Internal Use Only

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THERMA V™ System

SVC MANUAL

MODEL: AH Series

CAUTION

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

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Safety Precautions

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

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

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

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

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

⚠WARNING

■ Installation

Ask the dealer or an authorized technician to install the air conditioner.

• Improper installation by the user may result in water leakage, electric shock, or fire.

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

• This could result in personal injury and product damage.

Always ground the product.

• There is risk of fire or electric shock.

Always intstall a dedicated circuit and breaker.

• Improper wiring or installation may cause fire or electric shock.

For re-installation of the installed product, always contact a dealer or an Authorized Service Center.

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

Do not install, remove, or re-install the unit by yourself (customer).

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

Do not store or use flammable gas or combustibles near the air conditioner.

• There is risk of fire or failure of product.

Use the correctly rated breaker or fuse.

• There is risk of fire or electric shock.

Prepare for strong wind or earthquake and install the unit at the specified place.

- Improper installation may cause the unit to topple and result in injury.

Do not install the product on a defective installation stand.

- It may cause injury, accident, or damage to the product.

When installing and moving the air conditioner to another site, do not charge it with a different refrigerant from the refrigerant specified on the unit.

- If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.

Do not reconstruct to change the settings of the protection devices.

- If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by LGE are used, fire or explosion may result.

Ventilate before operating air conditioner when gas leaked out.

- It may cause explosion, fire, and burn.

Securely install the cover of control box and the panel.

- If the cover and panel are not installed securely, dust or water may enter the outdoor unit and fire or electric shock may result.

■ Operation

Do not damage or use an unspecified power cord.

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

Use a dedicated outlet for this appliance.

- There is risk of fire or electrical shock.

Be cautious that water could not enter the product.

- There is risk of fire, electric shock, or product damage.

Do not touch the power switch with wet hands.

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

When the product is soaked (flooded or submerged), contact an Authorized Service Center.

- There is risk of fire or electric shock.

Be cautious not to touch the sharp edges when installing.

- It may cause injury.

⚠CAUTION

■ Installation

Always check for gas (refrigerant) leakage after installation or repair of product.

- Low refrigerant levels may cause failure of product.

Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.

- It may cause a problem for your neighbors.

Keep level even when installing the product.

- To avoid vibration or water leakage.

Do not install the unit where combustible gas may leak.

- If the gas leaks and accumulates around the unit, an explosion may result.

Use power cables of sufficient current carrying capacity and rating.

- Cables that are too small may leak, generate heat, and cause a fire.

Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.

- There is risk of damage or loss of property.

Keep the unit away from children. The heat exchanger is very sharp.

- It can cause the injury, such as cutting the finger. Also the damaged fin may result in degradation of capacity.

When installting the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.

- The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.

Do not install the product where it is exposed to sea wind (salt spray) directly.

- It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

■ Operation

Do not use the air conditioner in special environments.

- Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.

Do not block the inlet or outlet.

- It may cause failure of appliance or accident.

Make the connections securely so that the outside force of the cable may not be applied to the terminals.

- Inadequate connection and fastening may generate heat and cause a fire.

Be sure the installation area does not deteriorate with age.

- If the base collapses, the air conditioner could fall with it, causing property damage, product failure, or personal injury.

Install and insulate the drain hose to ensure that water is drained away properly based on the installation manual.

- A bad connection may cause water leakage.

Be very careful about product transportation.

- Only one person should not carry the product if it weighs more than 20 kg.
- Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
- Do not touch the heat exchanger fins. Doing so may cut your fingers.
- When transporting the outdoor unit, suspending it at the specified positions on the unit base. Also support the outdoor unit at four points so that it cannot slip sideways.

Safely dispose of the packing materials.

- Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
- Tear apart and throw away plastic packaging bags so that children may not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.

Turn on the power at least 6 hours before starting operation.

- Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

Part 1
General Information

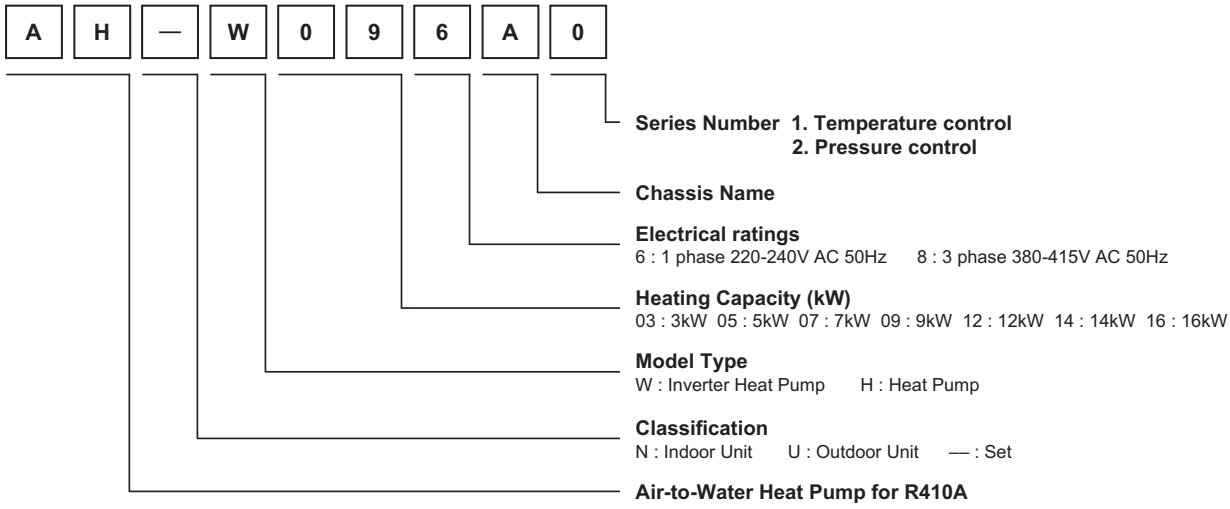
1. Model Information

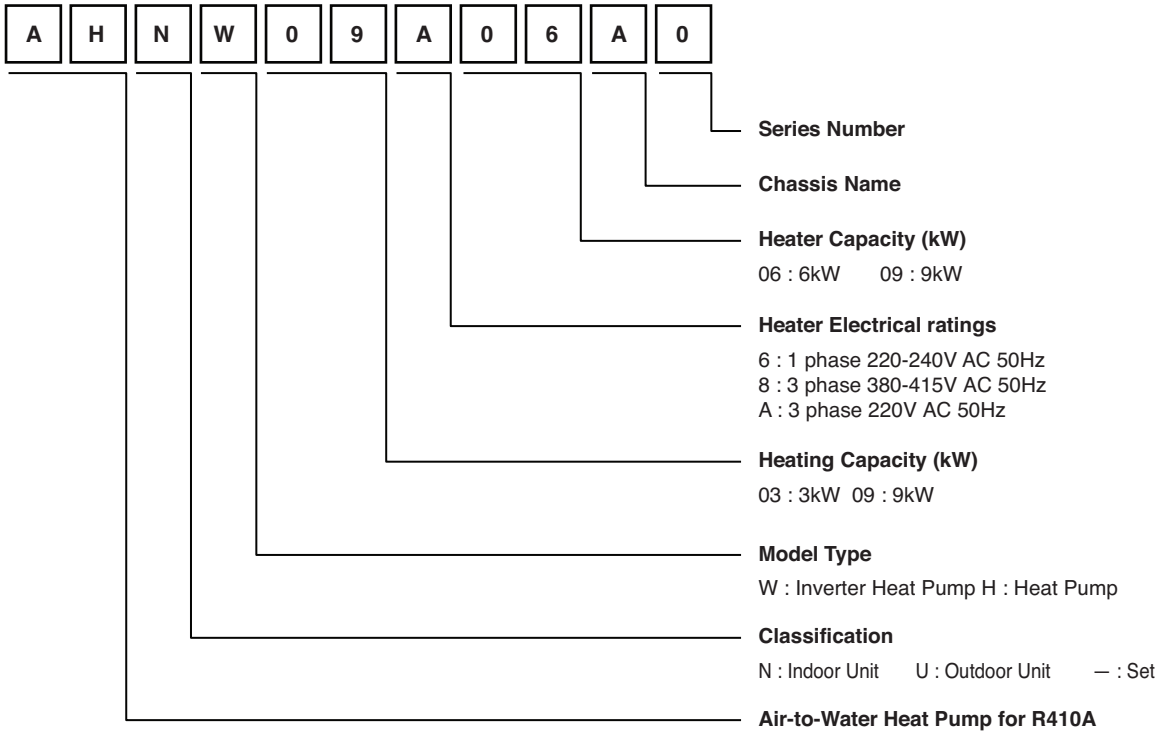
With advanced inverter technology, THERMAV is suitable for applications like under floor heating, under floor cooling, and hot water generation. By Interfacing to various accessories user can customize the range of the application.

In this chapter, general information of THERMAV is presented to identify the installation procedure. Before beginning installation, read this chapter carefully and find helpful information on installation.

1. Model Information

Model number nomenclature





Model name and related information

Model Name		Built-In Electric Heater(kW)	Power Source (Electric Heater)	Capacity		Power Source (Unit)
Outdoor Unit	Indoor Unit			Heating(kW)*1	Cooling(kW)*1	
AHUW036A2	AHNW03604A2	4(2+2)	220-240 V ~50Hz	3	3	220-240 V ~50Hz
AHUW056A2	AHNW09604A2	4(2+2)	220-240V ~50Hz	5	5	
AHUW076A2	AHNW09604A2	4(2+2)	220-240V ~50Hz	7	7	
AHUW096A2	AHNW09604A2	4(2+2)	220-240V ~50Hz	9	9	
AHUW126A2	AHNW16606A2	6(3+3)	220-240V ~50Hz	12	12	
AHUW146A2	AHNW16606A2	6(3+3)	220-240V ~50Hz	14	14	
AHUW166A2	AHNW16606A2	6(3+3)	220-240V ~50Hz	16	16	
AHUW128A2	AHNW16806A2	6(2+2+2)	380-415V ~50Hz	12	12	380-415V ~50Hz
AHUW148A2	AHNW16806A2	6(2+2+2)	380-415V ~50Hz	14	14	
AHUW168A2	AHNW16806A2	6(2+2+2)	380-415V ~50Hz	16	16	

*1 : tested under Eurovent Heating condition (water temperature 30°C → 35°C at outdoor ambient temperature 7°C / 6°C)

*2 : tested under Eurovent Cooling condition (water temperature 23°C → 18°C at outdoor ambient temperature 35°C / 24°C)

2. Specification

Indoor

Indoor Units			AHNW03604A2	AHNW09604A2	AHNW16606A2	AHNW16806A2
Combination Outdoor Units			AHUW036A2	AHUW056A2	AHUW126A2	AHUW128A2
				AHUW076A2	AHUW146A2	AHUW148A2
				AHUW096A2	AHUW166A2	AHUW168A2
Nominal Power Input		W	45	45	130	130
Nominal Running Current without Electric Heater		A	0.89	0.89	0.89	0.89
Operation Range (Min.~Max.) Leaving Water Temperature	Cooling(Fan coil unit)	°C	6 ~ 30	6 ~ 30	6 ~ 30	6 ~ 30
	Cooling(Under floor)	°C	16 ~ 30	16 ~ 30	16 ~ 30	16 ~ 30
	Heating(Fan coil unit or Radiator)	°C	15~57°C (* * 20~55°C)			
	Heating(Under floor)	°C	15~57°C (* * 20~55°C)			
Pump	Type	-	Canned type for hot water circulation			
	Steps of Speed	EA	2 (In Max. / Med. / Min., Min. step is not used)			
	Power Input	W	45	45	130	130
	Water Flowrate Limit	LPM	At least 15.0			
Heat Exchanger	Type	-	Brazed Plate HEX			
	Number of Plate	EA	32	54	76	76
	Quantity	EA	1			
Expansion Vessel	Volume	liter	8			
	Water Pressure(Max.)	bar	3			
	Water Pressure(Pre)	bar	1			
Strainer	Mesh Size	mm	1 X 1			
	Material	-	Stainless steel			
Electric Heater	Type	-	Sheath	Sheath	Sheath	Sheath
	Number of Heating Coil	EA	2	2	2	3
	Capacity Combination	kW	2+2	2+2	3+3	2+2+2
	Operation	-	Automatic	Automatic	Automatic	Automatic
	Heating Steps	step	2	2	2	2
	Power Supply	Ø / V / Hz	1/240/50	1/240/50	1/240/50	3/380~415/50
	Rated Current	A	16.7	16.7	25	9
	Maximum Current(MCA)	A	21	21	32	12
Water Circuit	Safety Valve	bar	3			
	Entering Side Diameter	inch	Male PT 1			
	Leaving Side Diameter	inch	Male PT 1			
	Manometer	-	O			
	Drain Valve / Fill Valve	-	O			
	Shut Off Valve	-	O			
	Air Vent	-	O			
Refrigerant Circuit	Gas Side Diameter	mm(inch)	12.7 (1/2)	15.88 (5/8)		
	Liquid Side Diameter	mm(inch)	6.35 (1/4)	9.52 (3/8)		
Dimensions	Unit(W x H x D)	mm	850 X 490 X 315			
	Packed Unit(W x H x D)	mm	1082 X 563 X 375			
Weight (Without water)	Unit	kg	45.5	47.5	52	52
	Packed Unit	kg	49.3	51.3	59	59
*Sanitary Water Tank (Field Supply)	Type	-	Indirect heating(+Electric heater)			
	Heater Capacity	kW	Max. 3			
	Power Supply	Ø / V / Hz	1/230/50			
	Power Supply Type	-	Separated Power Source			
	Thermal Protector Range	°C	Max. 90			
	Relay Contactor	-	Needed			
	ELB	A	40			
	Sensor Adaptor Diameter	mm(inch)	12.7 (1/2)			
	Accessory Kit	-	LG Supply			
	MCCB	A	32			

Note : 1. The specification may be subject to change without prior notice for purpose of improvement.
2. * : This information is given as a guideline about the connection of sanitary water tank
3. ** : This specification is data when electric heater is not used.

