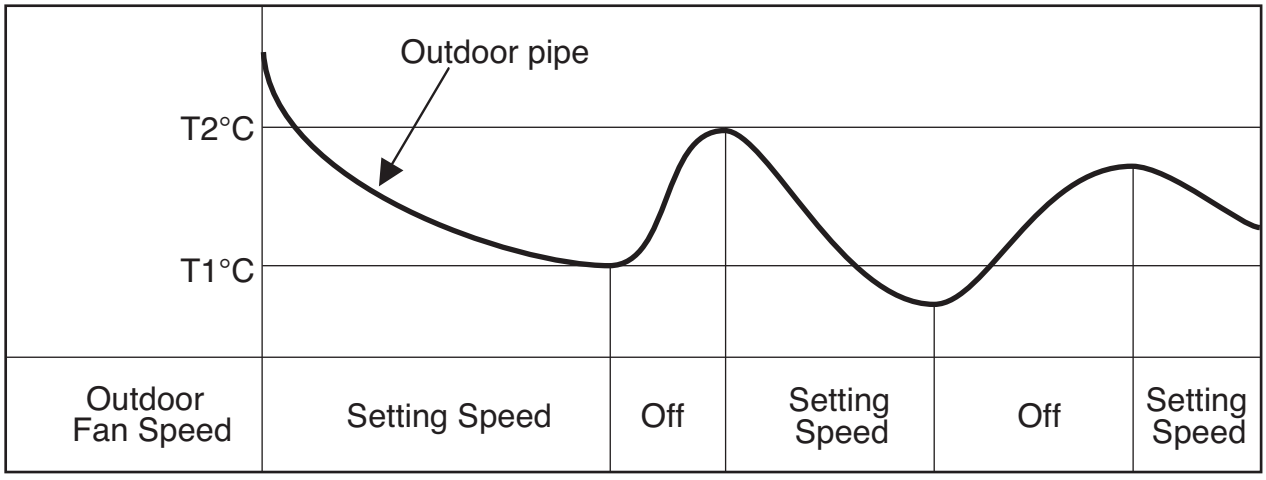
Temperature sensor selection			Function
01	Remote controller		Operation in remote controller temperature sensor
02	Indoor unit		Operation in indoor unit temperature sensor
03	2TH	Cooling	Operation of higher temperature by comparing indoor unit's and wired remote controller's temperature. (There are products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

7.1 Low Ambient control

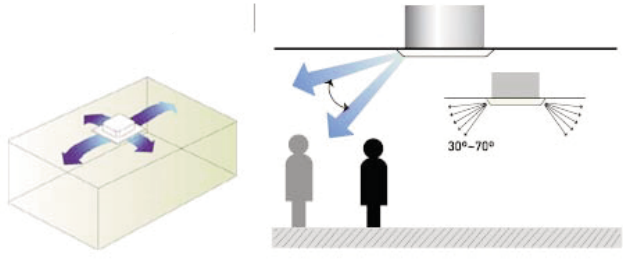
- This Function is for cooling operating in outdoor low temperature .
- If outdoor temperature drops below certain temperature, liquid back is prevented by reducing outdoor fan speed.
- It can prevent frosting of evaporator and keep cooling operation



7.2 Space control

Vanes angle can be controlled by pair, considering its installation environment.

- For example direct drafts can be annoying, leading to discomfort and reduced productivity vane control helps to eliminate this problem.
- Easily controlled by wired remote control.
- Air Flow can be controlled easily regarding any space environment.



7.3 Auto Elevation Grille

- Auto Elevation Grille is automatically down to height of max. 3.1 m. So it enables to install the Indoor unit at high ceiling space. And Auto Elevation Grille makes you cleaning the filter easily.

■ ELEVATION GRILL (REMOTE CONTROLLER_Accessory)

• Main Components of Lift Grill

① Lift grill front panel assembly

② Bolts for installation (4 EA, P/No. 3A00255K)

③ Instruction manual

④ Remote Controller for lift grill

• How to Use Remote Controller

As for operation of Remote Controller, use it by directing the transmitter part of Remote Controller to the receiver part of front panel directly under front panel.

- Do not drop it down or into water. Or else there is worry about trouble failure.
- Do not press hard the Remote Controller button with nail (ballpoint pen or other sharp substance). Or else there is worry about trouble failure.
- In case when obstacle such as curtain hides the signal reception part of receiver in between the space interval, Remote Controller operation is infeasible.

• How to Operate the Lift Grill

⚠CAUTION

- Always stop the air conditioner operation for safety before operating lift grill.
- Take heed _ there is worry about dust fall etc. when suction grill descends.
- In case when the set automatic stop distance goes wrong, check the set value of operation panel and confirm if there is neither obstacle nor mankind.
- When you are not to remove obstacle, stop the operation before touching the obstacle.

1. Stop the Air Conditioner Operation

2. Descend the Suction Grill

- Depress the down button(▼).
  Then suction grill descends and stops automatically at a certain distance.
- You may stop it at wanted distance point by depressing the stop button (■) when descending.

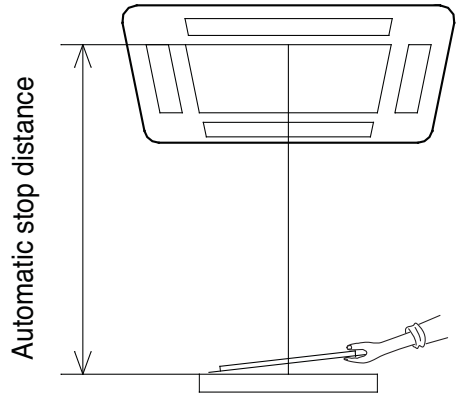
3. Raise the Suction Grill

- Depress the up button(▲).
  Then suction grill goes up and enters into the front panel.

4. Stop the Suction Grill during Rising

- Depress the stop button(■).
  Make use of this when you want to stop it at your wished position.

Automatic Stop Distance of Grill



Ceiling height	Low	Medium (Height: 3~4 m)	High
Automatic stop distance	1.5±0.5 m	2.5±0.5 m	3.5±0.5 m

✳ If you want to change automatic distance setting, consult with your sale agency.

7.4 Defrost Control (Heating)

- Defrost operation is controlled by timer and sensing temperature of outdoor pipe.
- The first defrost starts only when the outdoor pipe temperature falls below -11°C after starting of heating operation and more than 10 minutes operation of compressor.
- Defrost ends after 15 minutes passed from starting of defrost operation when the outdoor rises over 40°C even before 12 minutes.
- The second defrost starts only when the outdoor pipe temperature falls below – 6°C after from ending of the first defrost and more than 10 minutes operation of compressor.

3. Basic Control

1. Normal operation

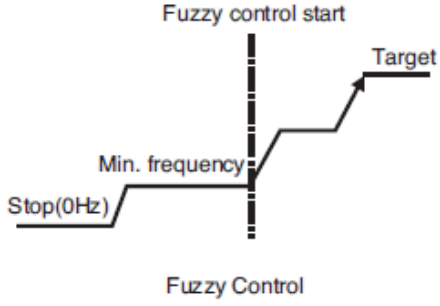
Basic principle is to control the rpm of the motor by changing the working frequency of the compressor.
Three phase voltage is supplied to the motor and the time for which the voltage will supplied is controlled by IPM (intelligent power module).
Switching speed of IPM defines the variable frequency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

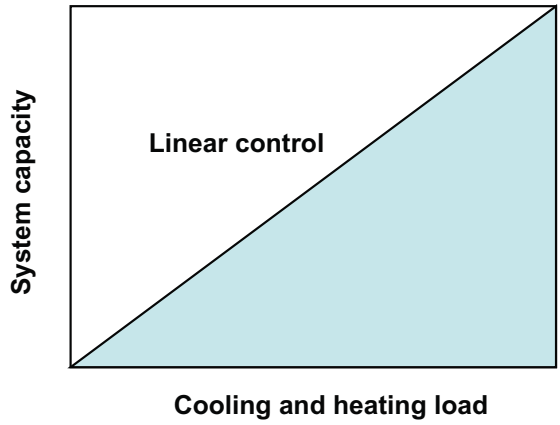
Actuator	Cooling operation	Heating operation	Stop state
Compressor	Fuzzy control	Fuzzy control	Stop
Fan	Fuzzy control	Fuzzy control	Stop
EEV	Super heating fuzzy control	Super heating & Sub cooling fuzzy control	Min. Pulse

※ 14,16k Models
Frequency that corresponds to each rooms capacity will be determined according to the difference in the temperature of each room and the temperature set by the remote controller.
There are various factors determining the frequency.

2. Compressor control

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





Inverter linear control as cooling and heating load increasing

※ 14, 16k Models
Capacity steps of compressor are decided by summation of capacity code, outdoor temp., indoor temp., step compensation of temperature difference indoor temp. and setting temp.

3. EEV(Electronic Expansion Valve) control

EEV operates with fuzzy control rules to keep the degree of superheat (about 2~3°C) at the evaporator outlet status.
The degree of superheat = Tsuction – Tevaporation
Tsuction : temperature at suction pipe sensor(°C)
Tevaporation : evaporation temperature (°C)

※ 14, 16k Models
EEV operates with PI control rules to keep the degree of superheat at the evaporator inlet and outlet status.

4. Oil return control

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

Outdoor unit

Component	Starting	Running	Ending
Compressor	Normal control	Setting value	Normal control
Fan	Normal control	Off	Normal control
EEV (Thermo on)	Normal control	Setting value	Normal control
EEV (Thermo off)	Min. Pulse	Setting value	Min. Pulse
4 way valve	On	Off	On

Indoor unit

Component	Starting	Running	Ending
Fan	Normal control	Off	Normal control
Defrost signal	Off	On	Off

5. Defrost control

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

Outdoor unit

Component	Starting	Running	Ending
Compressor	Normal control	Setting value	Normal control
Fan	Normal control	Off	Normal control
EEV (Thermo on)	Normal control	Setting value	Normal control
EEV (Thermo off)	Min. Pulse	Setting value	Min. Pulse
4 way valve	On	Off	On

Indoor unit

Component	Starting	Running	Ending
Fan	Normal control	Off	Normal control
Oil return signal	Off	On	Off

6. Protection control

6.1 High pressure protection control

Pressure range	Compressor
Pd ≥ 4069 kPa	Off
3938 kPa ≤ Pd < 4069 kPa	3Hz down
3840 kPa ≤ Pd < 3938 kPa	3Hz down
3709 kPa ≤ Pd < 3840 kPa	Frequency holding
3611 kPa ≤ Pd < 3709 kPa	3 Hz up
Pd < 3611 kPa	Normal control

※ 14,16k models are not applied.

6.2 Low pressure protection control

■ Cooling Mode

Pressure range	Compressor
Pe > 310 kPa	Normal control
278 kPa < Pe ≤ 310 kPa	3Hz down
245 kPa < Pe ≤ 278 kPa	3Hz down
212 kPa < Pe ≤ 245 kPa	3Hz down
Pe ≤ 212 kPa	Off

※ 14,16k models are not applied.

■ Heating mode

Pressure range	Compressor
Pe > 294 kPa	Normal control
255 kPa < Pe ≤ 294 kPa	3Hz down
229 kPa < Pe ≤ 255 kPa	3Hz down
203 kPa < Pe ≤ 229 kPa	3Hz down
Pe ≤ 203 kPa	Off

※ 14,16k models are not applied.

6.3 Discharge temperature control

Temperature range	Compressor
Td ≥ 105 °C	Off
100°C ≤ Td < 105°C	5Hz down
95°C ≤ Td < 100°C	5Hz down
93°C ≤ Td < 95°C	Frequency holding
90°C ≤ Td < 93°C	3 Hz up
Td < 90°C	Normal control

6.4 Input Current control

	Normal control	Frequency down	Comp off
Input current	Less than 10A	14A or less	Over than 14A

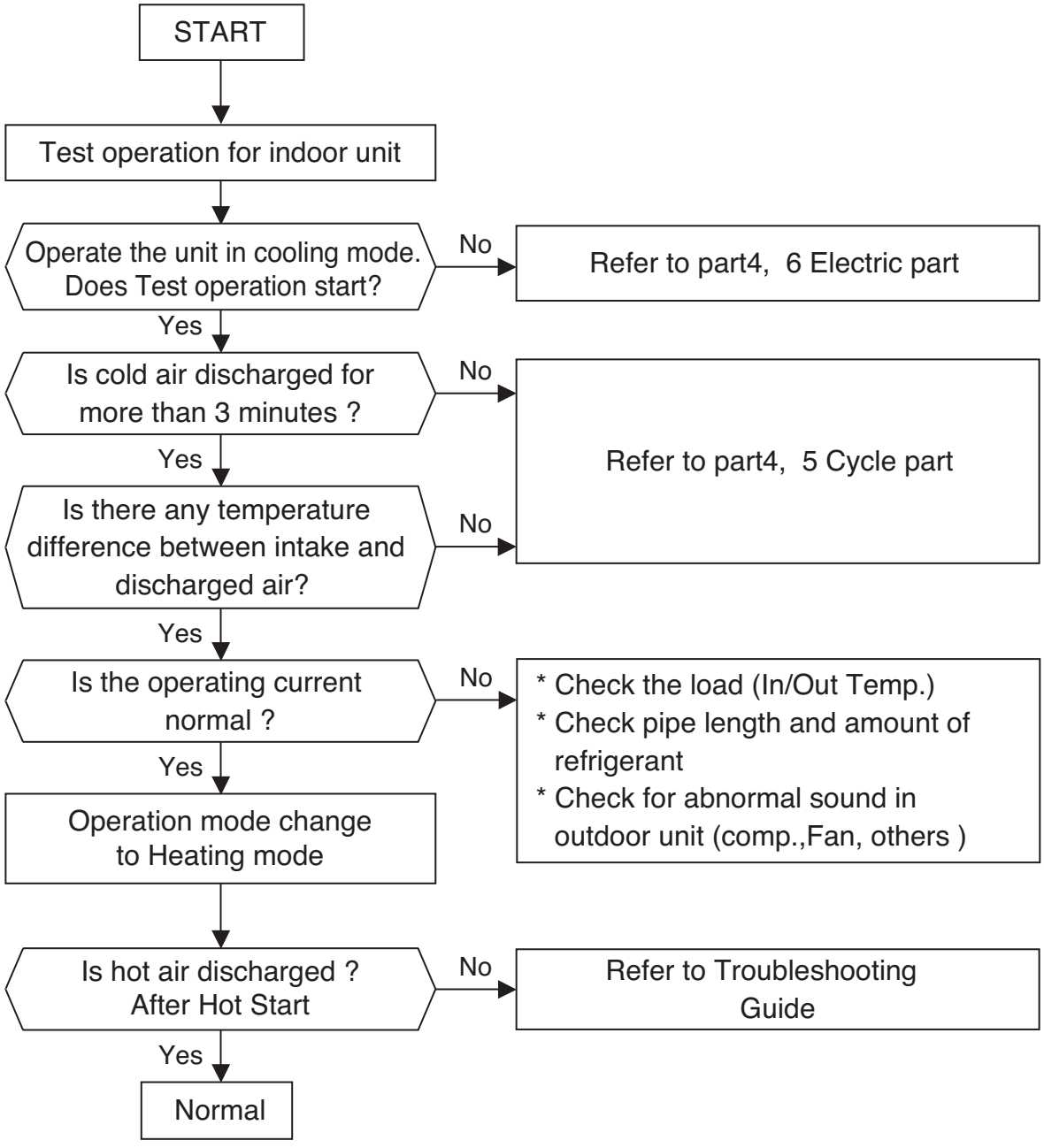
❊ **Remarks:** The data of pressure and frequency are different model by model.

4. Test Run

1. Check before Test Run

1	Check to see whether there is any refrigerant leakage, and check whether the power or transmission cable is connected properly.
2	Check liquid pipe and gas pipe valves are fully opened. **NOTE**: Be sure to tighten caps.
3	Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less. **NOTE**: Never carry out mega ohm check over terminal control board. Otherwise the control board may break. Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground maydecrease to approx. 2.0 MΩ as a result of refrigerant accumulation in the internal compressor. If the insulation resistance is less than 2.0 MΩ, turn on the main power supply.

2. Test Run Flow chart



• Each indoor unit should be tested.

• If the unit has accessory, it should be tested.

3. Test Running

3.1 SPLIT, ART cool, ART cool deluxe Type

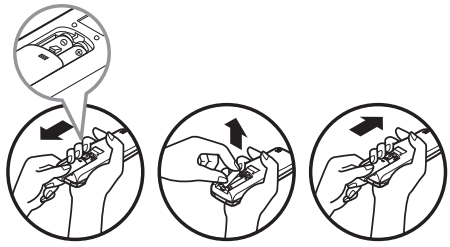
- Check that all tubing and wiring have been properly connected.
- Check that the gas and liquid side service valves are fully open.

3.1.1 Prepare remote controller

❶ Remove the battery cover by pulling it according to the arrow direction.

❷ Insert new batteries making sure that the (+) and (–) of battery are installed correctly.

❸ Reattach the cover by pushing it back into position.



NOTE:

- Use 2 AAA(1.5volt) batteries. Do not use rechargeable batteries.
- Remove the batteries from the remote controller if the system is not going to be used for a long time.

3.1.2 Precautions in test run

■ The initial power supply must provide at least 90% of the rated voltage.
Otherwise, the air conditioner should not be operated.

■ For test run, carry out the cooling operation firstly even during heating season. If heating operation is carried out firstly, it leads to the trouble of compressor. Then attention must be paid.

■ Carry out the test run more than 5 minutes without fail. (Test run will be cancelled 18 minutes later automatically)

■ The forced operation is started by pressing button for 2 seconds.
The test run is started by pressing button for 3~6 seconds.

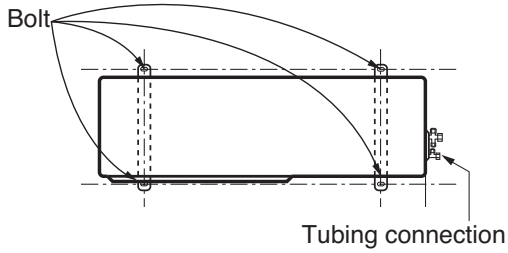
■ To cancel the test run, press any button.

3.1.3 Settlement of outdoor unit

■ Anchor the outdoor unit with a bolt and nut(ø10mm) tightly and horizontally on a concrete or rigid mount.

■ When installing on the wall, roof or rooftop, anchor the mounting base securely with a nail or wire assuming the influence of wind and earthquake.

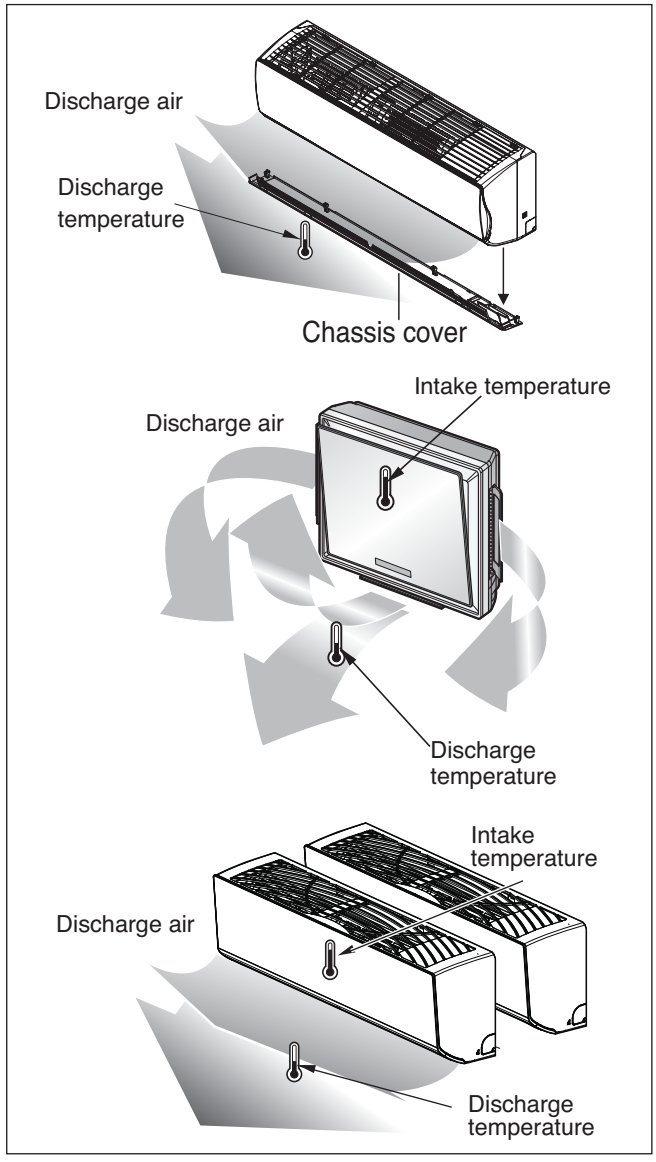
■ In the case when the vibration of the unit is conveyed to the hose, secure the unit with an anti-vibration rubber.



3.1.4 Evaluation of the performance

Operate unit for 15~20 minutes, then check the system refrigerant charge:

1. Measure the pressure of the gas side service valve.
2. Measure the temperature of the intake and discharge of air.
3. Ensure the difference between the intake temperature and the discharge is more than 8°C (Cooling) or reversely (Heating).



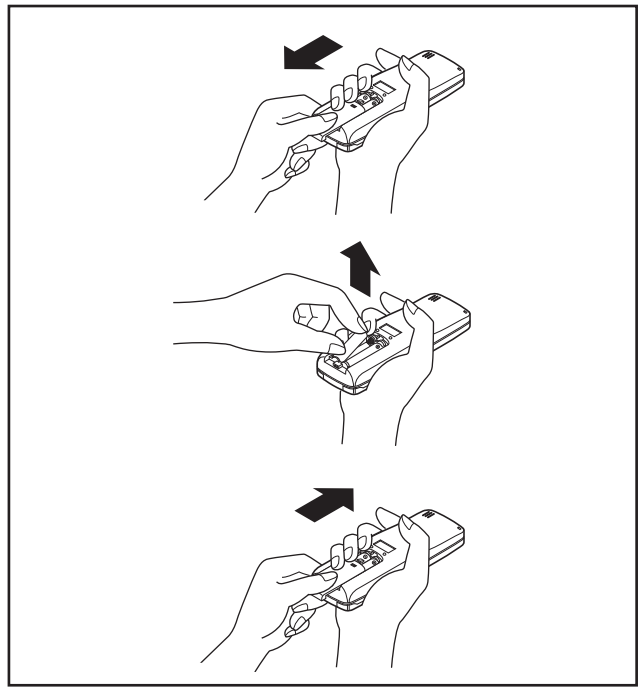
3.2 CVT Type

3.2.1 Connection of power supply

1) Connect the power supply cord to the independent power supply.
- Circuit breaker is required.

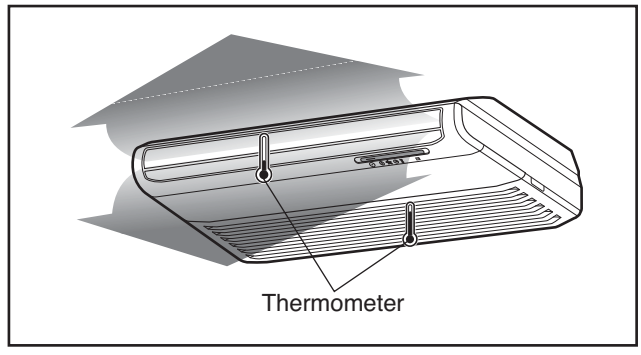
2) Prepare the remote control.
- Insert two batteries provided.
  Remove the battery cover from the remote controller.
- Slide the cover according to the arrow direction.
  Insert the two batteries.
  (Two "R03" or "AAA" dry-cell batteries or equivalent.)
- Be sure that the (+) and (-) directions are correct.
- Be sure that both batteries are new.
  Re-attach the cover.
- Slide it back into position.

3) Operate the unit for fifteen minutes or more.



3.2.2 Evaluation of the performance

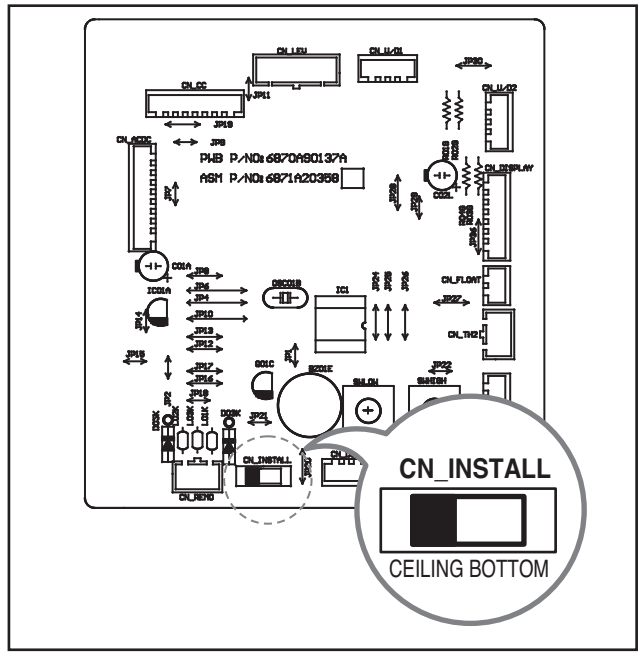
1) Measure the temperature of the intake and discharge air.
2) Ensure the difference between the intake temperature and the discharge one is more than 8°C (Cooling) or reversely (Heating).



3.2.3 Selection of the slide switch according to installation method

1) In case the indoor unit is installed on the floor, please change the side switch which is on the Main PCB Assembly to the 'BOTTOM' state.
2) In case the indoor unit is installed under the ceiling, please change the slide switch which is on the Main PCB Assembly to the ' CEILING' state.

❊ The initial state of the slide switch is set for the bottom installation.



3.3 Ceiling Cassette Type

3.3.1 PRECAUTIONS IN TEST RUN

• The initial power supply must provide at least 90% of the rated voltage.
Otherwise, the air conditioner should not be operated.

CAUTION:

① For test run, carry out the cooling operation first even during winter season. If heating operation is carried out first, it leads to the trouble of compressor.

② Carry out the test run more than 5 minutes without stopping.
(Test run will be cancelled 18 minutes later automatically)

• The test run is started by pressing the room temperature checking button and down timer button for 3 seconds at the same time.
• To cancel the test run, press any button.

3.3.2 CHECK THE FOLLOWING ITEMS WHEN INSTALLATION IS COMPLETE

• After completing work, be sure to measure and record trial run properties, and store measured data, etc.
• Measuring data are room temperature, outside temperature, suction temperature, blow out temperature, air velocity, air volume, voltage, current, presence of abnormal vibration and noise, operating pressure, piping temperature.
  • As to the structure and appearance, check following items.

❏ Is the circulation of air adequate?
❏ Is the drainage OK?
❏ Is the heat insulation complete (refrigerant and drain piping)?
❏ Is there any leakage of refrigerant?
❏ Does the romote controller works properly?
❏ Is there any error on wiring?
❏ Aren't terminal screws loosened?

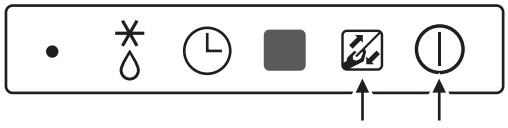
M4.....118N.cm{12kgf.cm} M5.....196N.cm{20kgf.cm}
M6.....245N.cm{25kgf.cm} M8.....588N.cm{60kgf.cm}

5. Trouble Shooting

1. Self-diagnosis Function

1.1 Error Indicator (Indoor)

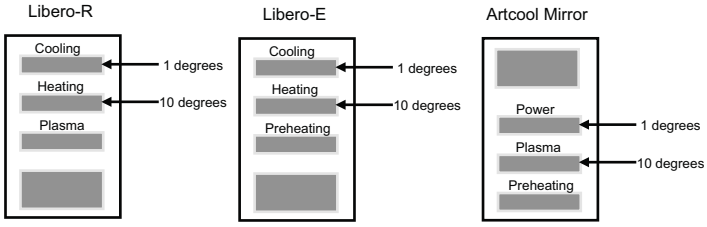
Ceiling Cassette Type Display



10 degrees 1 degrees

The number of times to blink = Error code

Standard Libero Type Display



The number of times to blink = Error code

Error Indicator

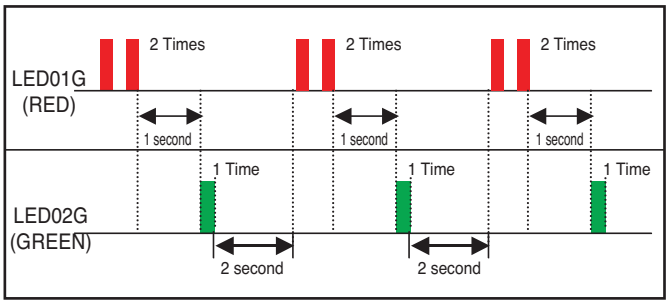
- The function is to self-diagnoisis airconditioner and express the troubles identifically if there is any trouble.
- Error mark is ON/OFF for the operation LED of evaporator body in the same manner as the following table.
- If more than two troubles occur simultaneously, primarily the highest trouble fo error code is expressed.
- After error occurrence, if error is released, error LED is also released simultaneously.
- To operate again on the occurrence of error code, be sure to turn off the power and then turn on.
- Having or not of error code is different from Model.

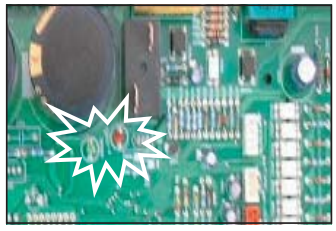
Indoor Error

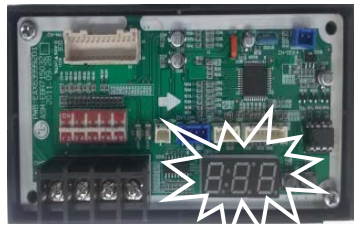
Error code	Description	Indoor Status
00	No Error	ON
01	Indoor Room themistor error	OFF
02	Indoor in-piping sensor error	OFF
03	Remote controller error	OFF
04	Drain Pump error	OFF
05	Communcation error between in and out	OFF
06	Indoor Out-Piping sensor error	OFF
07	Differnt mode operation	OFF
09	EEPROM Check Sum Error	OFF
10	Indoor BLDC Fan Lock	OFF

1.3 Error Indicator (Outdoor)

Outdoor Error
Ex) Error 21 (DC Peack)





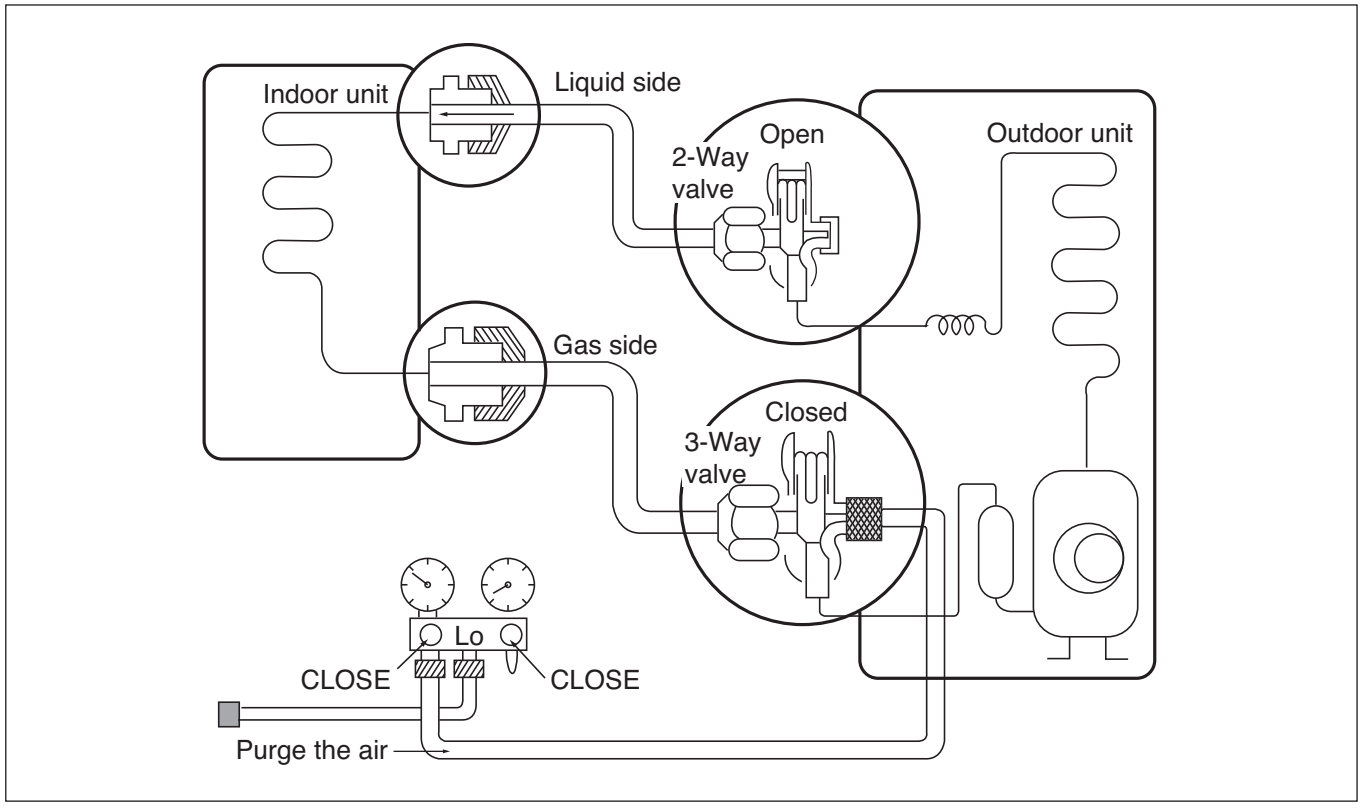


Error Code	Contents	LED01G/M (Red)	LED02G/M (Green)	case of Error	Outdoor Status
21	DC Link Peak (IPM Fault)	2times ◑	1times ◑	Over Rated Current	Off
22	CT 2 (Max CT)	2times ◑	2times ◑	Input Over Current	Off
23	DC Link Low Volt.	2times ◑	3times ◑	DC Link Volt is below 140Vdc	Off
	DC Link High Volt.			DC Link Volt is above 420Vdc	
24	Pressure Switch	2times ◑	4times ◑	High/Low Pressure Fault	Off
25	Low Voltage/Over Voltage	2times ◑	5times ◑	Abnormal AC Volt Input	Off
26	DC Compressor Position Error	2times ◑	6times ◑	Compressor Starting Fall Error	Off
27	PSC/PFC Fault Error	2times ◑	7times ◑	Over Inverter PCB input current	Off
29	COMP Over Current	2times ◑	9times ◑	Over Inverter Compressor Current	Off
32	D-Pipe High	3times ◑	2times ◑	D-Pipe Temp. High	Off
35	Low Pressure Error	3times ◑	5times ◑	Excessive decrease of Low Pressure	Off
39	Communication Error	3times ◑	9times ◑	Communication Error Between PFC Micom and INV Micom	Off
40	CT Sensor (Open/Short)	4times ◑	○	CT Circuit Malfunction	Off
41	INV. D-Pipe Th Error	4times ◑	1times ◑	Open/Short	Off
43	High Pressure Sensor Error	4times ◑	3times ◑	Open/Short	Off
44	Outdoor Air Th Error	4times ◑	4times ◑	Open/Short	Off
45	Cond. Mid-Pipe Th Error	4times ◑	5times ◑	Open/Short	Off
46	Suction Pipe Th Error	4times ◑	6times ◑	Open/Short	Off
48	Cond. Out-Pipe Th Error	4times ◑	8times ◑	Open/Short	Off
51	Capacity Over	5times ◑	1times ◑	Over combination	Off
53	Signal Error (Indoor <-> Outdoor)	5times ◑	3times ◑	Communication Poorly	Off
54	3-Phase Wrong wiring	5times ◑	4times ◑	3-Phase Wrong Wring of Outdoor Unit (Reverse Phase/Omission of Phase)	Off
60	EEPROM Check Sum Error	6times ◑	○	Check Sum Mismatching	Off
61	Cond. Pipe Th High	6times ◑	1times ◑	Cond. Temp. High	Off
62	Heaksink Th High	6times ◑	2times ◑	Heatsink Temp. High	Off
65	Heaksink Th Error	6times ◑	5times ◑	Open/Short	Off
67	Outdoor BLDC Fan Lock	6times ◑	7times ◑	Outdoor Fan is not operation	Off
73	PFC Fault Error(S/W)	7times ◑	3times ◑	Over Current of Outdoor Unit PFC	Off

◑ : A light on the display panel is blink.

2. Pump Down

2.1 14k/16k



• Procedure

(1) Confirm that both the 2-way and 3-way valves are set to the open position.
- Remove the valve stem caps and confirm that the valve stems are in the raised position.
- Be sure to use a hexagonal wrench to operate the valve stems.

(2) Operate the unit for 10 to 15 minutes.

(3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.
- Connect the charge hose with the push pin to the service port.

(4) Air purging of the charge hose.
- Open the low-pressure valve on the charge set slightly to air purge from the charge hose.

(5) Set the 2-way valve to the closed position.

(6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 1kg/cm²g.

(7) Immediately set the 3-way valve to the closed position.
- Do this quickly so that the gauge ends up indicating 3 to 5kg/cm²g.

(8) Disconnect the charge set, and mount the 2-way and 3-way valve's 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.

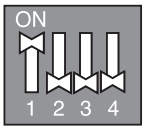
2.2 18k~56k

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

• Procedure

■ This function start Dip switch setting status of ODU PCB.

(1) Set the Dip switch as follow after shutting the power source down.

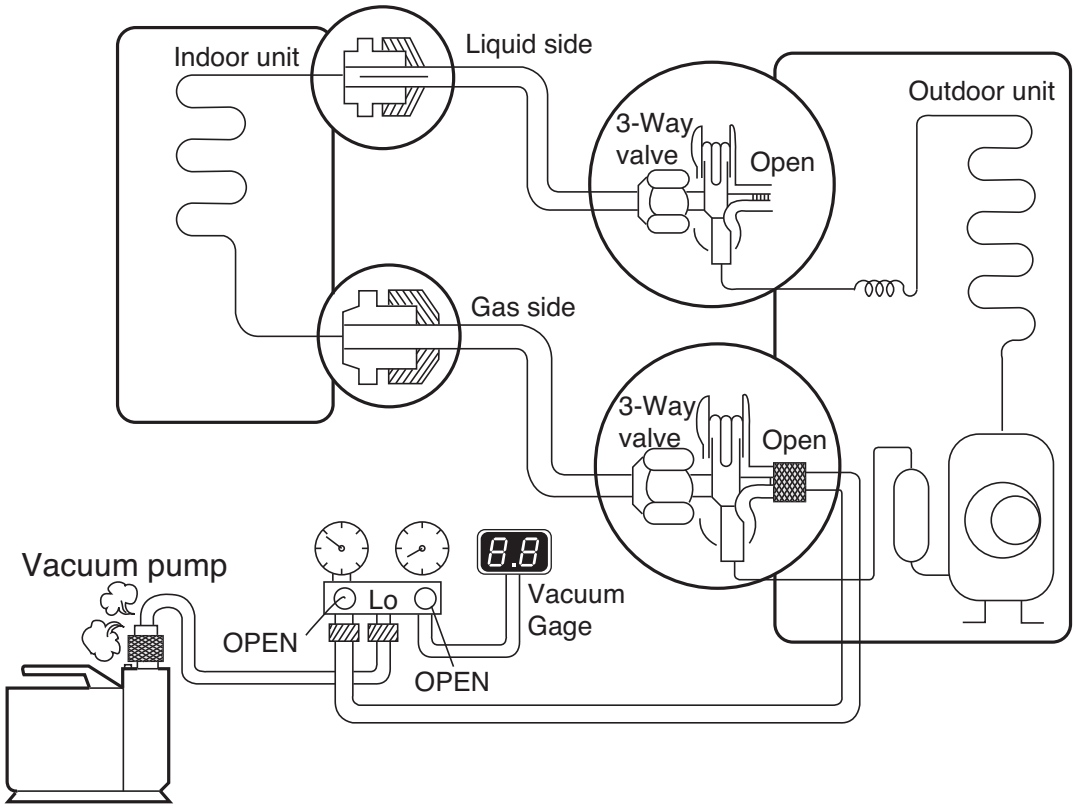


(2) Reset the power.
(3) Check that the Red LED of PCB is on during work.(The indoor unit is operated by force.)
(4) Pump down during forced cooling operation.

CAUTION

1. Use pump down function within guaranteed temperature range
   IDU : 20~32C
   ODU : 0~40C
2. Make certain that IDU doesn't run with thermo off mode during operation
3. After the compressor is starting operation, please complete Pump Down within 4 minutes.
4. Pump Down can be stopped (The compressor is turned off), because of compressor protection.
   In this case, reset the power.

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).