Outdoor

Outdoor Units			AHUW036A2	AHUW056A2	AHUW076A2	AHUW096A2
Combination Indoor Units			AHNW03604A2	AHNW09604A2	AHNW09604A2	AHNW09604A2
Power Supply		Ø / V / Hz	1/220-240/50	1/220-240/50	1/220-240/50	1/220-240/50
Maximum Running Current	Cooling	A	10	13	14	15
	Heating	A	10	13	14	15
Wiring Connections	For Power Supply (Included Earth)	Number of wires	3	3	3	3
	For Connection with Indoor Unit (Included Earth)	Number of wires	4	4	4	4
* Capacity	Cooling(Under floor)	kW	3	5	7	9
	Heating(Under floor)	kW	3	5	7	9
* Power Input	Cooling(Under floor)	kW	0.87	1.40	2.05	3.06
	Heating(Under floor)	kW	0.67	1.10	1.59	2.13
* EER	Cooling(Under floor)	W/W	3.50	3.57	3.41	2.94
* COP	Heating(Under floor)	W/W	4.50	4.55	4.40	4.23
Operation Range (Min.~Max.) Outdoor Temperature	Cooling	°C DB	5 ~ 48	5 ~ 48	5 ~ 48	5 ~ 48
	Heating	°C DB	-20 ~ 30	-20 ~ 30	-20 ~ 30	-20 ~ 30
Compressor	Type	-	Hermetic Motor	Hermetic Motor	Hermetic Motor	Hermetic Motor
	Model	-	GKT141MBC	GJT240MAA	GJT240MAA	GJT240MAA
	Quantity	EA	1	1	1	1
	Displacement	cm^3/Rev.	14.1	24	24	24
	Capacity	kW	4.24	7.41	7.41	7.41
Compressor Motor	Type	-	Brushless	Brushless	Brushless	Brushless
	Quantity	EA	1	1	1	1
	Rated Output	W	1,500	2,137	2,137	2,137
Refrigerant	Type	-	R410A	R410A	R410A	R410A
	Charge	g	1000	1550	1550	1550
	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve
Refrigerant Oil	Type	-	FVC68D	FVC68D	FVC68D	FVC68D
	Charged Volume	cc	570	900	900	900
Heat Exchanger	Quantity	EA	1	1	1	1
	Rows	EA	2	2	2	2
	Columns	EA	28	38	38	38
	FPI	Fins/inch	14	14	14	14
Fan	Type	-	Propeller	Propeller	Propeller	Propeller
	Quantity	EA	1	1	1	1
	Air Flow Rate	CMM(l/s)	50	58	58	58
Fan Motor	Model	-	BLDC	BLDC	BLDC	BLDC
	Quantity	EA	1	1	1	1
	Output	W	85.4	124	124	124
Sound Pressure Level	Cooling	dB(A)+3	48	48	48	48
	Heating	dB(A)+3	51	52	52	52
Liquid Piping Connection	Type	-	Flare	Flare	Flare	Flare
	Outer Diameter	mm(inch)	Ø 6.35 (1/4)	Ø 9.52 (3/8)	Ø 9.52 (3/8)	Ø 9.52 (3/8)
Gas Piping Connection	Type	-	Flare	Flare	Flare	Flare
	Outer Diameter	mm(inch)	Ø 12.7 (1/2)	Ø 15.88 (5/8)	Ø 15.88 (5/8)	Ø 15.88 (5/8)
Piping Length (Outdoor Unit ~ Indoor Unit)	Minimum	m	3	3	3	3
	Standard	m	7.5	7.5	7.5	7.5
	Maximum	m	30	50	50	50
Height Difference (Outdoor Unit ~ Indoor Unit)	Maximum	m	30	30	30	30
Additional Refrigerant Charge		g/m	20	40	40	40
Dimensions	Unit(W x H x D)	mm	870 X 655 X 320	834 X 950 X 330	834 X 950 X 330	834 X 950 X 330
	Packed Unit(W x H x D)	mm	1,140 x 900 x 461	1,140 x 900 x 461	1,140 x 900 x 461	1,140 x 900 x 461
Weight	Unit	kg	46	60	60	60
	Packed Unit	kg	50	66	66	66

Note :

1. Capacities and power inputs are based on the following conditions:
   * : Cooling conditions - Indoor Water Temperature 23°C/18°C; Outdoor Air Temperature 35°CDB/24°CWB
   Heating conditions - Indoor Water Temperature 30°C/35°C; Outdoor Air Temperature 7°CDB/6°CWB
   Standard piping length 7.5m
2. Wiring cable size must comply with the applicable local and national code.
3. The specification may be subject to change without prior notice for purpose of improvement.

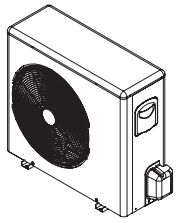
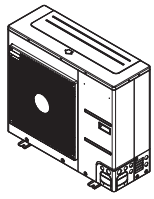
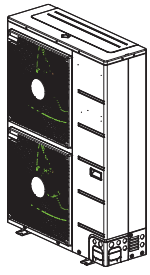
Outdoor Units			AHUW126A2	AHUW146A2	AHUW166A2
Combination Indoor Units			AHNW16606A2	AHNW16606A2	AHNW16606A2
Power Supply		Ø / V / Hz	1/220-240/50	1/220-240/50	1/220-240/50
Maximum Running	Cooling	A	32	32	32
Current	Heating	A	32	32	32
Wiring Connections	For Power Supply (Included Earth)	Number of wires	3	3	3
	For Connection with Indoor Unit (Included Earth)	Number of wires	4	4	4
* Capacity	Cooling(Under floor)	kW	12	14	16
	Heating(Under floor)	kW	12	14	16
* Power Input	Cooling(Under floor)	kW	4.00	4.69	5.07
	Heating(Under floor)	kW	2.67	3.15	3.81
* EER	Cooling(Under floor)	W/W	3.63	3.30	3.18
* COP	Heating(Under floor)	W/W	4.49	4.44	4.20
Operation Range(Min.~Max.)	Cooling	°C DB	5 ~ 48	5 ~ 48	5 ~ 48
Outdoor Temperature	Heating	°C DB	-20 ~ 30	-20 ~ 30	-20 ~ 30
Compressor	Type	-	Hermetic Motor	Hermetic Motor	Hermetic Motor
	Model	-	GPT442MBA	GPT442MBA	GPT442MBA
	Quantity	EA	1	1	1
	Displacement	cm^3/Rev.	44.2	44.2	44.2
	Capacity	kW	13.92	13.92	13.92
Compressor Motor	Type	-	Brushless	Brushless	Brushless
	Quantity	EA	1	1	1
	Rated Output	W	4,000	4,000	4,000
Refrigerant	Type	-	R410A	R410A	R410A
	Charge	g	2,200	2,200	2,200
	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve
Refrigerant Oil	Type	-	FVC68D	FVC68D	FVC68D
	Charged Volume	cc	1,300	1,300	1,300
Heat Exchanger	Quantity	EA	2	2	2
	Rows	EA	2	2	2
	Columns	EA	32	32	32
	FPI	Fins/inch	14	14	14
Fan	Type	-	Propeller	Propeller	Propeller
	Quantity	EA	2	2	2
	Air Flow Rate	CMM(l/s)	55	55	55
Fan Motor	Model	-	BLDC	BLDC	BLDC
	Quantity	EA	2	2	2
	Output	W	124	124	124
Sound Pressure	Cooling	dB(A)+3	52	52	52
Level	Heating	dB(A)+3	54	54	54
Liquid Piping	Type	-	Flare	Flare	Flare
Connection	Outer Diameter	mm(inch)	Ø 9.52 (3/8)	Ø 9.52 (3/8)	Ø 9.52 (3/8)
Gas Piping	Type	-	Flare	Flare	Flare
Connection	Outer Diameter	mm(inch)	Ø 15.88 (5/8)	Ø 15.88 (5/8)	Ø 15.88 (5/8)
Piping Length (Outdoor Unit ~ Indoor Unit)	Minimum	m	3	3	3
	Standard	m	7.5	7.5	7.5
	Maximum	m	50	50	50
Height Difference (Outdoor Unit ~ Indoor Unit)	Maximum	m	30	30	30
Additional Refrigerant Charge		g/m	60	60	60
Dimensions	Unit(W x H x D)	mm	950 x 1,380 x 330	950 x 1,380 x 330	950 x 1,380 x 330
	Packed Unit(W x H x D)	mm	1,140 x 1,462 x 461	1,140 x 1,462 x 461	1,140 x 1,462 x 461
Weight	Unit	kg	92	92	92
	Packed Unit	kg	105	105	105

Note :

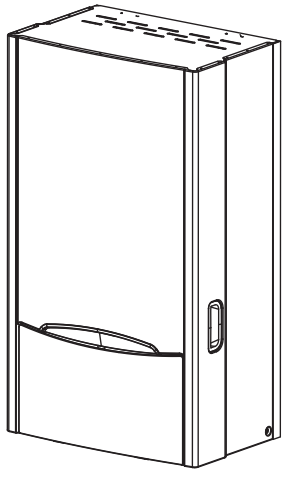
1. Capacities and power inputs are based on the following conditions:
   * : Cooling conditions - Indoor Water Temperature 23°C/18°C; Outdoor Air Temperature 35°CDB/24°CWB
     Heating conditions - Indoor Water Temperature 30°C/35°C; Outdoor Air Temperature 7°CDB/6°CWB
     Standard piping length 7.5m
2. Wiring cable size must comply with the applicable local and national code.
3. The specification may be subject to change without prior notice for purpose of improvement.