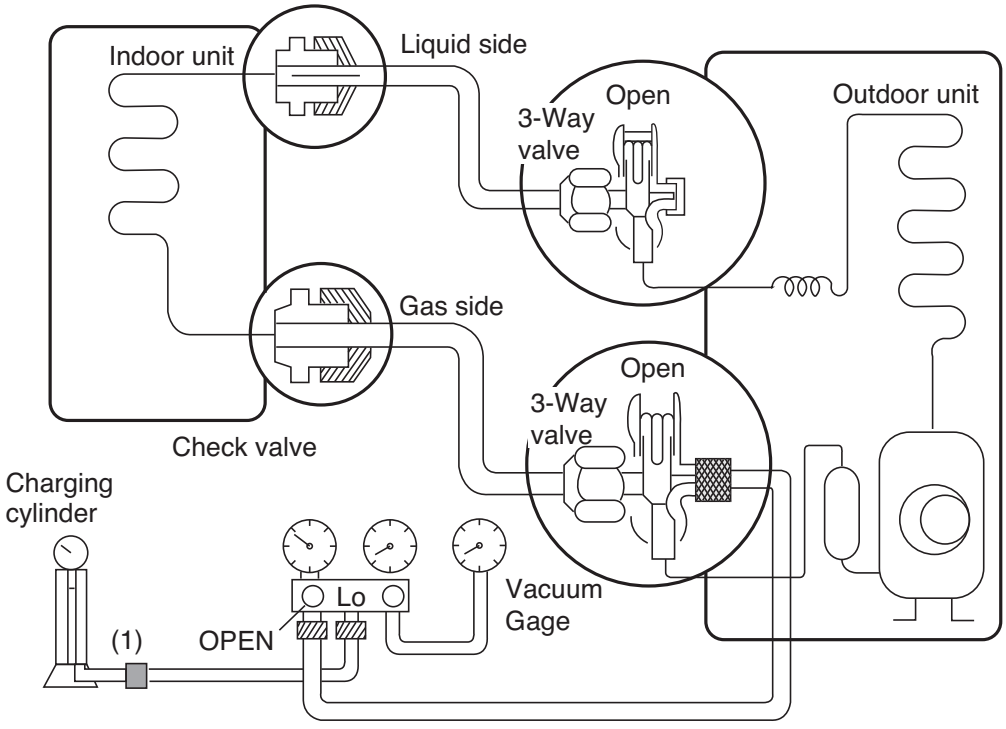
(4) Disconnect the charge hose from the vacuum pump.
- Vacuum pump oil.
  If the vacuum pump oil becomes dirty or depleted, replenish as needed.

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 dis-connected 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 relativery 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.

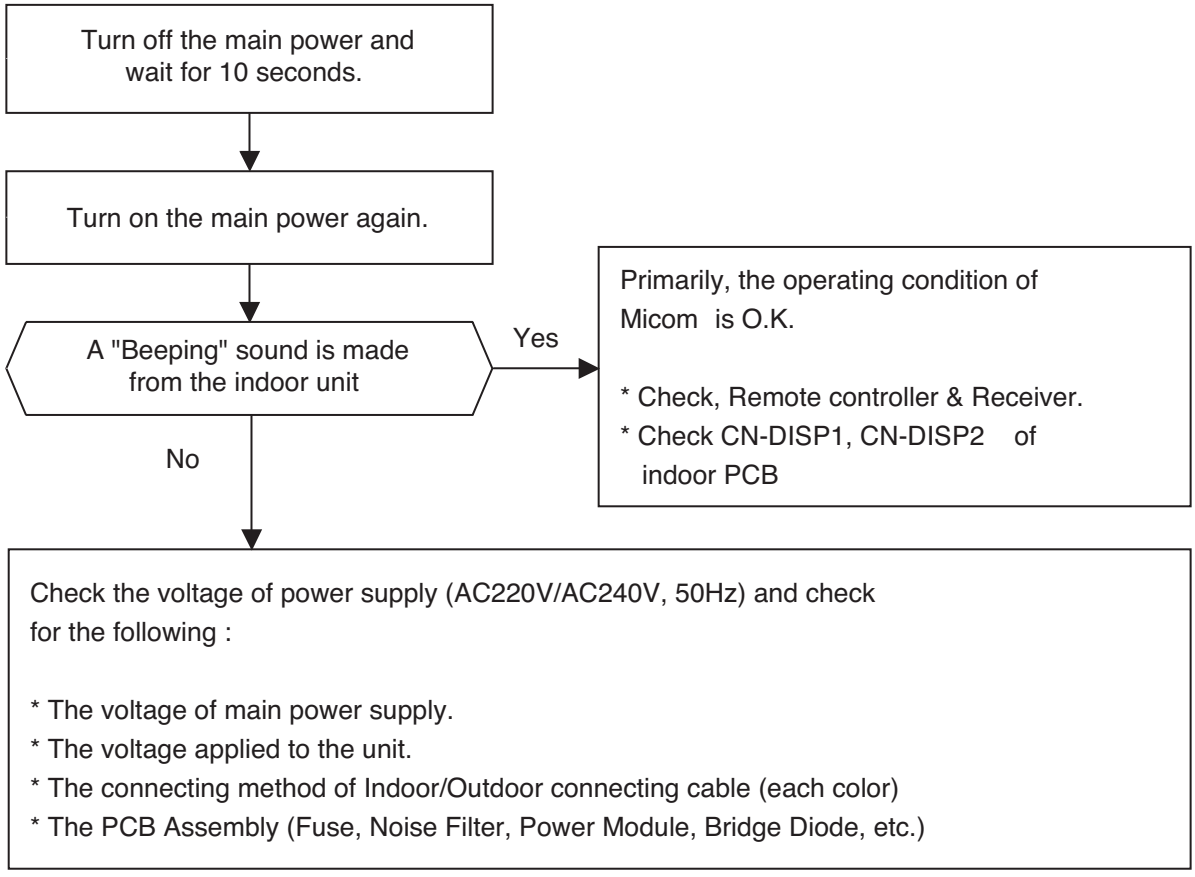
Suction pressure (Compared with the normal value)	Temperature of Discharge Air (Compared with the normal valve)	Cause of Trouble	Description
Higher	High	Defective compressor Defective 4-way reverse valve	Current is low.
	Normal	Excessive amount of refrigerant	High pressure does not quickly rise at the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

NOTICE

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

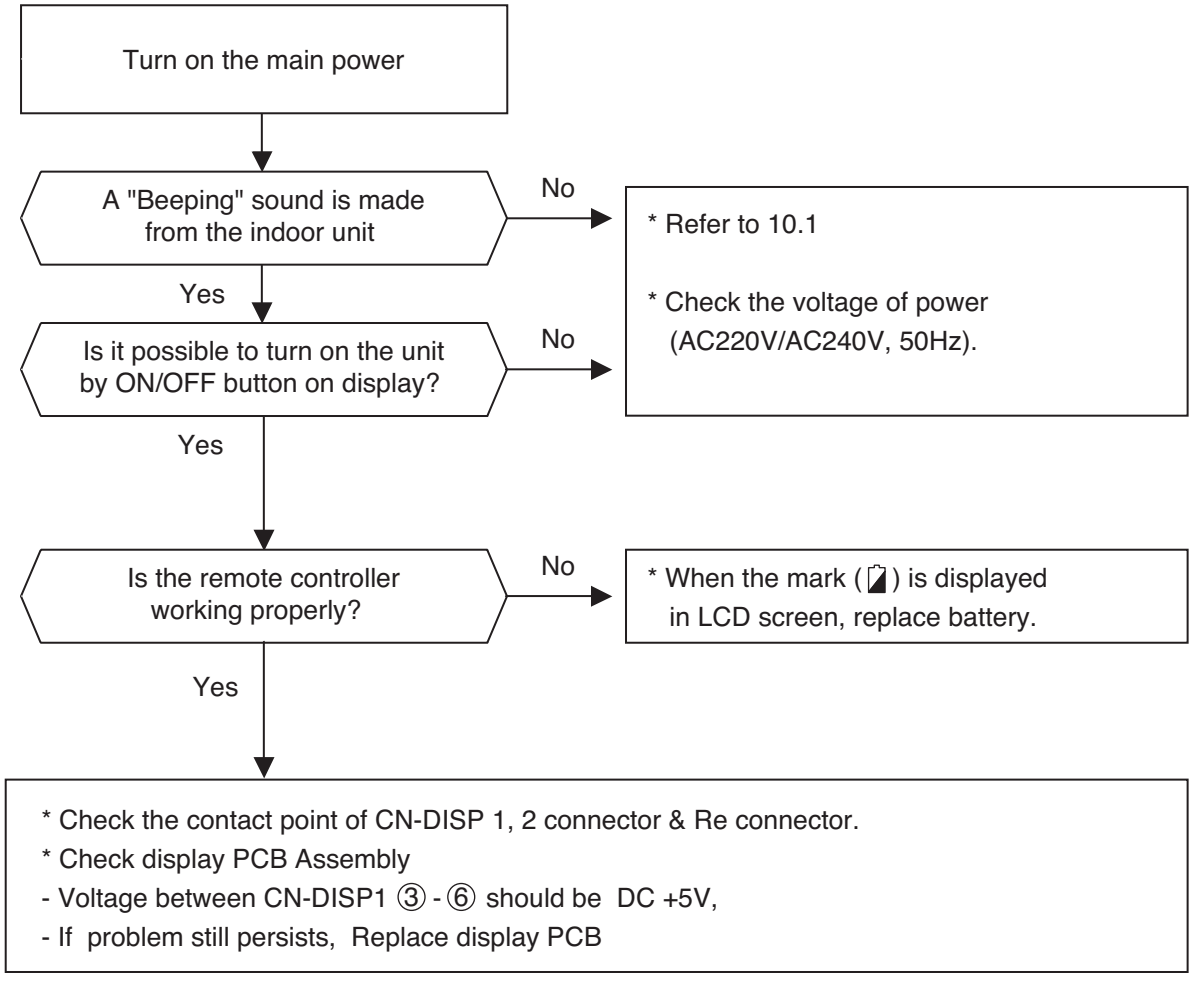
6. Electronic Parts

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

Turn on the main power.

↓

Operate Cooling Mode by setting the disired temperature of the remote controller is less than one of the Indoor temperature by 1°C at least.

↓

When in air circulation mode, compressor/outdoor fan is stopped.

↓

Check the sensor for Indoor temperature is attatched as close as to be effected by the themperature of Heat Exchange (EVA.)

↓

When the sensor circuit for Indoor temperature and connector are in bad connection or are not engaged, Compressor/Outdoor fan is stopped.

- Check the related circuit of R02H(12.1K), R01H(1K), R04H(6.2K), R03H(1K), C01H(102), C02H(102), Micom(pin No. ⑪, ⑫).
- Check the Indoor temperature sensor is disconnected or not (about 10K at 25°C).

↓

Check the Relay(RY-PWR, RY-START) for driving Compressor.

- Check the voltage between brown and blue cable of terminal to connect the Outdoor (About AC220V / 240V).
- Check the related circuit of relay in Outdoor PCB Ass'y.

Check Point	Comp. ON	Comp. OFF
Between Micom(No. 19) and GND	DC 5V	DC 0V
Between IC01M(No. 10) and GND	DC 1V ↓	DC 12V

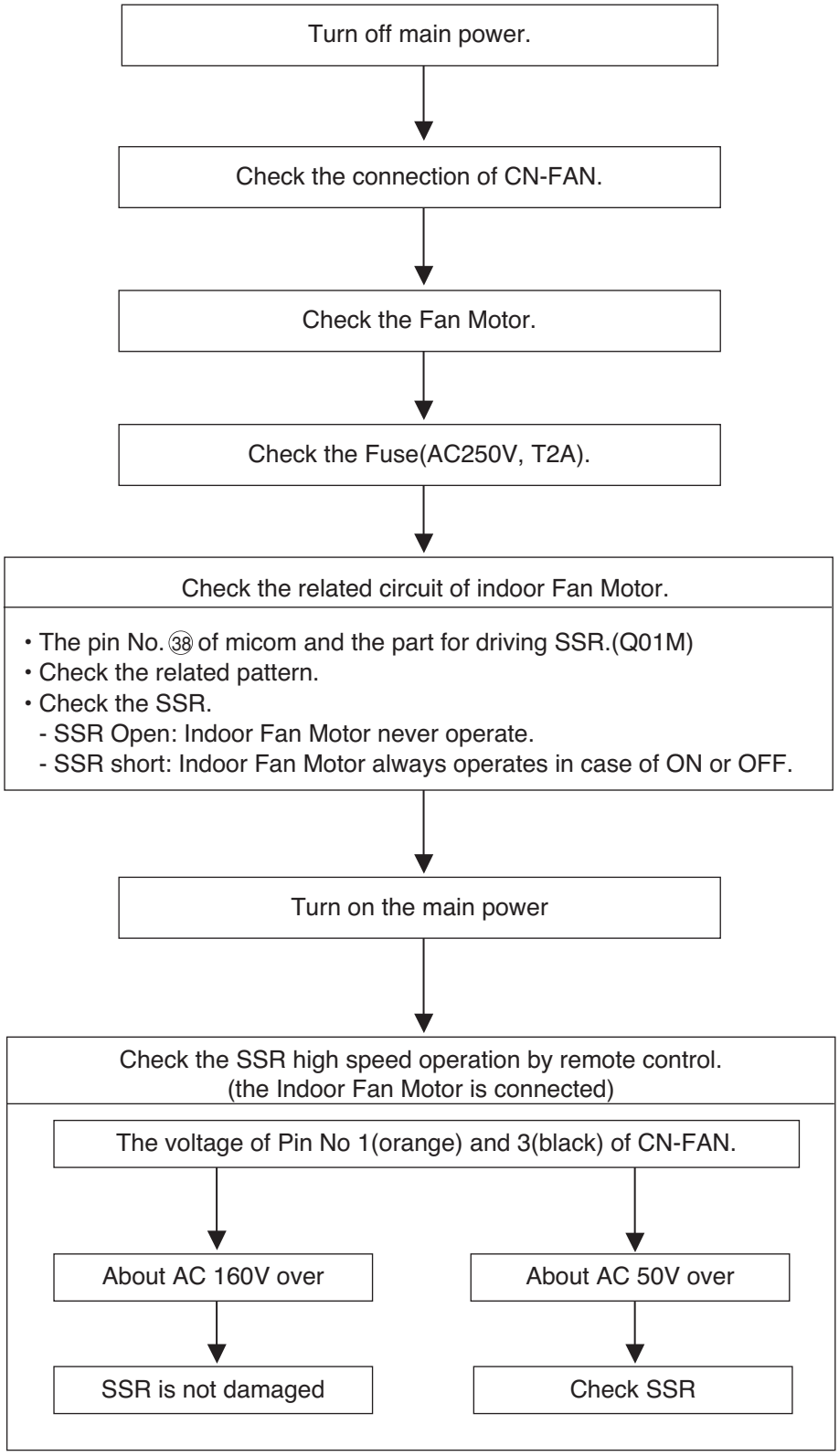
↓

Turn off main power.

↓

Check the electrical wiring diagram of Outdoor side.
Check the open or short of connecting wires between Indoor and Outdoor.

6.4 When indoor Fan does not operate.



6.5 When the louver does not operate.

- Confirm that the vertical louver is normally geared with the shaft of Stepping Motor.
- If the regular torque is detected when rotating the vertical louver with hands ⇒ Normal

↓

- Check the connecting condition of CN-U/D or CN0L/R Connector
- Check the soldering condition(on PCB) of CN-U/D or CN0L/R Connector

↓

Check the operating circuit of the vertical louver

- Confirm that there is DC +12V between pin ① of CN-U/D, CN0L/R and GND.
- Confirm that there is a soldering short at following terminals.
  - Between ①, ②, ③ and ④ of MICOM
  - Between ④, ⑤, ⑥ and ⑦ of IC01M
  - Between ⑰, ⑱, ⑲ and ⑳ of MICOM
  - Between ⑤, ⑥, ⑦ and ⑧ of IC01M

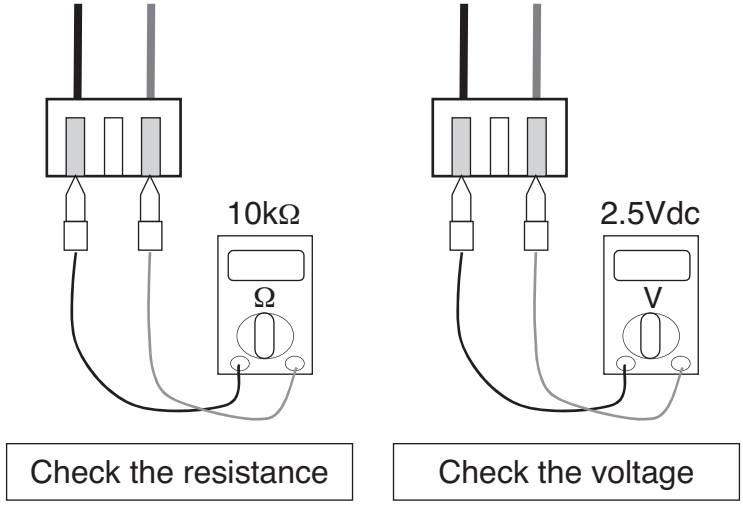
↓

If there are no problems after above checks.

- Confirm the assembly condition that are catching and interfering parts in the link of the vertical louver

6.6 Troubleshooting Indoor Error

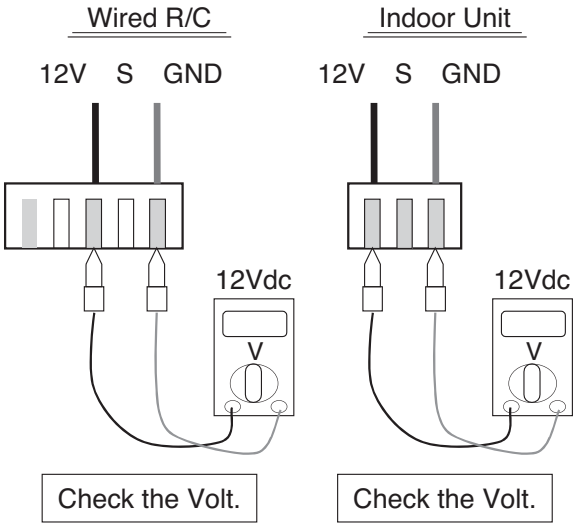
Display code	Title	Cause of error	Check point & Normal condition
01	Indoor air sensor	• Open / Short • Soldered poorly • Internal circuit error	Normal resistor : 10KΩ/ at 25°C (Unplugged) Normal voltage : DC 2.5V / at 25°C (plugged)
02	Indoor inlet pipe sensor	• Open / Short • Soldered poorly • Internal circuit error	Normal resistor : 5KΩ/ at 25°C (Unplugged) Normal voltage : DC 2.5V / at 25°C (plugged)
06	Indoor outlet pipe sensor	• Open / Short • Soldered poorly • Internal circuit error	Normal resistor : 5KΩ/ at 25°C (Unplugged) Normal voltage : DC 2.5V / at 25°C (plugged)

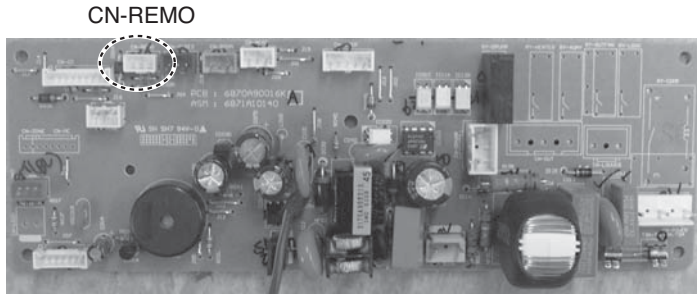


Check Point

1. Unplug the sensor on Indoor unit PCB.
2. Estimate the resistance of each sensor.
3. If the resistance of the sensor is 10KΩ/ 5KΩ at 25°C, then sensor is normal.
4. If the resistance of the sensor is 0 KΩ or ∞, then sensor is abnormal. → Change the sensor.
5. Plug the sensor on Indoor unit PCB and Power ON.
6. Estimate the voltage of each sensor.
7. If the voltage of the sensor is 2.5Vdc at 25°C, then sensor is normal.
8. If the resistance of the sensor is 0 or 5Vdc, then sensor is abnormal. → Repair or Change the PCB.

Display code	Title	Cause of error	Check point & Normal condition
03	Communication Wired R/C	• Open / Short • Wrong connection	• Connection of wire • Main PCB Volt. DC12V • Noise interference

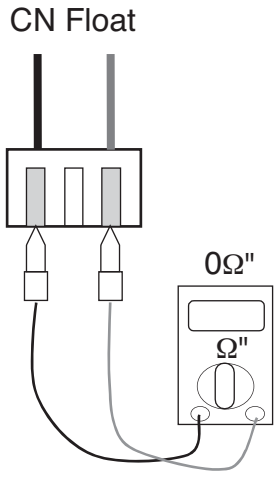




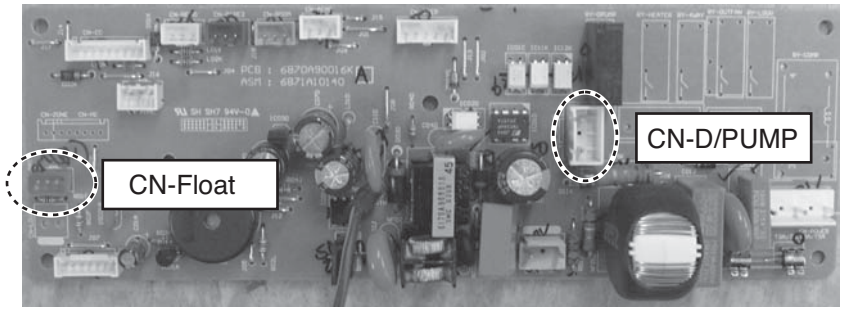
Check Point

1. Check the wire connection. (Open / Short) → Repair the connection
2. Check the soldering state of connector. (Soldered poorly) → Repair or Change the PCB.
3. Check the volt. Of main PCB power source. (DC 12V) → Repair or Change the main PCB.
4. Check the installation of wired remote controller. (Noise interference) → Adjust the state of installation

Display code	Title	Cause of error	Check point & Normal condition
04	Drain pump / Float switch	• Float switch Open. (Normal : short)	• The connection of wire(Drain pump/ Float switch) • Drain pump power input. (230V) • Drain tube installation. • Indoor unit installation. (Inclination)



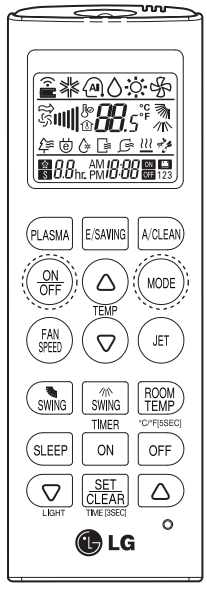
Check the resistance



Check Point

1. Check the wire connection. (Open, Soldered poorly) → Repair the connection or change the PCB.
2. Check the resistance of float switch (Abnormal : Open, Normal : short) → Check the float switch.
3. Check the level of water
4. Check the volt. Of Drain pump power supply. (AC 230V) → Repair or Change the main PCB.

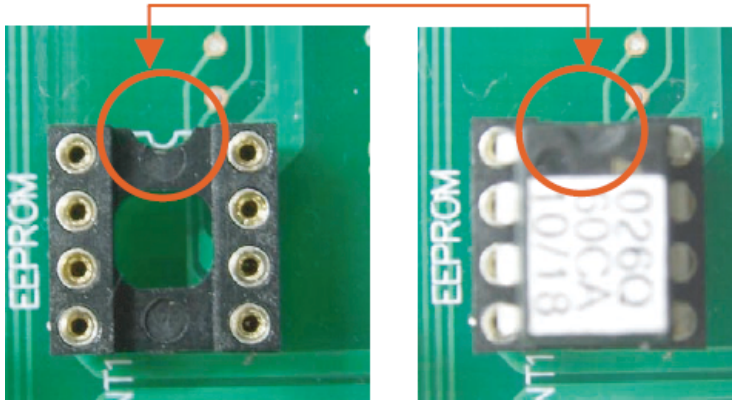
Display code	Title	Cause of error	Check point & Normal condition
07	Different Operation Mode	• One of Indoor Unit operate cooling Another Unit operate heating	• At the same time, this model cannot use cool and heating mode



Check Point

1. Check another indoor model operation mode
2. Operating the same mode with the first operated indoor unit
3. Clearing the "CH07"
   Press the on/off button or mode change button and matching the indoor unit mode same as the first operated indoor unit

Display code	Title	Cause of error	Check point & Normal condition
09	Indoor EEPROM Check Sum Error	• Check sum error	1. Check the poor soldering 2. Check the insertion condition of the EEPROM 3. Check the PCB Connection

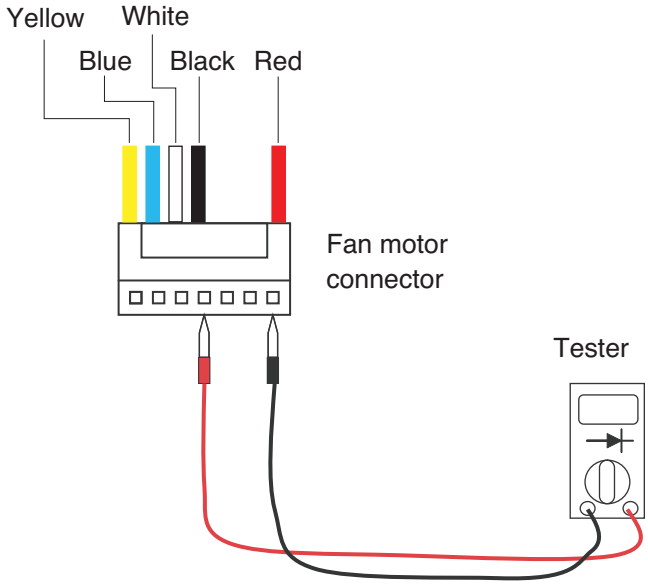


<EEPROM Direction Check Point>

Check Point

1. Check the EEPROM Direction
2. If the EEPROM value & the Program value are not matched, the Code is Displayed
3. After Checking the connection and Insertion, replace the PCB or Option PCB

Display code	Title	Cause of error	Check point & Normal condition
10	Indoor BLDC Fan Motor Lock	The Fan is not operated properly	Check the Indoor fan locking



Check Point

Check the PCB during the Power on

1. Check the Voltage Red line to Black line
   → The Voltage is about [input voltage x 1.414]
   → if the Voltage does not come with the above Voltage,
   → Check the power input
   → Replace the PCB & Motor
2. Check the Voltage Black line to White
   → the Voltage is DC 15V
   → Check the Power input
   → Replace the motor

Check the Motor

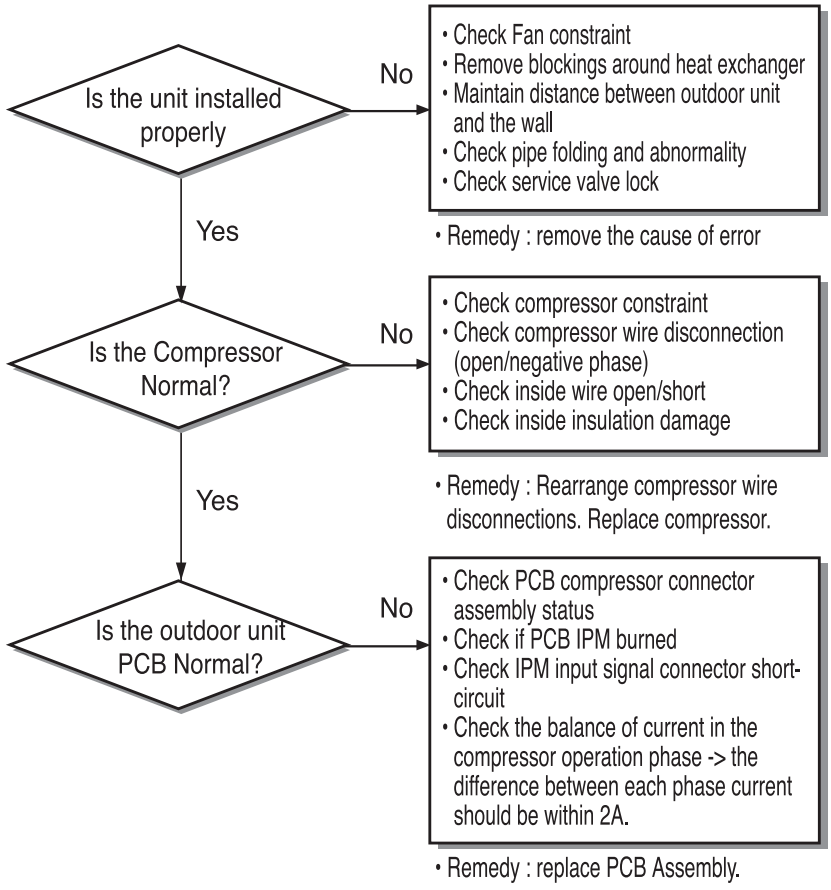
1. Check the shaft
   → if the shaft is not turn smoothly, the Motor Power IC is defected
   → replace the motor
2. Check the motor resistance(if the shaft is turn smoothly, check the resistance)
   → Check Red line to Black line, Blue line to Black line
   → The resistance should infinite
   → replace the motor

6.7 Troubleshooting Outdoor Error

▶ **14/16/18/21k**

Display code	Title	Cause of error	Check point & Normal condition
21	High current into the compressor	• Compressor blocked • Disconnection/shortcircuit inside compressor • Over load operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB	• Check compressor constraint • Check compressor wire open/short • Check compressor insulation damage • Check outdoor fan constraint / screened / flow structure • Check if IPM burned

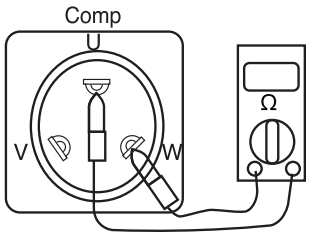
warning Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



• **Check for short-circuit of PCB IPM Input Signal Connector.**

1. Set as the multi-tester resistance measurement mode.
2. Check the short-circuit between the input signal pins at the IPM(SPM3) lower parts in Power-off state.

• Verifying compressor burn



1. Remove the connectors to the PCB.
2. Measure the resistance between the lines of each terminal of the compressor. (Refer to Table 1)
3. Measure the resistance between each terminal and the chassis(pipe) of the compressor. (Refer to Table 2)
4. If the measurements are distinctively different from Table 1 and 2, the compressor is decided to be burned.

Table 1

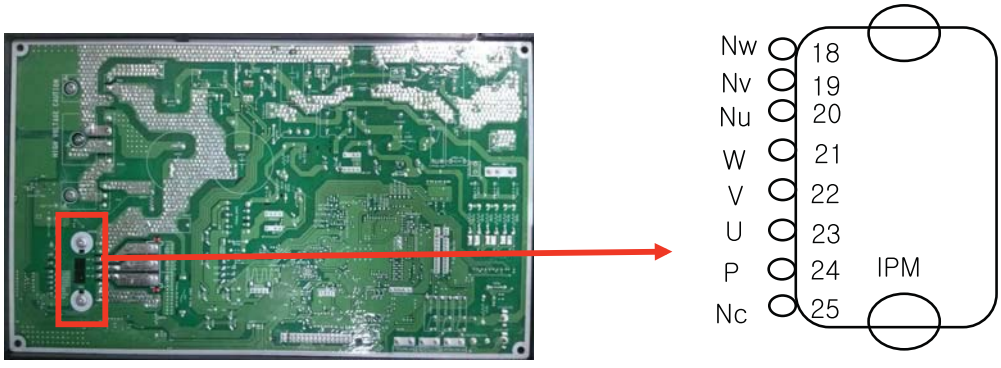
Model	Winding Resistance(Ω at 75°C)	
	Terminal	Inverter Comp.
14k/16k/ 18k/21k	U-V	1.620±7%
	V-W	1.620±7%
	W-U	1.620±7%

Table 1

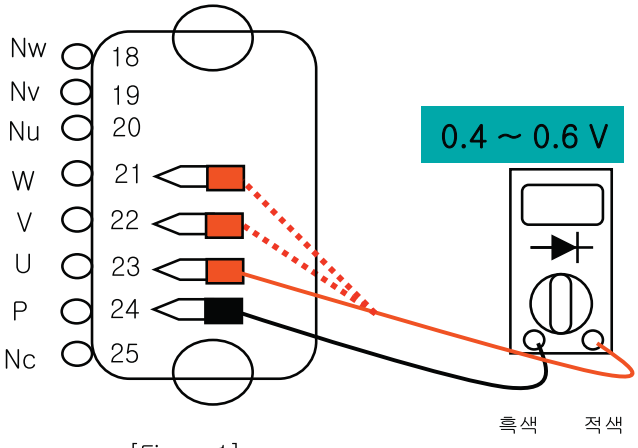
Resistance of terminal insulations)	
U - chassis	1MΩ ↑
V - chassis	1MΩ ↑
W - chassis	1MΩ ↑

• Verifying IPM burn

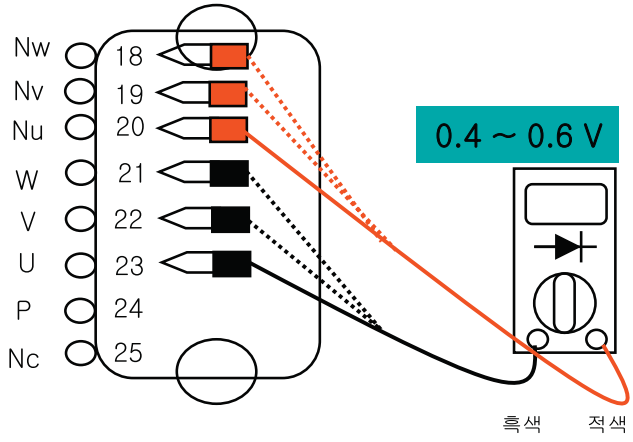
1. Remove the connectors to the PCB.
2. Set Multi-tester as Diode voltage measurement mode.
3. Measure voltages of P~U / P~V / P~W as shown in figure 1 below.
4. Measure voltages of U~Nu / V~Nu / W~Nu as shown in figure 2 below.
5. If the measurements are distinctively different as in the figures, the IPM is decided to be burned.



[IPM Position & Pin number]



[Figure 1]

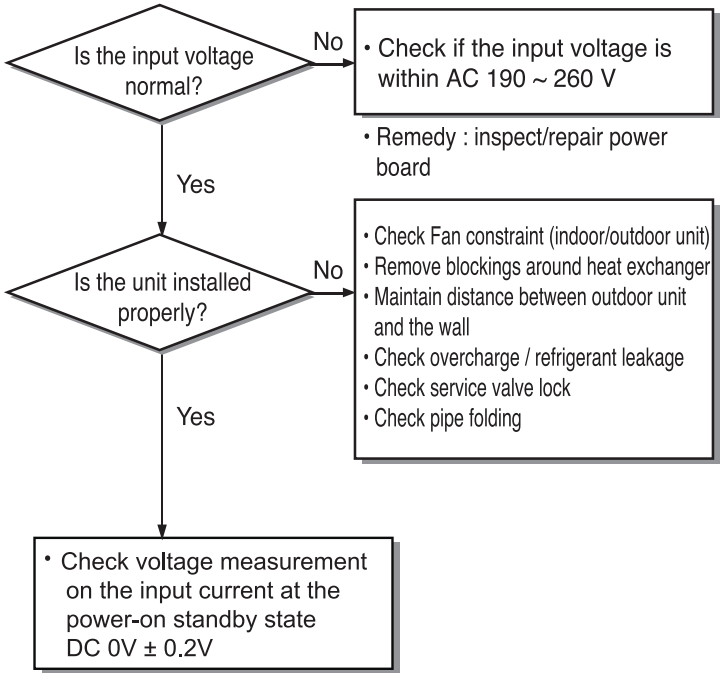


[Figure 2]

Display code	Title	Cause of error	Check point & Normal condition
22	AC Input current is higher than the limit.	• Input voltage error(low voltage) • Over load operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB	• Check input voltage • Check outdoor fan canstraint / screened / flow structure • Check PCB current sensor parts

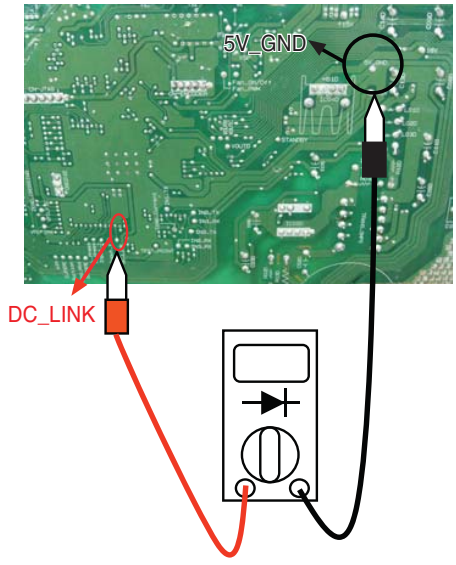
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



• Inspecting PCB input current sensing circuit

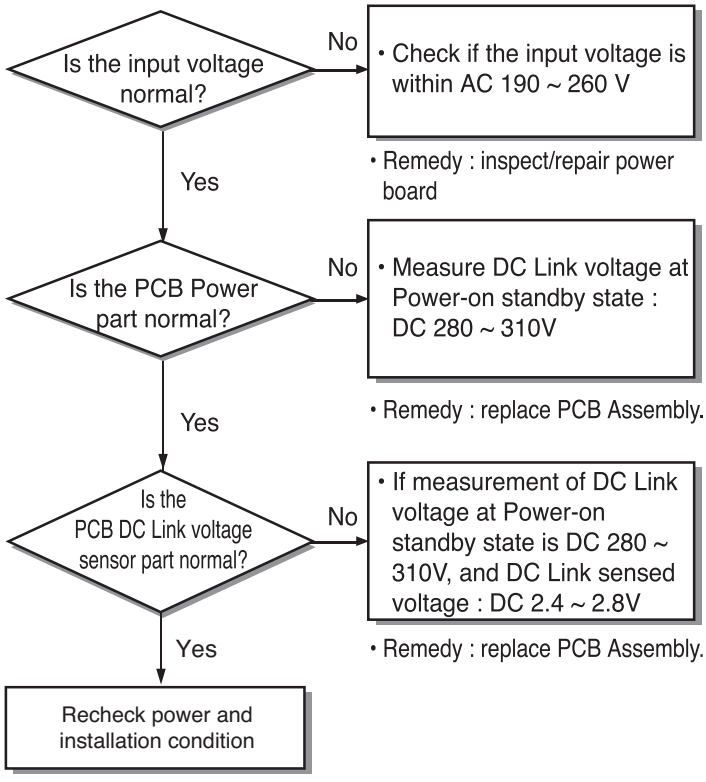
1. Set Multi-tester as DC voltage measurement mode.
2. Measure the measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.



Display code	Title	Cause of error	Check point & Normal condition
23	DC Link High / Low Volt	• DC Link Voltage is above 420Vdc • DC Link Voltage is below 140Vdc	• Check Input Voltage • Check PCB DC Link voltage sensor parts

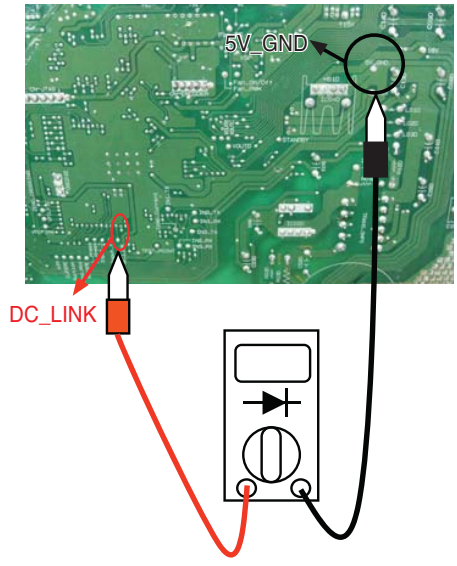
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



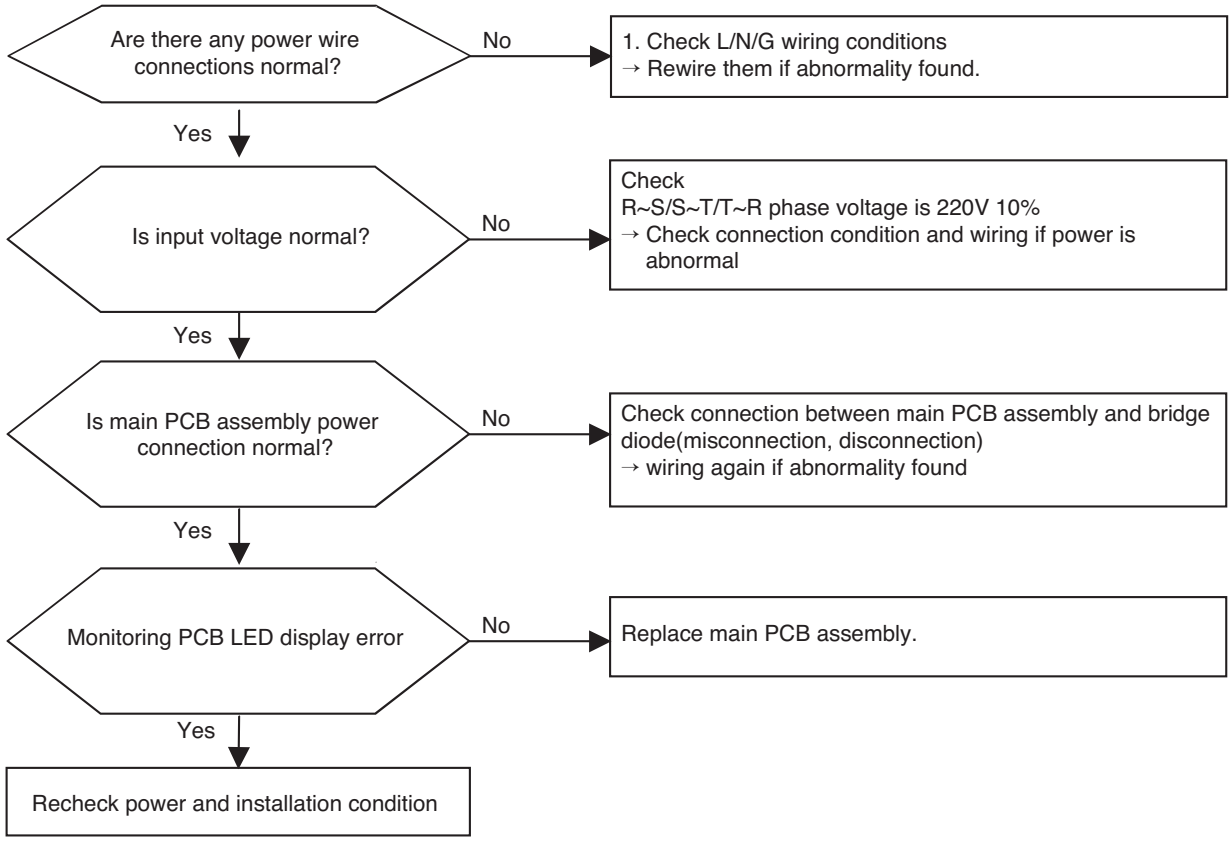
• Inspecting PCB DC Link voltage sensing circuit

1. Set Multi-tester as DC voltage measurement mode.
2. Measure the measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.4 ~ 2.8V, the parts are decided as burned.