2. External Apprearance

2.1 Outdoor Unit

Item	Image	Quantity
Outdoor Unit UE Chassis (Product heating capacity : 3kW)		
Outdoor Unit U4 Chassis (Product heating capacity : 5kW, 7kW, 9kW)		
Outdoor Unit U3 Chassis (Product heating capacity : 12kW, 14kW, 16kW)		

2.2 Indoor Unit

AHNW03604A2, AHNW09604A2, AHNW16606A2, AHNW16608A2


Part 2
Features & Controls

1. List of Function

Category	Functions	AHUW036A2 AHUW056A2 AHUW076A2 AHUW096A2	AHUW126A2 AHUW146A2 AHUW166A2	AHUW128A2 AHUW148A2 AHUW168A2
Installation	Drain pump	X	X	X
	E.S.P. control	X	X	X
	Electric heater	O	O	O
	High ceiling operation	X	X	X
	Auto Elevation Grille	X	X	X
Reliability	Hot start	X	X	X
	Self diagnosis	O	O	O
	Soft dry operation	X	X	X
Convenience	Auto changeover	X	X	X
	Auto cleaning	X	X	X
	Auto operation(artificial intelligence)	X	X	X
	Auto Restart	O	O	O
	Child lock	O	O	O
	Forced operation	X	X	X
	Group control	X	X	X
	Sleep mode	O	O	O
	Timer(on/off)	O	O	O
	Timer(weekly)	O	O	O
	Two thermistor control	X	X	X
Individual control	Standard Wired remote controller	O	O	O
	Deluxe wired remote controller	X	X	X
	Simple wired remote controller	X	X	X
	Simple Wired remote controller(for hotel use)	X	X	X
	Wireless remote controller	X	X	X
Network function	General central controller (Non LGAP)	X	X	X
	Network Solution(LGAP)	X	X	X
	Dry contact	PQDSA	PQDSA	PQDSA
	PI 485(for Indoor Unit)	X	X	X
Special function kit	Zone controller	X	X	X
	CTI(Communication transfer interface)	X	X	X
	Electronic thermostat	X	X	X
Others	Remote temperature sensor	PQRSTA0	PQRSTA0	PQRSTA0
	Group control wrie	X	X	X
	Telecom shelter controller	X	X	X
Air to Water Heat Pump Functions	Anti-condensation on floor(cooling)	O	O	O
	Water pump on / off Control	O	O	O
	Flow switch control	O	O	O
	Thermostat interface (230V AC)	O	O	O
	Thermostat interface (24V AC)	X	X	X
	Sanitary tank heating (Install kit)	PHLTB	PHLTB	PHLTB
	Solar-thermal interface with sanitary tank (Solar thermal kit)	PHLLA	PHLLA	PHLLA
	PHEX anti-freezing control	O	O	O
	Water pump foeced operation	O	O	O
	Autosetting according to ambient temperature	O	O	O
	Slient operation (with scheduler)	O	O	O
	Anti-overheating of water pipe	O	O	O
	Emergency operation	O	O	O
	Scheduler(Sanitary Tank Heating / Sanitary Tank Heater)	O	O	O
	Timer(Sanitary Tank Heating / Sanitary Tank Heater)	O	O	O
	Quick Sanitary tank Heating	O	O	O
	Electric Heater Capacity Control	O	O	O
	screed drying mode	O	O	O
	Sump Heater	O	O	O
	Dry Contact (Main PCB)	X	O	O

Notes

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

O : Applied, X : Not applied

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

Category	Functions	AHUW036A2 AHUW056A2 AHUW076A2 AHUW096A2	AHUW126A2 AHUW146A2 AHUW166A2	AHUW128A2 AHUW148A2 AHUW168A2
Reliability	Defrost / Deicing	O	O	O
	High pressure switch	X	X	X
	Low pressure switch	X	X	X
	Phase protection	X	X	X
	Restart delay (3-minutes)	O	O	O
	Self diagnosis	O	O	O
	Soft start	X	X	X
Convenience	Test function	O	O	O
	Night Silent Operation	X	X	X
	Wiring Error Check	X	X	X
	Peak Control	X	X	X
	Mode Lock	X	X	X
	Forced Cooling Operation (Outdoor Unit)	X	X	X
Network function	Network soluation(LGAP)	X	X	X

Notes

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

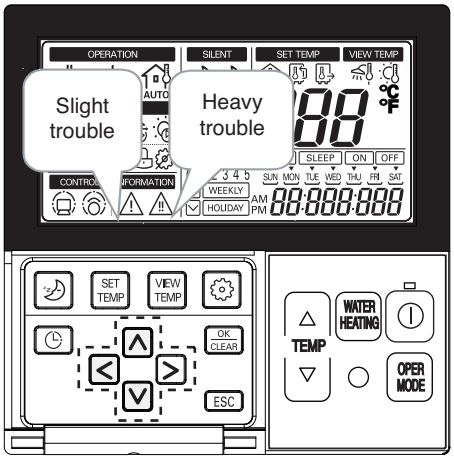
O : Applied, X : Not applied

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

2. Feature & Controls

1. Summarized Features

1.1 Emergency Control



Easy checking of system failure

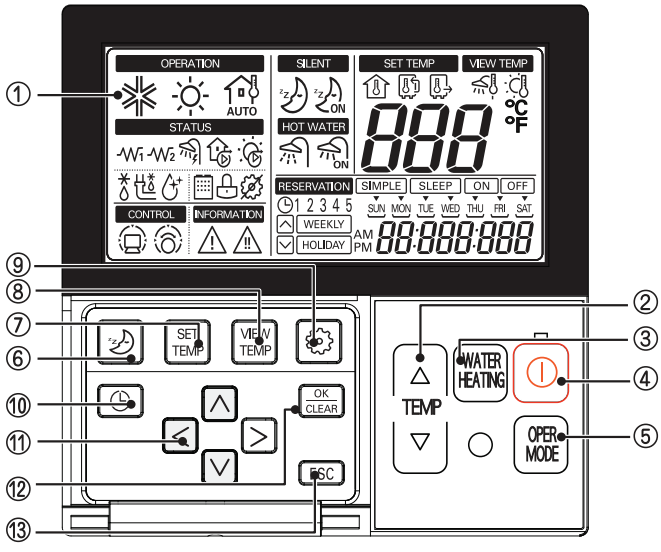
- Slight / Heavy trouble

Emergency operating

- Heavy trouble
- Electric heater ON
- Secure at least heating before A/S

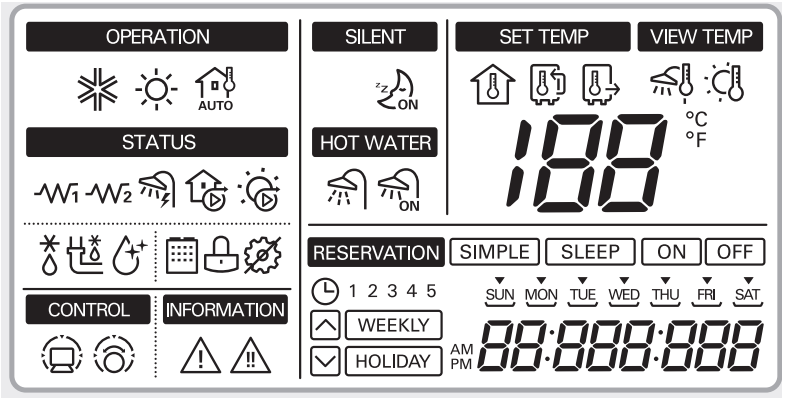
1.2 Remote controller

• Controller Configuration



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

• Display Panel



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

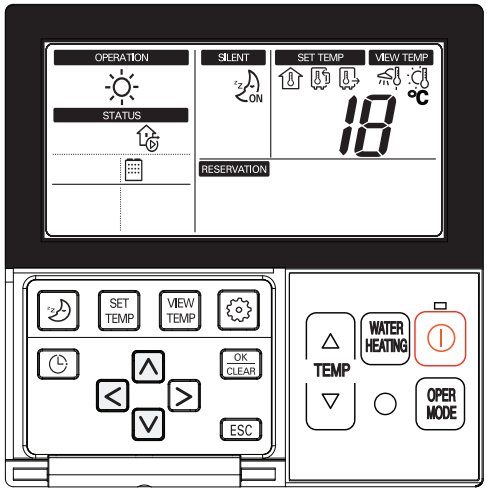
2. Special Function

2.1 Child Lock Function

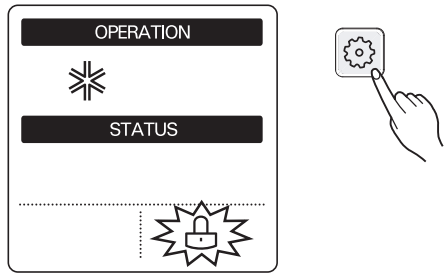
This function prevents children or others from tampering with the control buttons on the unit.

• All the buttons on indoor display panel will blocked.

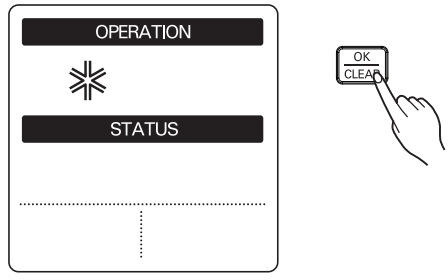
The function is used to restrict children to not to use the AWHP carelessly.(CL is an abbreviated form of Child Lock.)



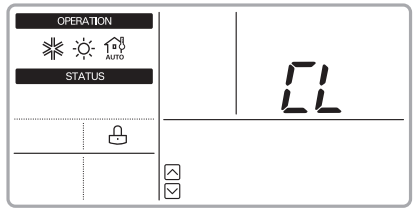
1 Press Function Setting button to enter user setting mode.
(The segment will be flashed)



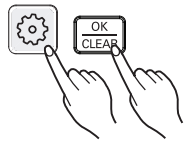
2 Press OK / CLEAR button to finish the selection. The segment will be disappear.



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



4 To release this setting, pressing function setting button until icon flash and then enter setting/clear button.



2.2 Sleep Timer Operation

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

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

2.3 Timer (On / Off)

2.3.1 On-Timer Operation

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

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

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

2.3.2 Off-Timer Operation

• When the set time is reached after the time is input by the control panel, the appliance stops operating.

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

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

2.4 Weekly Program

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

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

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

Operation Time Table (Example)

Setting	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Temp.	25 °C	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		

2.5 Sanitary Tank Heating Scheduler & Sanitary Tank Heater Scheduler

• If necessary, enable or disable of sanitary tank heating or sanitary tank heater can be programmed according to user's specific time.

• Schedulers are operating everyday.

2.6 Silent mode operation

• If necessary, enable or disable of silent mode can be programmed according to user's specific time.

2.7 Screed drying

• If necessary, enable or disable of screed drying can be programmed according to user's setting.

• While the screed drying mode is operating, "Dry" is displayed.

3. System Set-up

As THERMAV is designed to satisfy various installation environment, it is important to set up system correctly. If not configured correctly, improper operation or degrade of performance can be expected.

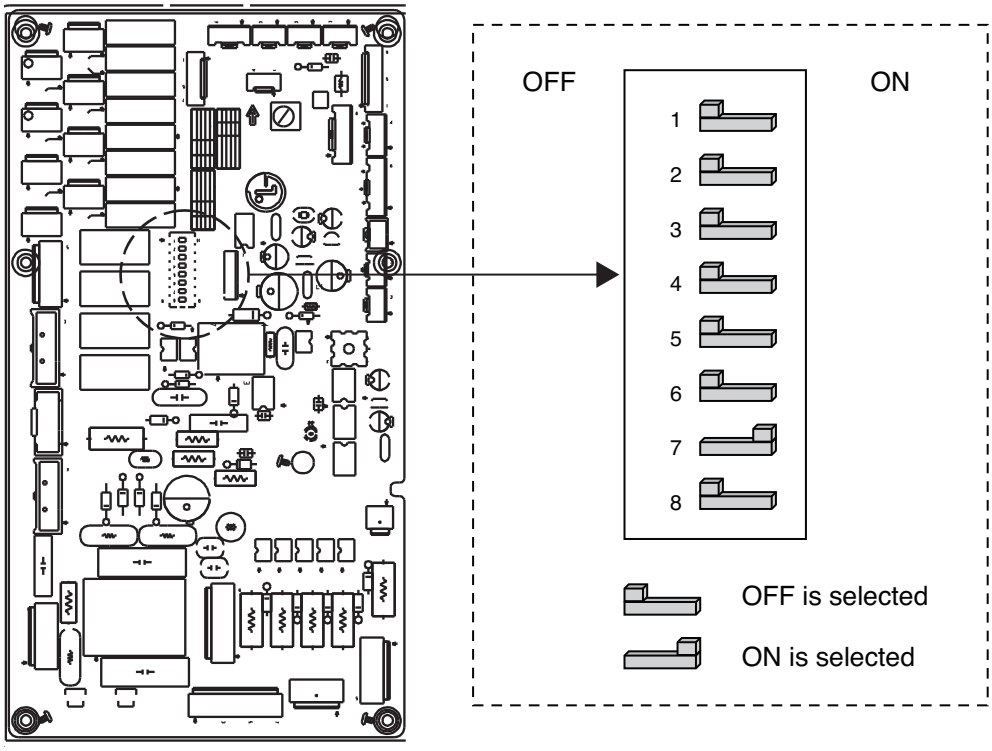
3.1 DIP Switch Setting

⚠CAUTION

Turn off electric power supply before setting DIP switch

• Whenever adjusting DIP switch, turn off electric power supply to avoid electric shock.

General Information



DIP switch information

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

Description	Setting	1	2	3	4	5	6	7	8
Role when central controller is equipped.	As Master	X							
	As slave	●							
Accessory installation information	Unit only		X	X					
	Unit + Sanitary water tank is installed.		X	●					
	Unit + Sanitary water tank + Solar thermal system is installed.		●	X					
Emergency operation Level.	High temperature cycle				X				
	Low temperature cycle				●				
External water pump installation information.	External water pump is NOT installed.					X			
	External water pump is installed.					●			
Selecting electric heater capacity.	Step 2 capacity is used.						X	X	
	Step 1 capacity is used.						X	●	
	Electric heater is not used.						●	X	
Thermostat installation information.	Thermostat is NOT installed.								X
	Thermostat is installed.								●
Default		X	X	X	X	X	X	●	X

CAUTION

1. "X" mark means dip switch must be off. Otherwise the function may not operates correctly.
2. If each dip switch doesn't set correctly, unit will operate abnormally.

NOTICE

Emergency operation

• **Definition of terms**

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

• **Objective of introducing 'trouble'**

- Not like airconditioning unit, Air-to-Water heat pump is generally operating in whole winter season without any system stopping.
- If system found some problem, which is not critical to system operating for yielding heating energy, the system can temporarily continue in emergency mode operation with end user's decision.

• **Classified trouble**

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

• **Emergency operation level**

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

※ It can not be operated, if the electric heater accessory is not installed.

	Dip Switch (#4)	Target Leaving Water Temperature	Target Room Air Temperature	Target Sanitary Water Temperature
High temperature cycle	OFF	50 °C	24 °C	70 °C
Low temperature cycle	ON	30 °C	19 °C	50 °C

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

-  Operation On/Off
-  VIEW TEMP button(*)
-  Temperature adjust button (*)
-  Sanitary water heating Enable / Disable

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

(*) : Adjusted temperature is only used to control electric heater on / off condition.
The unit does not turn on / off according to the setting temperature at the remote controller.
It turns on / off according to the thermostat signal.

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

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

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

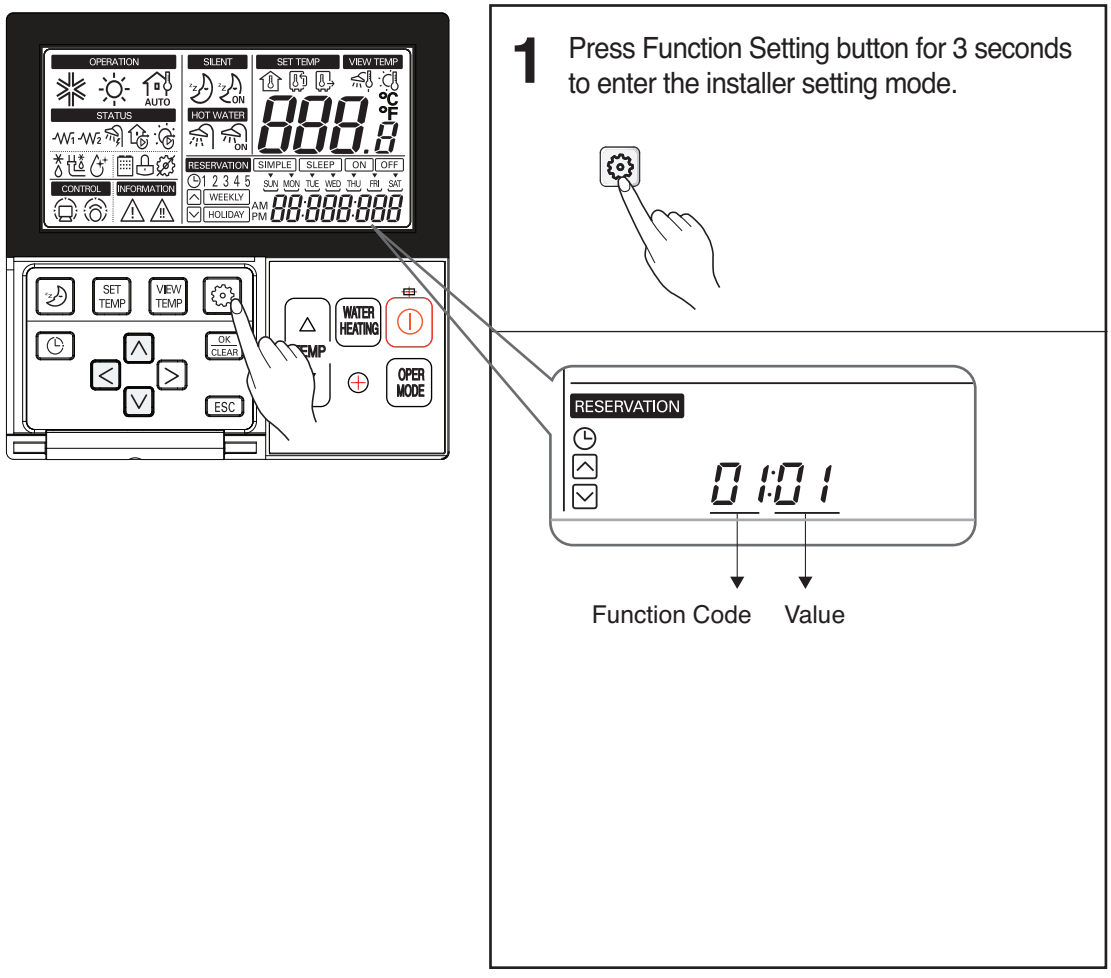
• **Emergency operation is not automatically restarted after main electricity power is reset.**
In normal condition, the unit operating information is restored and automatically restarted after main electricity power is reset.
But in emergency operation, automatic re-start is prohibited to protect the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

3.2 Control Panel Setting

How to enter installer setting mode

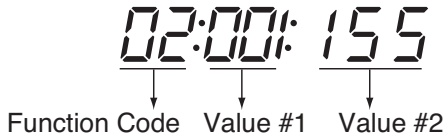
⚠CAUTION

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



Summary

Example of Fuction Code Display



Code	Item		Detail	Remark
01	Function		Additional refrigerant charging	
	Description		Instant cooling operation for charging additional refrigerant	
	Value #1	Note	-	
		Default	01	
		Range	-	
	Value #2	Note	-	
		Default	-	
		Range	-	
02	Function		Disable 3 minute delay	
	Description		Factory use only	
	Value #1	Note	-	
		Default	01	
		Range	-	
	Value #2	Note	-	
		Default	-	
		Range	-	
03	Function		Remote air sensor connection	
	Description		Connection information about remote air sensor	
	Value #1	Note	01:Remote air sensor is not connected and not used. 02:Remote air sensor is connected and used.	
		Default	1	
		Range	01 ~ 02	
	Value #2	Note	-	
		Default	-	
		Range	-	
04	Function		Celsius / Fahrenheit switching	
	Description		Display temperature in Celsius or Fahrenheit	
	Value #1	Note	01:Celsius 02:Fahrenheit	
		Default	1	
		Range	01 ~ 02	
	Value #2	Note	-	
		Default	-	
		Range	-	

Code	Item		Detail	Remark
05	Function		Setting temperature selection	
	Description		Selection for setting temperature as air temperature or leaving water temperature.	
	Value #1	Note	01:Air temperature 02:Leaving water temperature Air temperature as setting temperature is ONLY available when remote air sensor. Connection is enabled and Function code 03 is set as 02.	
		Default	2	
		Range	01 ~ 02	
	Value #2	Note	-	
		Default	-	
		Range	-	
06	Function		Auto dry contact	
	Description		Setting dry contact auto start option. If thermostat is used, value should be changed from "2" to "1".	
	Value #1	Note	01: Auto start off 02: Auto start on	
		Default	2	
		Range	01 ~ 02	
	Value #2	Note	-	
		Default	-	
		Range	-	
07	Function		Address setting	
	Description		Assigning address when central controller is installed If thermostat is used, value should be changed from "2" to "1".	
	Value #1	Note	-	
		Default	00	
		Range	00 ~ FF	
	Value #2	Note	-	
		Default	-	
		Range	-	
11	Function		Setting air temperature in cooling mode	'Setting Air Temperature' is used when user wants to set target temperature by room air temperature.
	Description		Adjusting range of 'Setting Air Temperature' in cooling mode	
	Value #1	Note	Upper limit of setting range	
		Default	30 °C	
		Range	24 ~ 30 °C	
	Value #2	Note	Lower limit of setting range	
		Default	18 °C	
		Range	18 ~ 22 °C	
12	Function		Setting leaving water temperature in cooling mode	'Setting Leaving Water Temperature' is used when user wants to set target temperature by leaving(from the unit) water temperature.
	Description		Adjusting range of 'Setting Leaving Water Temperature' in cooling mode	
	Value #1	Note	Upper limit of setting range	
		Default	24 °C	
		Range	20 ~ 25 °C	
	Value #2	Note	Lower limit of setting range(FCU is equipped)	
		Default	06 °C	
		Range	06 ~ 18 °C	

Code	Item		Detail	Remark
12	Value #2	Note	Lower limit of setting range(FCU is not equipped)	
		Default	16 °C	
		Range	16 ~ 18 °C	
13	Function		Setting air temperature in heating mode	'Setting air temperature' is used when user wants to set target temperature by room air temperature.
	Description		Adjusting range of 'Setting Air Temperature' in heating mode	
	Value #1	Note	Upper Limit of setting range	
		Default	30 °C	
		Range	24 ~ 30 °C	
	Value #2	Note	Lower Limit of setting range	
		Default	16 °C	
		Range	16 ~ 22 °C	
14	Function		Setting leaving water temperature in heating mode	'Setting leaving Water temperature' is used when user wants to set target temperature by leaving(from the unit) water temperature. * : Electric heater is not used
	Description		Adjustin range of 'Setting Leaving Water Temperature' in heating mode	
	Value #1	Note	Upper Limit of setting range	
		Default	55 °C	
		Range	35 ~ 57 °C	
	Value #2	Note	Lower Limit of setting range	
		Default	15 °C (*20 °C)	
		Range	15 ~ 34 °C (*20 ~ 34 °C)	
15	Function		Setting sanitary tank leaving water temperature for Sanitary water heating	'Setting Sanitary Tank Leaving Water Temperature' is used when user wants to set water temperature of Sanitary Tank.
	Description		Adjusting range of 'Setting Sanitary Tank Leaving Water Temperature' in sanitary water heating mode	
	Value #1	Note	Upper Limit of setting range	
		Default	50 °C	
		Range	50 ~ 80 °C	
	Value #2	Note	Lower Limit of setting range	
		Default	40 °C	
		Range	30 ~ 40 °C	
18	Function		Screed drying mode	
	Description		After installing water pipes for under floor heating, user can select screed drying mode for curing the cement	
	Value #1	Note	00:Screed drying mode is not used. 01:Screed drying mode is used.	
		Default	00	
		Range	00 ~ 01	
	Value #2	Note	-	
		Default	-	
		Range	-	

Code	Item		Detail		Remark
21	Function		Setting electric heater on / off temperature		DIP Switch setting is described in Chapter 6 of Installation Manual.
	DIP switch setting		No.6 = Off No.7 = On	No.6 = Off No.7 = Off	
	Description		Setting for using Step 1 capacity of electric heater	Setting for using Step 2 capacity of electric heater	
	Value #1	Note	Outdoor air temperature where Step 1 capacity of electric heater starts operation.	Base outdoor air temperature	
		Default	0 °C		
		Range	-15 ~ 18 °C		
	Value #2	Note	Not used	Temperature gap (it means 'how much colder than base outdoor air temperature?')	
		Default	-	0 °C	
		Range	-	0 ~ 33 °C	
22	Function		Setting cut-off temperature in cooling mode (FCU setting included)		
	Description		Determine leaving water temperature when the unit is turned off. This function is used for preventing condensation on the floor in cooling mode.		
	Value #1	Note	Cut-off temperature. Value #1 is valid when Value #2 is '00 (that means, FCU is installed)'."		
		Default	16 °C		
		Range	16 ~ 25 °C		
	Value #2	Note	Determines if FCU is installed or not. '01' means 'FCU is not installed', and '00' means 'FCU is installed.'		
		Default	00		
		Range	00(Equipped) ~ 01(not Equipped)		
23	Function		Setting outdoor temperature range for weather-dependent operation		
	Description		Setting outdoor Max/Min temperature for weather-dependent operation		
	Value #1	Note	Upper Limit of setting range		
		Default	-10 °C		
		Range	-20 ~ 05 °C		
	Value #2	Note	Lower Limit of setting range		
		Default	15 °C		
		Range	10 ~ 20 °C		
24	Function		Setting indoor air temperature range for weather-dependent operation		
	Description		Setting indoor Max/Min temperature for weather-dependent operation		
	Value #1	Note	Upper limit of setting range		
		Default	21 °C		
		Range	20 ~ 30 °C		
	Value #2	Note	Lower limit of setting range		
		Default	16 °C		
		Range	16 ~ 19 °C		