Display code	Title	Cause of error	Check point & Normal condition
25	Input Voltage high/low	Input voltage is over limited value of the product (140V or less, 300V or more)	1. Input voltage abnormal (R-S-T) 2. Outdoor unit main PCB assembly damage (input voltage sensing part)

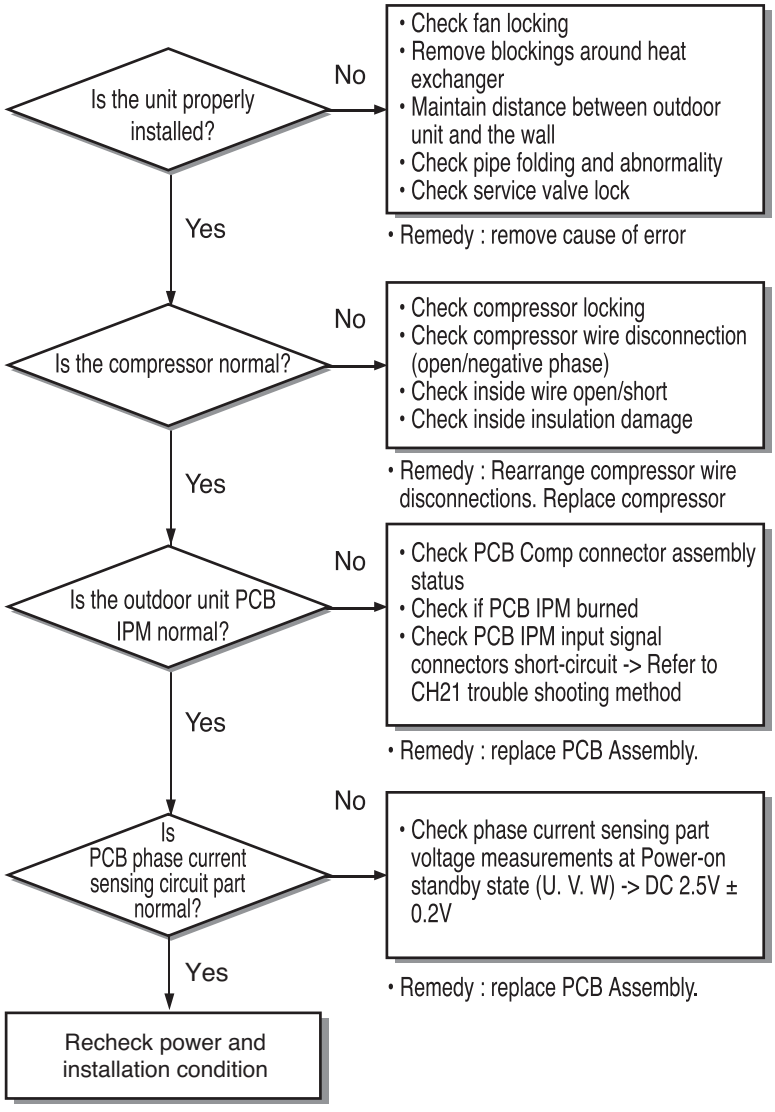
■ Error Diagnosis and Countermeasure Flow Chart



Display code	Title	Cause of error	Check point & Normal condition
26	Over-current at the initial operation of the compressor / location sensing signal for compressor operation is not input	• Compressor Locking • Overload operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB(IPM) • Burned PCB phase current sensing circuit parts	• Check compressor locking • Compressor wire open/short • Check compressor insulation damage • Check outdoor fan constraint / screened / flow structure • Check if IMP burned (refer to CH21) • Check on-PCB current sensing circuit parts

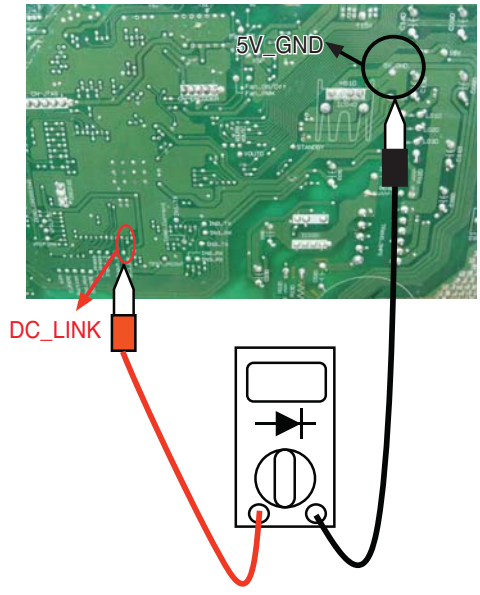
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



• Inspecting PCB phase current sensing circuit

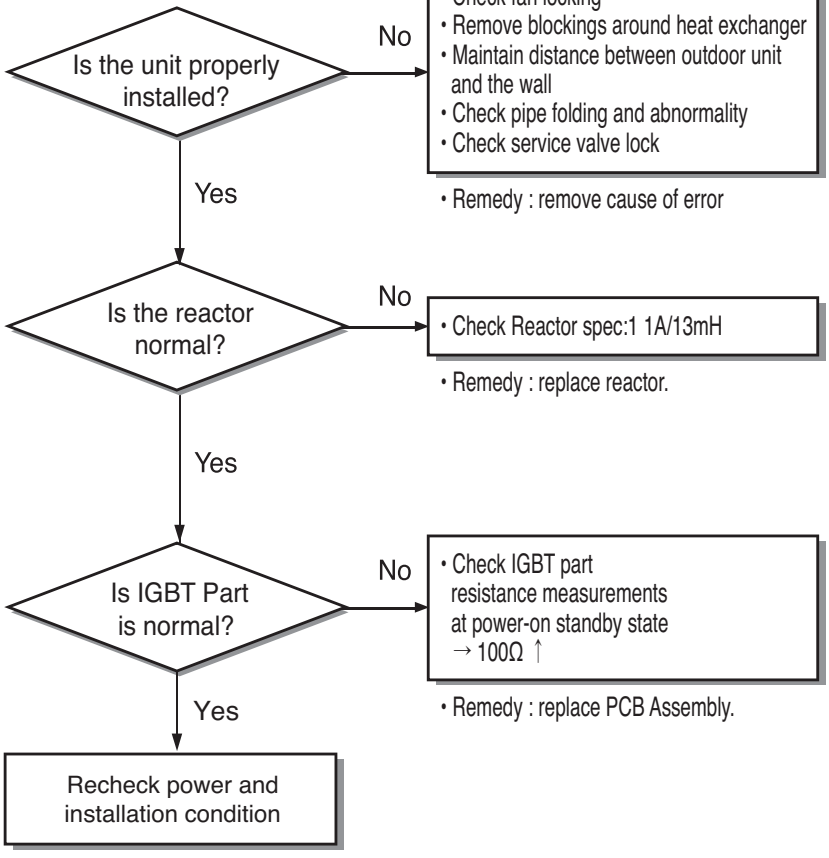
1. Set Multi-tester as DC voltage measurement mode.
2. Measure the below measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.



Display code	Title	Cause of error	Check point & Normal condition
27	Over-current on AC → DC converter circuit	• Overload operation (Outdoor fan constraint, screened, blocked) • Wrong application of Reactor Spec. • Burned PCB internal parts (PSC Module)	• Check outdoor fan constraint/ screened/ flow structure • Check Reactor Spec: 11A/ 13mH • Check for PCB internal part burn

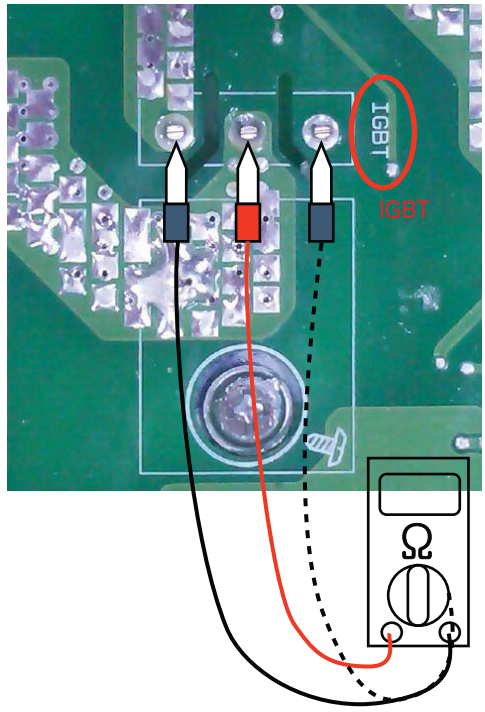
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



• Inspecting PCB IGBT part

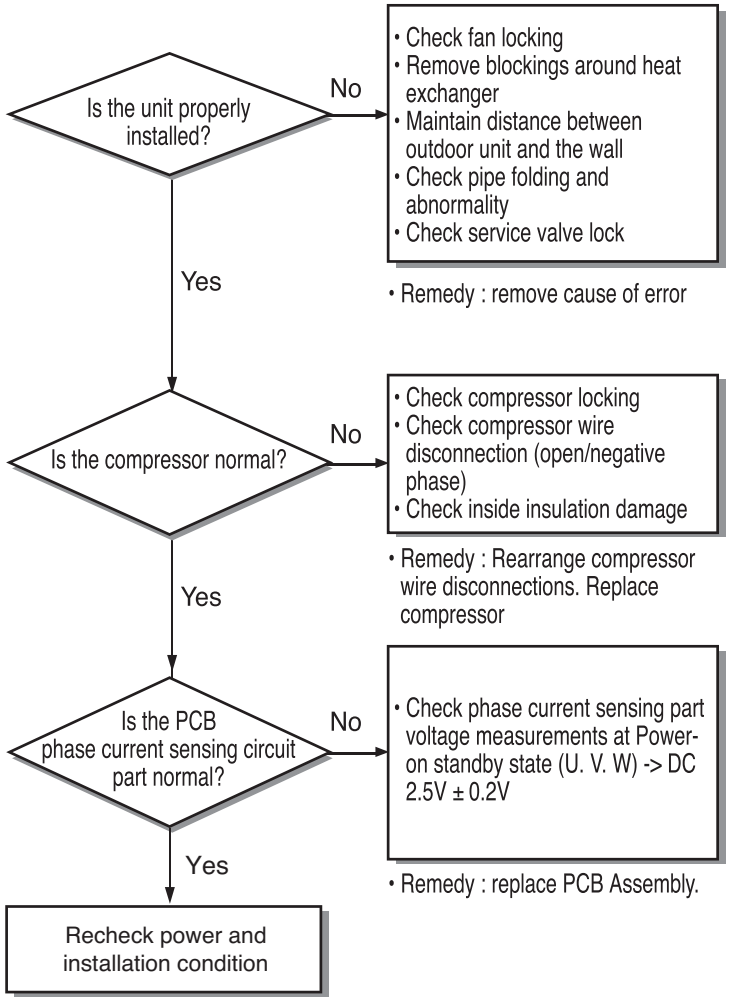
1. Remove the connectors to the PCB.
2. Set Multi-tester as Resistance measurement mode
3. Measure Resistance of Gate-collector, Emitter-collector.
4. If the measurements are 1MΩ ↓, the parts are decided as burned.



Display code	Title	Cause of error	Check point & Normal condition
29	Over-current at the initial operation of the compressor / location sensing signal for compressor operation is not input	• Compressor Locking • Overload operation (Outdoor fan constraint, screened, blocked) • Burned parts inside PCB(IPM) • Burned PCB phase current sensing circuit parts	• Check compressor locking • Compressor wire open/short • Check compressor insulation damage • Check outdoor fan constraint / screened / flow structure • Check if IMP burned (refer to CH21) • Check on-PCB current sensing circuit parts

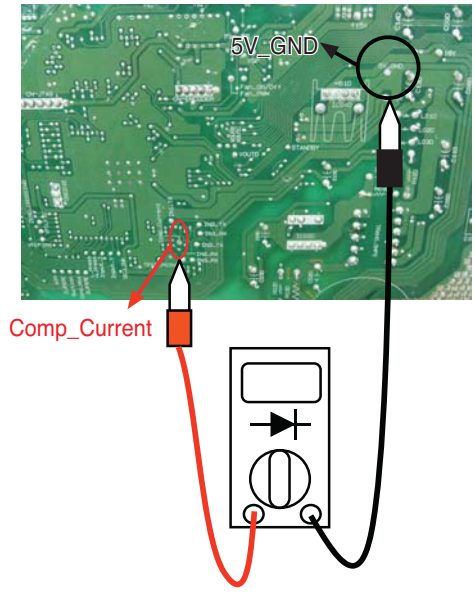
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



• Inspecting PCB phase current sensing circuit

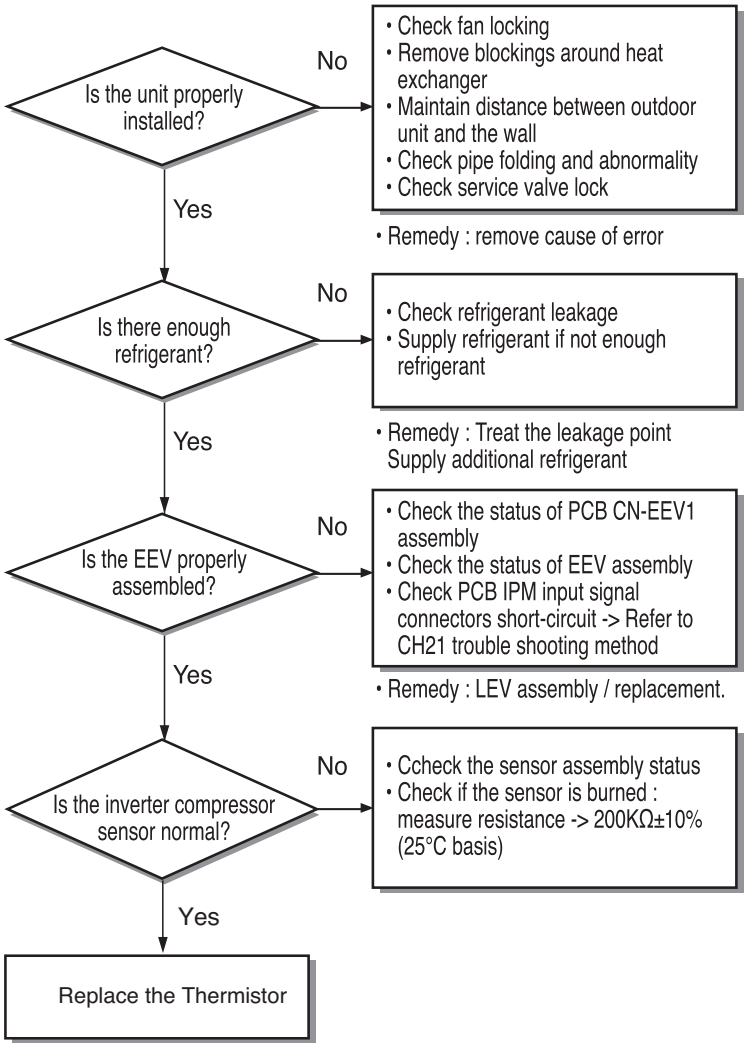
1. Set Multi-tester as DC voltage measurement mode.
2. Measure at the below measuring point DC voltages at Power-on standby state.
3. If the measurements are outside DC 2.5V ± 0.2V, the parts are decided as burned.



Display code	Title	Cause of error	Check point & Normal condition
32	High temperature in Discharge pipe of the inverter compressor	• Overload operation (Outdoor fan constraint, screened, blocked) • Refrigerant leakage (insufficient) • Poor INV Comp Discharge sensor • LEV connector displaced / poor LEV assembly	• Check outdoor fan constraint/ screened/ flow structure • Check refrigerant leakage • Check if the sensor is normal • Check the status of EEV assembly

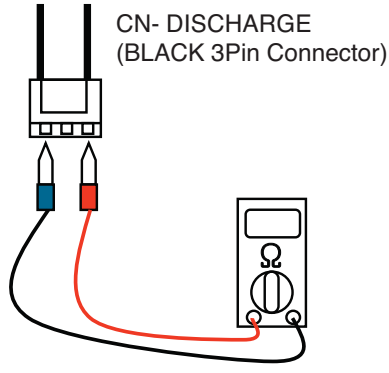
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



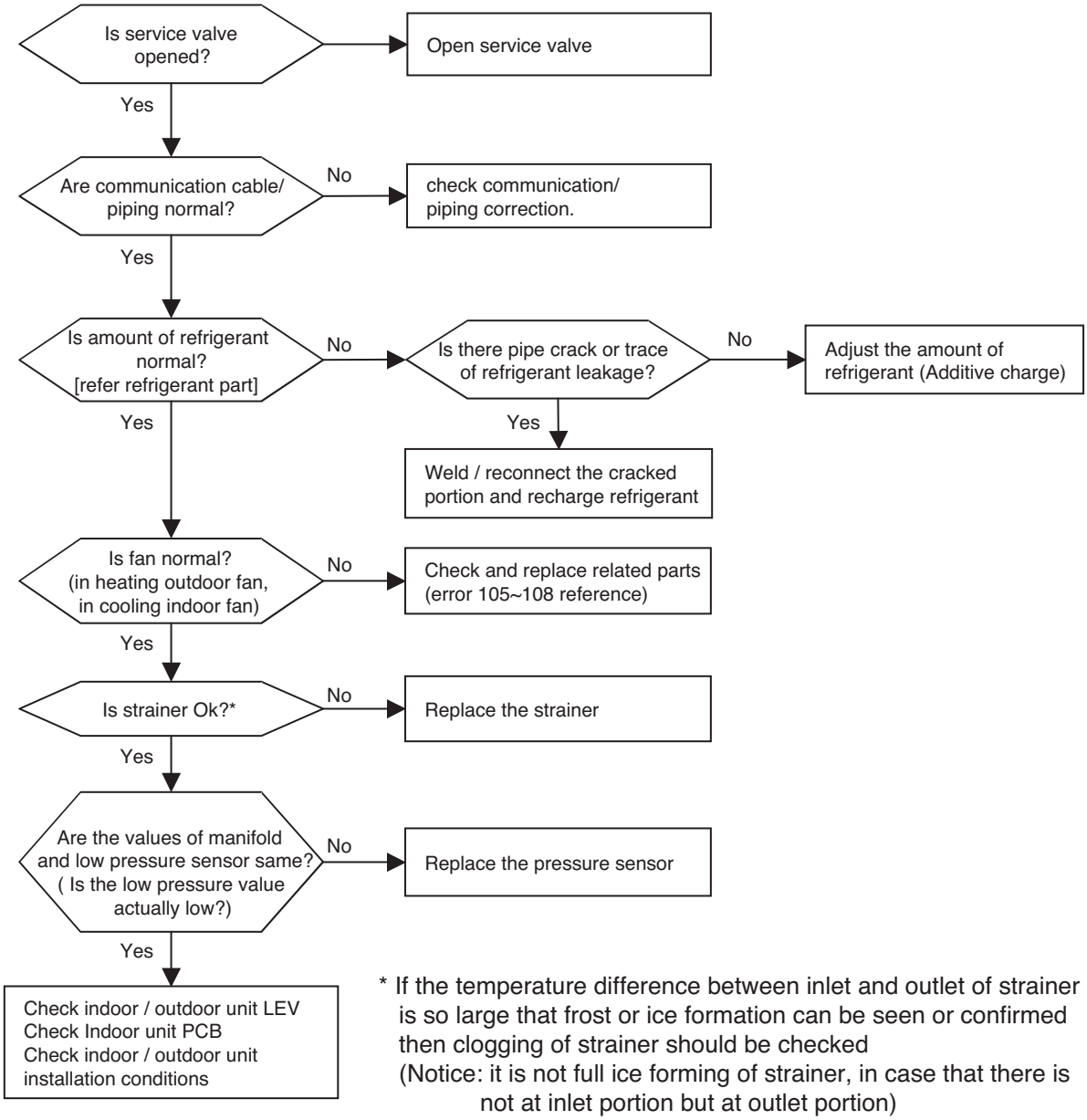
- **Inspecting Inverter Compressor Discharge Sensor**

1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between inverter discharge sensor connector pins.
3. Measure resistance value of 200KΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)



Display code	Title	Cause of error	Check point & Normal condition
35	Low Presser Error	Excessive decrease of low pressure	• Defective low pressure sensor • Defective outdoor/indoor unit fan • Refrigerant shortage/leakage • Deformation because of damage of refrigerant pipe • Defective indoor / outdoor unit EEV • Covering / clogging (outdoor unit covering during the cooling mode / indoor unit filter clogging during heating mode) • SVC valve clogging • Defective outdoor unit PCB • Defective indoor unit pipe sensor

■ Error diagnosis and countermeasure flow chart

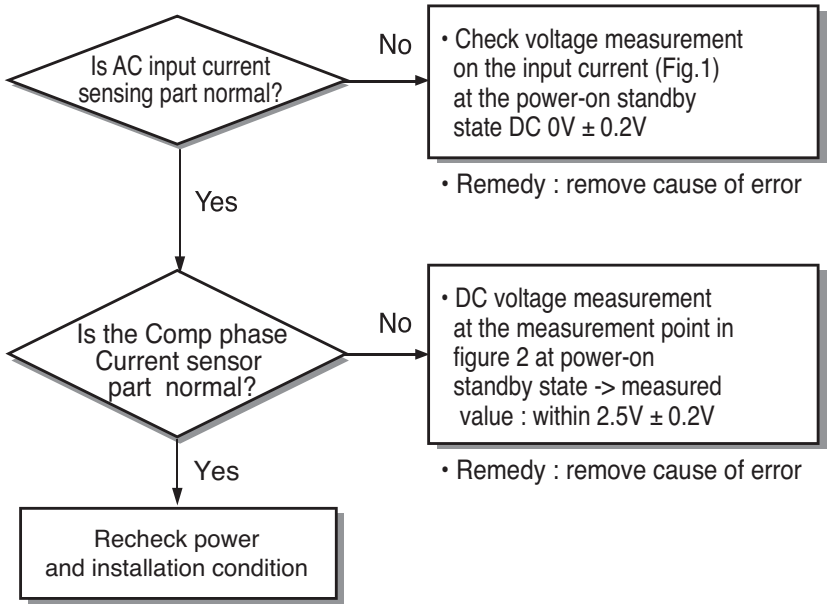


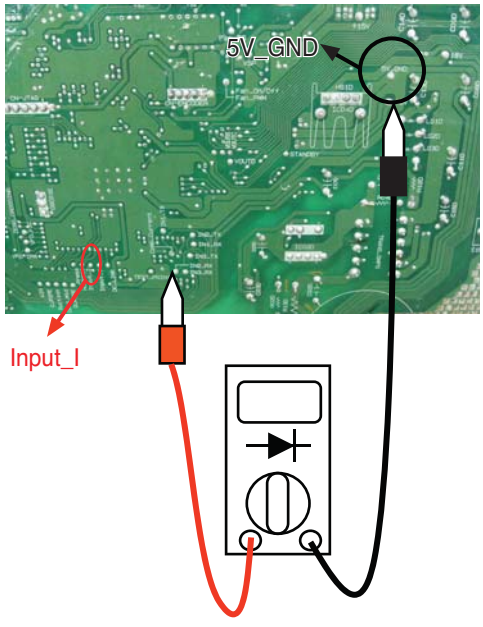
* If the temperature difference between inlet and outlet of strainer is so large that frost or ice formation can be seen or confirmed then clogging of strainer should be checked
(Notice: it is not full ice forming of strainer, in case that there is not at inlet portion but at outlet portion)

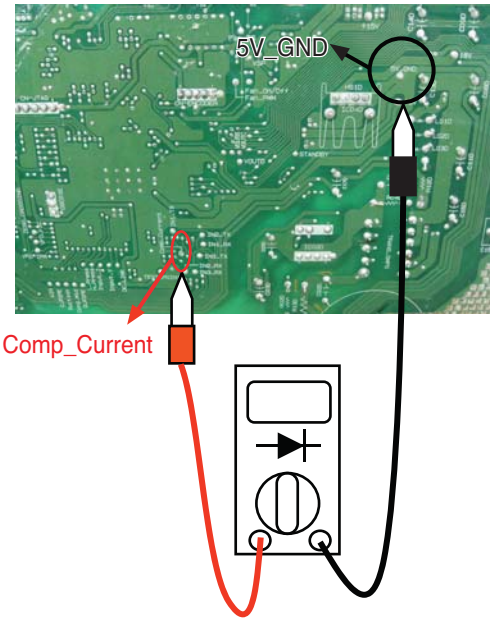
Display code	Title	Cause of error	Check point & Normal condition
40	AC Input current / Comp phase current sensing circuit - basic vlotage sensing error	• PCB sensing circuit part burned	• Check power input connector, Comp output current sensing circuit

WARNING

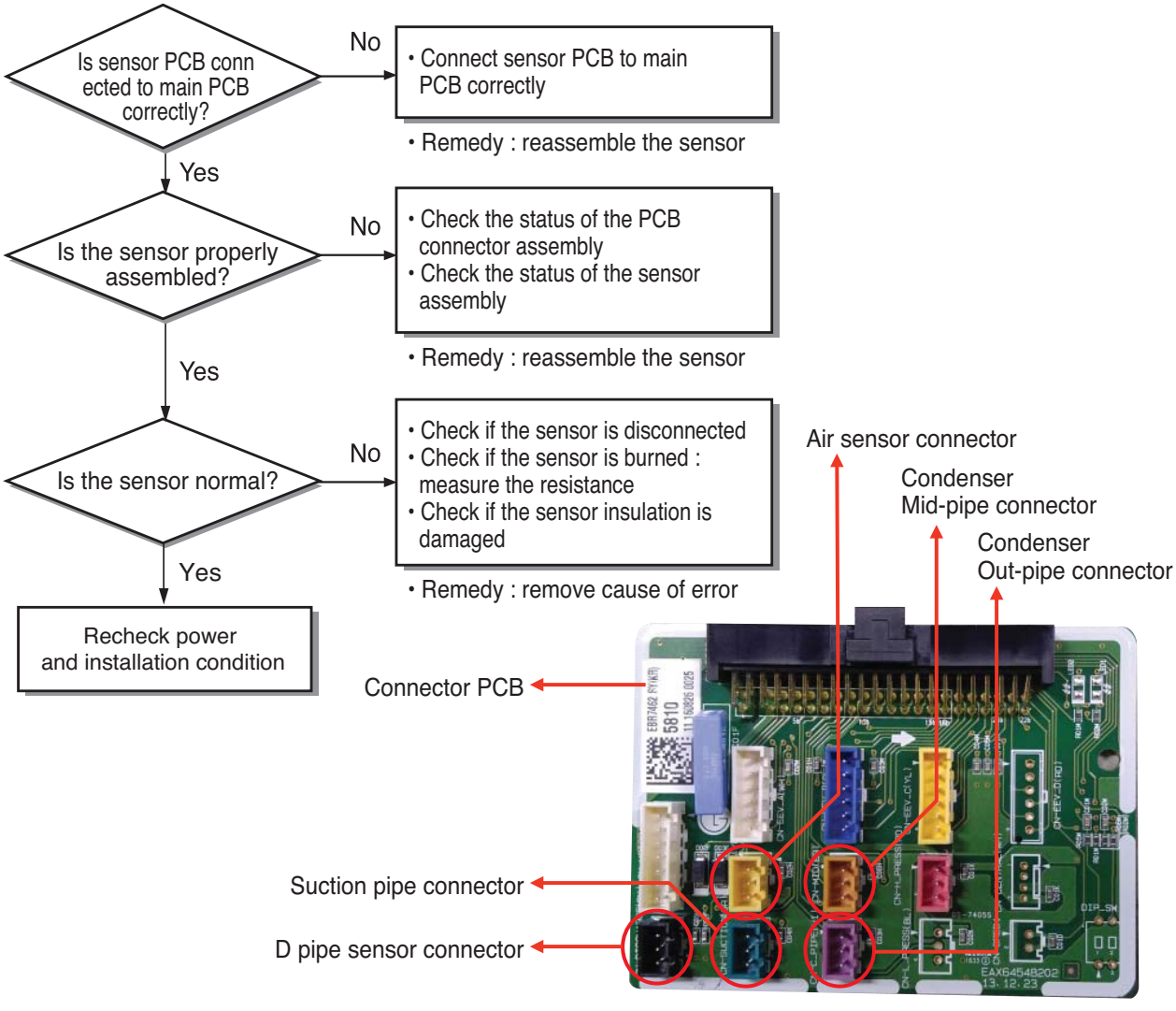
Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



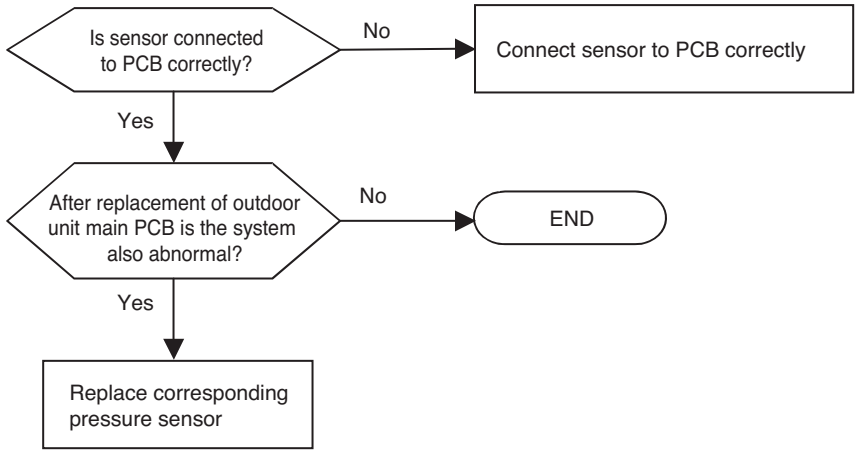




Display code	Title	Cause of error	Check point & Normal condition
41	D-pipe sensor (Inverter)	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 200KΩ / at 25°C (Unplugged)
44	Air sensor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 10KΩ / at 25°C (Unplugged)
45	Condenser Mid-pipesensor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 5KΩ / at 25°C (Unplugged)
46	Suction Pipe sensor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 5KΩ / at 25°C (Unplugged)
48	Condenser Out-pipe sensor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 5KΩ / at 25°C (Unplugged)



Display code	Title	Cause of error	Check point & Normal condition
43	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	• Bad connection of connector PCB • Bad connection high pressure connector • Defect of high pressure connector (Open/Short) • Defect of connector PCB (Open/Short) • Defect of outdoor main PCB.



Display code	Title	Cause of error	Check point & Normal condition
51	Over capacity	• Over capacity Combination	• Check the indoor unit capacity. • Check the combination table.

Model	Gross max.capacity	Max.single indoor unit capacity
16k	21k	12k
16k	24k	15k
18k	30k	18k
21k	33k	

Check Point

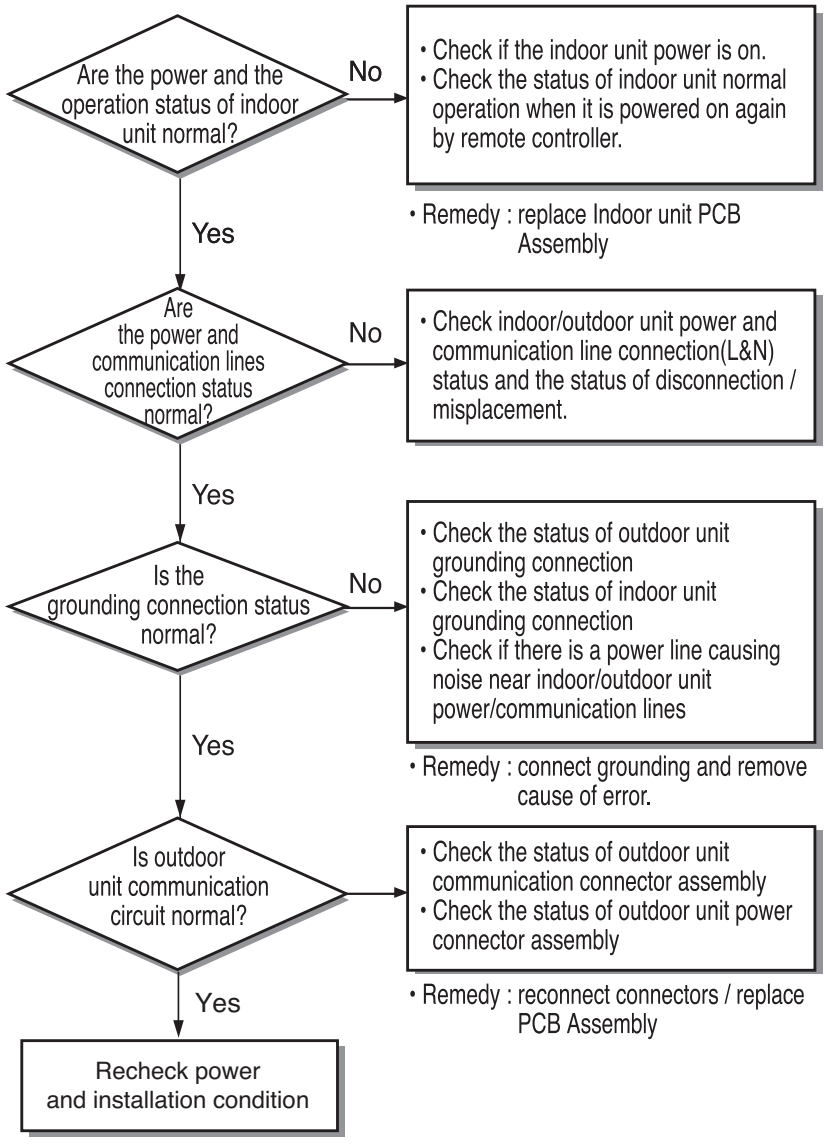
• CH 51

1. Check the indoor unit capacity.
2. Check the combination table.

Display code	Title	Cause of error	Check point & Normal condition
53	If the data transmitted by the indoor unit is not received for 3 minutes continuously.	• No power on indoor unit • Indoor/outdoor unit Power connection error/communication error caused by external noise • Indoor/outdoor unit communication circuit parts burned	• Check indoor unit power status • Check indoor/outdoor unit power/communication line disconnection • Check the status of indoor/outdoor unit ground connections • Check if outdoor unit communication parts are burned

WARNING

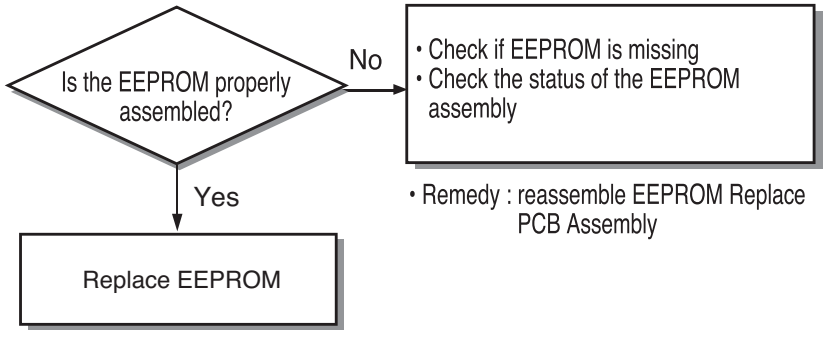
Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



Display code	Title	Cause of error	Check point & Normal condition
60	Incorrect checksum of outdoor unit PCB EEPROM	• Outdoor unit PCB EEPROM misapplied • Outdoor unit PCB EEPROM poor assmbly	EEPROM assembly

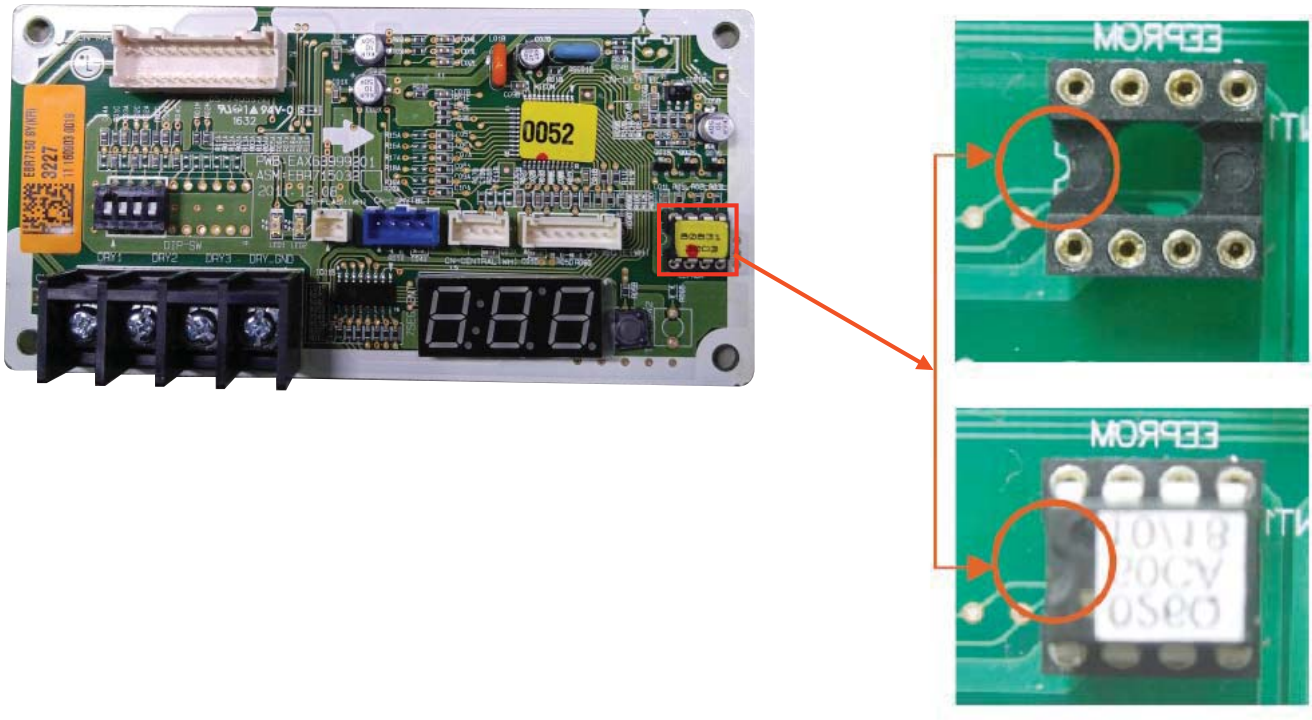
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



• Inspecting Outdoor EEPROM Assembly Status

1. Check the consistency of the EEPROM's direction inserted in the PCB and the EEPROM marking.

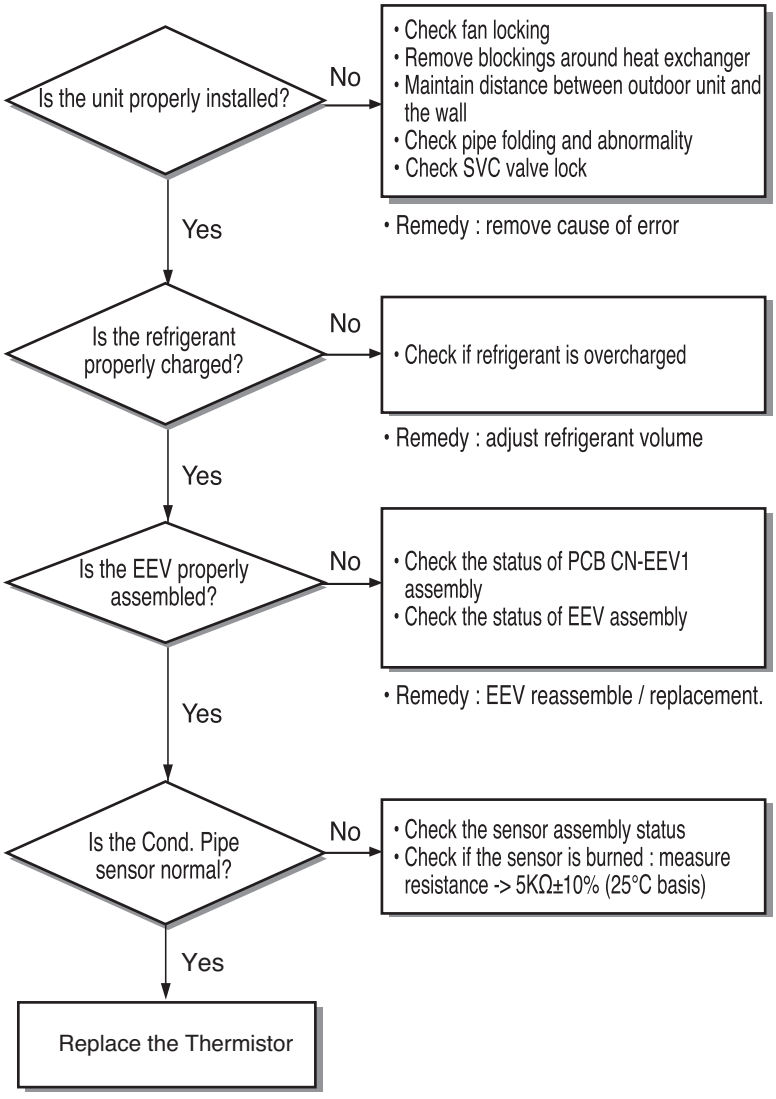


<EEPROM Direction Check Point>

Display code	Title	Cause of error	Check point & Normal condition
61	High temperature in outdoor Cond. Pipe	• Overload operation (Outdoor fan constraint, screened, blocked) • Outdoor unit heat exchanger contaminated • EEV connector displaced / poor EEV assembly • Poor Cond. Pipe sensor assembly / burned	• Check outdoor fan constraint / screened / flow structure • Check if refrigerant overcharged • Check the status of EEV assembly • Check the status of sensor assembly / burn