Code	Item		Detail	Remark
25	Function		Setting leaving water temperature range for weather-dependent operation	* : Electric heater is not used
	Description		Setting leaving water max / min temperature fo weather-dependent operation	
	Value #1	Note	Upper limit of setting range	
		Default	55 °C	
		Range	35 ~ 57 °C	
	Value #2	Note	Lower limit of setting range	
		Default	15 °C (*20 °C)	
		Range	15 ~ 34 °C (*20 ~ 34 °C)	
26	Function		Setting disinfection operation	Sanitary water heating should be enable. • If sanitary water heating is disable, the disinfection mode will not be operated although Value #1 of Code 26 is set as '01'. • To use disinfection mode, sanitary water heating should be enable.
	Description		Setting start/maintain time for disinfection	
	Value #1	Note	Enable / Disable of disinfection operation(00:Disable , 01:Enable)	
		Default	00	
	Value #2	Range	00 ~ 01	
		Note	Starting date (Sunday:1,Monday:2, ···· ,Saturday:7)	
		Default	06	
		Range	01 ~ 07	
	Value #3	Note	Starting time in 24 hours(00 ~ 23)	
		Default	23	
		Range	00 ~ 23	
27	Function		Setting Disinfection Operation	
	Description		Setting disinfection temperature	
	Value #1	Note	Maximum heating temperature	
		Default	70 °C	
		Range	40 ~ 80 °C	
	Value #2	Note	Maximum heating duration in minute	
		Default	10 min	
		Range	05 ~ 60 min	
28	Function		Setting control parameter for sanitary water heating operation	Only available when Sanitary Water Tank is installed.
	Description		See below notes for each values	
	Value #1	Note	Temperature gap from Value #2 of Function Code 28	
		Default	05 °C	
		Range	01 ~ 20 °C	
	Value #2	Note	Maximum temperature generated by AWHP compressor cycle	
		Default	55 °C	
		Range	40 ~ 57 °C	
29	Function		Setting control parameter for sanitary water heating operation	
	Description		See below notes for each values	
	Value #1	Note	Temperature gap from target sanitary water temperature. (This value is required to frequent ON and OFF of water tank heater.)	
		Default	03 °C	
		Range	02 ~ 04 °C	
	Value #2	Note	Determining heating demand priority between sanitary water tank heating and under floor heating	
		Default	00	
		Range	00 ~ 01	

Code	Item		Detail	Remark
2A	Function		Miscellaneous setting	
	Description		Determine electric heater and water heater on and off	
	Value #1	Note	00: Operate both electric heater and sanitary tank heater 01: Operate only sanitary tank heater	
		Default	00	
		Range	00 ~ 01	
	Value #2	Note	Not used	
		Default	-	
		Range	-	
2B	Function		Sanitary water heating timers	
	Description		Determine following time duration : operation time of sanitary tank heating, stop time of sanitary tank heating, and delay time of sanitary tank heater operating.	
	Value #1	Note	This time duration defines how long time sanitary tank heating can be continued.	
		Default	30 min	
		Range	5 ~ 95 min (step: 5 min)	
	Value #2	Note	This time duration defines how long time sanitary tank heating can be stopped. It is also regarded as time gap between sanitary tank heating cycle.	
		Default	180 min	
		Range	0 ~ 600 min (step: 30 min)	
	Value #3	Note	This time duration defines how long time sanitary tank heater will not be turned on in sanitary water heating operation.	
		Default	20 min	
		Range	20 ~ 95 min (step: 5 min)	
2E	Function		Changing thermal on / off room air temp	
	Description		Select Thermal on / off Temperature gap.	
	Value #1	Note	Thermal on / Thermal off 0: -0.5 °C / 1.5 °C 1: 4 °C / 6 °C 2: 2 °C / 4 °C 3: -1 °C / 1 °C	
	Default		0	
	Range		0 ~ 3	
2F	Function		Changing thermal on / off leaving water Ten	
	Description		Select Thermal on / off Temperature gap.	
	Value #1	Note	Thermal on / Thermal off 0: -2 °C / 2 °C 1: -6 °C / 4 °C 2: -2 °C / 4 °C 3: -1 °C / 1 °C	
	Default		0	
	Range		0 ~ 3	

※ Some contents may not be displayed depending on DIP switch setting in the main PCB assembly 2.

Common setting

• **Function Code 01** : Additional refrigerant charging
Function Code 01 should be performed when additional refrigerant charging is required. To charge the refrigerant, the unit must run in cooling mode. additional refrigerant charging instantly makes the unit working in cooling mode for 18 minutes.

Note: • If you press any kind of button during this mode, additional refrigerant charging mode will be finished.
• After running 18 minutes under additional refrigerant charging mode, system will automatically turn OFF.

• **Function Code 02** : Disable 3 minute delay
Factory use only.

• **Function Code 03** : Remote air sensor connection
If user connects remote air sensor to control the unit by room air temperature, the connection information should be notified to the unit.

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

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

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

Note : Air temperature as setting temperature is ONLY available when remote air sensor connection is enabled and Function Code 03 is set as 02.

• **Function Code 06** : Auto dry contact
This function allows the dry contact operate under auto run mode or manual mode with remote controller.

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

• **Function Code 07** : Address setting
When central controller is installed, address assigning is set by this function.

Temperature range setting

• **Function Code 11** : Setting air temperature in cooling mode
Determine cooling setting temperature range when air temperature is selected as setting temperature.

NOTICE

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

• **Function Code 12** : Setting leaving water temperature in cooling mode
Determine cooling setting temperature range when leaving water temperature is selected as setting temperature.

NOTICE

Water condensation on the floor
- While cooling operation, it is very important to keep leaving water temperature higher than 16 °C. Otherwise, dew condensation can be occurred on the floor.
- If floor is in humid environment, do not set leaving water temperature below 18 °C.

NOTICE

Water condensation on the radiator
- While cooling operation, cold water may not flow to the radiator. If cold water enters to the radiator, dew generation on the surface of the radiator can be occurred.

• **Function Code 13** : Setting air temperature in heating mode
Determine heating setting temperature range when air temperature is selected as setting temperature.

CAUTION

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

• **Function Code 14** : Setting leaving water temperature in heating mode
Determine heating setting temperature range when leaving water temperature is selected as setting temperature.

• **Function Code 15** : Setting sanitary tank leaving water temperature
Determine heating setting temperature range of water tank leaving water.

NOTICE

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

• **Function Code 18** : Screed drying mode.
After installing water pipes for under floor heating, user can select screed drying mode for curing the cement.

Temperature control parameter setting and etc

• **Function Code 21** : Setting electric heater On / Off temperature

Using Step 1 capacity of electric heater : when DIP switch No. 6 and 7 is set as 'OFF-ON' :

- Value #1 : outdoor air temperature where Step 1 capacity of electric heater starts operation.
- Value #2 : not used.
- Example : If Value #1 is set as '-1' and DIP switch No 6. and 7 is set as 'OFF-ON', then Step 1 capacity of electric heater will start operation when outdoor air temperature is below -1 °C and current leaving water temperature or room air temperature is much belower than target leaving water temperature or target room air temperature.

Using Step 2 capacity of electric heater : when DIP switch No. 6 and 7 is set as 'OFF-OFF' :

- Value #1 : base outdoor air temperature.
- Value #2 : not used
- Example : If Value #1 is set as '-1' and DIP switch No 6. and 7 is set as 'OFF-OFF', then step2 capacity of electric heater will start operation when outdoor air temperature is below -1 °C and current leaving water temperature or room air temperature is much belower than target leaving water temperature or target room air temperature.

• **Function Code 22** : Setting cut-off temperature in cooling mode (FCU setting included)

Determine leaving water temperature when the unit is turned off. This function is used fr preventing condensation on the floor in cooling mode.

- Value #1 : cut-off temperature. Value #1 is valid when Value #2 is '01 (that means, FCU is installed)'.
- Value #2 : determines if FCU is installed or not. '01' means 'FCU is NOT installed', and '00' means 'FCU is installed.'
- Example : If Value #1 is set as '10' and Value #2 is '01' and actually FCU is NOT installed in the water loop, the unit stop operation in cooling mode when the leaving water temperature is below 10 °C.
- Example : If Value #1 is set as '10' and Value #2 is '00' and actually FCU is installed in the water loop, the Value #1 is not used and the unit do NOT stop operation in cooling mode when the leaving water temperature is below 10 °C.

NOTICE

FCU Installation

• If FCU is used, related 2way valve should be installed and connected to the Main PCB assembly 1.

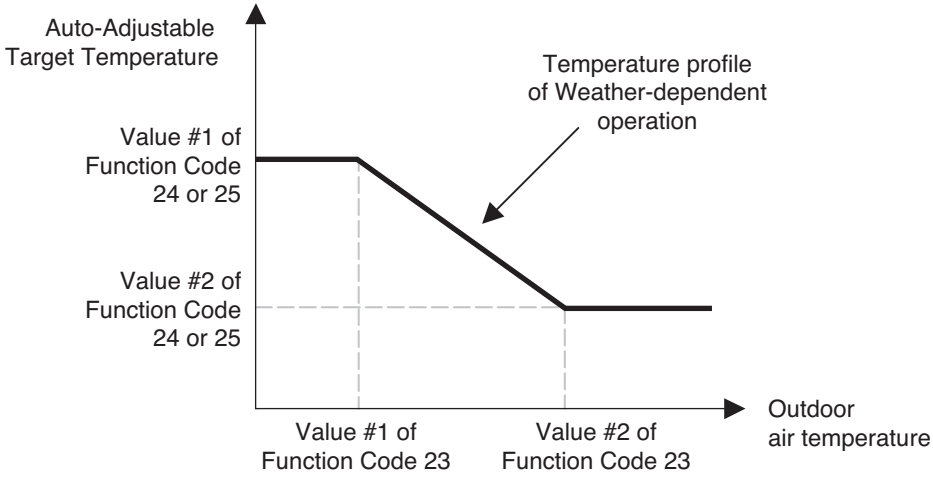
• If Value #2 is set as '00' but FCU or 2way valve is NOT installed, the unit can do abnormal operation.

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

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

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

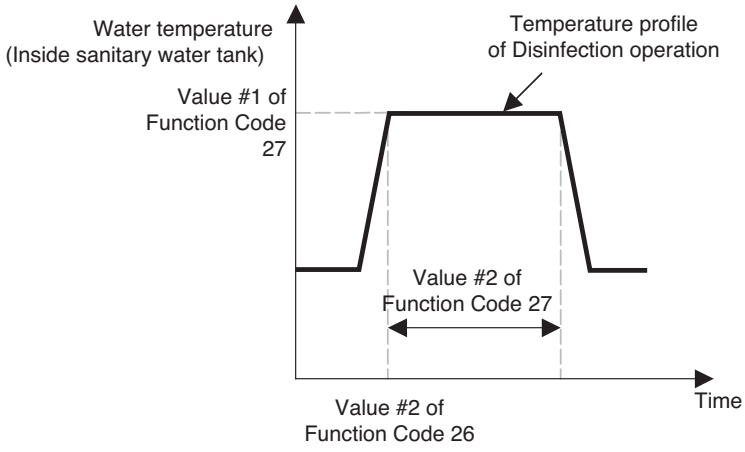
Note : Weather-dependent operation is applied for heating mode only.



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

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

- Value #1 of Function Code 26 : Selecting enable or disable of disinfection operation. ’00’ for disable, and ’01’ for enable.
- Value #2 of Function Code 26 : Determining the date when the disinfection mode is running. ’01’ for Sunday, ’02’ for Monday, … , and ’07’ for Saturday.
- Value #3 of Function Code 26 : Determining the time when the disinfection mode is running. ’00’ for 0:00am, ’01’ for 01:00am, … , ’22’ for 10:00pm, and ’23’ for 11:00pm.
- Value #1 of Function Code 27 : Target temperature of disinfection mode.
- Value #2 of Function Code 27 : Duration of disinfection mode.



NOTICE

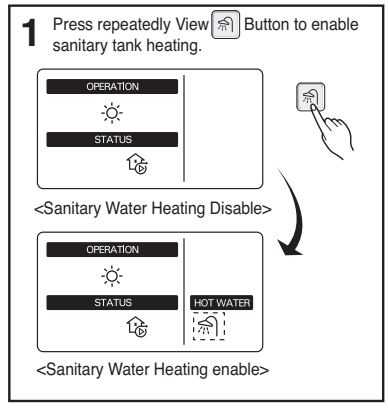
Vales of Function Code 26

- If Value #1 of Function Code 26 is set as ’00’, that is ‘disable disinfection mode’, Value #2 and Value #3 is not used.
- When Value #1 is set as ’01’, that is ‘enable disinfection mode’,’ Value #2 is displayed at the position of Value #1 and Value #3 is displayed at the position of Value #2. It is due to limited width of the remote controller display.