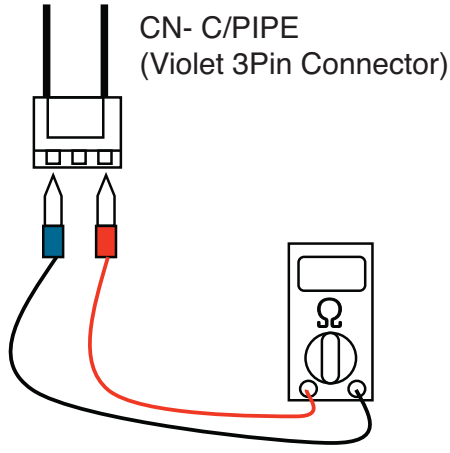
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



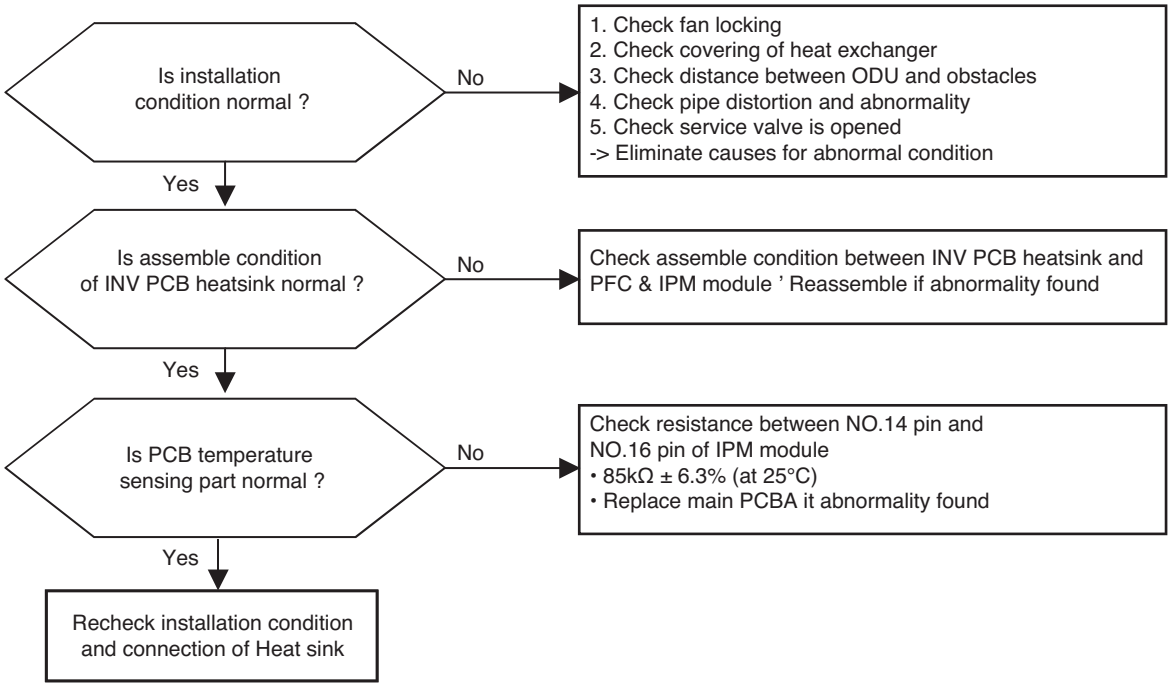
• Inspecting Cond. Pipe Sensor

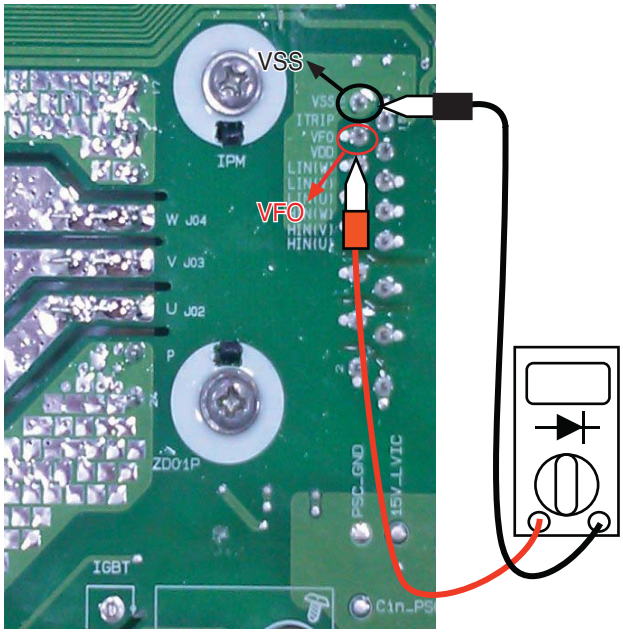
1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between rated speed Comp Discharge sensor connector pins.
3. Measure resistance value of 5kΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)



Display code	Title	Cause of error	Check point & Normal condition
62	Heat Sink High	Inverter PCB heatsink temperature is over 85°C	• ODU fan locking • Heatsink assembly of INV PCB assemble condition abnormal • Defect of temperature sensing circuit part defect of INV PCB

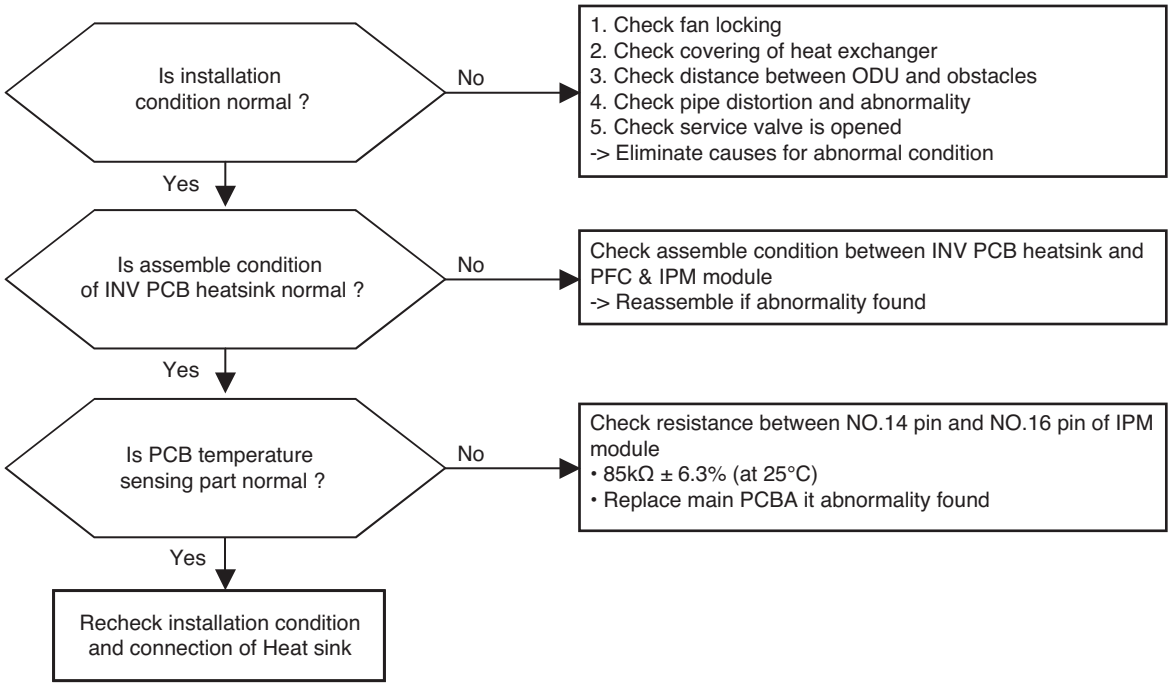
■ Error Diagnosis and Countermeasure Flow Chart

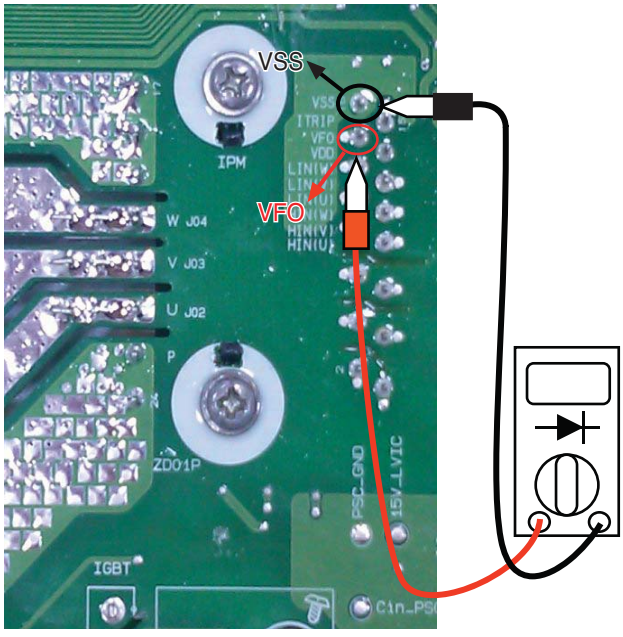




Display code	Title	Cause of error	Check point & Normal condition
65	Heatsink Sensor error	Inverter PCB heatsink sensor is open or short	• ODU fan locking • Heatsink assembly of INV PCB assemble condition abnormal • Defect of temperature sensing circuit part defect of INV PCB

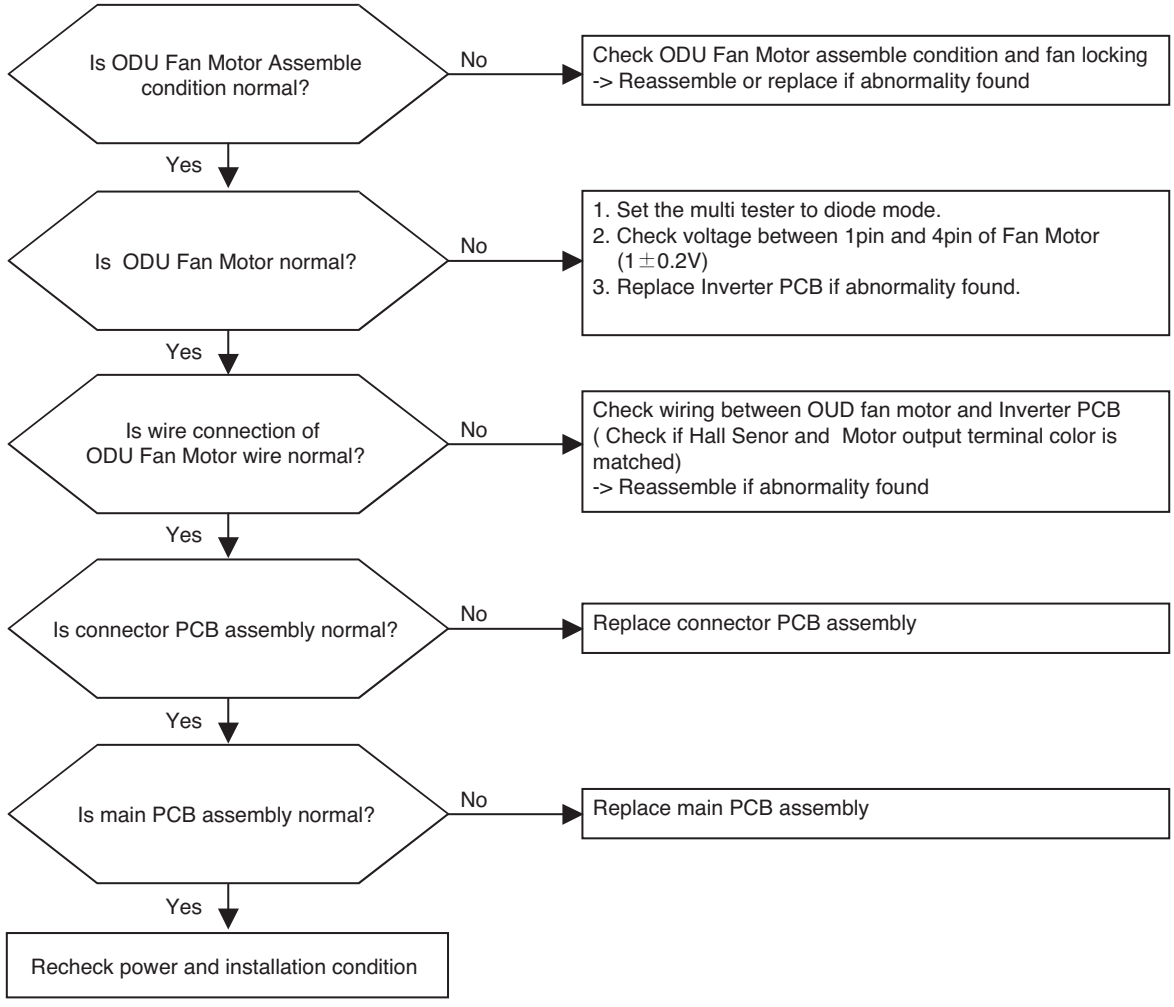
■ Error Diagnosis and Countermeasure Flow Chart





Display code	Title	Cause of error	Check point & Normal condition
67	Fan Lock Error	Fan RPM is 10RPM or less for 5 second when ODU fan starts or 40 RPM or less after fan starting.	• ODU fan locking • Heatsink assembly of INV PCB assemble condition abnormal • Defect of temperature sensing circuit part defect of INV PCB

■ Error Diagnosis and Countermeasure Flow Chart



Check Point

1. Check voltage between 1pin and 4pin of Fan Mortor connector (Tester diode mode)
2. Voltage value should be in 1V ±0.2V.

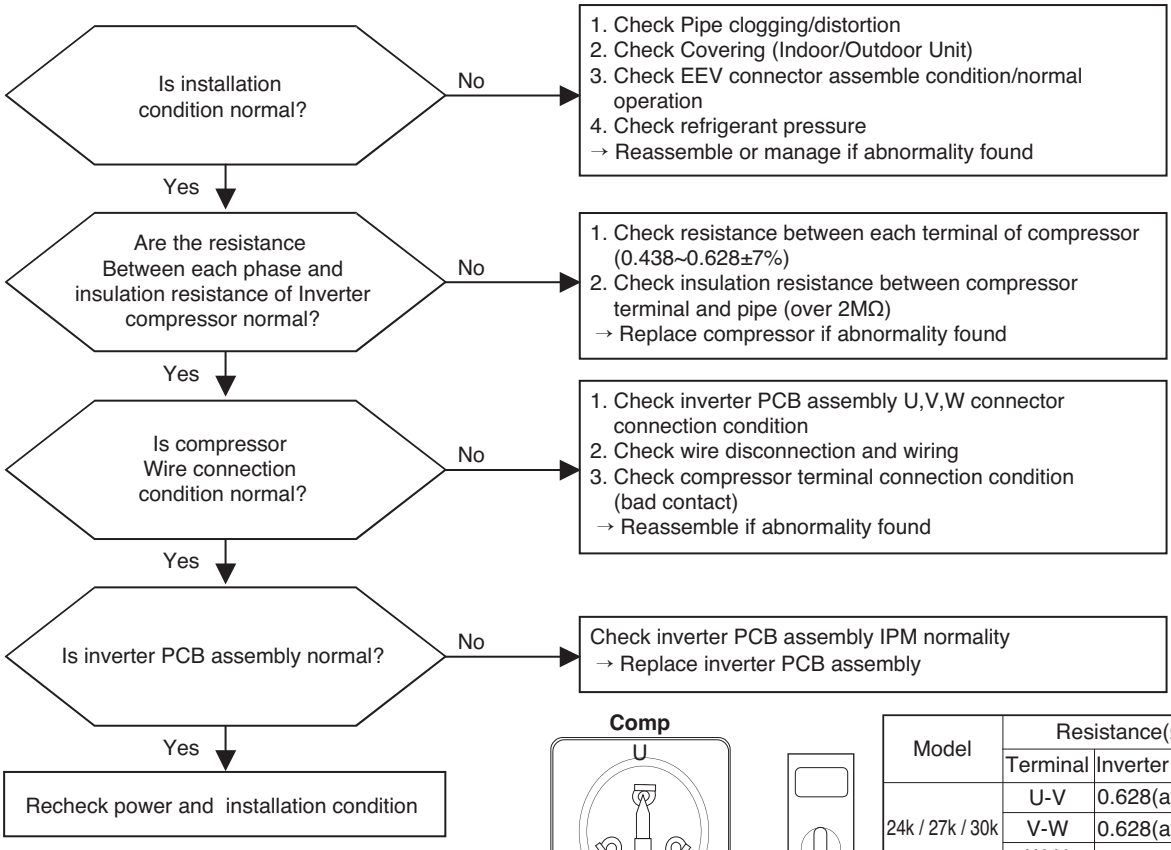
▶ **24/27/30/40/48/56k**

Display code	Title	Cause of error	Check point & Normal condition
21	DC PEAK (IPM Fault)	• Instant over current • Over Rated current • Poor insulation of IPM	• An instant over current in the U,V,W phase - Comp lock - The abnormal connection of U,V,W • Over load condition - Overcharging of refrigerant Pipe length. Outdoor Fan is stop • Poor insulation of compressor

WARNING

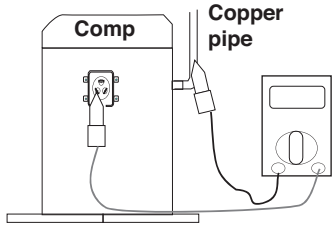
Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

■ Error Diagnosis and Countermeasure Flow Chart



■ Comp checking method

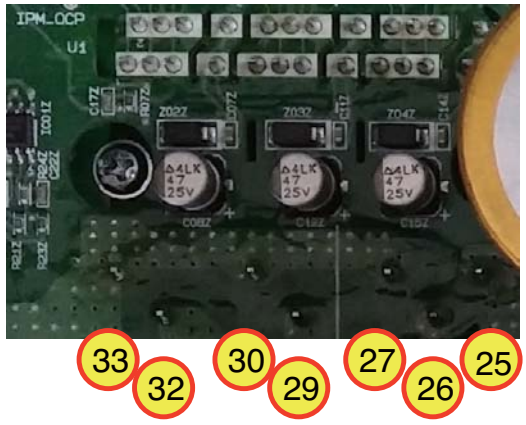
Model	Resistance(Ω)	
	Terminal	Inverter Comp.
24k / 27k / 30k	U-V	0.628(at 25˚C)
	V-W	0.628(at 25˚C)
	W-U	0.628(at 25˚C)
36k/40k 48k/56k	U-V	0.438(at 25˚C)
	V-W	0.438(at 25˚C)
	W-U	0.438(at 25˚C)

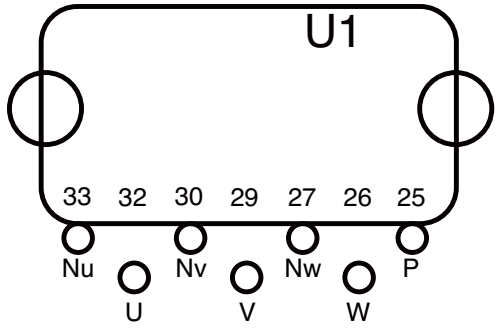


Resistance(Ω) at 20°C		
Terminal	Inverter comp.	Constant comp.
U-GND	2MΩ	2MΩ
V-GND	2MΩ	2MΩ
W-GND	2MΩ	2MΩ

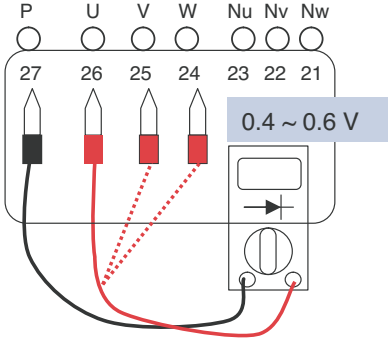
■ 24/27/30k

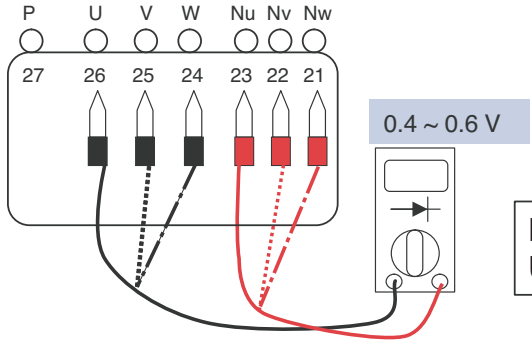
IPM Check Point





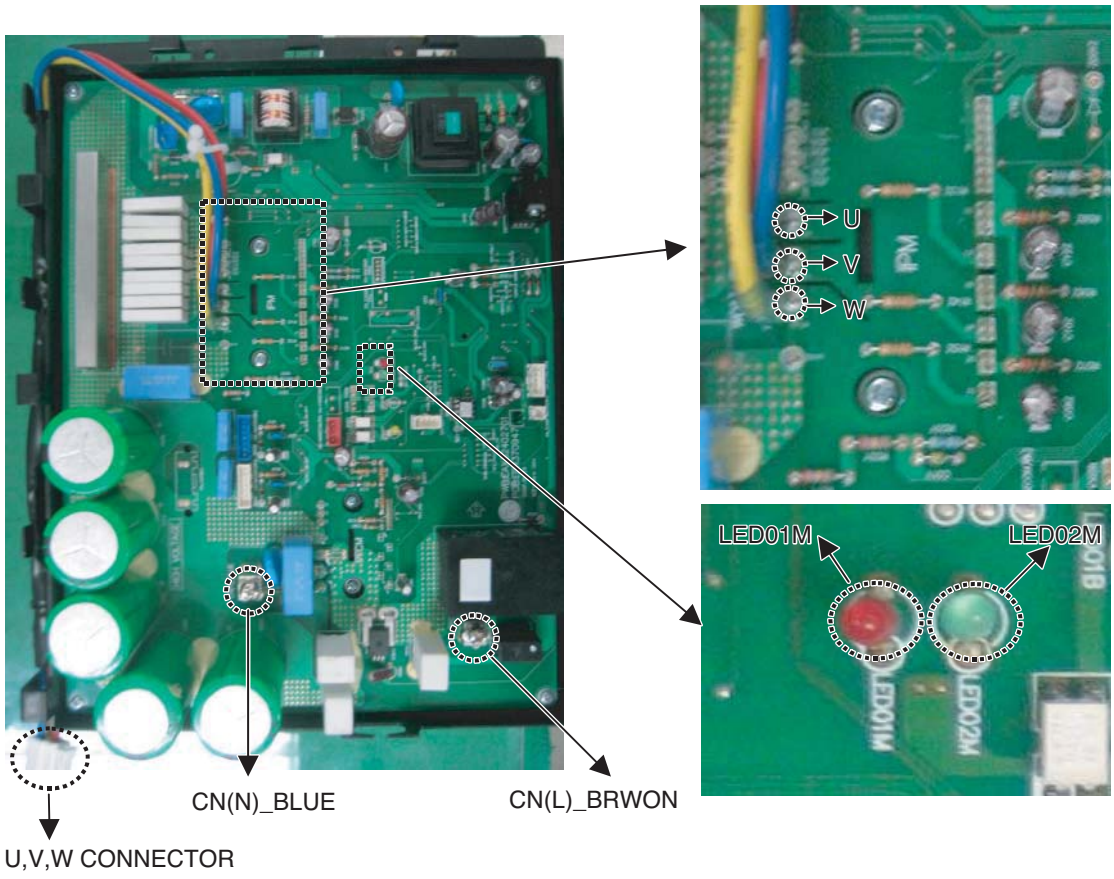
1. Wait until inverter PCB DC voltage is discharged after main power off.
2. Pull out V, V, W COMP connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short(0Ω) or open(hundreds MΩ), PCB needs to be replaced.(IPM damaged)
5. Set the multi tester to diode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



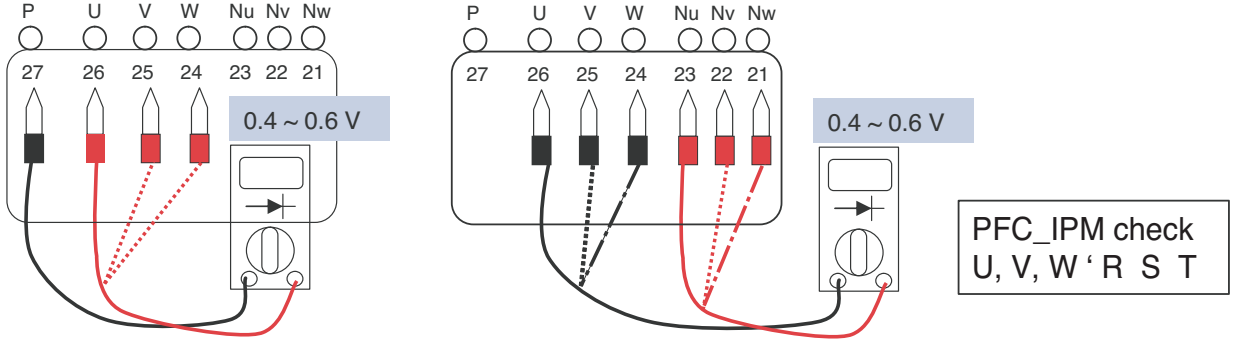


PFC_IPM check
U, V, W ‘ R S T

■ 40/48/56k



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

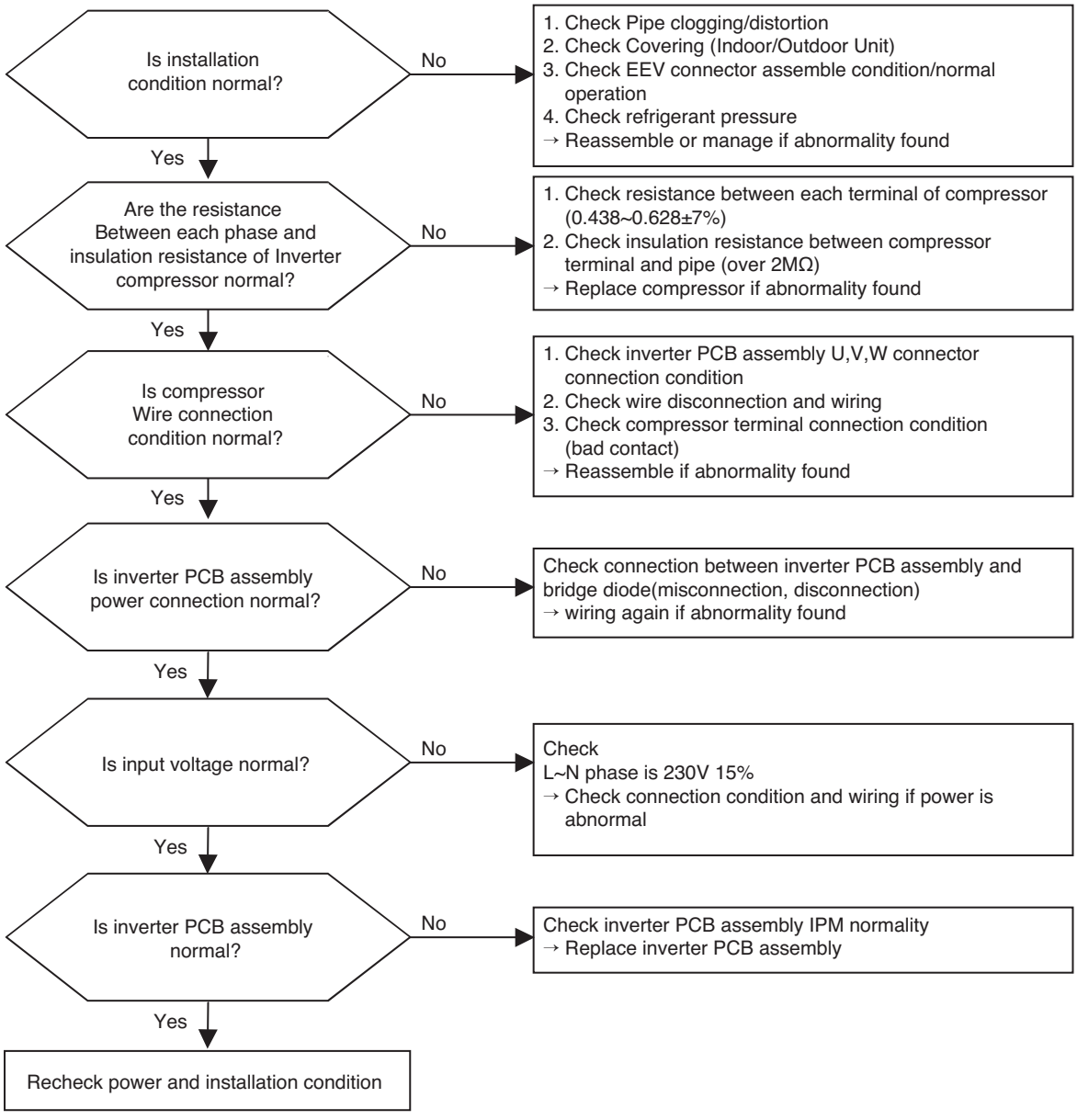


Display code	Title	Cause of error	Check point & Normal condition
22	Max. C/T	Input Over Current(27/30/40k-17A ↑ 36/48/56k-29A ↑)	1. Malfunction of Compressor 2. Blocking of Pipe 3. Low Voltage Input 4. Refrigerant, Pipe length, Blocked...

WARNING

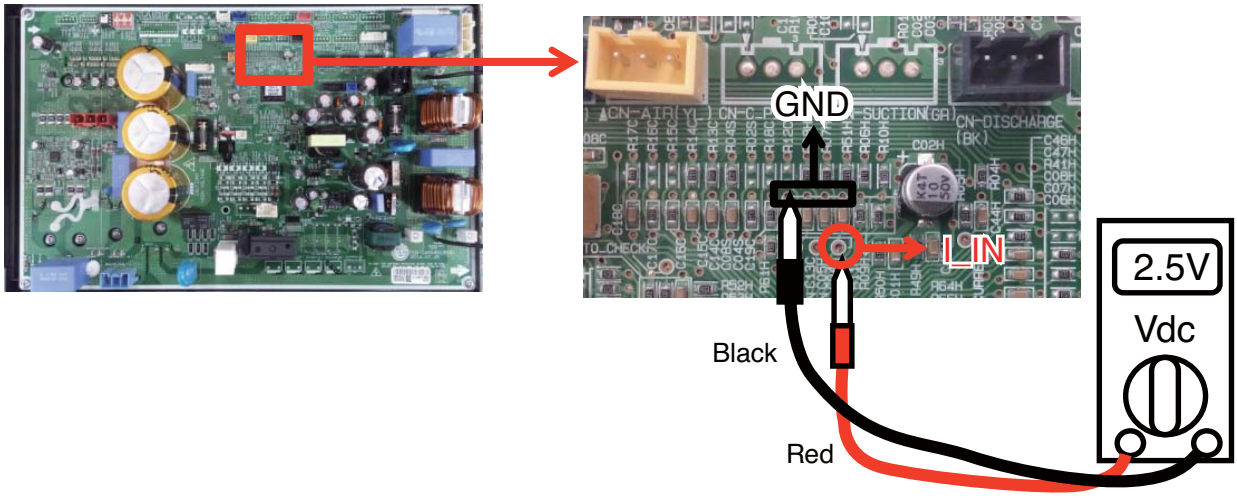
Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

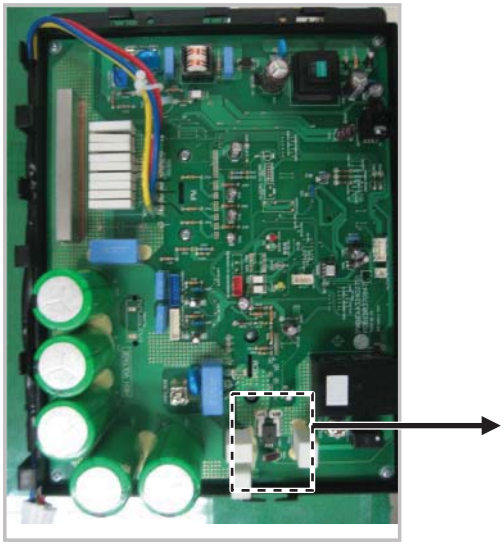
■ Error Diagnosis and Countermeasure Flow Chart



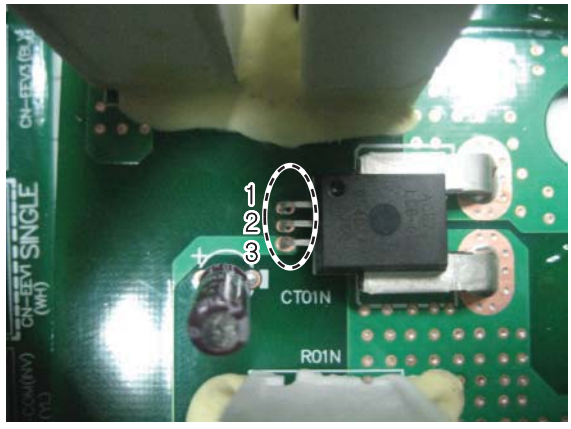
Check Point

1. Check the power source.(230V ±15%)
2. Check the fan operation is right.
3. Check the current.
4. Check the install condition.
5. Check the CT Sensor Output signal
   (24/27/30k - Check output the CT Sensor : DC 2.5±0.2V)
   (36/40/48/56k - Check output pin 1.2 of the CT Sensor : 5V)





< Inverter PCB>



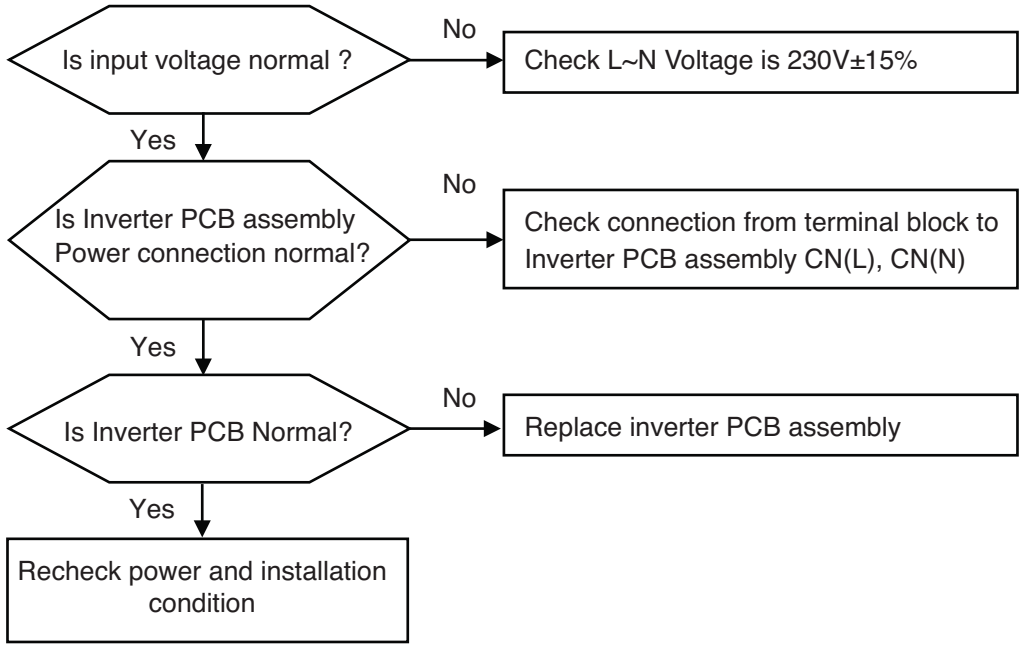
<CT Sensing Check Point>

Display code	Title	Cause of error	Check point & Normal condition
23	DC Link High / Low Volt	• DC Link Voltage is above 420Vdc • DC Link Voltage is below 140Vdc	• Check CN_(L), CN_(N) Connection • Check Input Voltage • Check PCB DC Link voltage sensor parts

WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

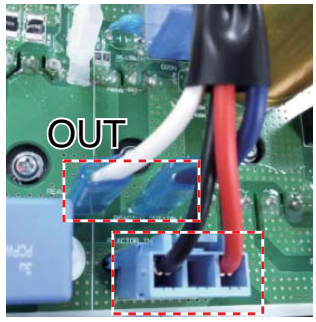
■ Error Diagnosis and Countermeasure Flow Chart



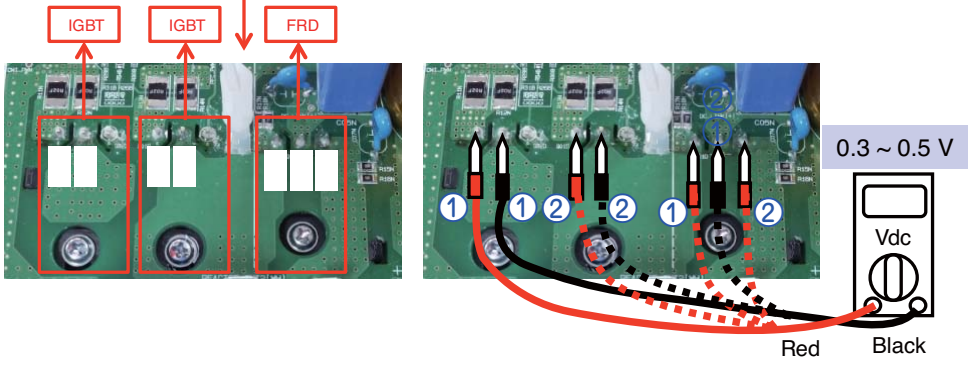
Check Point

1. Check the REACTOR_IN and REACTOR_OUT1,2 Connection condition at the Main PCB.(Refer to outdoor wiring diagram)
2. Measure the voltage as shown in figures.
3. If the measurements are significantly different from the levels shown in the figures, the PFCM is deemed to be damaged.

■ 24/27/30k



IN



< IGBT >

Sequence of Measurement	Measurement	Normal Standards
1	C – E	0.3V~0.5V
2	C – E	0.3V~0.5V

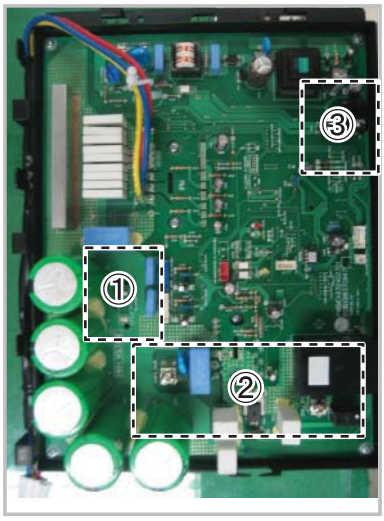
※ C : Collector / E : Emitter

< FRD >

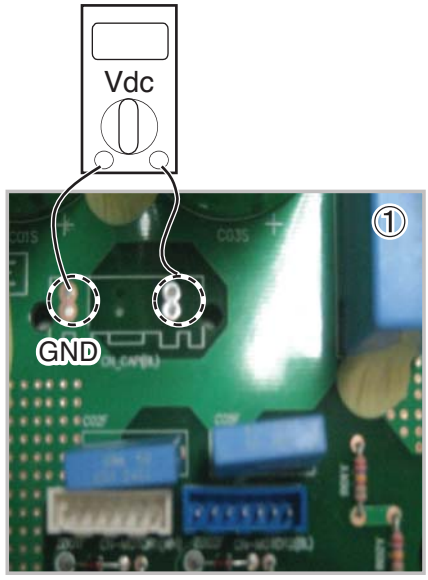
Sequence of Measurement	Measurement	Normal Standards
1	A – C	0.3V~0.5V
2	A – C	0.3V~0.5V

※ A : Anode / C : Cathode

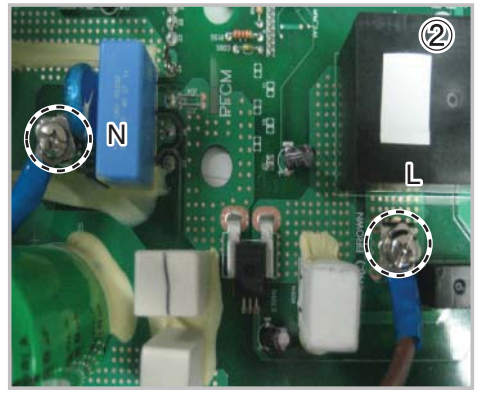
▸ 40/48/56k



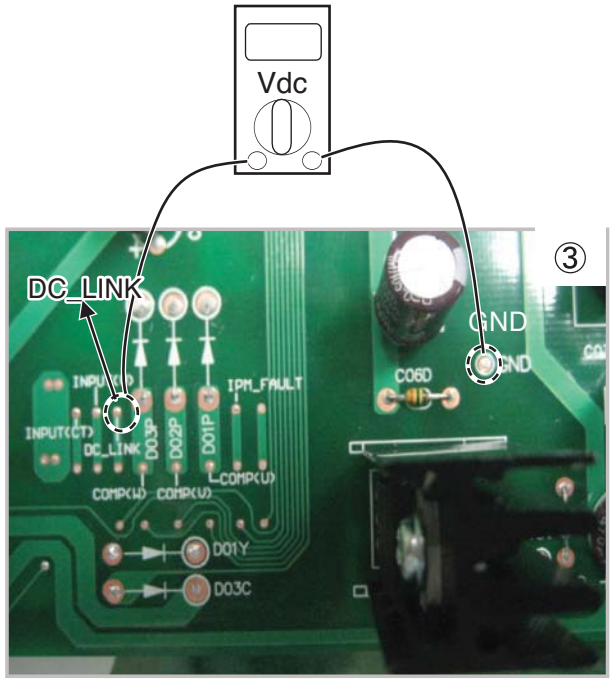
< Inverter PCB>



<DC Link Voltage Check Point>



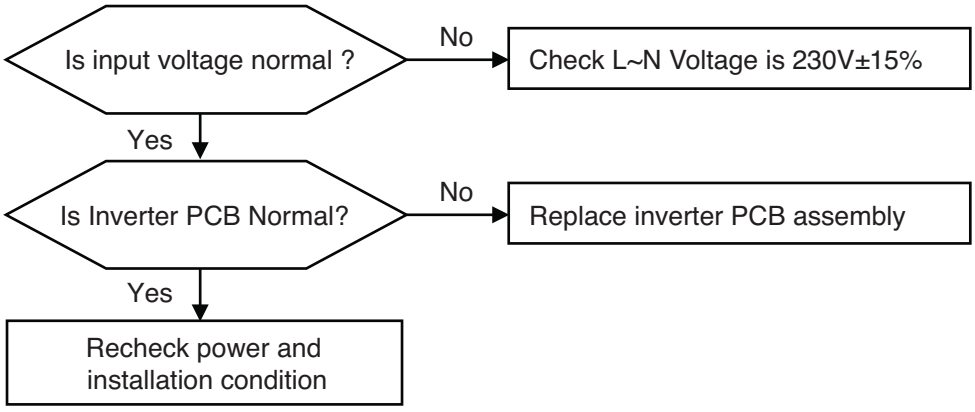
<Connection Check Point>



<DC_LINK Sensing Check Point>

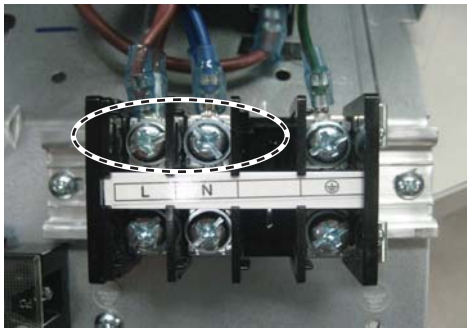
Display code	Title	Cause of error	Check point & Normal condition
25	Input voltage	• Abnormal Input voltage (140Vac , 300Vac)	• Check the power source. • Check the components.

■ Error Diagnosis and Countermeasure Flow Chart



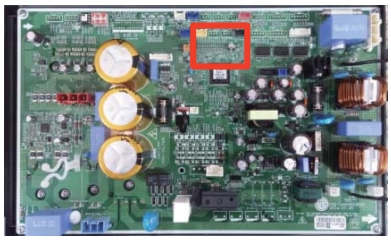
Check Point

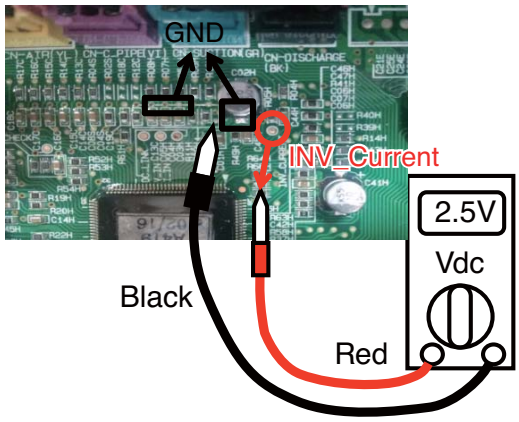
1. Check the Input Voltage (L–N ➔ 230V±10%)
2. Check Input Voltage Sensor output voltage (2.5Vdc±10%)



< Input Power Source Check Point >

▶ **24/27/30k**

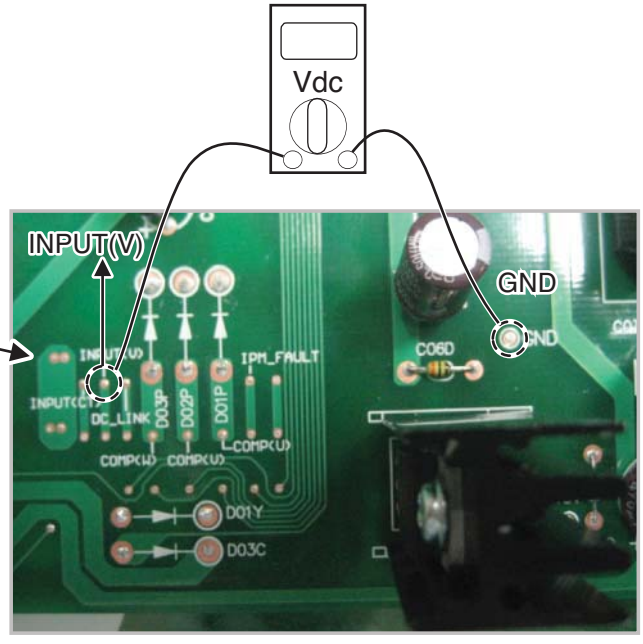




<CT Sensing Check Point>

▶ **40/48/56k**

< Inverter PCB>



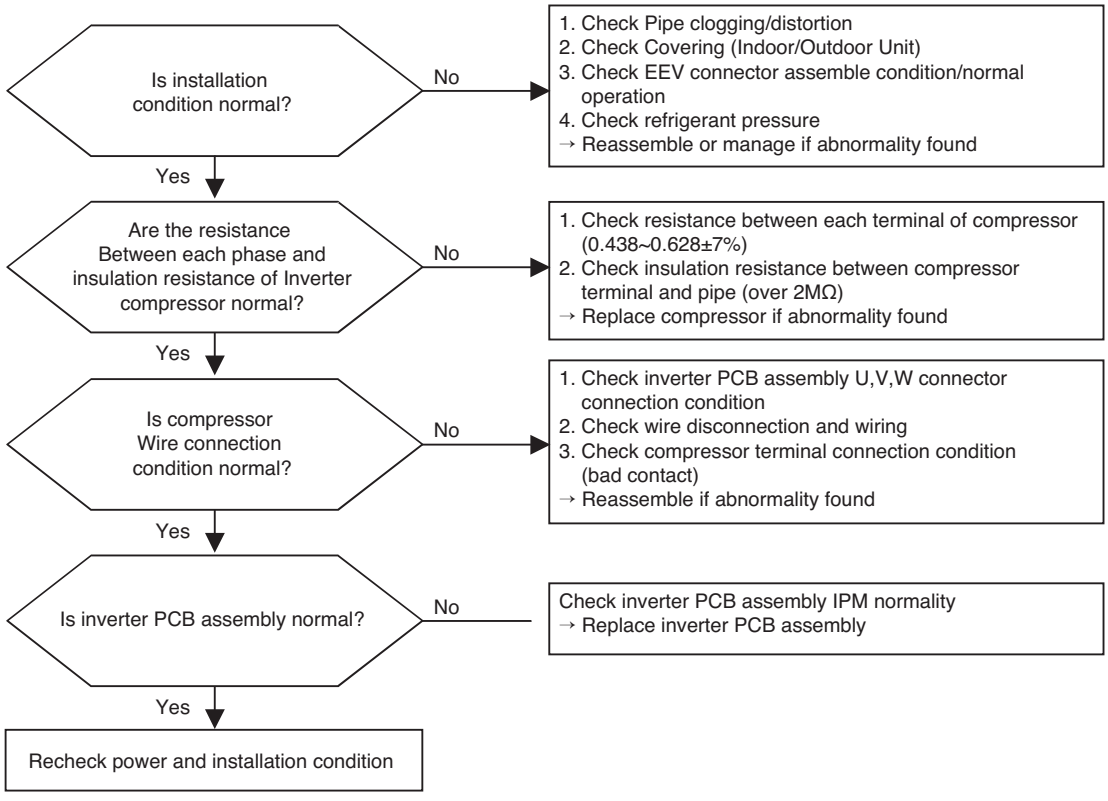
< Input Voltage Sensing Check Point >

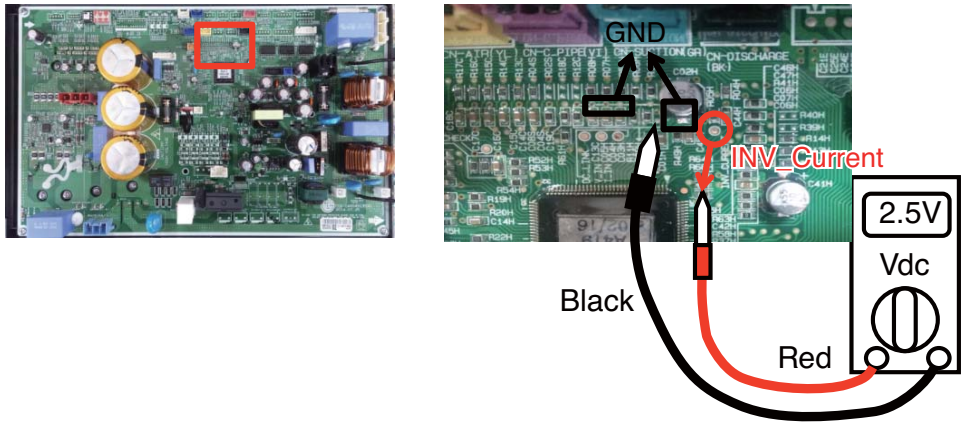
Display code	Title	Cause of error	Check point & Normal condition
26	DC Compressor Position	• Compressor Starting fail error	• Check the connection of comp wire “U,V,W” • Malfunction of compressor • Check the component of “IPM”, detection parts.

WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

■ Error Diagnosis and Countermeasure Flow Chart





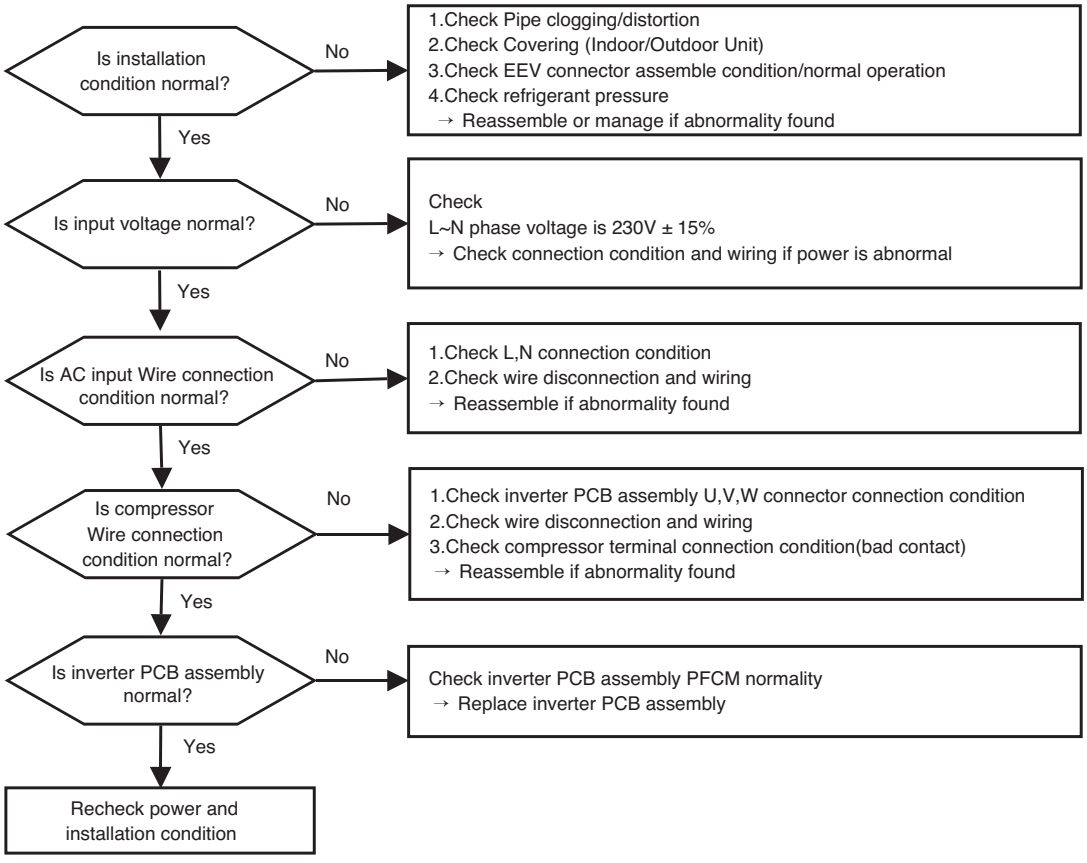
<CT Sensing Check Point>

Display code	Title	Cause of error	Check point & Normal condition
27	AC Input Instant over Current Error	Inverter PCB input current is over100A(peak) for 2us	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Input voltage abnormal (L,N) 4. Power line assemble condition abnormal 5. Inverter PCB assembly Damage (input current sensing part)

WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

■ Error Diagnosis and Countermeasure Flow Chart

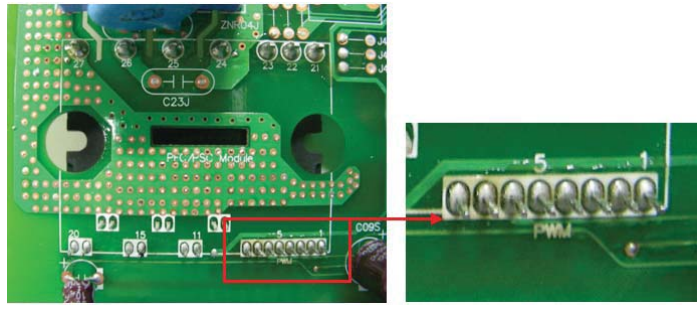


❊ PFCM Moudle checking method

① Set the multi tester to diode mode.

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

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



<Short Check Point>

CAUTION

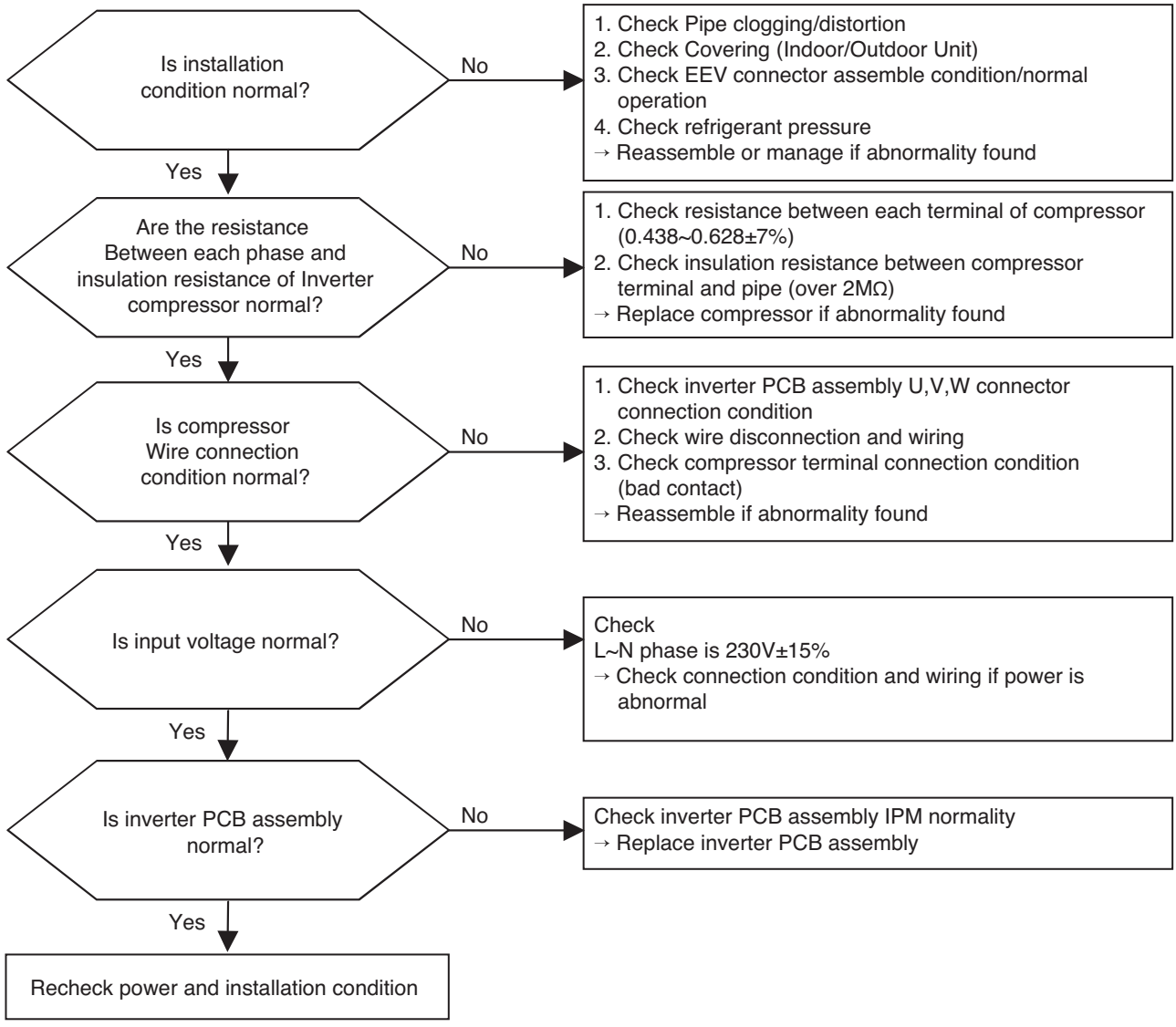
PFCM module No.4,5 pins are internal short state.

Display code	Title	Cause of error	Check point & Normal condition
29	Inverter compressor over current	Inverter compressor input current is over 30A	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. over-charge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU inverter PCB assembly damage

⚠ WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

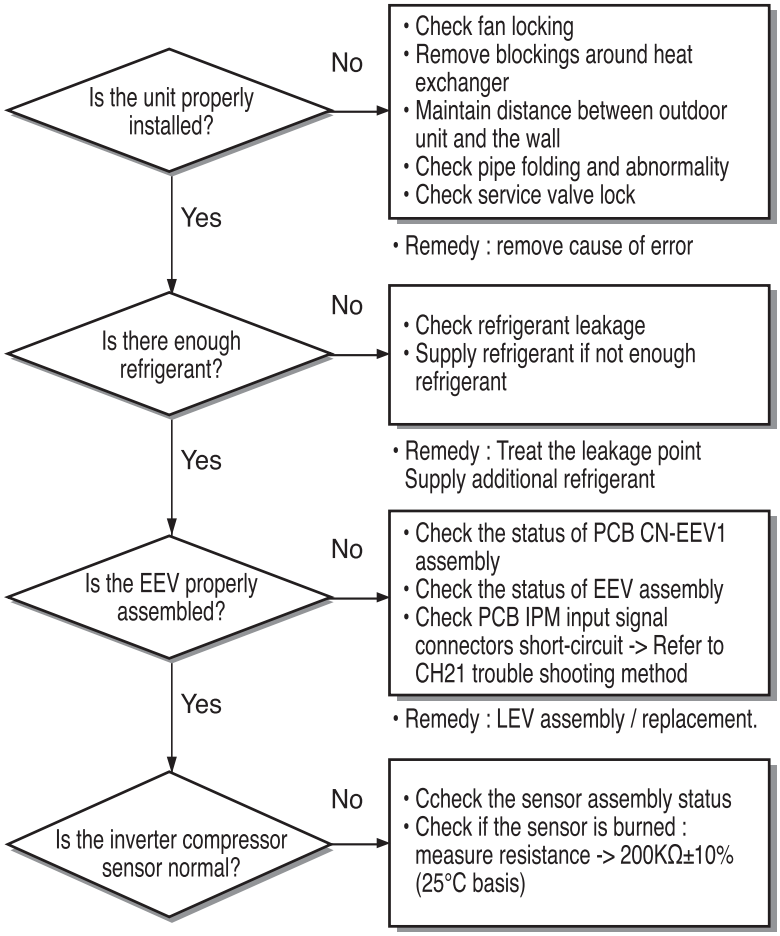
■ Error Diagnosis and Countermeasure Flow Chart



Display code	Title	Cause of error	Check point & Normal condition
32	High temperature in Discharge pipe of the inverter compressor	• Overload operation (Outdoor fan constraint, screened, blocked) • Refrigerant leakage (insufficient) • Poor INV Comp Discharge sensor • LEV connector displaced / poor LEV assembly	• Check outdoor fan constraint/ screened/ flow structure • Check refrigerant leakage • Check if the sensor is normal • Check the status of EEV assembly

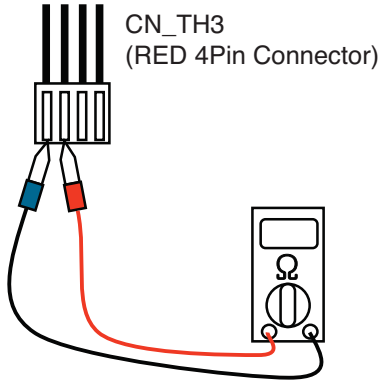
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



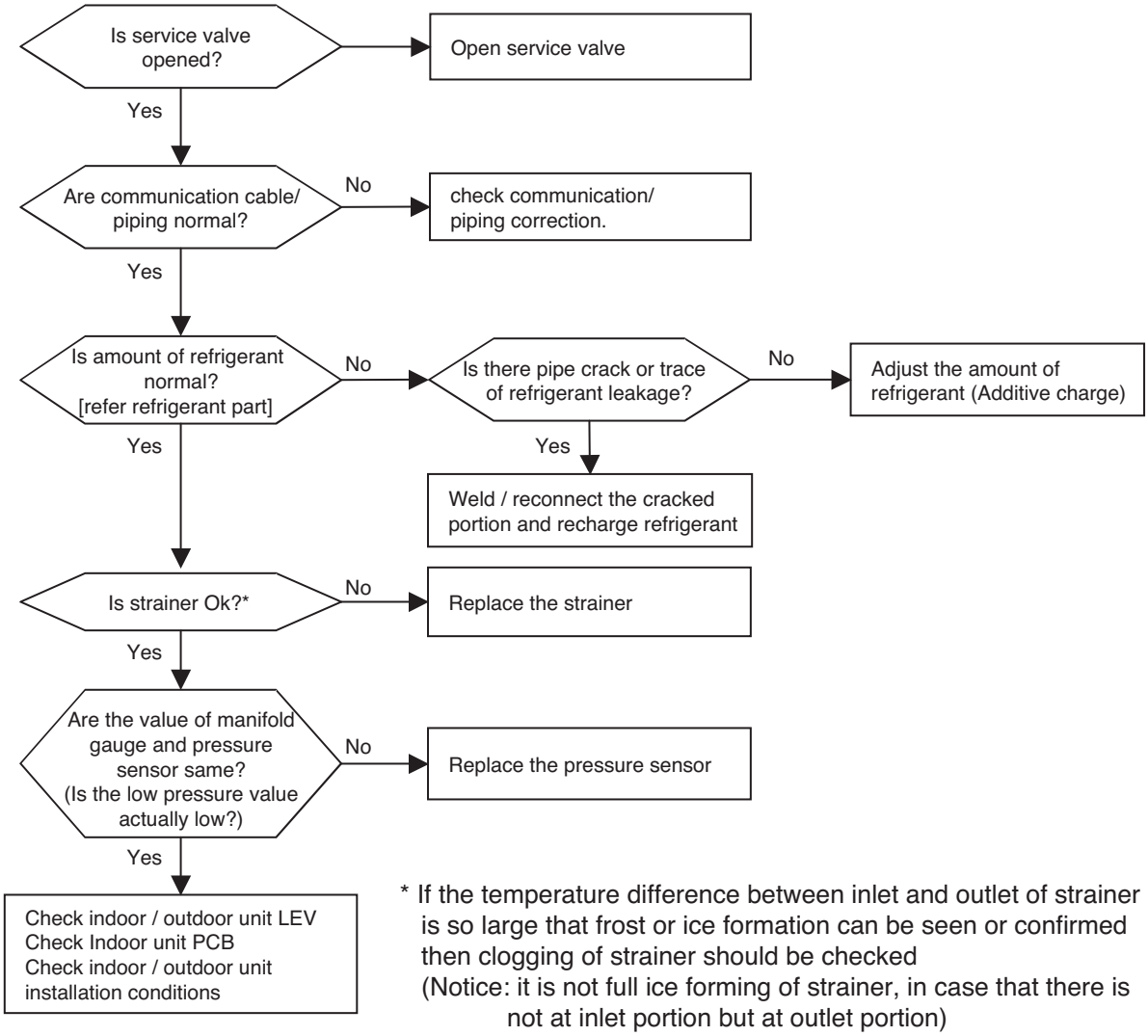
• Inspecting Inverter Compressor Discharge Sensor

1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between inverter discharge sensor connector pins.
3. Measure resistance value of 200KΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)



Display code	Title	Cause of error	Check point & Normal condition
35	Low Presser Error	Excessive decrease of low pressure	• Defective low pressure sensor • Defective outdoor/indoor unit fan • Refrigerant shortage/leakage • Deformation because of damage of refrigerant pipe • Defective indoor / outdoor unit EEV • Covering / clogging (outdoor unit covering during the cooling mode / indoor unit filter clogging during heating mode) • SVC valve clogging • Defective outdoor unit PCB • Defective indoor unit pipe sensor

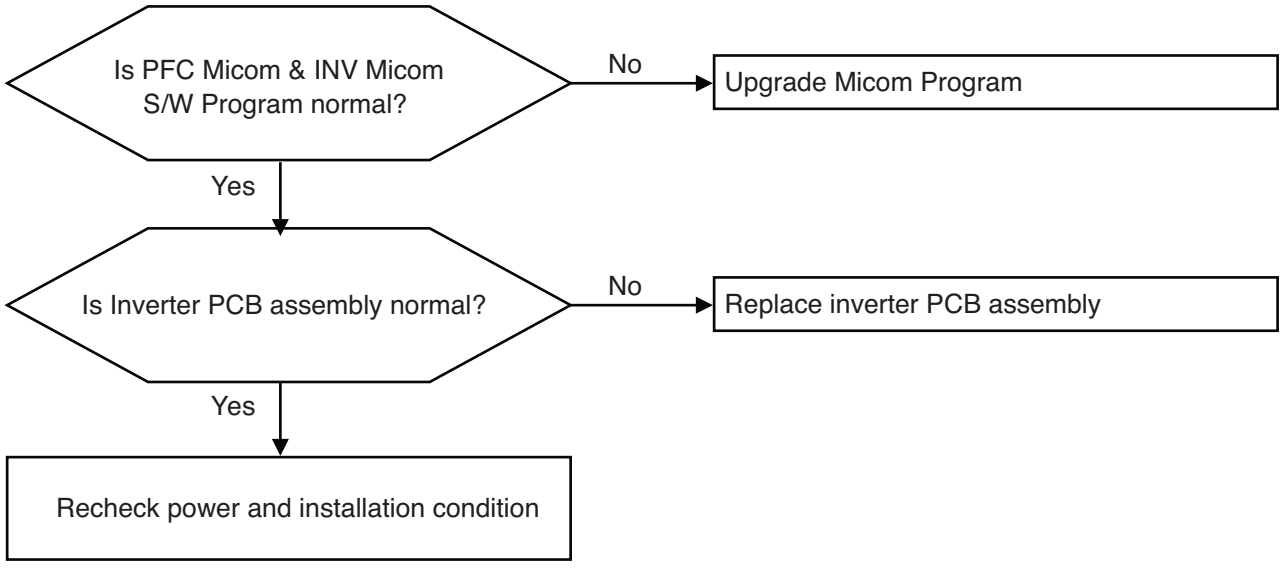
■ Error diagnosis and countermeasure flow chart



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

Display code	Title	Cause of error	Check point & Normal condition
39	Transmission Error Between (PFC Micom → INV Micom)	Communication Error Between PFC Micom and INV Micom.	1. Micom defect/Circuit defect 2. Different Micom S/W Version 3. ODU inverter PCB assembly damage

■ Error Diagnosis and Countermeasure Flow Chart

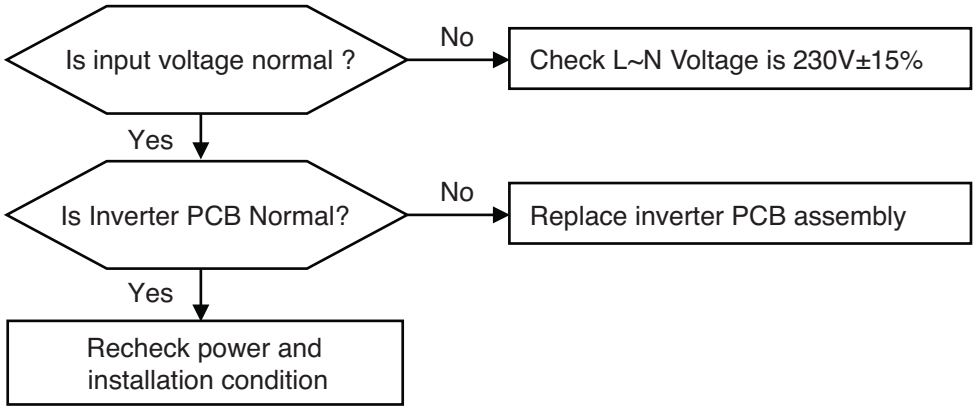


Display code	Title	Cause of error	Check point & Normal condition
40	C/T Sensor Error	• Initial current error	• Malfunction of current detection circuit. (Open / Short) • Check CT Sensor output voltage : 2.5Vdc ±5%

WARNING

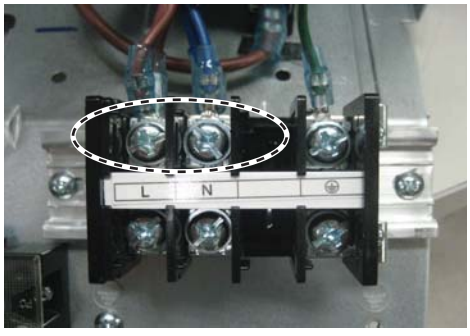
Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

■ Error Diagnosis and Countermeasure Flow Chart



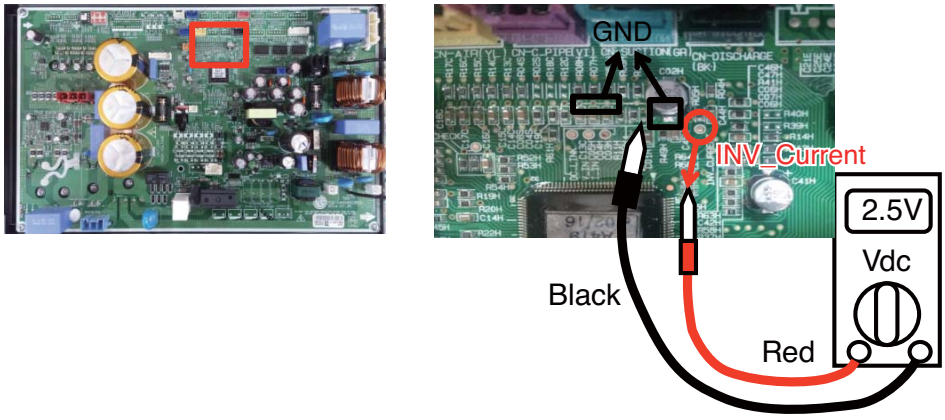
Check Point

1. Check the Input Voltage (L–N ➔ 230V±10%)
2. Check Input Voltage Sensor output voltage (2.5Vdc±10%)



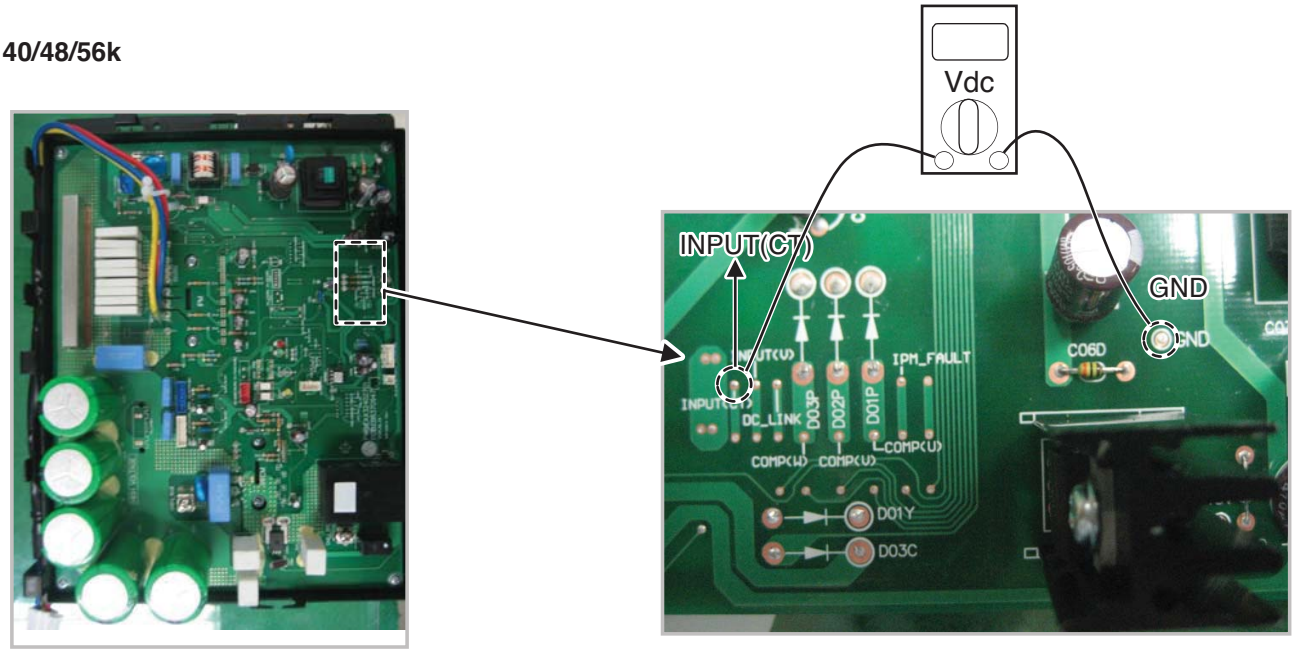
< Input Power Source Check Point >

▶ **24/27/30k**



<CT Sensing Check Point>

▶ **40/48/56k**

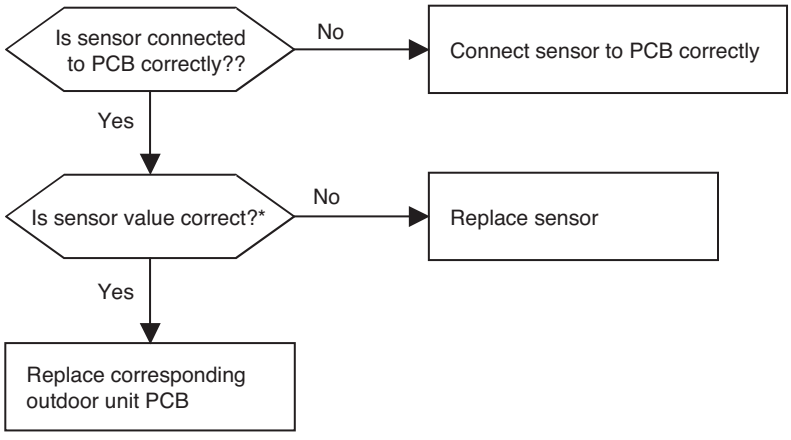


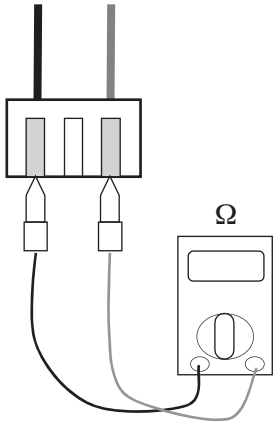
< Inverter PCB>

< CT Sensing Check Point >

Display code	Title	Cause of error	Check point & Normal condition
41	D-pipe sensor (Inverter)	• Open / Short • Soldered poorly • Internal circuit error	1. Bad connection of thermistor connector 2. Defect of thermistor connector (Open/Short) 3. Defect of outdoor PCB
44	Air sensor	• Open / Short • Soldered poorly • Internal circuit error	1. Bad connection of thermistor connector 2. Defect of thermistor connector (Open/Short) 3. Defect of outdoor PCB
45	Condenser Mid-pipesen-sor	• Open / Short • Soldered poorly • Internal circuit error	1. Bad connection of thermistor connector 2. Defect of thermistor connector (Open/Short) 3. Defect of outdoor PCB
46	Suction Pipe sensor	• Open / Short • Soldered poorly • Internal circuit error	1. Bad connection of thermistor connector 2. Defect of thermistor connector (Open/Short) 3. Defect of outdoor PCB
48	Condenser Out-pipe sen-sor	• Open / Short • Soldered poorly • Internal circuit error	1. Bad connection of thermistor connector 2. Defect of thermistor connector (Open/Short) 3. Defect of outdoor PCB

■ Error Diagnosis and Countermeasure Flow Chart

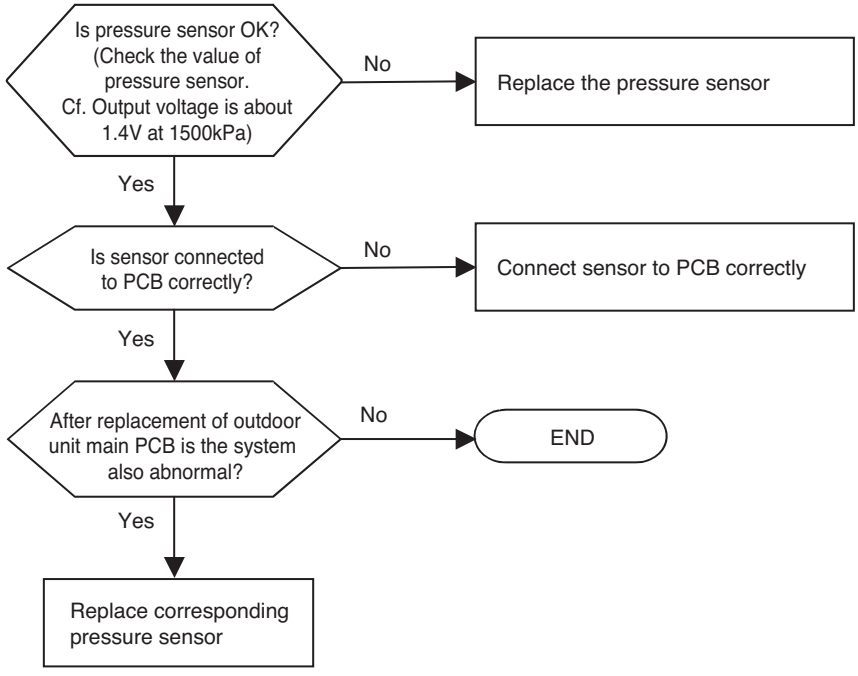




Check Point

1. Estimate the resistance of each sensor.(Unplugged)
2. Check the value of the resistor of thermistor.
   - D-pipe sensor (Inverter) : Normal Value of the resistor is 200kΩ at 25°C
   - Air sensor : Normal Value of the resistor is 10kΩ at 25°C
   - Cond. Mid-pipe sensor : Normal Value of the resistor is 5kΩ at 25°C
   - Suction pipe sensor : Normal Value of the resistor is 5kΩ at 25°C
   - Condenser Out-pipe sensor : Normal Value of the resistor is 5kΩ at 25°C

Display code	Title	Cause of error	Check point & Normal condition
43	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	• Bad connection of connector PCB • Bad connection high pressure connector • Defect of high pressure connector (Open/Short) • Defect of connector PCB (Open/Short) • Defect of outdoor main PCB.



Display code	Title	Cause of error	Check point & Normal condition
51	Over capacity	• Over capacity Combination	• Check the indoor unit capacity. • Check the combination table.

Model	Gross max.capacity	Max.single indoor unit capacity
Z4UW24GFA0	39k	24k
Z4UW27GFA0	41k	
Z5UW30GFA0	48k	
A5UW40GFA0	52k	
A7UW40GFA0	52k	
A8UW48GFA0	63k	
A9UW56GFA0	73k	

Check Point

• CH 51

1. Check the indoor unit capacity.
2. Check the combination table.

Display code	Title	Cause of error	Check point & Normal condition
53	Title Communication (Indoor → Outdoor)	• Communication poorly	• Power input AC 230V. (Outdoor, Indoor) • The connector for transmission is disconnected. • The connecting wires are misconnected. • The communication line is shorted at GND. • Transmission circuit of outdoor PCB is abnormal. • Transmission circuit of indoor PCB is abnormal.

WARNING

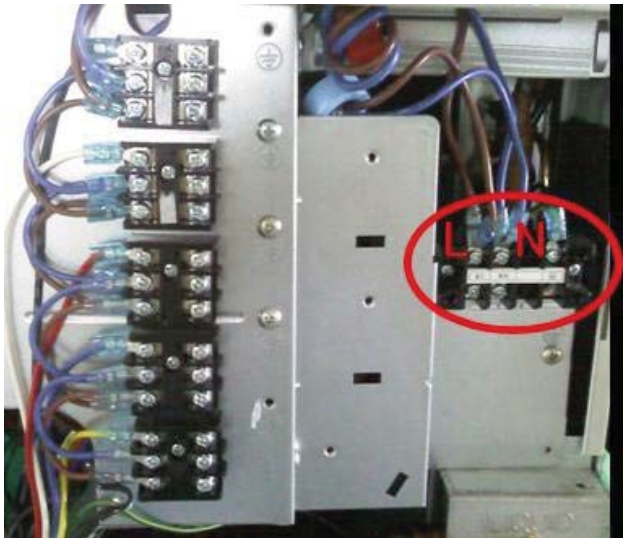
Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

Check Point

1. Check the input power AC230V. (Outdoor, Indoor unit)
2. Check the communication wires are correctly connected.
   Adjust the connection of wire Confirm the wire of "Live", "Neutral"
3. Check the resistance between communication line and GND. (Normal : Over 2MΩ)
4. Check the connector for communication is correctly connected.
5. If one indoor unit is operated normally, outdoor PCB is no problem.
   Check the another indoor unit.
   * CH05 is displayed at indoor unit, CH53 is displayed at outdoor unit.
6. If all indoor unit is displayed CH05 but outdoor PCB not display
   CH53 : Check the CN_COM and CN_POWER is correctly connected.