NOTICE

Sanitary water heating should be enable.

- If sanitary water heating is disable, the disinfection mode will not be operated although Value #1 of Code 26 is set as ’01’.
- To use disinfection mode, sanitary water heating should be enable.(by button input or scheduler programming)

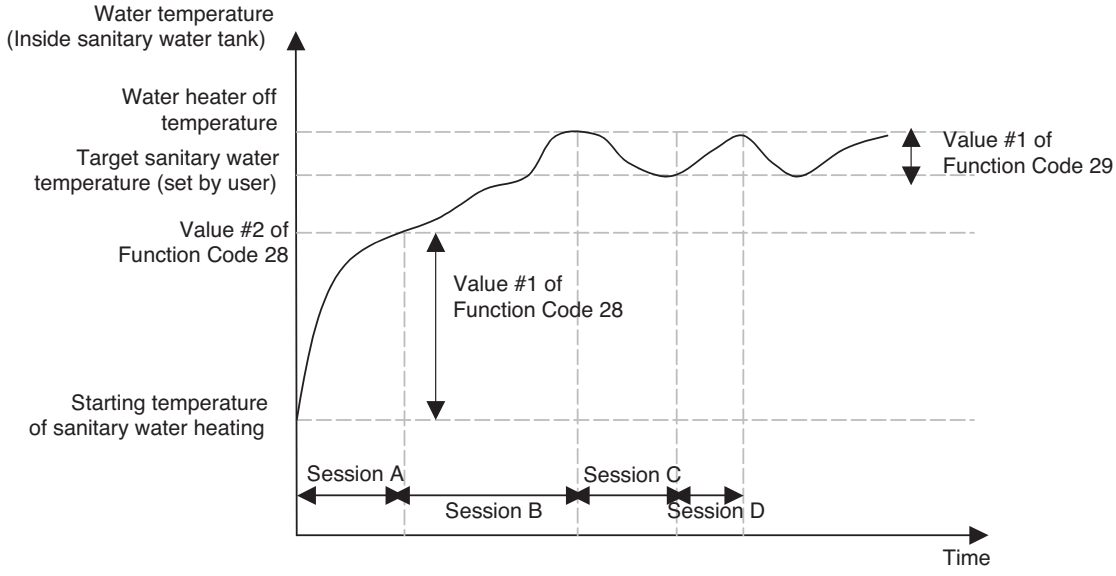


• **Function Code 28 and 29** : Setting control parameter for sanity water heating operation

Descriptions for each parameters are as following.

- Value #1 of Function Code 28 : temperature gap from Value #2 of Function Code 28.
- Value #2 of Function Code 28 : maximum temperature generated by AWHP compressor cycle.
- Example : If Value #1 is set as '5' and Value #2 is set as '48', then Session A (see the graph) will be started when the water tank temperature is below 45 °C…. If temperature is above 48 °C…, then Session B will be started.

- Value #1 of Function Code 29 : temperature gap from target sanitary water temperature. This value is required to frequent On and Off of water tank heater.
- Value #2 of Function Code 29 : Determining heating demand priority between sanitary water tank heating and under floor heating.
- Example : If user's target temperature is set as '70' and Value #1 is set as '3', then the water tank heater will be turned off when the water temperature is above 73 °C. The water tank heater will be turned on when the water temperature is below 70 °C.
- Example : If Value #2 is set as '0', that means heating priority is on sanitary water heating, sanitary water is heated by AWHP compressor cycle and water heater. In this case the under floor can not be heated while sanitary water heating. On the other hand, if the Value #2 is set as '1', that means heating priority is on under floor heating, sanitary tank is ONLY heated by water heater. In this case the under floor heating is not stopped while sanitary water is heated.



Session A : Heating by AWHP compressor cycle and water heater
Session B : Heating by water heater
Session C : No heating (Water heater is Off)
Session D : Heating by water heater

NOTICE

Sanitary water heating does not operate when it is disabled.

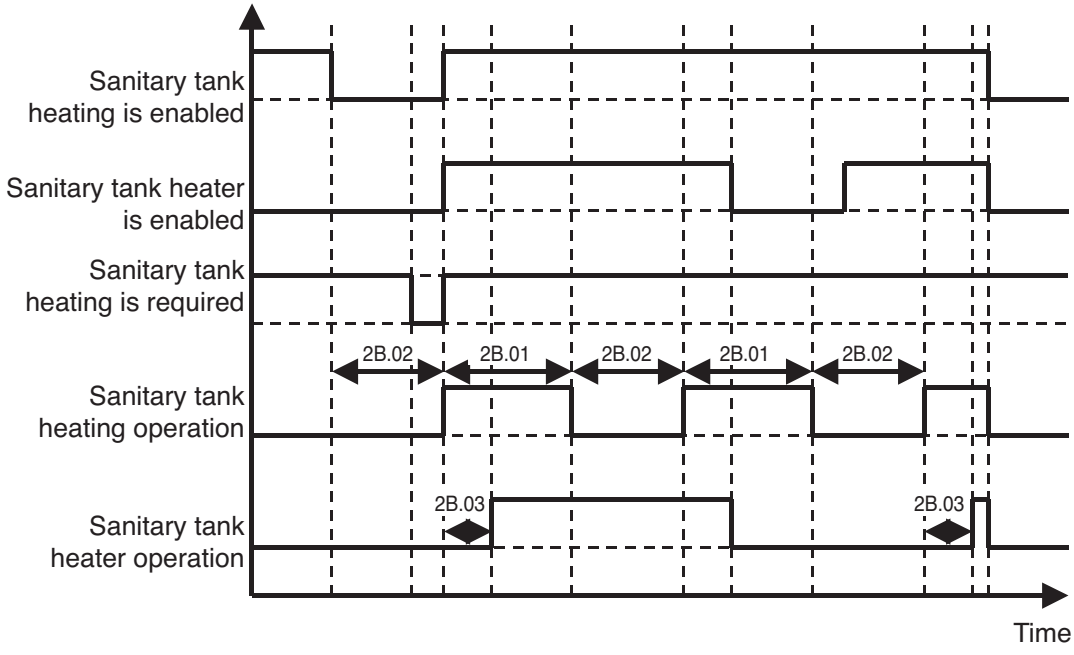
Enabling / Disabling of sanitary water heating is determined by pushing button.

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

• **Function Code 2A** : Miscellaneous setting
- Value #1 of Function Code 2A : determine electric heater and sanitary tank heater on and off.
- Value #2 of Function Code 2A : not used.
- Example : If Value #1 is set as '0', then electric heater and sanitary tank heater are on and off according to control logic. If Value #1 is set as '1', then electric heater is never turned on and only water heater is on and off according to control logic.

• **Function Code 2B** : Sanitary water heating timers

Determine following time duration : operation time of sanitary tank heating, stop time of sanitary tank heating, and delay time of sanitary tank heater operating.
- Value #1 of Function Code 2B : This time duration defines how long time sanitary tank heating can be continued.
- Value #2 of Function Code 2B : This time duration defines how long time sanitary tank heating can be stopped. It is also regarded as time gap between sanitary tank heating cycle.
- Value #3 of Function Code 2B : This time duration defines how long time sanitary tank heater will not be turned on in sanitary water heating operation.
- Example of timing chart :

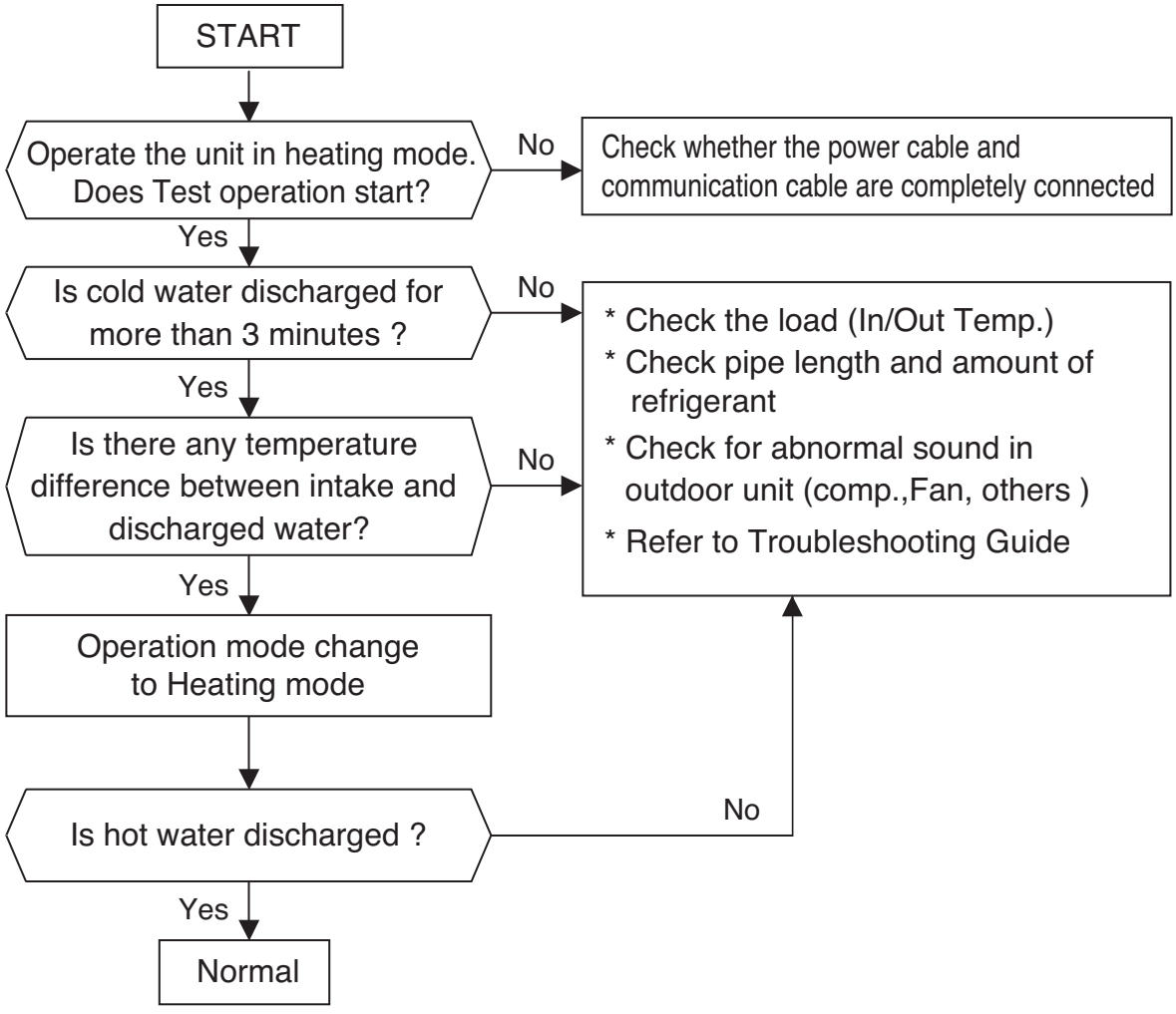


3. Test Run

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	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 may decrease 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



Part 3
Basic Control

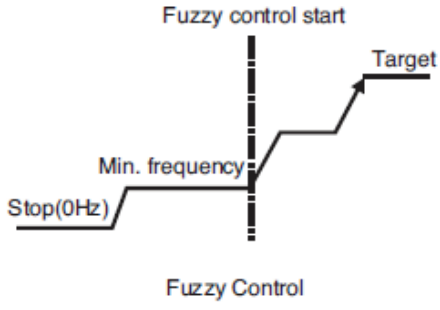
1. Normal operation

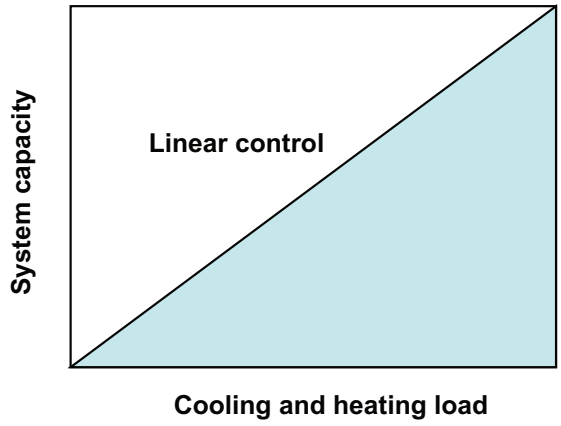
Basic principle is to control the rpm of the motor by changing the working frequency of the compressor.
Three phase voltage is supplied to the motor and the time for which the voltage will supplied is controlled by IPM (intelligent power module).
Switching speed of IPM defines the variable frequency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