• 24/27/30k

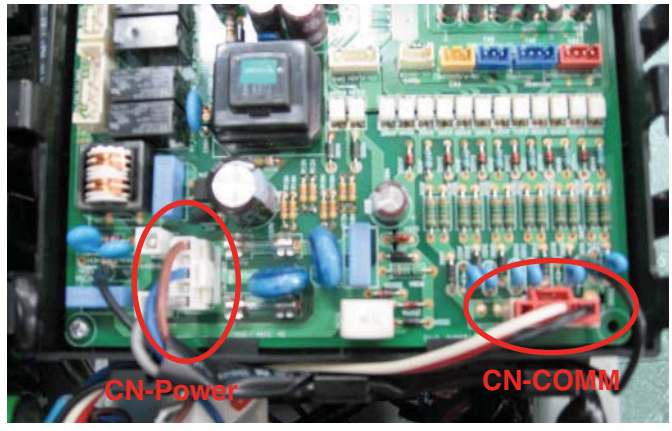
1. In Case of CH53, Check the Connection
   → L,N at the terminal block



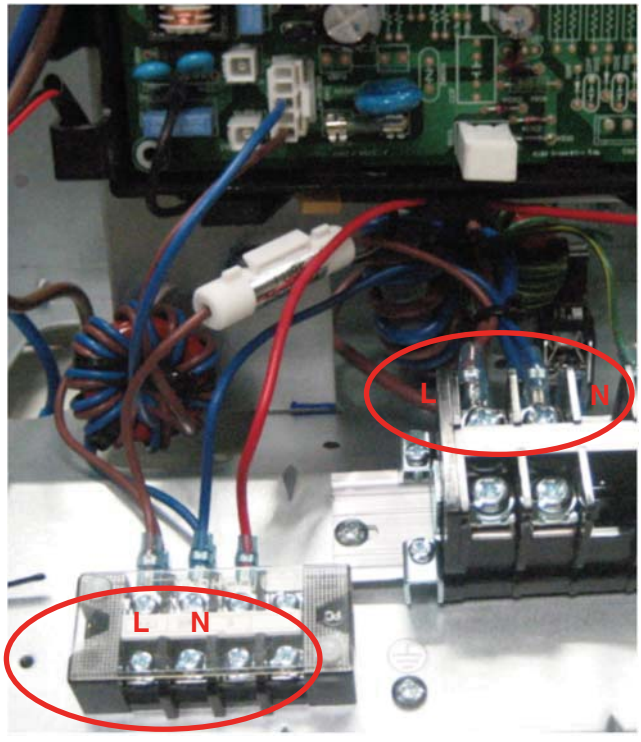
< TERMINAL BLOCK >

• 40/48/56k

1. In Case of CH05, Check the Connection
   → CN_POWER, CN_COMM at the Main PCB
2. In Case of CH53, Check the Connection
   → CN_COMM at the Main PCB → L, N at the terminal block



< MAIN PCB >

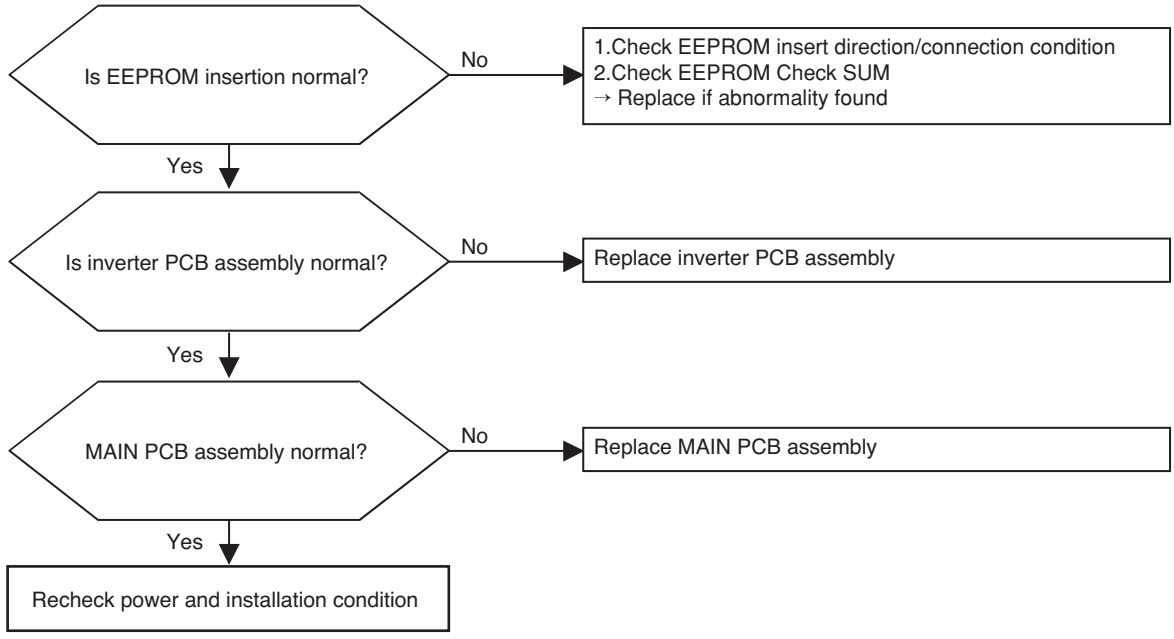


Display code	Title	Cause of error	Check point & Normal condition
60	Inverter PCB & Main EEPROM check sum error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU Inverter & Main PCB assembly damage

WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

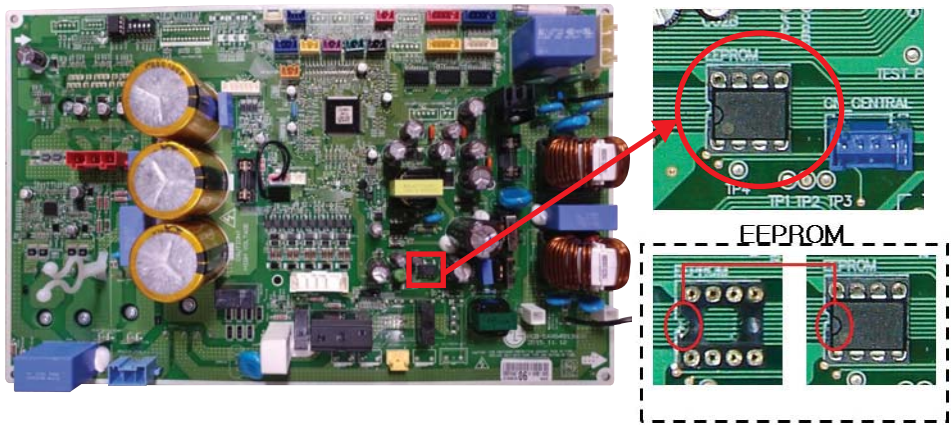
■ Error Diagnosis and Countermeasure Flow Chart



Check Point

- Check the EEPROM Check sum & Direction

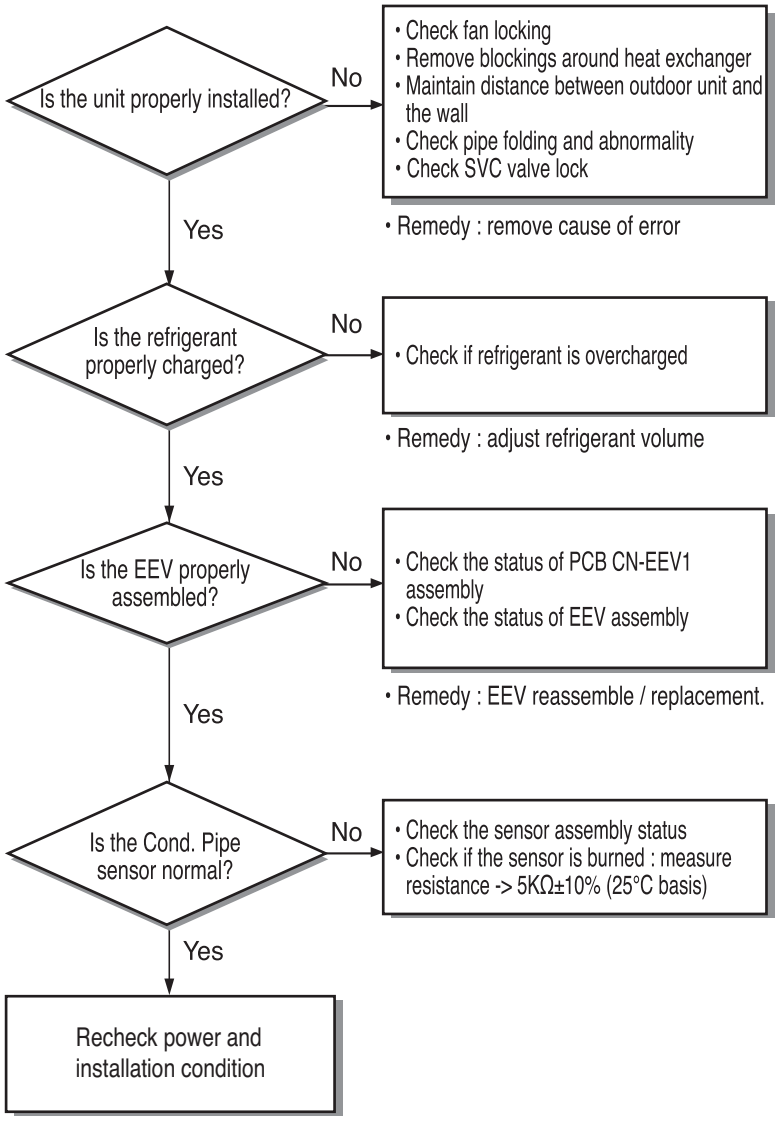
▶ 24/27/30k



Display code	Title	Cause of error	Check point & Normal condition
61	High temperature in outdoor Cond. Pipe	• Overload operation (Outdoor fan constraint, screened, blocked) • Outdoor unit heat exchanger contaminated • EEV connector displaced / poor EEV assembly • Poor Cond. Pipe sensor assembly / burned	• Check outdoor fan constraint / screened / flow structure • Check if refrigerant overcharged • Check the status of EEV assembly • Check the status of sensor assembly / burn

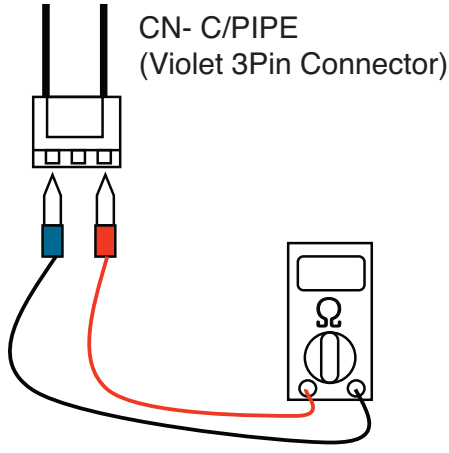
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



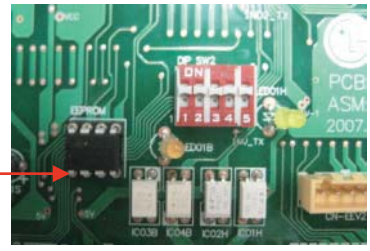
• Inspecting Cond. Pipe Sensor

1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between rated speed Comp Discharge sensor connector pins.
3. Measure resistance value of 5kΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)

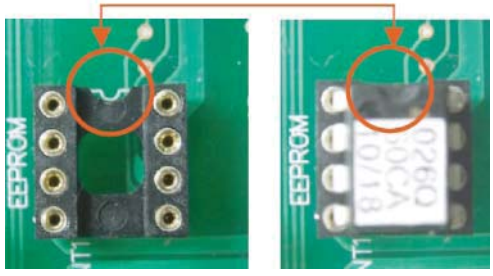


▶ 40/48/56k

<Inverter PCB>



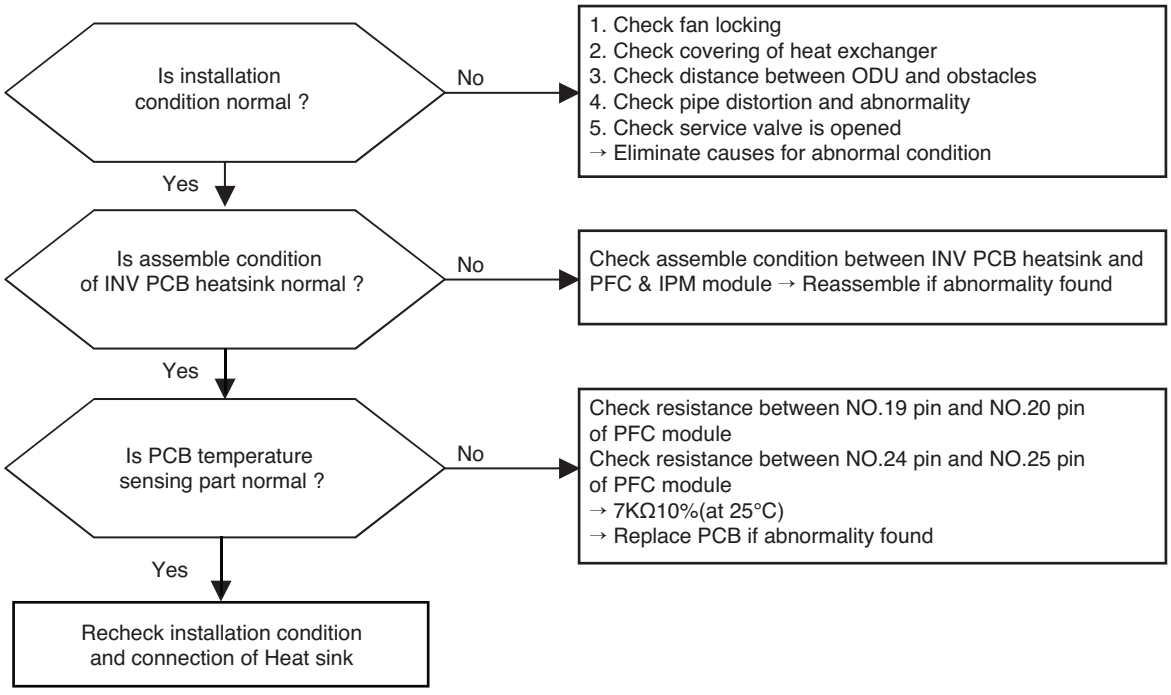
<MAIN PCB>



<EEPROM Direction Check Point>

Display code	Title	Cause of error	Check point & Normal condition
62	Heatsink High error	Inverter PCB heatsink temperature is over 85°C	1. ODU fan locking 2. Heatsink assembly of INV PCB assemble condition abnormal 3. Defect of temperature sensing circuit part defect of INV PCB

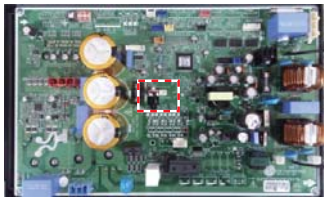
■ Error Diagnosis and Countermeasure Flow Chart

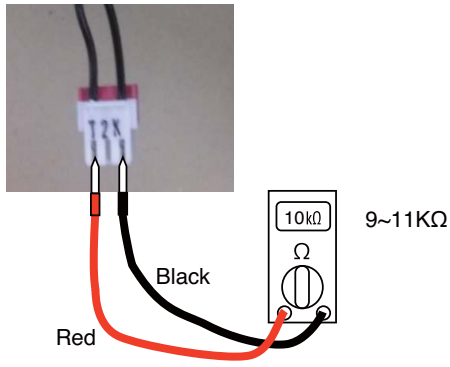


Check Point

1. Check resistance between No.19 pin and NO.20 pin of PCB PFC module
2. Check resistance between No.24 pin and NO.25 pin of PCB PFC module - only 48/56k
3. Resistance value should be in 7kΩ ±10%.(at 25°C).

▶ 24/27/30k

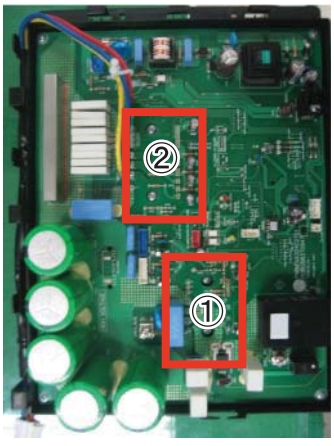


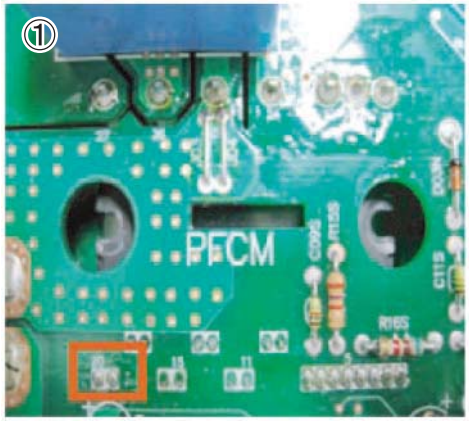


9~11KΩ

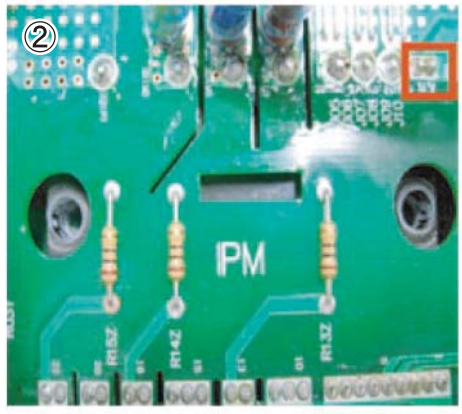
PFCM :
Measuring resistance
between No.19,20 pin

▶ 40/48/56k





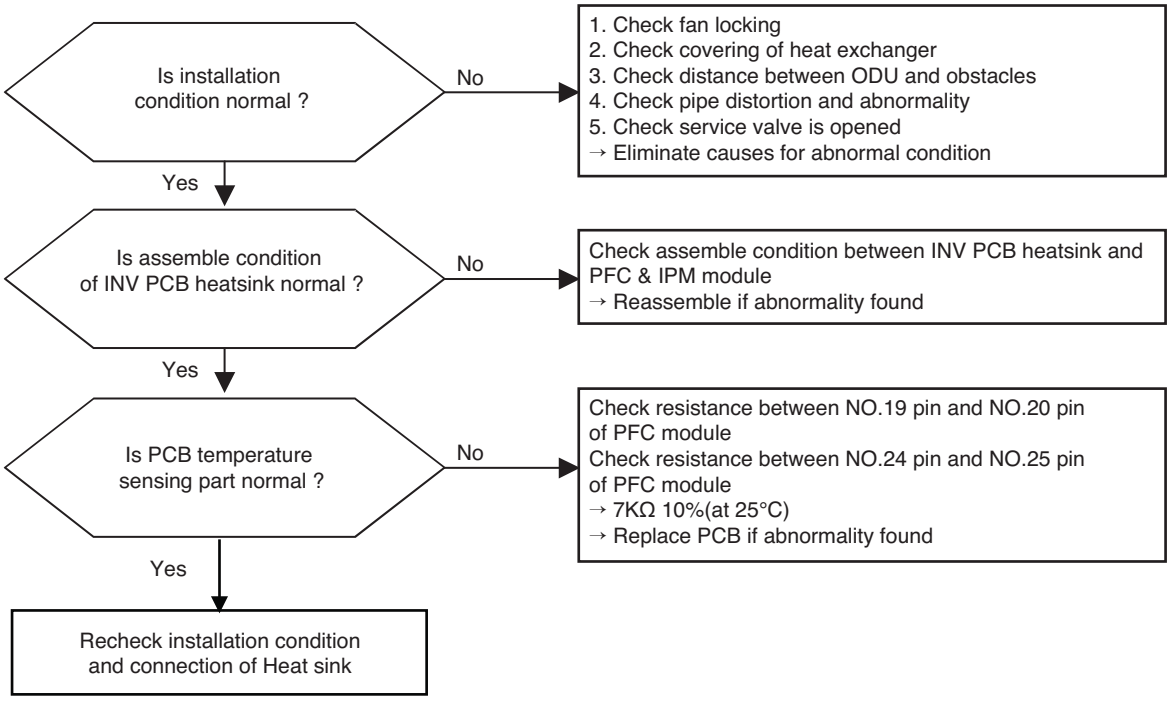
PFCM :
Measuring resistance
between No.19,20 pin



IPM :
Measuring resistance
between No.24,25 pin

Display code	Title	Cause of error	Check point & Normal condition
65	Heatsink Sensor error	Inverter PCB heatsink sensor is open or short	1. ODU fan locking 2. Heatsink assembly of INV PCB assemble condition abnormal 3. Defect of temperature sensing circuit part defect of INV PCB

■ Error Diagnosis and Countermeasure Flow Chart

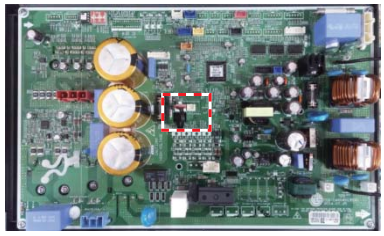


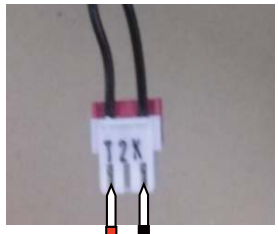
Check Point

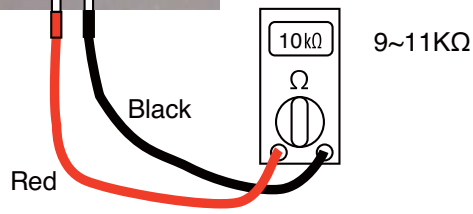
1. Check resistance between No.19 pin and NO.20 pin of PCB PFC module
2. Check resistance between No.24 pin and NO.25 pin of PCB PFC module - only 48/56k
3. Resistance value should be in 7kΩ ±10%.(at 25°C).
4. Check the PFC Module No.19, 20 and IPM Module No.24, 25 pin soldering condition.

▶ 24/27/30k

Location of SPM /PSCM /PFCM





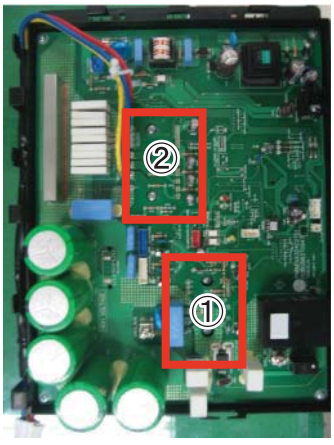


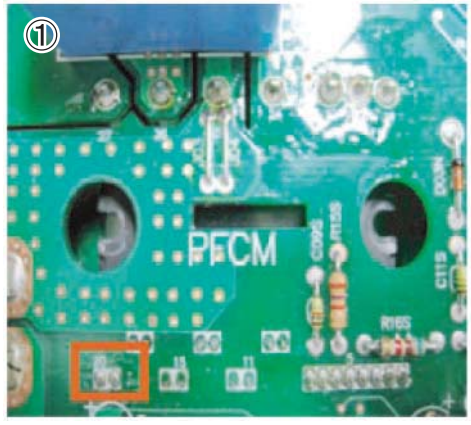
9~11KΩ

A: PSCM /PFCM

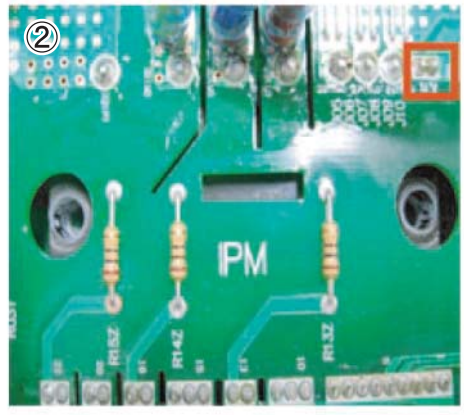
B: SPM

▶ 40/48/56k





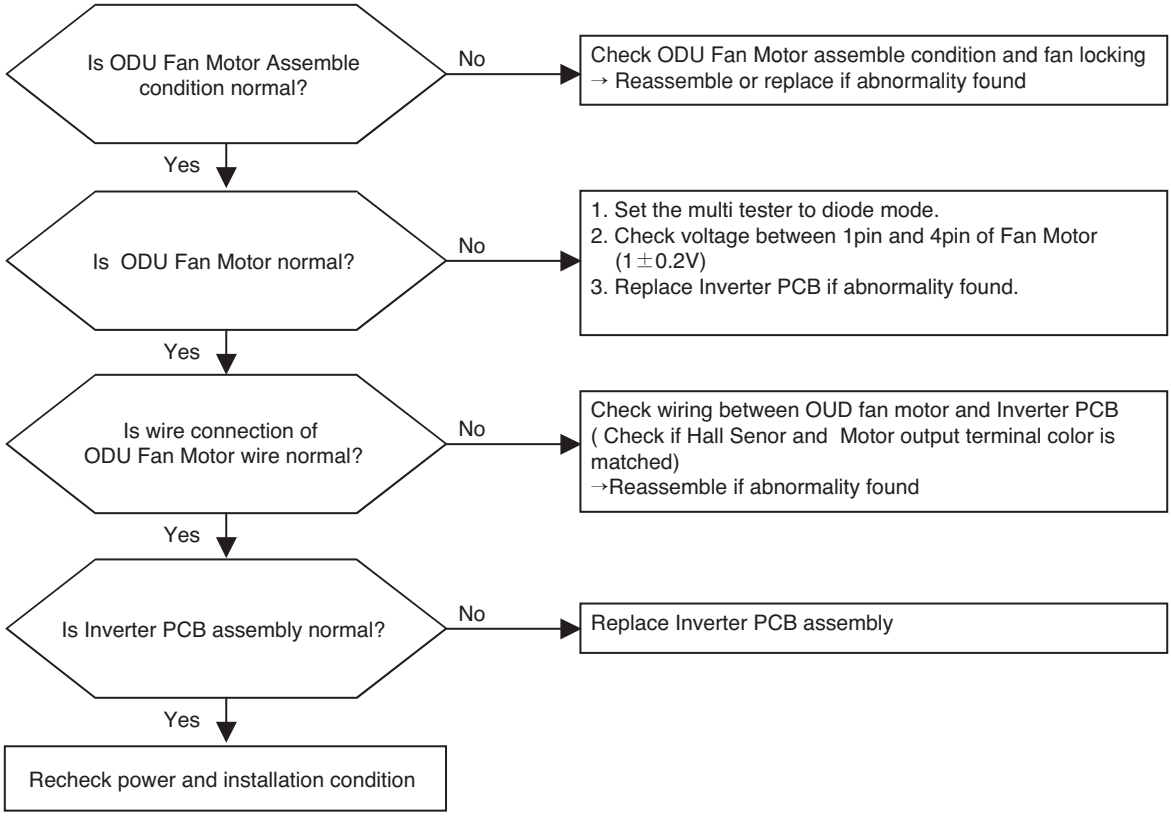
PFCM :
Measuring resistance
between No.19,20 pin



IPM :
Measuring resistance
between No.24,25 pin

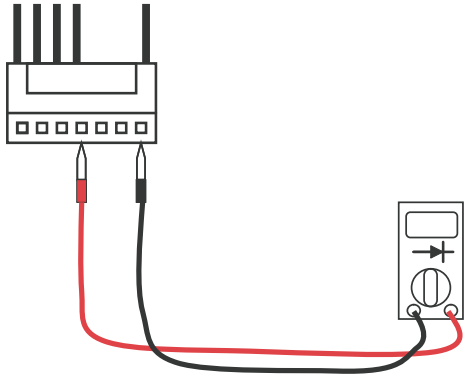
Display code	Title	Cause of error	Check point & Normal condition
67	Fan Lock Error	Fan RPM is 10RPM or less for 5 second when ODU fan starts or 40 RPM or less after fan starting.	1. ODU fan locking 2. Heatsink assembly of INV PCB assemble condition abnormal 3. Defect of temperature sensing circuit part defect of INV PCB

■ Error Diagnosis and Countermeasure Flow Chart



Check Point

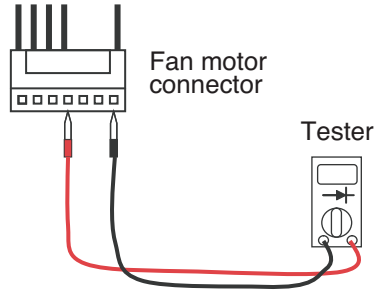
1. Check voltage between 1pin and 4pin of Fan Mortor connector (Tester diode mode)
2. Voltage value should be in 1V ±0.2V.
3. Do not replacing all of fan motor and PCB at once.
   Check error code again, after replacing the abnormal part (Fan Motor or PCB) first.

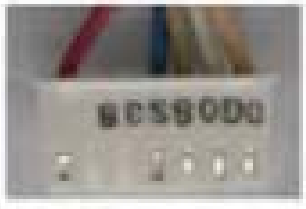


▶ 24/27/30k

-. Checking wire terminals for possible short

Check voltage betwen 1pin and 4pin of fan motor

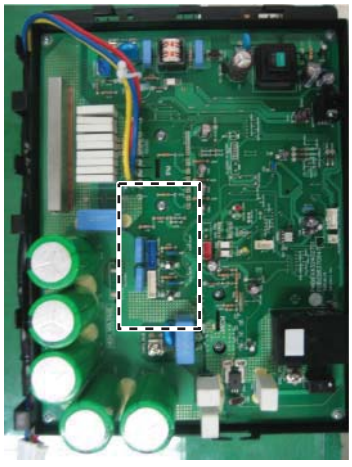


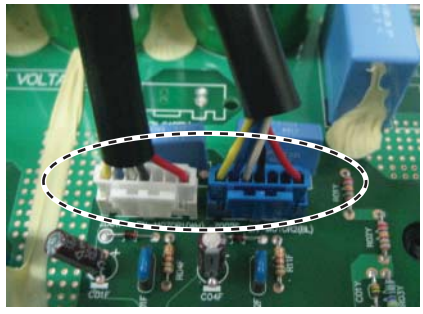


① ④⑤⑥⑦

Tester		정상저항(±10%)	
①	④	∞	∞
⑤	④	Dozens kΩ ~hundreds kΩ	Dozens kΩ ~hundreds kΩ
⑥	④	∞	∞
⑦	④	Dozens kΩ ~hundreds kΩ	Dozens kΩ ~hundreds kΩ

▶ 40/48/56k

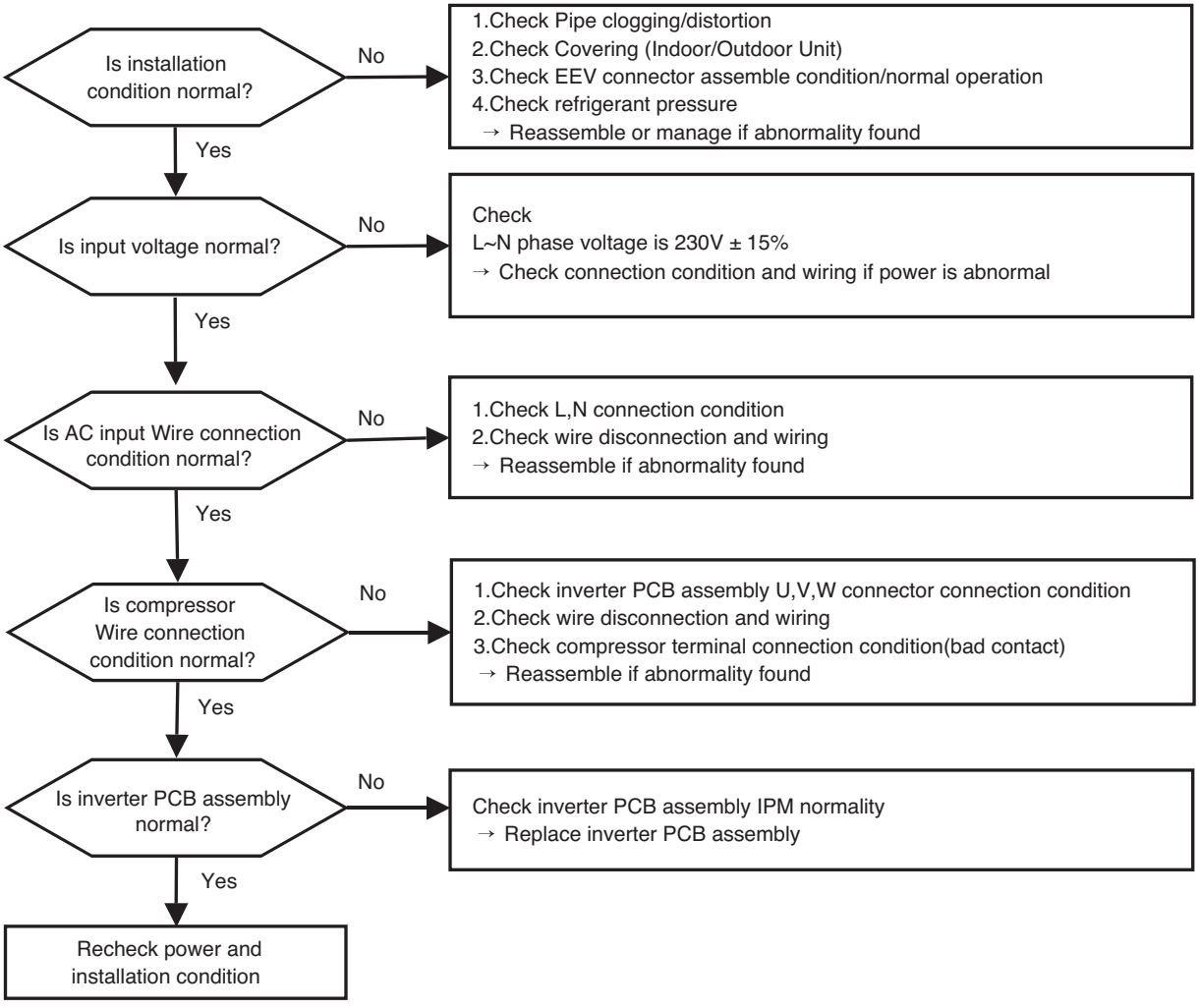




<Inverter PCB>

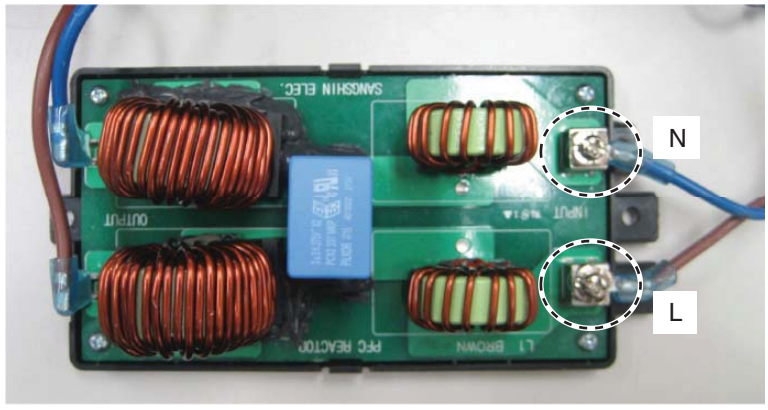
Display code	Title	Cause of error	Check point & Normal condition
73	AC input instant over current error (Matter of software)	Inverter PCB input power current is over 48A(peak) for 2ms	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref.overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Input voltage abnormal (L, N) 4. Power line assemble condition abnormal 5. Inverter PCB assembly damage (input current sensing part)

■ Error Diagnosis and Countermeasure Flow Chart

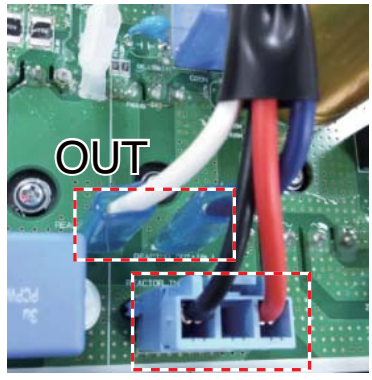


▸ 24/27/30k

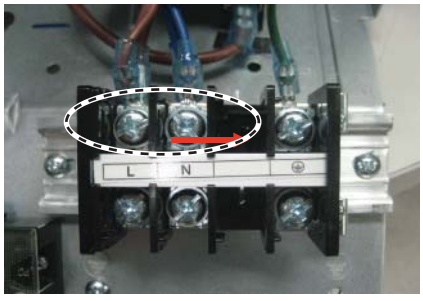
▸ 40k



< Noise Filter wiring Check Point >

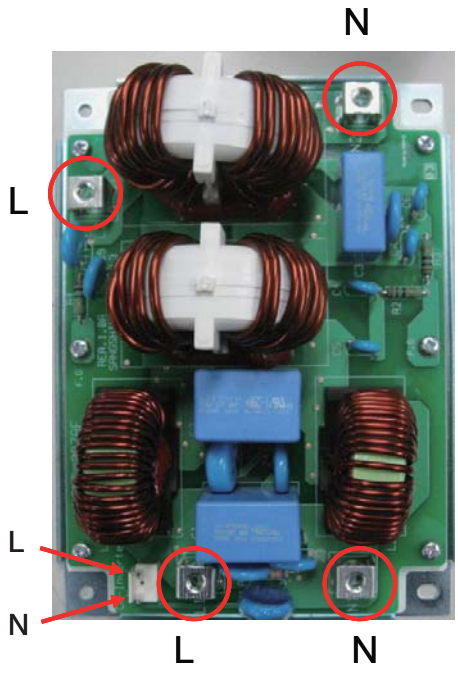


< Main PCB wiring Check Point >



< Input Power Source Check Point >

▸ 48/56k



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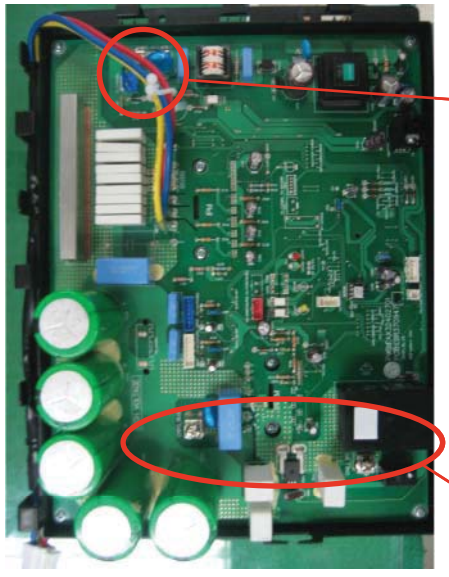
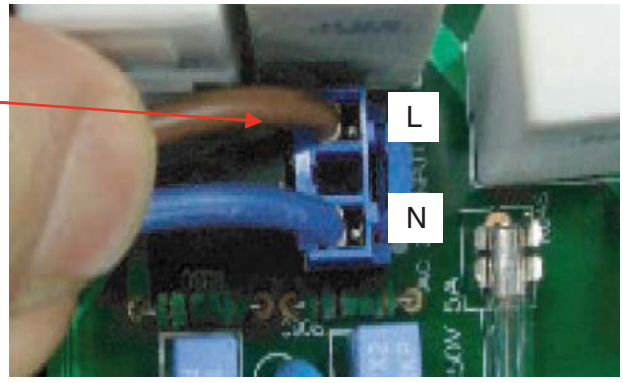
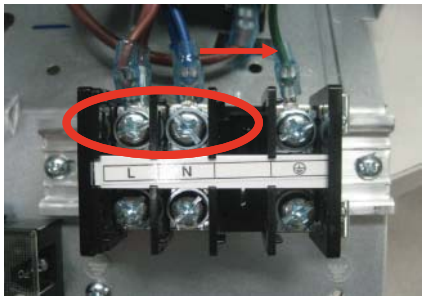
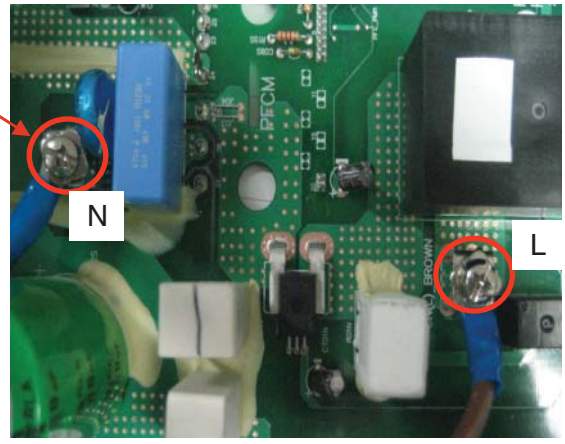






< Input Power Source Check Point >



< Inverter PCB wiring Check Point >

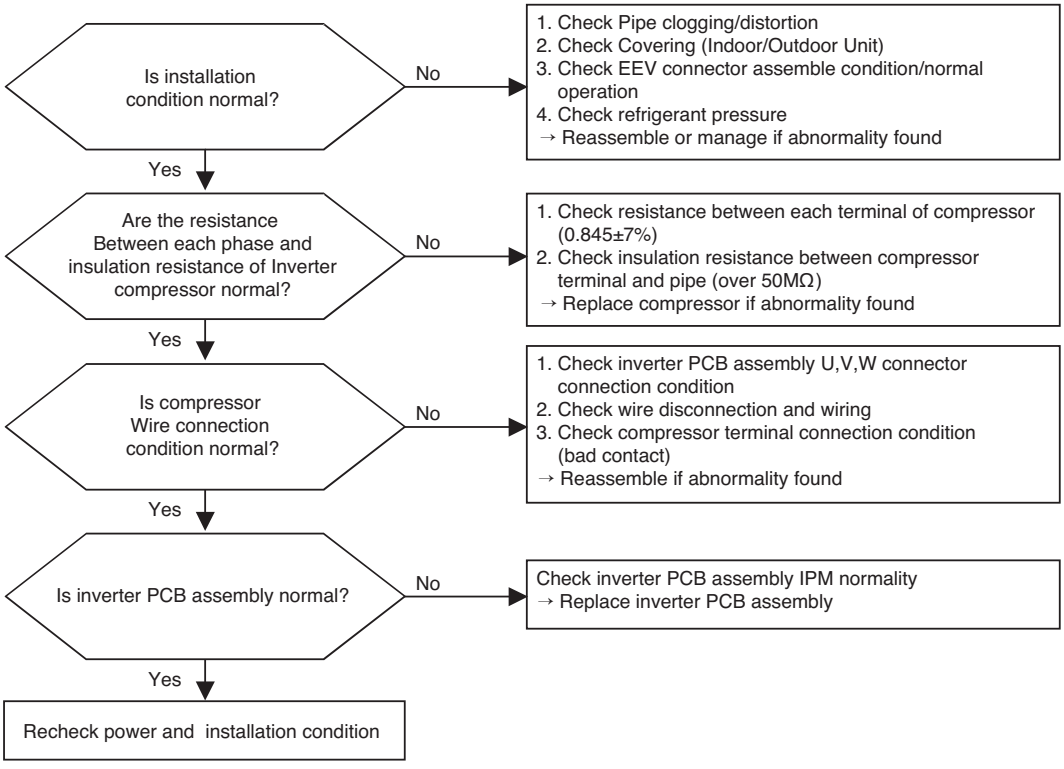
▶ **A7UW42LFA0/A8UW48LFA0/A9UW56LFA0**

Display code	Title	Cause of error	Check point & Normal condition
21	DC PEAK (IPM Fault)	• Instant over current • Over Rated current • Poor insulation of IPM	• An instant over current in the U,V,W phase - Comp lock - The abnormal connection of U,V,W • Over load condition - Overcharging of refrigerant Pipe length. Outdoor Fan is stop • Poor insulation of compressor

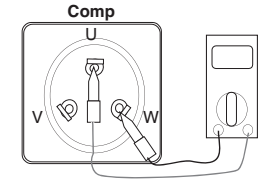
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

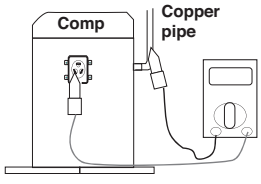
■ Error Diagnosis and Countermeasure Flow Chart



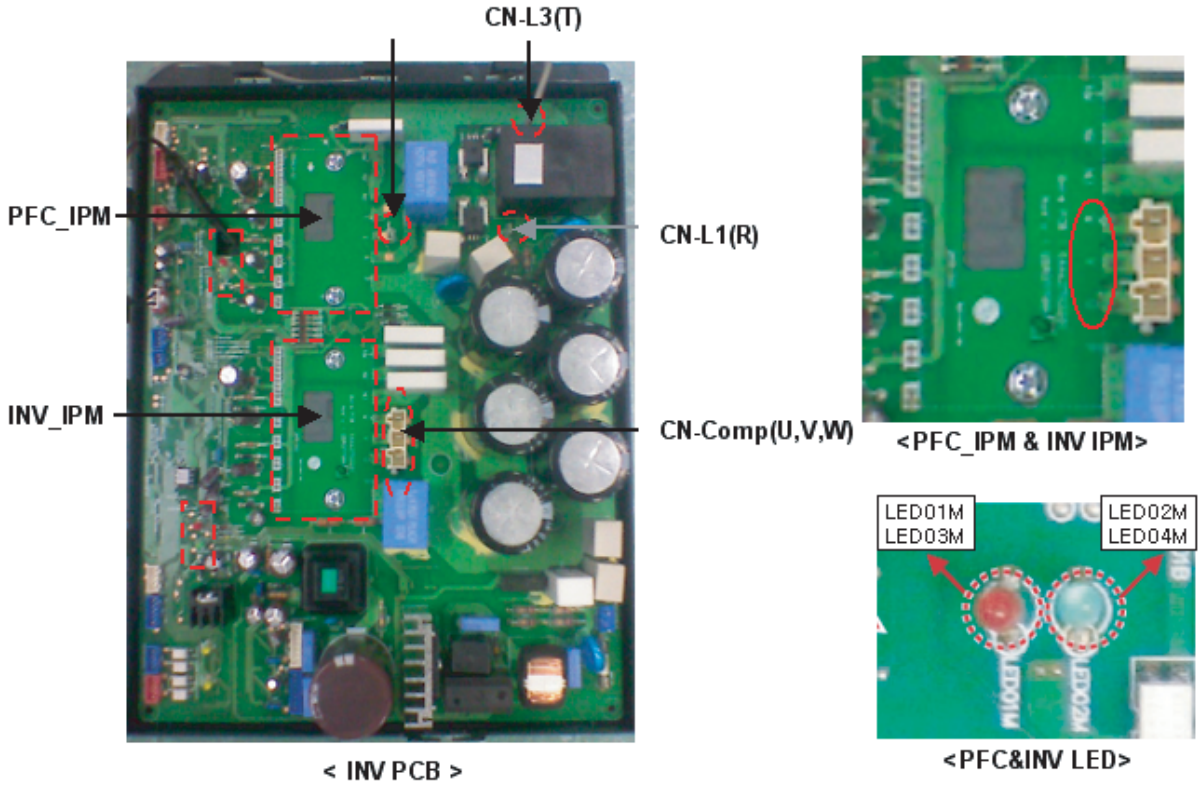
■ Comp checking method



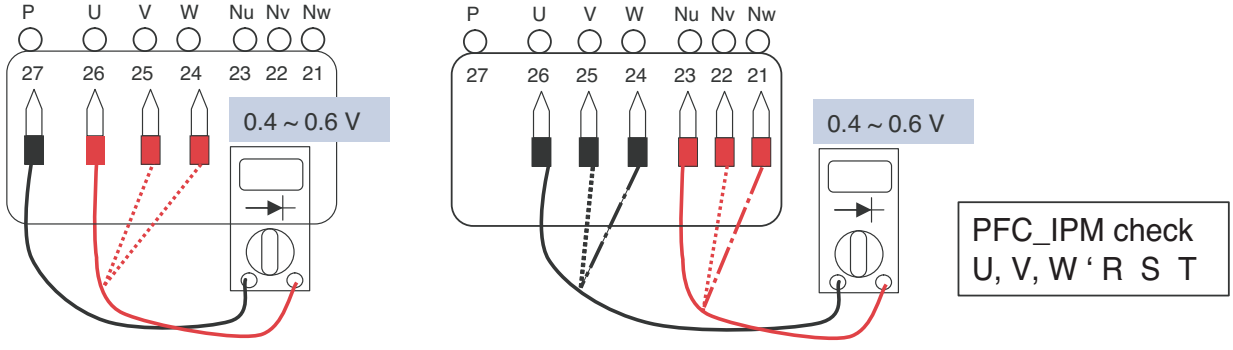
Resistance(Ω) at 20°C	
Terminal	Inverter comp.
U-V	0.845(at 25°C)
V-W	0.859(at 25°C)
W-U	0.864(at 25°C)



Resistance(Ω) at 20°C	
Terminal	Inverter comp.
U-GND	50M
V-GND	50M
W-GND	50M



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

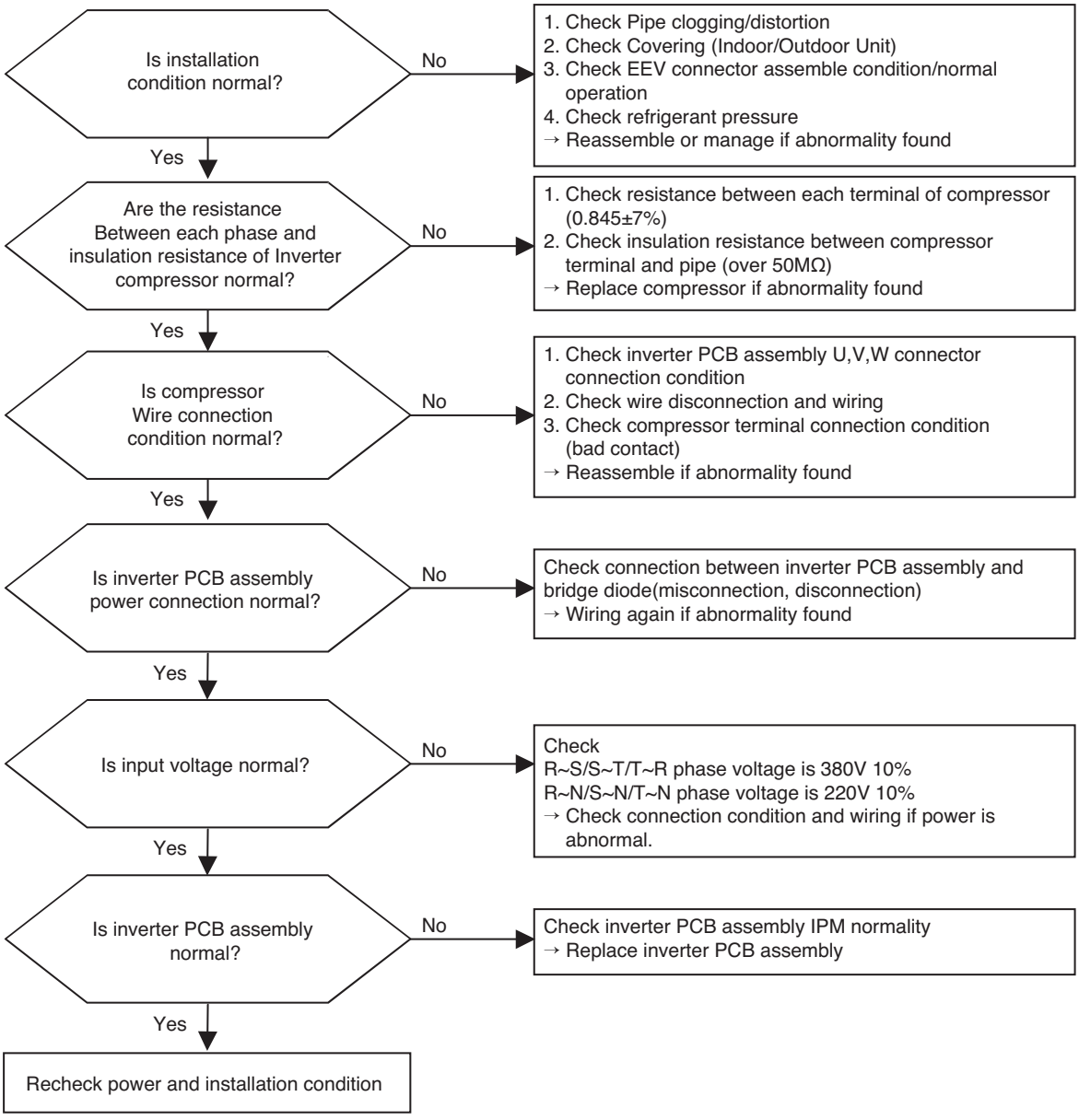


Display code	Title	Cause of error	Check point & Normal condition
22	Max. C/T	Input Over Current	1. Malfunction of Compressor 2. Blocking of Pipe 3. Low Voltage Input 4. Refrigerant, Pipe length, Blocked...

WARNING

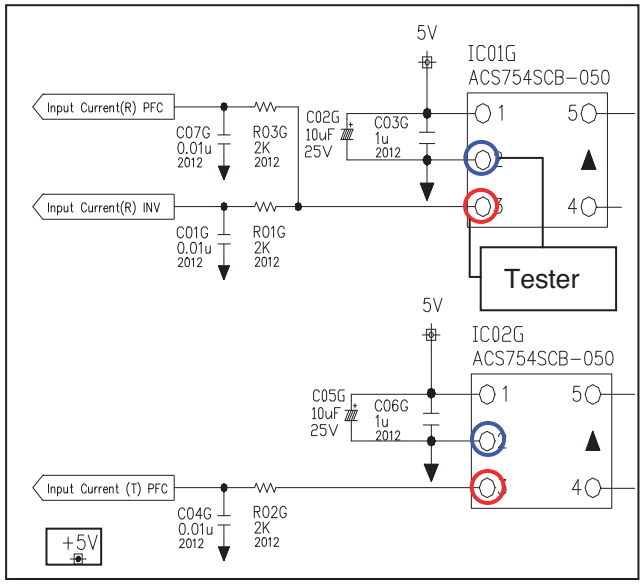
Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

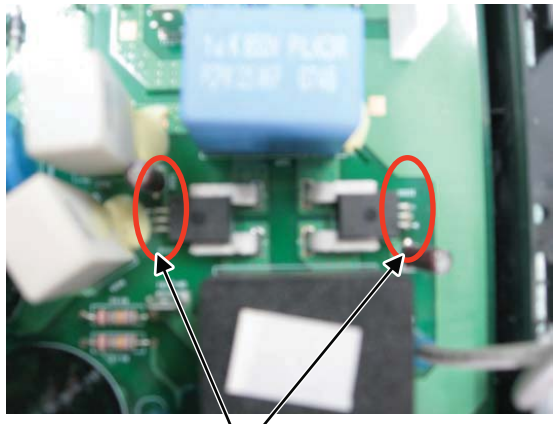
■ Error Diagnosis and Countermeasure Flow Chart



Check Point

1. Check the power source.(200~240V)
2. Check the fan operation is right.
3. Check the current.
4. Check the install condition.
5. Check the CT Sensor Output signal (Check output pin 1.2 of the CT Sensor : 5V)

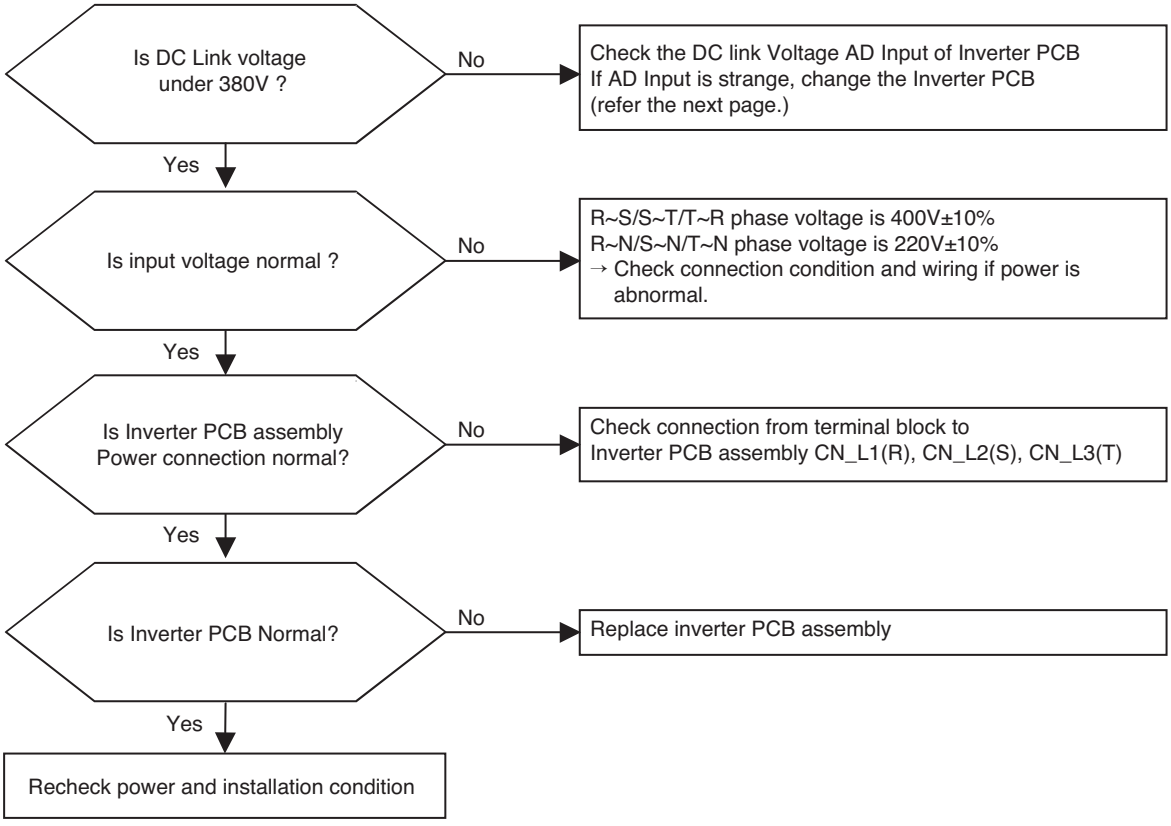




CT Sensor Output
(at the INVERTER PCB)

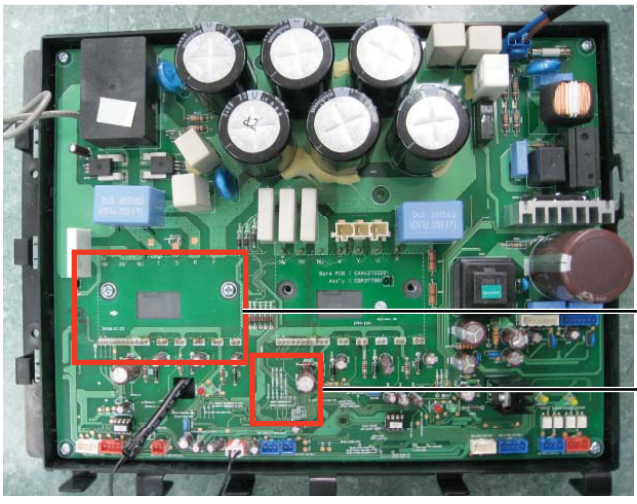
Display code	Title	Cause of error	Check point & Normal condition
23	DC Link High / Low Volt.	• DC Link Voltage is above 780Vdc • DC Link Voltage is below 300Vdc	• Check point & Normal condition • Check the TAB1 is connect. • At not operating : DC Link voltage(260V ↑) • At Comp operating : DC Link voltage(500V ↑)

■ Error Diagnosis and Countermeasure Flow Chart

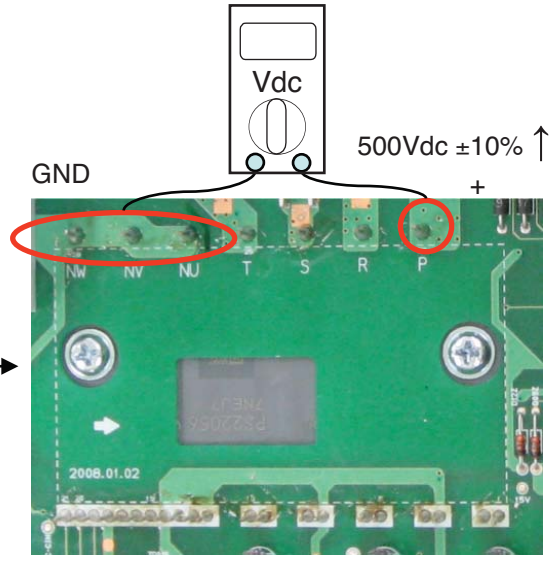


Check Point

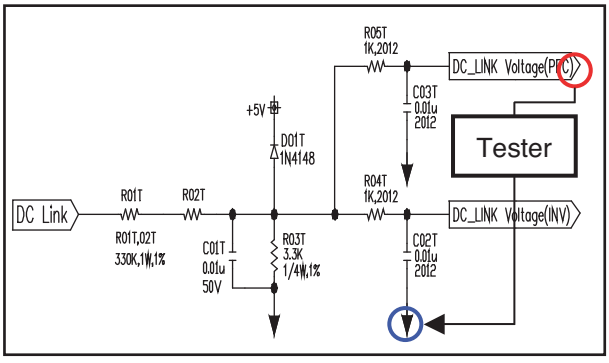
1. Check the Tab1 connection condition. (Refer to outdoor wiring diagram)
2. Check the CN_L1(R), CN_L2(S), CN_L3(T) connection condition
3. Check the DC Link voltage at not operating(380V ↑)
4. Check the DC Link voltage at Comp operating(500V ↑)
5. Check DC Link Sensing Signal (Refer the Picture)

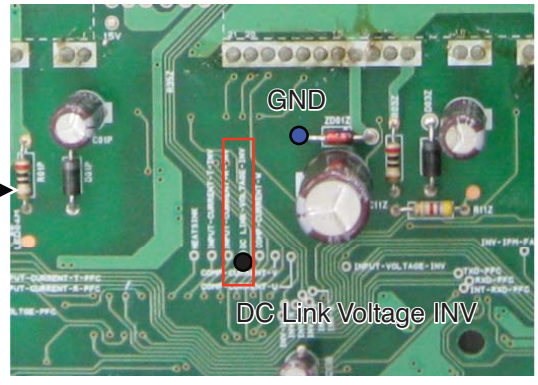


<INVERTER PCB>



<DC Link Voltage Check Point>

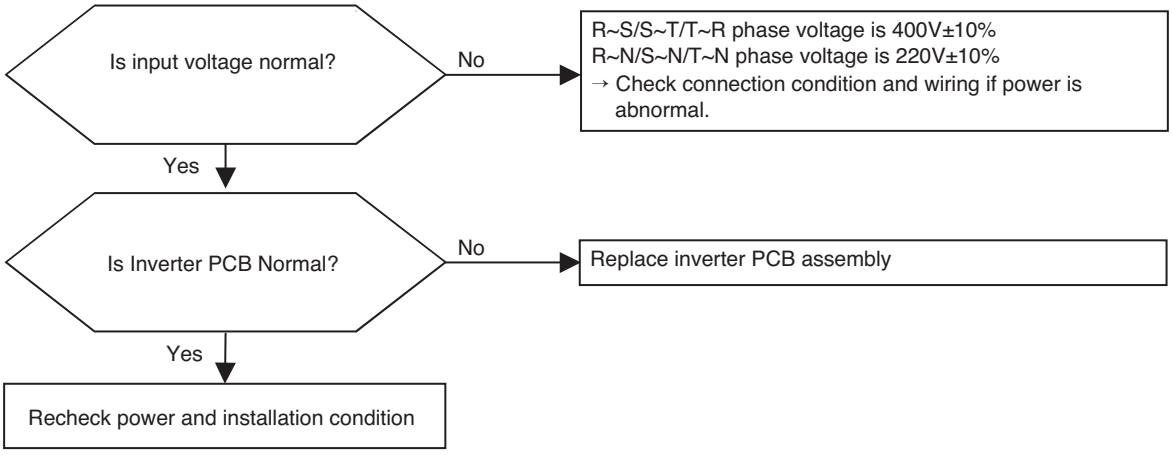


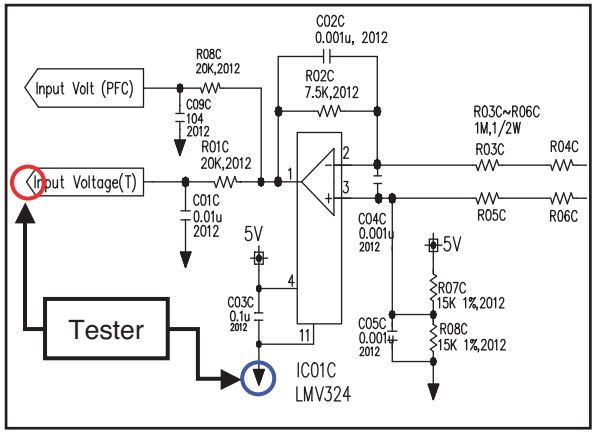


<INPUT VOLTAGE Check Point>

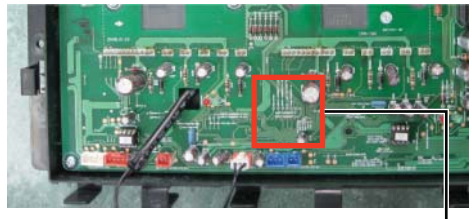
Display code	Title	Cause of error	Check point & Normal condition
25	Input voltage	Abnomal Input Voltage (R,S,T -N /140Vac ↓, 300Vac ↑)	Check the power source. • Check the components.

■ Error Diagnosis and Countermeasure Flow Chart

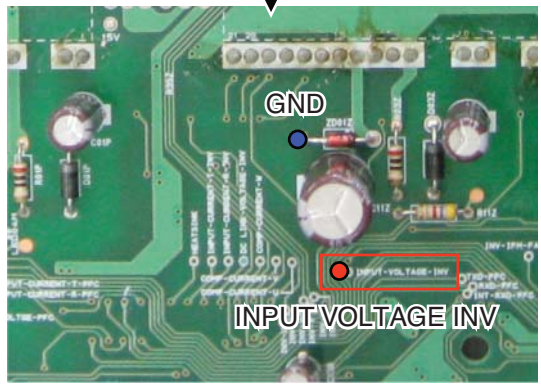




< CH25 Check Point >



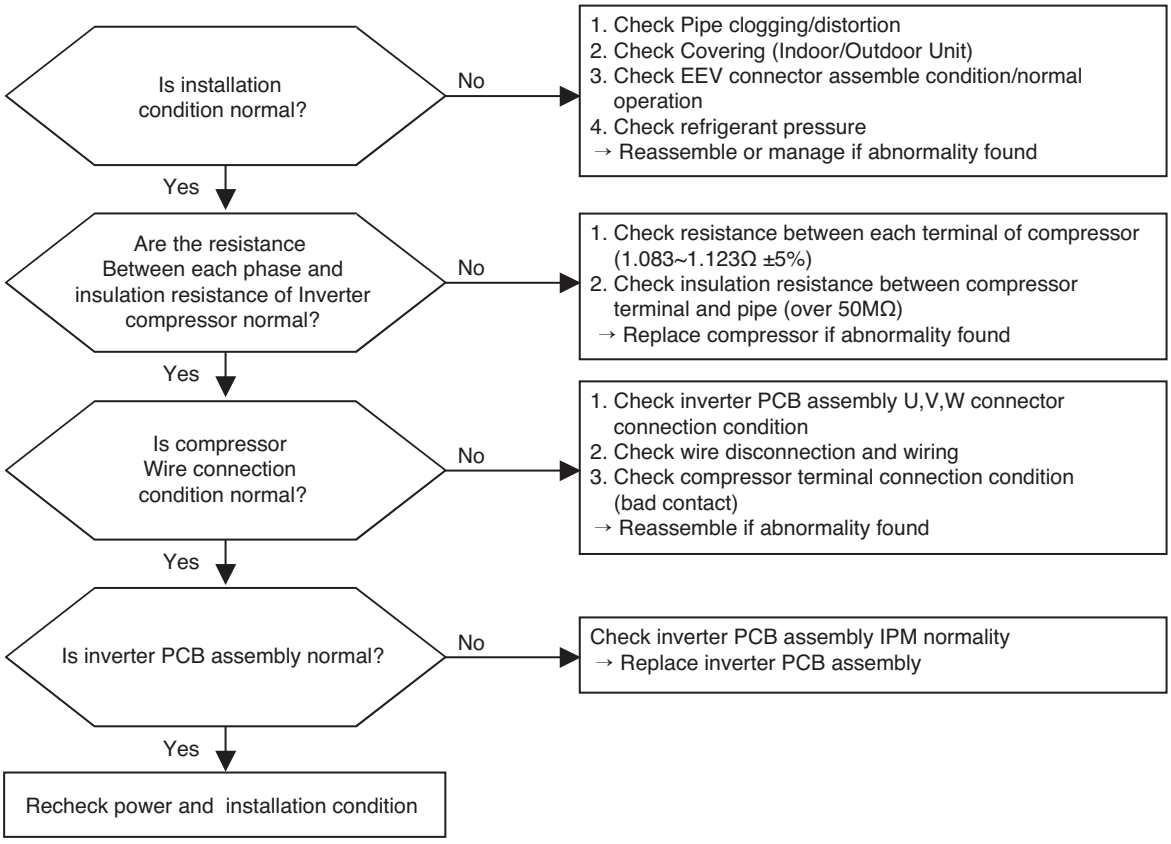
<INVERTER PCB>



<INPUT VOLTAGE Check Point>

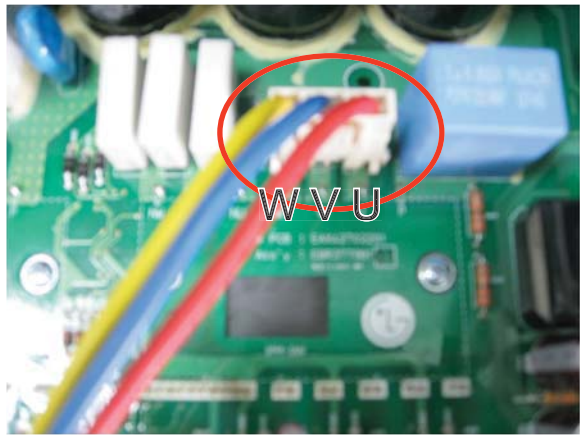
Display code	Title	Cause of error	Check point & Normal condition
26	DC Compressor Position	• Compressor Starting fail error	• Check the connection of comp wire “U,V,W” • Malfunction of compressor • Check the component of “IPM”, detection parts.

■ Error Diagnosis and Countermeasure Flow Chart



Check Point

1. Check the connection condition of PCB.
2. Check the connection condition of Comp. U,V,W wire.
3. Check the comp resistor and insulation resistance .
4. Check the IPM.(Refer 106 page)
5. Check the pressure of refrigerant.
6. Check the Service Valve Open.

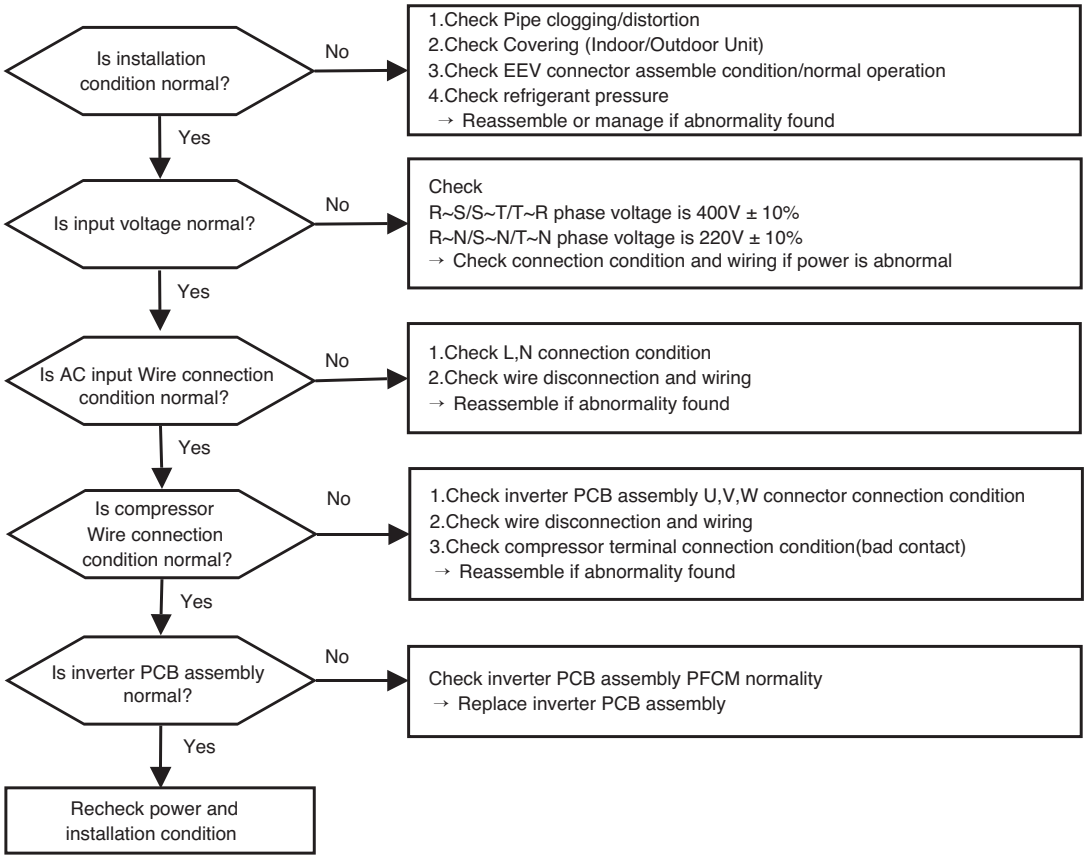


Display code	Title	Cause of error	Check point & Normal condition
27	AC Input Instant over Current Error	Inverter PCB input current is over100A(peak) for 2us	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Input voltage abnormal (L,N) 4. Power line assemble condition abnormal 5. Inverter PCB assembly Damage (input current sensing part)

WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

■ Error Diagnosis and Countermeasure Flow Chart

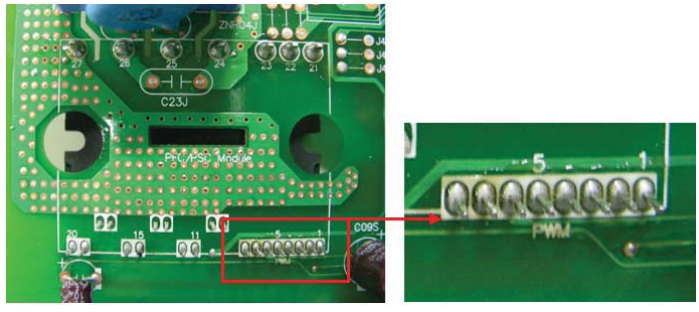


❊ PFCM Moudle checking method

① Set the multi tester to diode mode.

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

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



<Short Check Point>

CAUTION

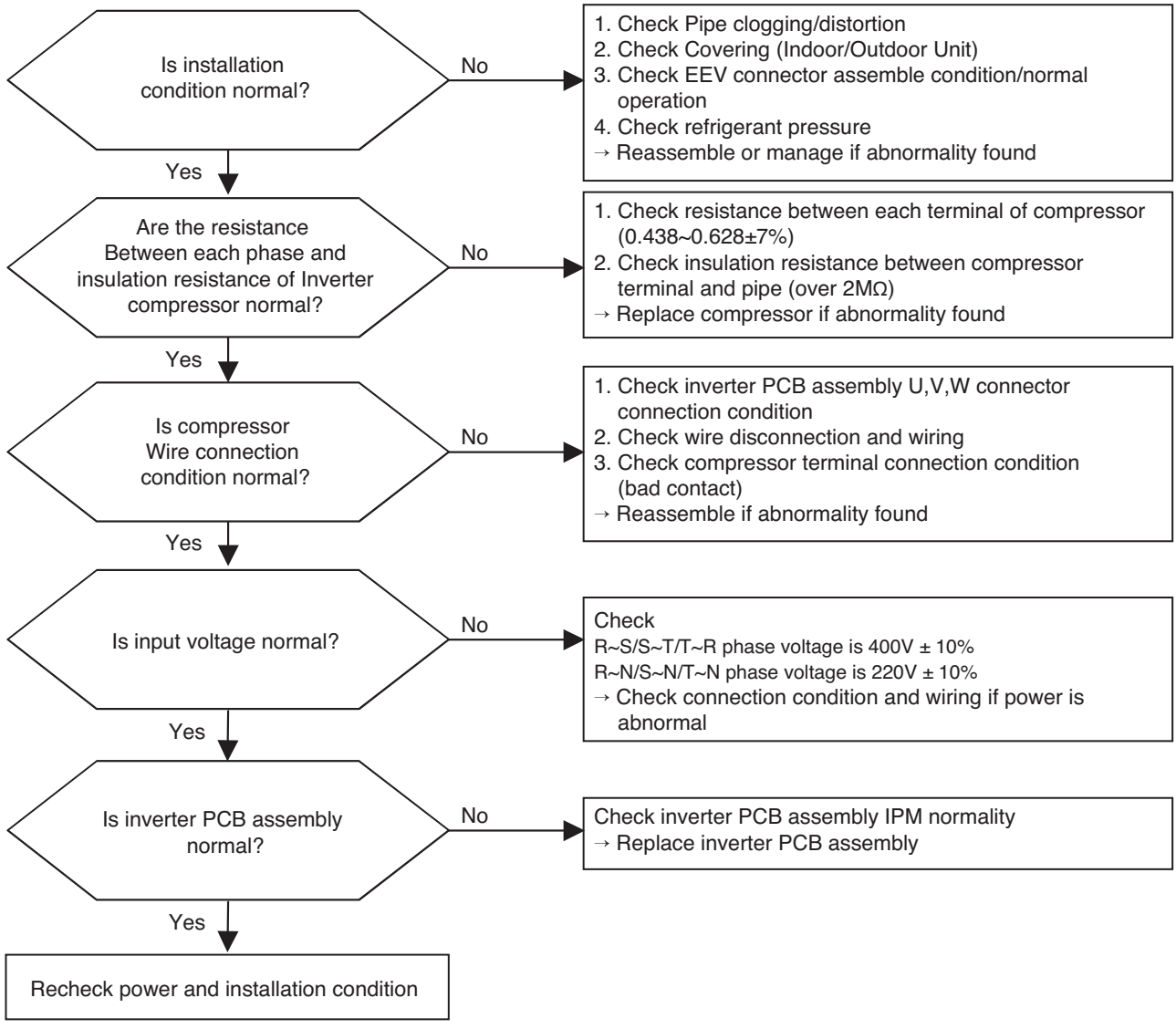
PFCM module No.4,5 pins are internal short state.