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

3. EEV(Electronic Expansion Valve) control

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

* Cooling mode

The degree of superheat = Tsuction – Tevaporator

Tsuction : temperature at suction pipe sensor(°C)

Tevaporator : evaporation temperature (°C)

* Heating mode

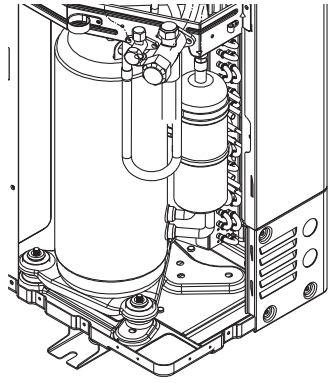
the target temperature of discharge pipe = T condenser + α

T condenser : condenser temperature (°C)

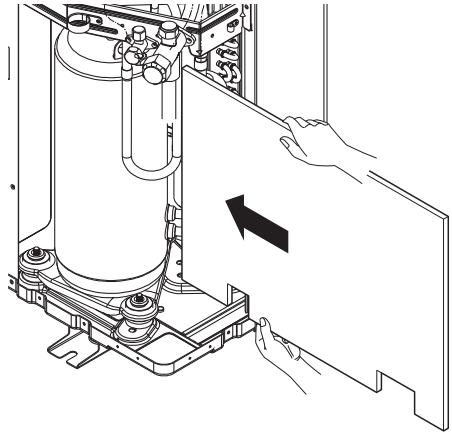
Part 3
Replacement

1. Replacement Procedure for Compressor

1. **Remove the sound proof covering the faulty compressor, and disconnect the power**
2. **Disconnect the brazing sections of suction pipe and discharge pipe by using brazing torch after the refrigerant has been pumped out or collected completely.**
3. **Remove three nuts at cushion rubber section to take out the faulty compressor outside the unit. <Figure 1>**
4. **Install the new compressor in the unit.(Be sure to insert the cushion rubbers before tightening the fixing nut of compressor.)**
5. **Remove the rubber caps put on the suction and discharge pipe of the new compressor to release the sealing nitrogen gas.**
6. **Braze the suction and discharge pipe with brazing torch to the compressor.**
7. **Conduct air tight test to check the piping system is free from leakage.**
8. **Connect power cable to the terminal board of compressor and cover the compressor with sound proof. <Figure 2>**
9. **Conduct vacuum.**
10. **After completion of vacuum, open the service valves. If recovery unit is used, charge refrigerant.**

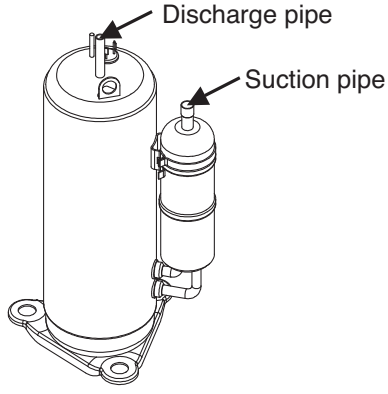


< Figure 1 >



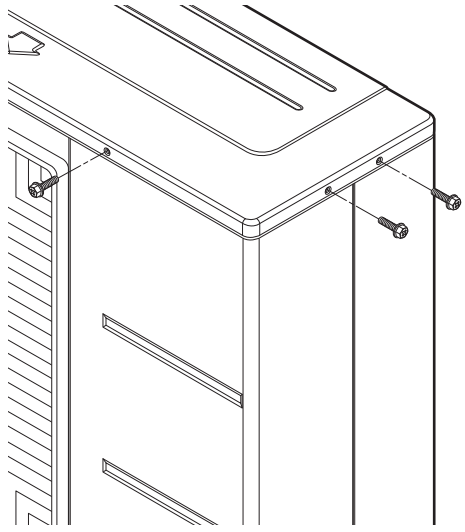
When inserting the sound proof, be sure to insert counter-clockwise.

< Figure 2 >



2. Caution for Assembling Outdoor Panels after Test Run

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

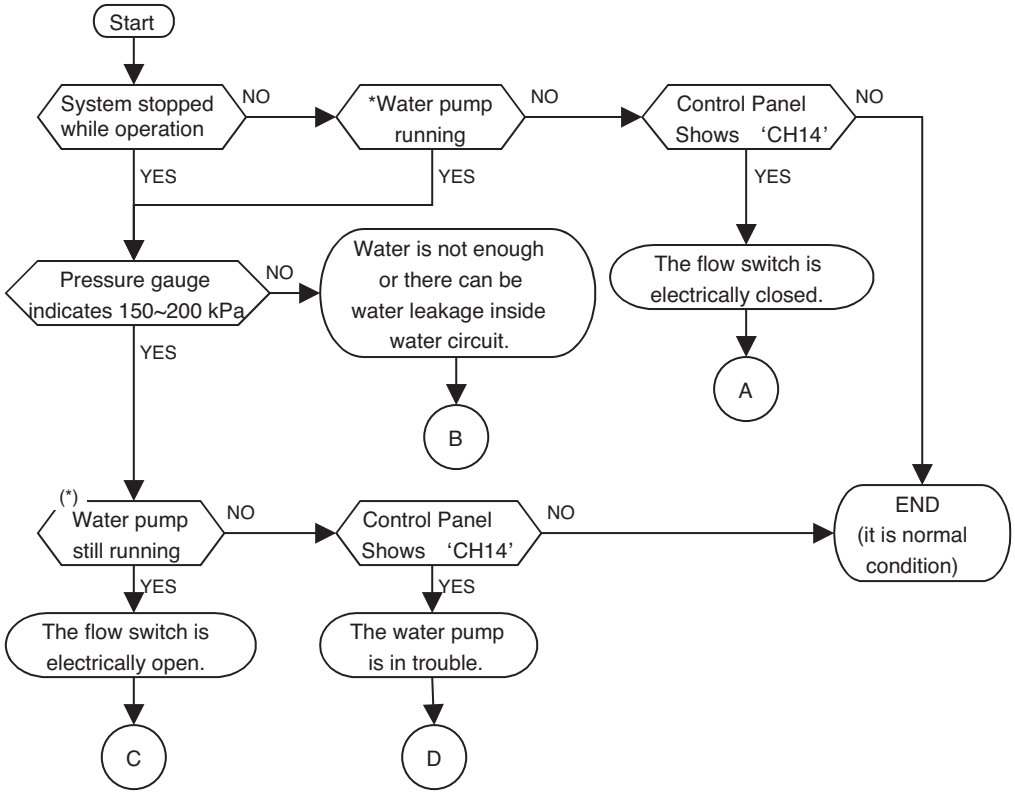


Part 5
Trouble Shooting

Trouble Shooting

1. Checking Key Components of Unit

1.1 Flow Switch



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

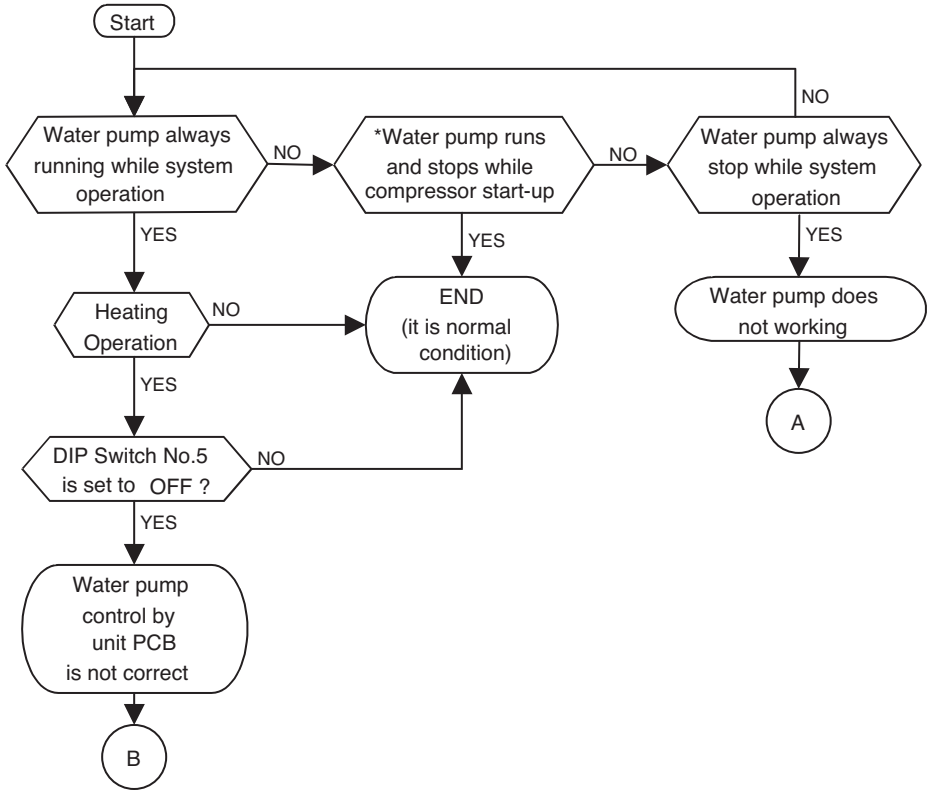
A
- Although there is not water flow inside water circuit, the flow switch detects as if water is flowing. It is due to electrically closed (or short) of flow switch or the contact of flow switch is mechanically stuck.
- Contact official After Service Center and replace the flow switch.
- Check the air vent. If there is air in the unit, it can display "CH14". Please remove the air by using the air vent.

B
- Check if water inside water circuit is fully charged. Pressure gauge at the unit should indicate 150~200 kPa.
- Also, as the hand of the pressure gauge is not react so fast according to water charging, check the pressure gauge again.
- Otherwise, there can be water leakage inside water circuit. Examine if water circuit is completely sealed.

C
- Although water is well flowing, the flow switch can not detect water flow. It is due to electrically open of flow switch or the contact of flow switch is mechanically broken.
- Contact official After Service Center and replace the flow switch.

D
- Read 'Checking Key Components of Unit – Water Pump' carefully to get more detail information.
- Contact official After Service Center and replace the water pump.
- Also, check the water quality if there are particles that can yield locking at the shaft of the water pump.
- Check the air vent. If there is air in the unit, it can display "CH14". Please remove the air by using the air vent.

1.2 Water Pump



* : It is normal condition that water pump runs or stops during system operation (including compressor start-up) due to specific control logic.

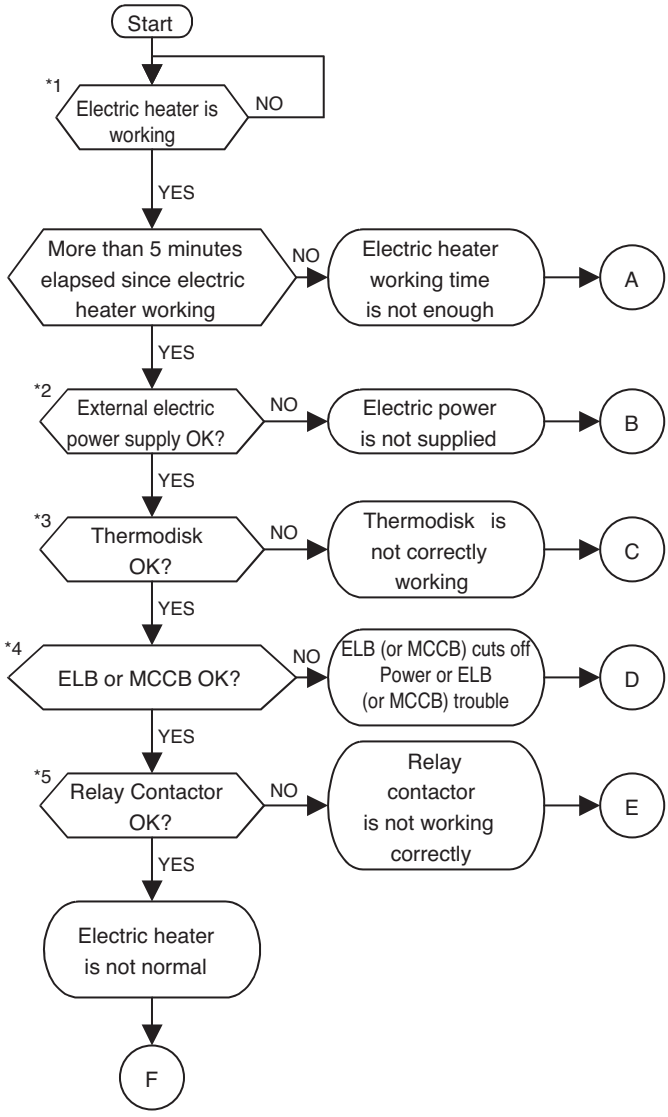
A

- Water pump does not because of mechanical defects of water pump or wrong wiring at the water pump.
- To correct mechanical defects, contact official After Service Center and replace the water pump.
- To correct wrong wiring, check if wires 'CN_W/PUMP (A)' connector on the unit PCB and water pump terminal box (black plastic box at the water pump) are connected firmly. Also, check wires are electrically connected by measuring resistance of each wires (if electrically connected exactly, resistance should be 0 ohm).