Display code	Title	Cause of error	Check point & Normal condition
29	Inverter compressor over current	Inverter compressor input current is over 30A	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. over-charge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU inverter PCB assembly damage

WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

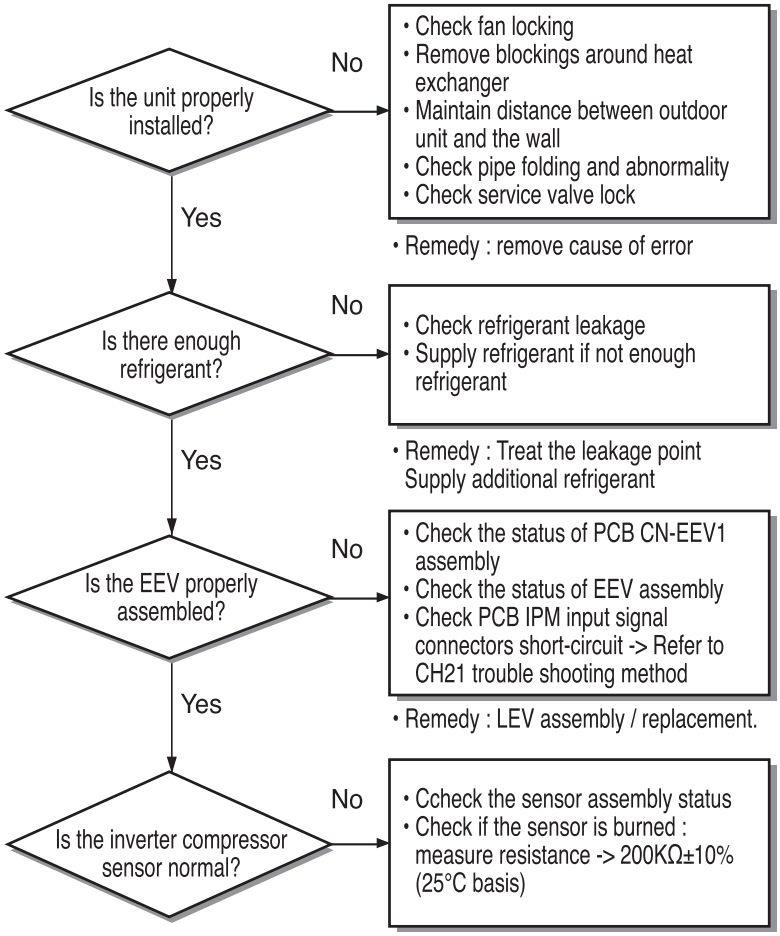
■ Error Diagnosis and Countermeasure Flow Chart



Display code	Title	Cause of error	Check point & Normal condition
32	High temperature in Discharge pipe of the inverter compressor	• Overload operation (Outdoor fan constraint, screened, blocked) • Refrigerant leakage (insufficient) • Poor INV Comp Discharge sensor • LEV connector displaced / poor LEV assembly	• Check outdoor fan constraint/ screened/ flow structure • Check refrigerant leakage • Check if the sensor is normal • Check the status of EEV assembly

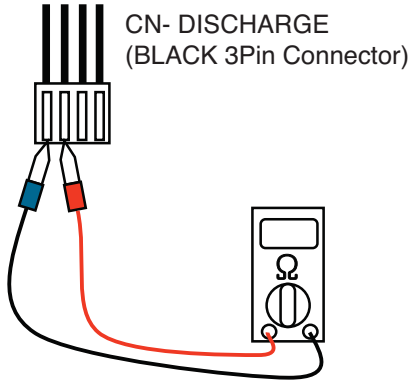
WARNING

Before checking PCB or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



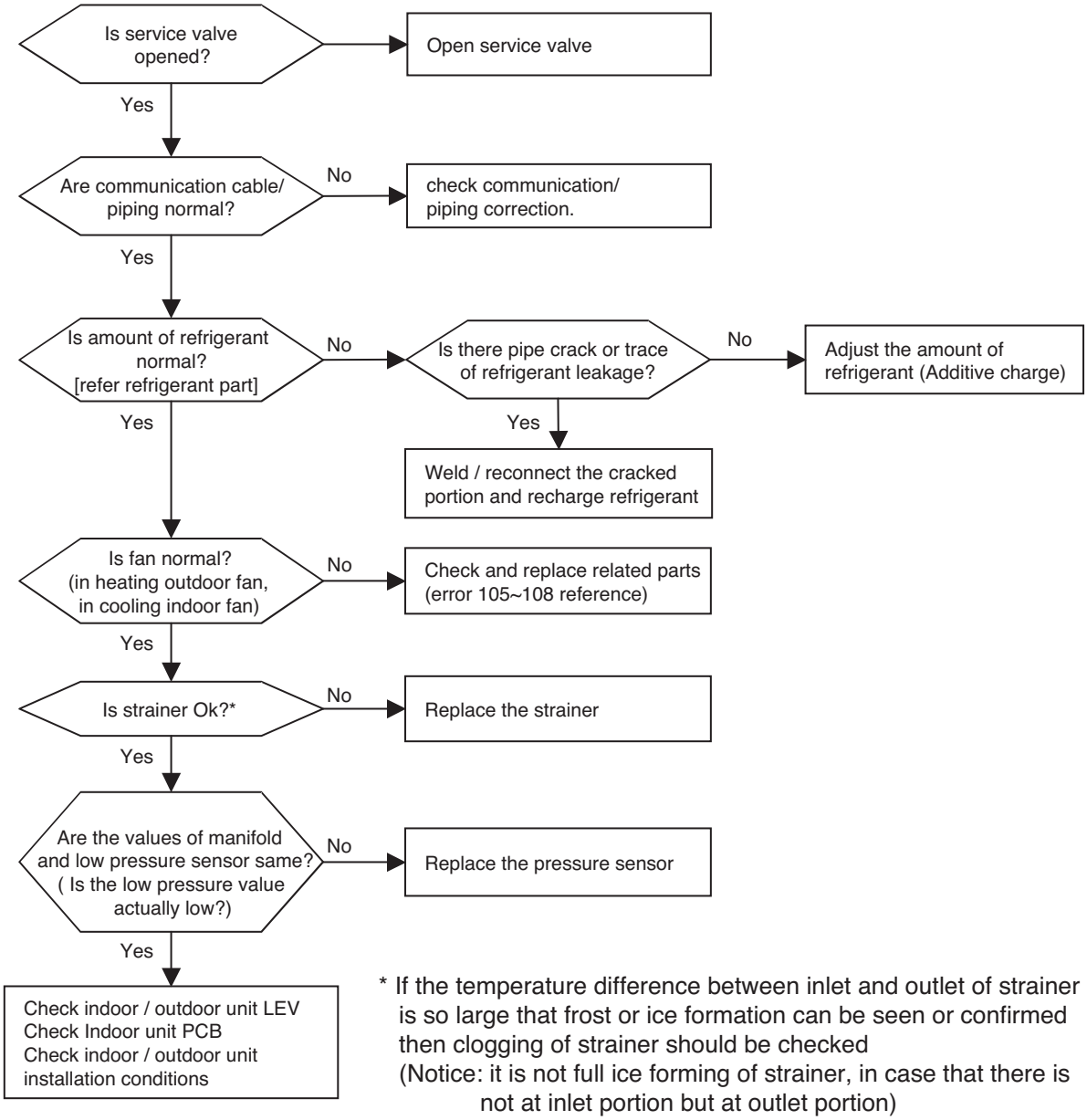
• Inspecting Inverter Compressor Discharge Sensor

1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between inverter discharge sensor connector pins.
3. Measure resistance value of 200KΩ±10%, 25°C basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. (1MΩ or more)



Display code	Title	Cause of error	Check point & Normal condition
35	Low Presser Error	Excessive decrease of low pressure	• Defective low pressure sensor • Defective outdoor/indoor unit fan • Refrigerant shortage/leakage • Deformation because of damage of refrigerant pipe • Defective indoor / outdoor unit EEV • Covering / clogging (outdoor unit covering during the cooling mode / indoor unit filter clogging during heating mode) • SVC valve clogging • Defective outdoor unit PCB • Defective indoor unit pipe sensor

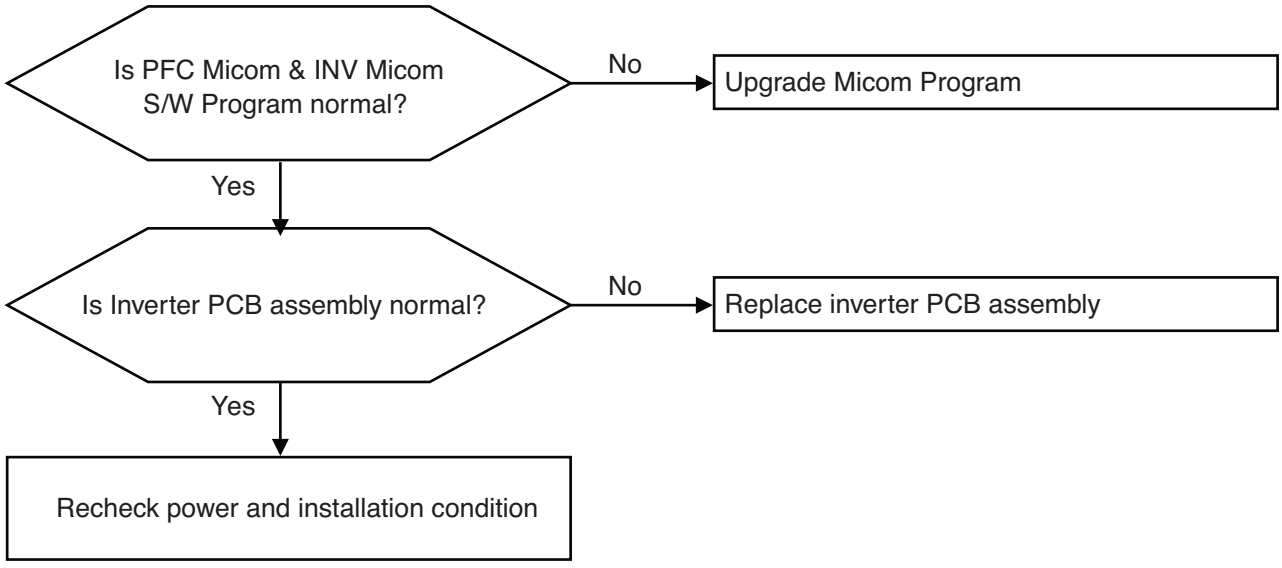
■ Error diagnosis and countermeasure flow chart



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

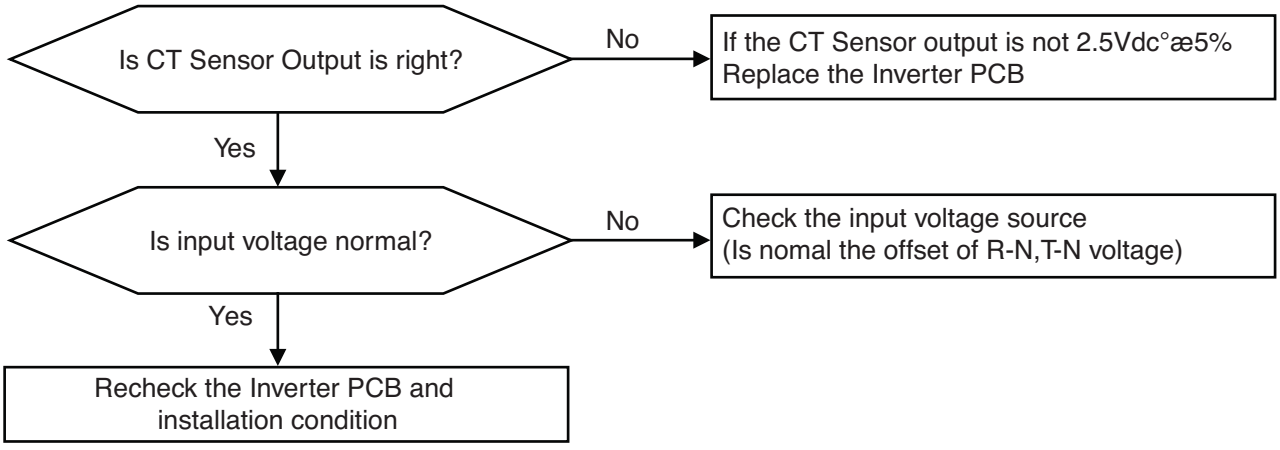
Display code	Title	Cause of error	Check point & Normal condition
39	Transmission Error Between (PFC Micom → INV Micom)	Communication Error Between PFC Micom and INV Micom.	1. Micom defect/Circuit defect 2. Different Micom S/W Version 3. ODU inverter PCB assembly damage

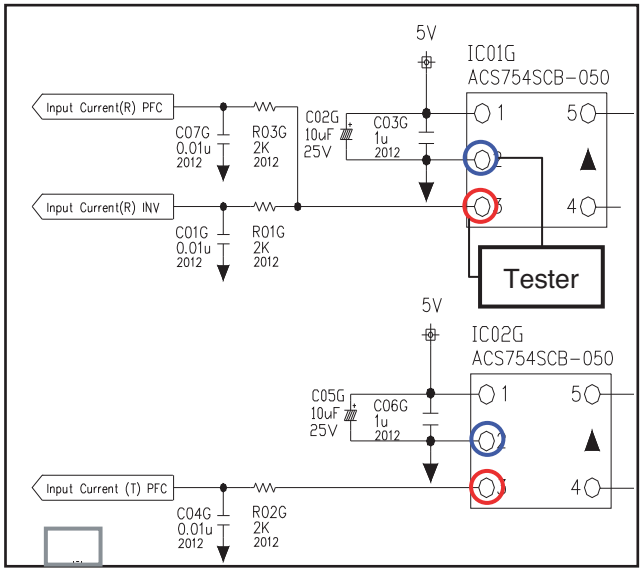
■ Error Diagnosis and Countermeasure Flow Chart

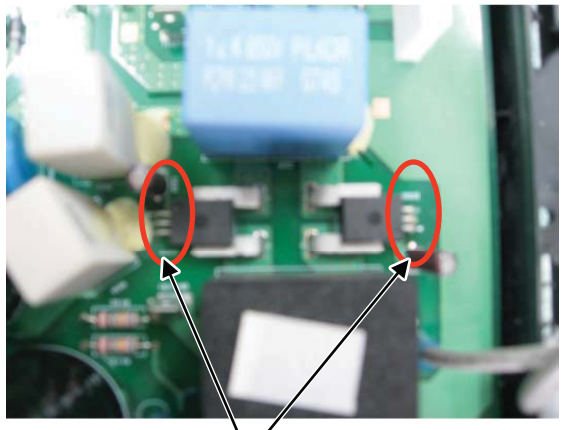


Display code	Title	Cause of error	Check point & Normal condition
40	C/T Sensor Error	• Initial current error	• Malfunction of current detection circuit. (Open / Short) • The voltage of "C01N" Is 4.0Vdc(25A) . • Check CT Sensor output voltage : 2.5Vdc ±5%

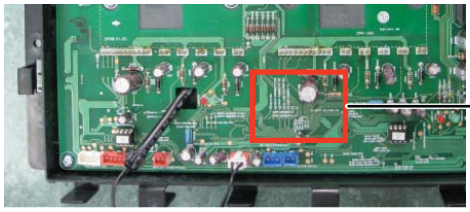
■ Error Diagnosis and Countermeasure Flow Chart



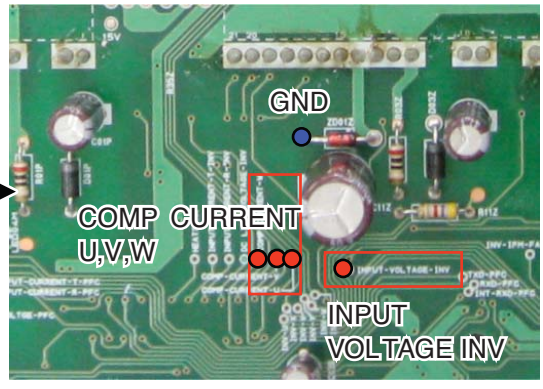




CT Sensor Output
(at the INVERTER PCB)

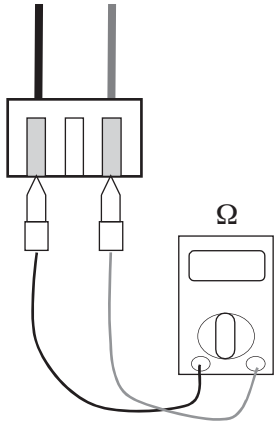


<INVERTER PCB>



<INPUT VOLTAGE Check Point>

Display code	Title	Cause of error	Check point & Normal condition
41	D-pipe sensor (Inverter)	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 200KΩ / at 25°C (Unplugged)
43	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	• Bad connection of connector PCB • Bad connection high pressure connector • Defect of high pressure connector (Open/Short) • Defect of connector PCB (Open/Short) • Defect of outdoor main PCB.
44	Air sensor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 10KΩ / at 25°C (Unplugged)
45	Condenser Mid-pipesen-sor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 5KΩ / at 25°C (Unplugged)
46	Suction Pipe sensor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 5KΩ / at 25°C (Unplugged)
48	Condenser Out-pipe sen-sor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 5KΩ / at 25°C (Unplugged)
65	Heat sink sensor	• Open / Short • Soldered poorly • Internal circuit error	• Normal resistor : 10KΩ / at 25°C (Unplugged)



Check Point

1. Estimate the resistance of each sensor.(Unplugged)
2. Estimate the voltage of each sensor.(Plugged)
3. If the resistance of the sensor is 0 kΩ or ∞, then sensor is abnormal.
   If the voltage of the sensor is 0 V or 5Vdc, then sensor is abnormal.

Display code	Title	Cause of error	Check point & Normal condition
51	Over capacity	• Over capacity	• Check the indoor unit capacity. • Check the combination table.
60	Over capacity	• Check sum error	• Check the PCB ASM P/No. • Check the poor soldering.

Model	Gross Max. Capacity[Btu/h]	Max. Single Indoor Unit Capacity[Btu/h]
A7UW42LFA0	54k	24k
A8UW48LFA0	62k	
A9UW56LFA0	73k	

Check Point

• CH 51

1. Check the indoor unit capacity.
2. Check the combination table.

• CH 60

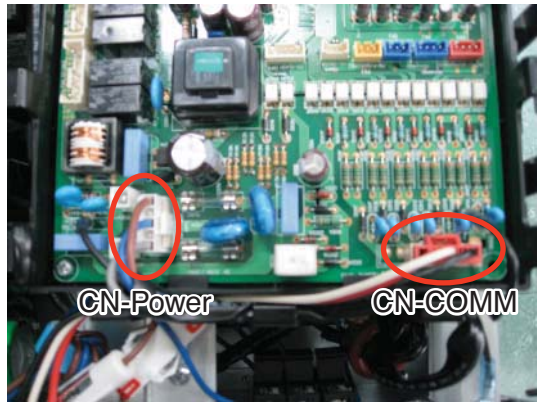
1. Check the insertion condition of EEPROM.
2. Check the poor soldering

Display code	Title	Cause of error	Check point & Normal condition
53	Title Communication (Indoor → Outdoor)	• Communication poorly	• Power input AC 220V. (Outdoor, Indoor) • The connector for transmission is disconnected. • The connecting wires are misconnected. • The communication line is shorted at GND. • Transmission circuit of outdoor PCB is abnormal. • Transmission circuit of indoor PCB is abnormal.

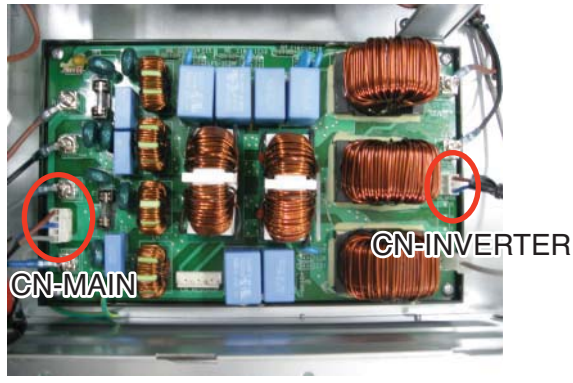
Check Point

1. Check the input power AC230V. (Outdoor, Indoor unit)
2. Check the communication wires are correctly connected.
   Adjust the connection of wire Confirm the wire of "Live", "Neutral"
3. Check the resistance between communication line and GND. (Normal : Over 2MΩ)
4. Check the connector for communication is correctly connected.
5. If one indoor unit is operated normally, outdoor PCB is no problem.
   Check the another indoor unit.
   * CH05 is displayed at indoor unit, CH53 is displayed at outdoor unit.
6. If all indoor unit is displayed CH05 but outdoor PCB not display
   1) In Case of CH05, Check the Connection
      → CN-POWER, CN-COMM at the Main PCB
      → CN-MAIN at the Noise Filter

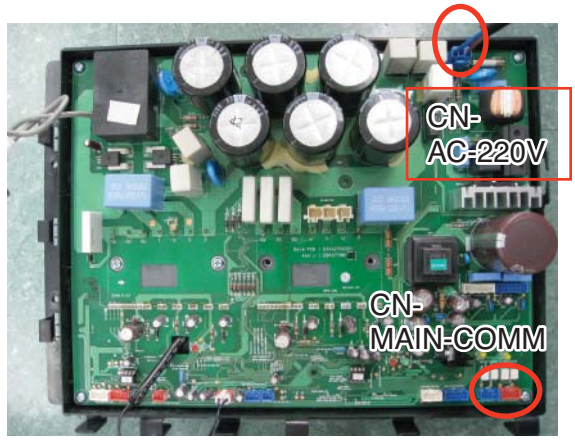
   2) In Case of CH53, Check the Connection
      → CN-COMM at the Main PCB
      → CN-MAIN-COMM, CN-AC-220V at the Inverter PCB
      → CN- INVERTER at the Noise Filter



< MAIN PCB >



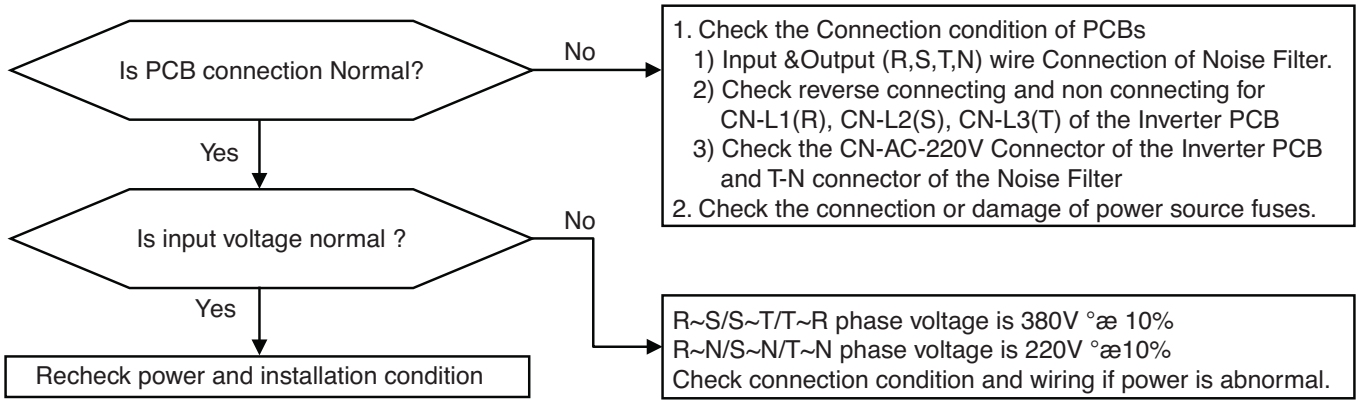
< Noise Filter >

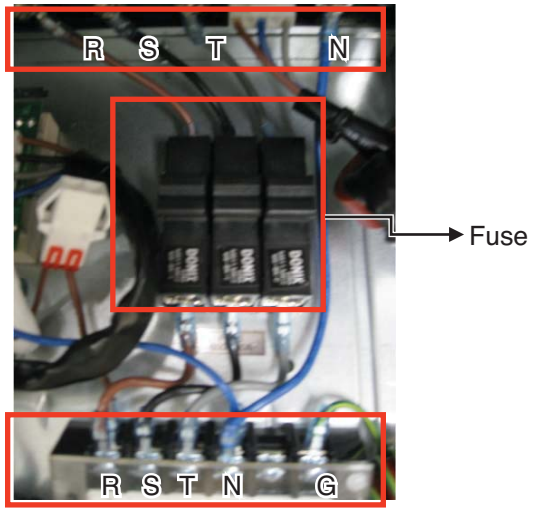


< INVERTER PCB >

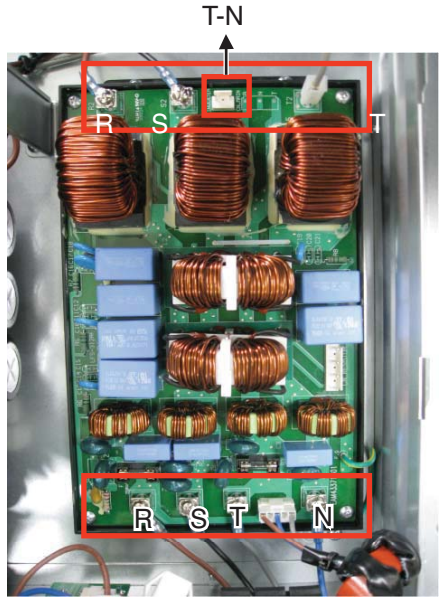
Display code	Title	Cause of error	Check point & Normal condition
54	3-phase wrong wiring of main outdoor unit	• 3-phase wrong wiring of outdoor unit (Reverse Phase /omission of phase)	• Abnormal Main PCB • No connection of CN_Phase • Changed R, S, T connection order

■ Error Diagnosis and Countermeasure Flow Chart

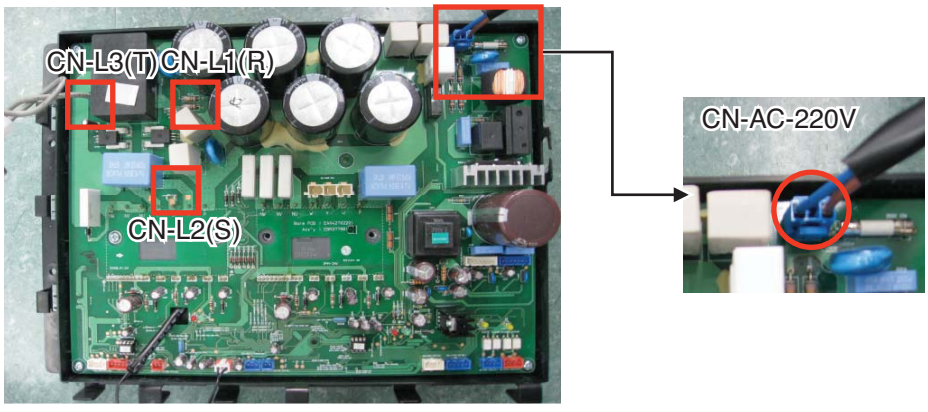




<Terminal Block&Fuse Check>

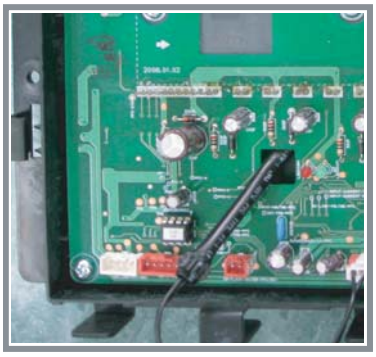


<Noise Filter Connection Check>



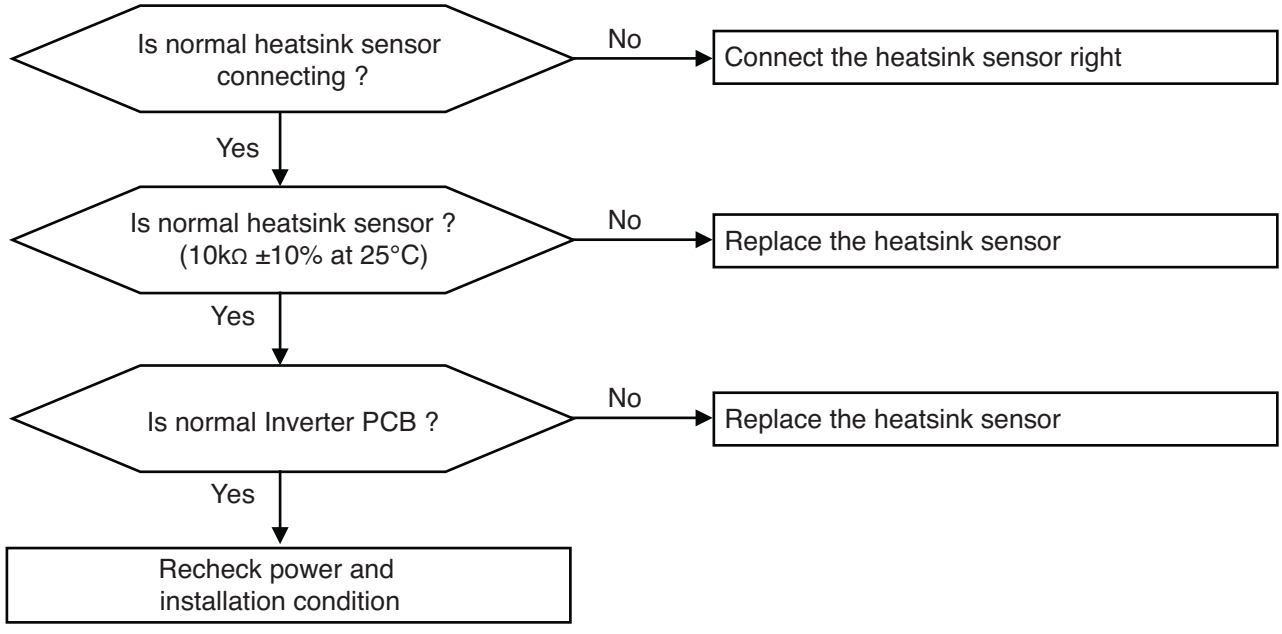
<INVERTER PCB Connection Check>

Display code	Title	Cause of error	Check point & Normal condition
61	Condenser pipe sensor temp. high	• Condenser pipe sensor detected high temp.(65°C)	• Check the load condition. • Check the sensor of Condenser pipe sensor.
62	Heat sink sensor temp. high	• Heat sink sensor detected high temp.(85°C)	• Check the Heat sink sensor (10kΩ ±10% at 25°C) • Check that outdoor fan is driving rightly



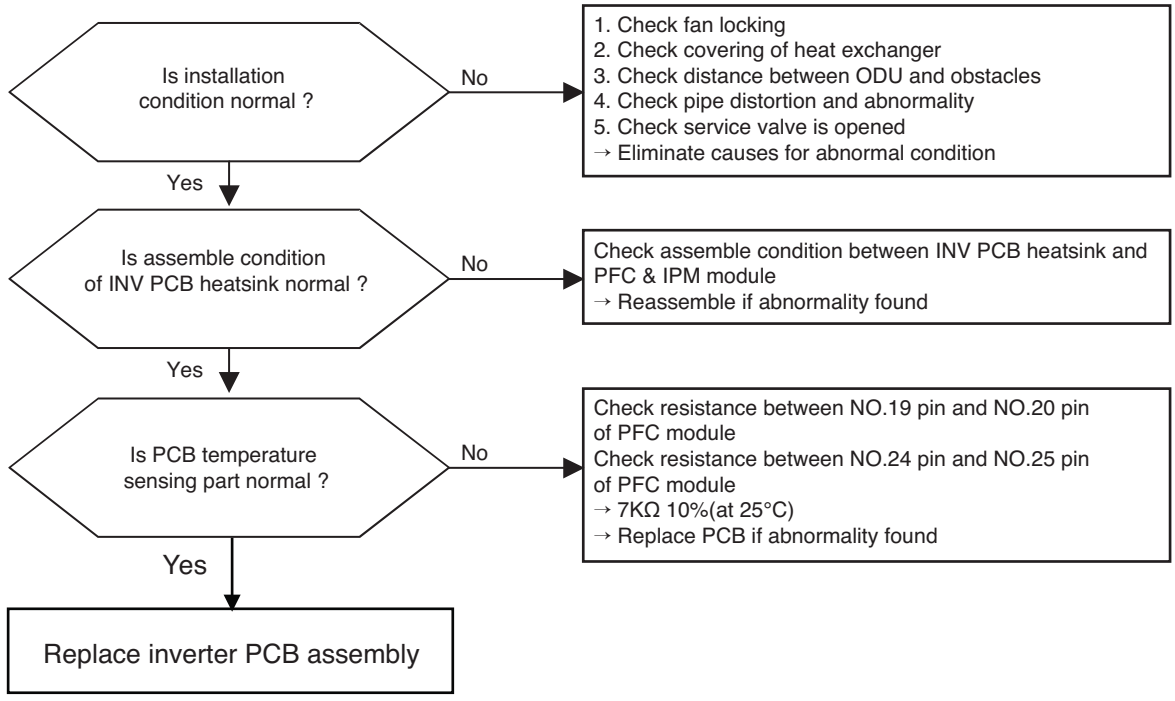
Comp frequecy control accoding to heatsink temp.

■ Comp frequency control according to heat sink temp.



Display code	Title	Cause of error	Check point & Normal condition
65	Heatsink Sensor error	Inverter PCB heatsink sensor is open or short	1. ODU fan locking 2. Heatsink assembly of INV PCB assemble condition abnormal 3. Defect of temperature sensing circuit part defect of INV PCB

■ Error Diagnosis and Countermeasure Flow Chart

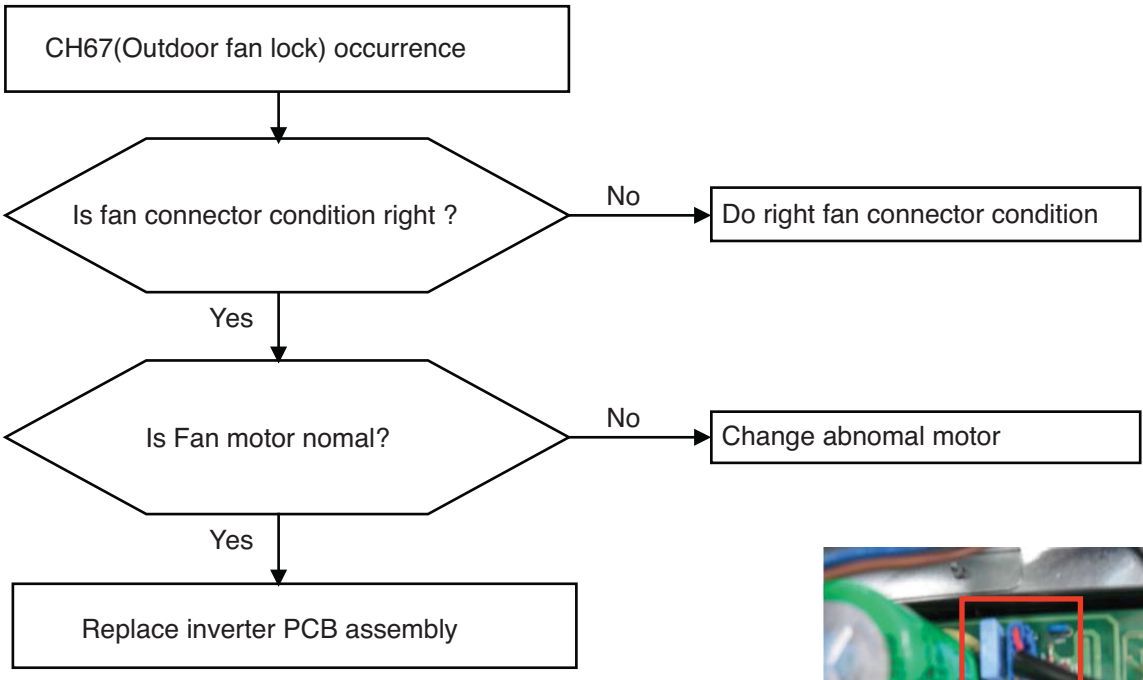


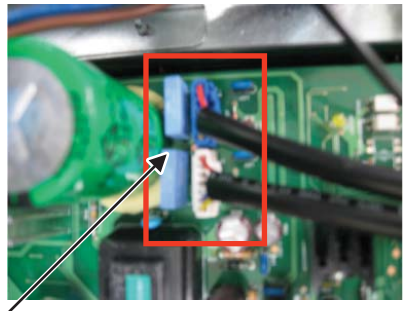
Check Point

1. Check resistance between No.19 pin and NO.20 pin of PCB PFC module
2. Check resistance between No.24 pin and NO.25 pin of PCB PFC module - only 48/56k
3. Resistance value should be in 7kΩ ±10%.(at 25°C).
4. Check the PFC Module No.19, 20 and IPM Module No.24, 25 pin soldering condition.

Display code	Title	Cause of error	Check point & Normal condition
67	Outdoor fan lock	• Outdoor fan is not operating	• Check the fan condition. • Check the fan connector • Check the fan control part of the INVERTER PCB

■ Error Diagnosis and Countermeasure Flow Chart





<INVERTER PCB connection>

<fan motor middle connection>

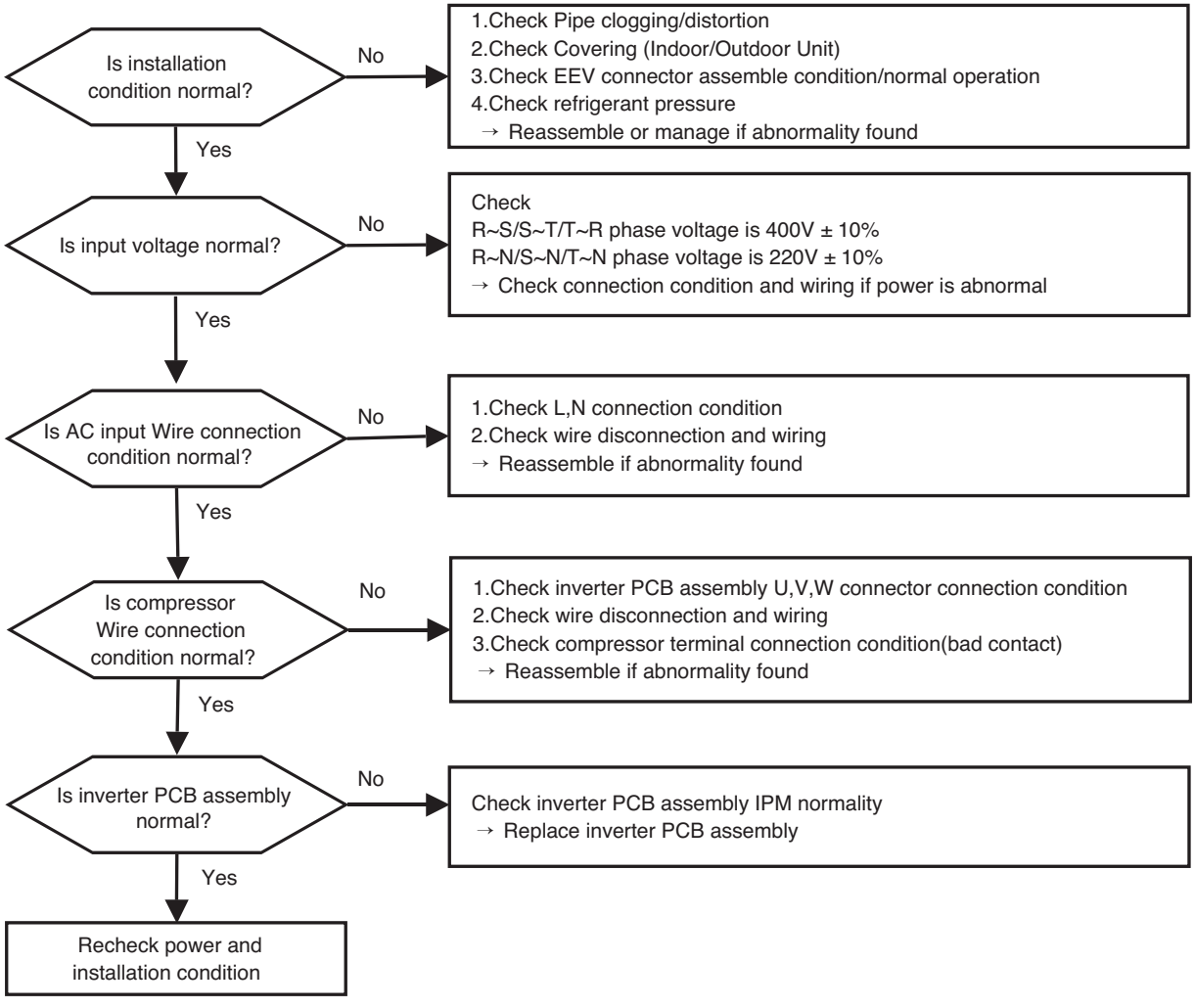
<FAN Motor Connection check>

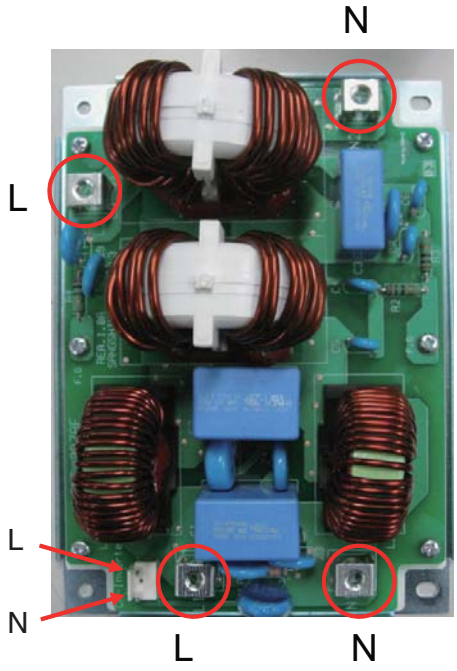
Check Point

1.Check error code again, after replacing the abnormal part (Fan Motor or PCB) first.

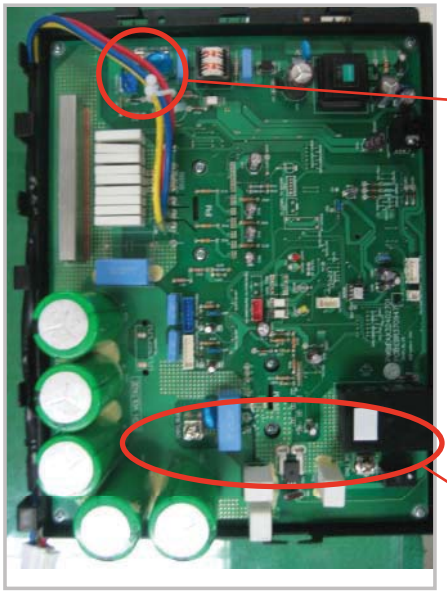
Display code	Title	Cause of error	Check point & Normal condition
73	AC input instant over current error (Matter of software)	Inverter PCB input power current is over 48A(peak) for 2ms	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref.overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Input voltage abnormal (L, N) 4. Power line assemble condition abnormal 5. Inverter PCB assembly damage (input current sensing part)

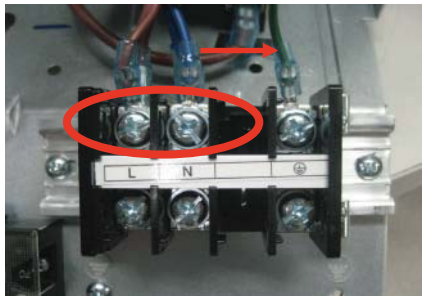
■ Error Diagnosis and Countermeasure Flow Chart



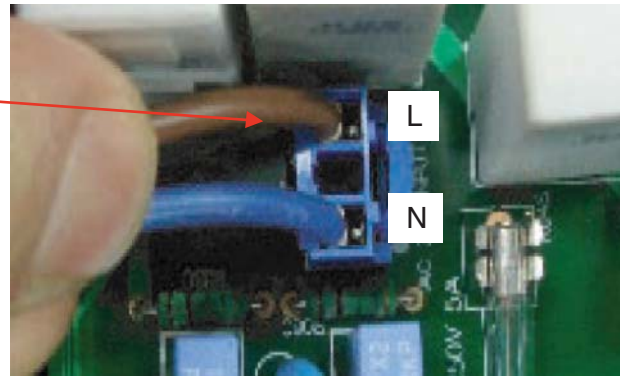


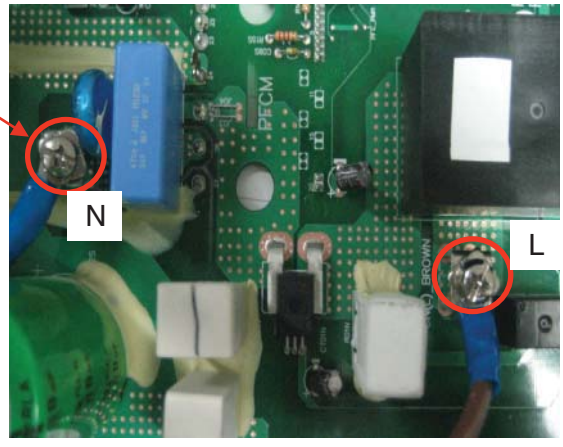
< Noise Filter wiring Check Point >





< Input Power Source Check Point >





< Inverter PCB wiring Check Point >

Part 6 Service Order

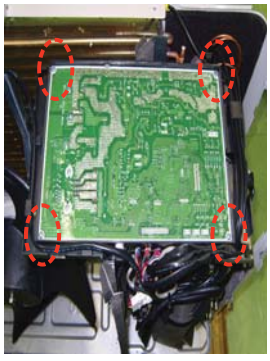
1. PCB Service Order

▶ **14/16/18/21k**

1

Remove Top Cover and Control Box Cover

2



Remove PCB Screws (4ea)

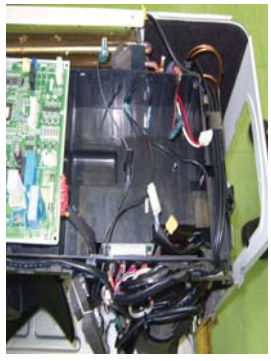
3

Raise PCB and take terminals from PCB

4

Take Terminals from PCB with a tool

5



Replace New PCB

6

Re-wire terminal

7

Hang wires up on the Rib from Case and Insert PCB into Control Box

8

Tighten PCB Screws (4ea)

9

Assemble C/Box and Top Cover into a complete whole

P/NO : MFL36552524

December, 2017