B

- Unit PCB can not make control signal or wrong wiring at the water pump.
- To correct unit PCB's making control signal, first check the signal level. Use electric voltage meter and measure voltage at 'CN_W/PUMP (A)' connector on the unit PCB. If measured value is not 220 V ~ 240 V AC while 'Water Pump Operating Icon ( ) ' is displayed at control panel, the unit PCB is in trouble. In this case, contact official After Service Center and replace the unit PCB.
- To correct wrong wiring, please refer Ⓐ.

1.3 Electric Heater



*1 : When electric heater is working, 'Electric Heater Operating Icon (~W1 or ~W2)' is displayed at control panel

*2 : For single-phase model : Measure electric voltage at port 3 (Live) and port 4 (Neutral) of Terminal Block 3 with voltage meter. The measured value should be 220-240 V~ AC. To identify the location of Terminal Block 3, please refer circuit diagram of unit at 'Installation Manual' or backside of front cover of the unit.

*2 : For three-phase model : Measure electric voltage at two port of 3 (R), 4 (S), and 5 (T) of Terminal Block 3 with voltage meter. The measured value should be 220-240 V~ AC or 380-415 V~ AC. To identify the location of Terminal Block 3, please refer circuit diagram of unit at 'Installation Manual' or backside of front cover of the unit.

*3 : For single-phase model : Find cover of thermodisk which is located beside air vent. Air vent is on the top of the electric heater tank. Uncover the cover by unscrewing bolts. Find two copper leads located both left and right side of the thermodisk core. Check resistance of both leads. The measured resistance should be 0 ohm. After then, check if voltage is transmitted to the thermodisk correctly. Measure electric voltage between one of the lead (Live) of the thermodisk and port 3 (Neutral) of ELB (A). The measured value should be 220-240 V~ AC.

*3 : For three-phase model : Find cover of thermodisk which is located side of electric heater tank.Uncover the cover by unscrewing bolts. Find two copper leads located both left and right side of two thermodisk core. Check resistance of both leads of each thermodisks. The measured resistance should be 0 ohm.

While uncovering the cover of the thermodisk, be careful for electric shock.

*4 : For single-phase model : Resistance between port 1 and port 2 should be 0 ohm. Also, port 3 and port 4 should be 0 ohm, too. Finally, measure electric voltage at port 2 (Live) and port 4 (Neutral) with voltage meter. The measured value should be 220V~240V AC.

*4 : For three-phase model : Resistance between port 1-to-port 2, port 3-to-port 4, and port 5-to-port 6 of MCCB (A) should be 0 ohm. Port number and location of MCCB (A) can be found circuit diagram of the unit(back side of front cover).

*5 : For single-phase model : At Relay Contactor (A), measure electric voltage at port 2 (Live) and port 6 (Neutral) with voltage meter. The measured value should be 220V~240V AC. Also, at Relay Contactor (B), measure electric voltage at port 2 (Live) and port 6 (Neutral) with voltage meter. The measured value should be 220V~240V AC.

*5 : For three-phase model : At Magnet Contact (C) or Magnet Contact (B), resistance between port L1-to-port T1, port L2-to-port T2, and port L3-to-port T3 should be 0 ohm.

A
- Wait for 5 minutes to heat water inside electric heater tank. If capacity of electric heater is 6kW, at least 2 centigrade will be increased.

B
- For single-phase model : Check if external electricity power supply is breakout. If not, check wiring between external electricity power supply and port 3 and port 4 of Terminal Block 3. You can identify the location of Terminal Block 3 at the circuit diagram of unit.
- For three-phase model : Check if external electricity power supply is breakout. If not, check wiring between external electricity power supply and port 3, port 4, and port 5 of Terminal Block 3. You can identify the location of Terminal Block 3 at the circuit diagram of unit.

C
- Thermodisk is mechanically defected. In this case, contact official After Service Center and replace the thermodisk.

D
- Check the insulation resistance of Electric Heater.
- If the insulation resistance has improper, remove the cause of the problem and then reset the ELB (or MCCB).
- Replace the ELB (or MCCB) when the insulation resistance is suitable.

E
- Relay contactor is is mechanically defected. In this case, contact official After Service Center and replace the relay contactor.

F
- Heating coil of electric heater can be damaged or wiring inside the electric heater is problem. Before replacing the electric heater, in this case, contact official After Service Center and do diagnosis about electric heater and related parts including the capacity of external electric power source. If the reason of malfunction is clearly proved as the defect of the electric heater itself, then replace it with new one.

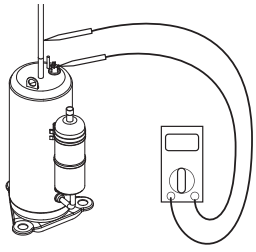
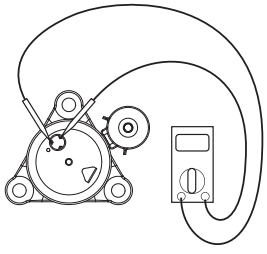
1.4 Remote Controller

To solve various troubles while using control panel, please read following FAQ (Frequently Asked Questions).
For your convenience, all questions are classified according to topics.

No	Topic	Question	Answer
1	Power button does not bright	System installation is finished. Also, all wirings including power connection is all right. But when the power button in front of the control panel is pushed, it does not bright.	• There can be a problem in wiring between PCB and control panel. Open control box and find 'CN_REMO' connector at the PCB. If the connector is empty or nothing is connected, please connect it with end of wire which is from control panel then restart the system. • Check if external controller is connected like thermostat. If thermostat is connected to the system and it is configured exactly, you can see 'Thermostat Icon ( )' at the display of the control panel. It is normal condition that power button of control panel does not work when thermostat is installed.
2	Some icons are displayed automatically	Although nobody touched control panel, someties it displays specific icons and the system operates automatically.	• It is normal condition. Basically, two features can be operated without user's decision – one is system protective operation, the other is 'background water tank heating operation', which is heating inside the water tank while space heating is not used or the system is not working. System protective operation is, as letter says, for the purpose of securing the system from worse condition. Anti-freezing operation, for example, is one of the protective operation. It is essential to start protective operation to prevent potential malfunction and to keep possible accidents. On the other hand, background water tank heating operation is not protective operation but to supply warm water to end-user. The background water tank heating operation is only started when the water tank temperature is under the specific temperature.
3	Water tank heating or related features are not permitted	Setting water tank temperature is not permitted although the water tank is installed.	Following two conditions should be satisfied. • Check if 'Water tank enable/disable' button is correctly pushed or not. To use water tank, end-user must push button and highlight icon. Otherwise, water tank heating is disabled. • Also, check if DIP switch setting is correct or not. To identify the DIP switch setting, open the control box inside the unit. Unless 2nd and 3rd pin of DIP switch setting is 01(OFF-ON) or 10(ON-OFF), the water tank heating will not be configured.

1.5 Compressor

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

No.	Checking Item	Symptom	Countermeasure
1	Is how long power on during operation?	1) Power on for 12 hours or more	• Go to No.2.
		2) Power on for 12 hours or less	• Go to No.2 after applying power for designated time (12 hours).
2	Does failure appears again when starting operation?	1) The compressor stops andsame error appears again.	• Check IPM may fail.
	Method to measure insulation resistance  Method to measure coil resistance 	2) If output voltage of the inverter is stable.	• Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor. • Insulation resistor: 2 MΩ or more • Coil resistor: Please refer to page 76
		3) If output voltage of the inverter is unstable or it is 0 V. (When incapable of using a digital tester)	• Check the IPM. If the IPM is normal, replace the inverter board. • Check coil resistor and insulation resistor.

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

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

Note

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

1.6 Fan Motor

Checking Item	Symptom	Countermeasure
(1) The fan motor does not operate. Does failure appears again when starting operation? (2) Vibration of the fan motor is large.	1) When power supply is abnormal	• Modify connection status in front of or at the rear of the breaker, or if the power terminal console is at frosting condition.
		• Modify the power supply voltage is beyond specified scope.
	2) For wrong wiring	• For following wiring. 1. Check connection status. 2. Check contact of the connector. 3. Check that parts are firmly secured by tightening screws. 4. Check connection of polarity. 5. Check short circuit and grounding.
	3) For failure of motor	• Measure winding resistance of the motor coils.
	4) For failure of circuit board	Replace the circuit board in following procedures if problems occur again when powering on and if there are no matters equivalent to items as specified in above 1) through 4). (Carefully check both connector and grounding wires when replacing the circuit board.) 1. Replace only fan control boards. If starting is done, it means that the fan control board has defect. 2. Replace both fan control board and the main board. If starting is done, it means that the main board has defect. 3. If problems continue to occur even after countermeasure of No.1 and No.2, it means that both boards has defect.

2. Self-Diagnosis Feature

2.1 Concept of 'Classified Trouble'

• **Definition of terms**

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

• **Objective of introducing 'Trouble'**

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

• **Classified trouble**

- Trouble is classified two levels according to the seriousness of the problem : Slight trouble and heavy trouble
- Slight trouble : In most case, this trouble is concerned with sensor problems. The outdoor unit is operating under emergency mode operation condition which is configured by DIP switch No. 4 of the Main PCB Assembly 1.
- Heavy trouble : As the outdoor unit has problem, the emergency mode operation is performed by electric heater.
- Option trouble : a problem is found for option operation such as water tank heating. In this trouble, the troubled option is assumed as if it is not installed at the system.

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

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

2.2 Error Code List

Main PCB assembly(Heater)

Error Code	Description	Main Reasons
01 *	Problem in Remote Room Air sensor	Remote room air sensor disconnection or short circuit
02 **	Problem in Refrigerant (Inlet side) sensor	Refrigerant Inlet side sensor disconnection or short circuit
03 ****	Bad communication between control panel and unit	Connector connection error or connection wire break
05 ****	Bad communication between Indoor unit and Main PCB assembly(Inverter) and Main PCB assembly(Heater)	PCB(Heater) Unit does not receive signal from PCB(Inverter)
06 **	Problem in Refrigerant (Outlet side) sensor	Refrigerant Outlet side sensor disconnection or short circuit
08 ***	Problem in Water Tank sensor	Water tank sensor disconnection or short circuit
09 ****	PCB Program (EEPROM) Fault	Electrical or mechanical damage at the EEPROM
13 ***	Problem in Solar-thermal sensor	Solar-thermal sensor disconnection or short circuit
14 ****	Problem in Flow Switch	Folw switch is open while internal water pump is working
15 ****	Water pipe overheated	Leaving water temperature is above 57°C
16 ****	Problems in sensors	An error cord 17,18,19 error has occurred at the same time.
17 *	Problem in Water-inlet sensor	Water-Inlet sensor disconnection or short circuit
18 *	Problem in Water-outlet sensor	Water-outlet sensor disconnection or short circuit
19 *	Problem in Water-interlim sensor	Water-interlim sensor disconnection or short circuit
20 ****	Electric heater overheated	Leaving water temperature is above 80°C

• **Notice of error code**

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

CAUTION

Precaution in service or check

Even after stopping the operation of product, it takes some time to discharge the remaining electricity of the electrolytic capacitor that was charged early. Before conducting a checking or repairing job, pull out the plug out of the outlet and make sure that the lamp on the control board outdoor unit is off.

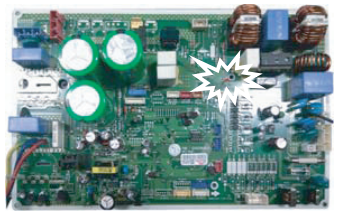
Main PCB assembly(Inverter)

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

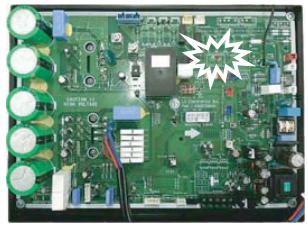
  Ex) Inverter compressor IPM defect Error : error number 21

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

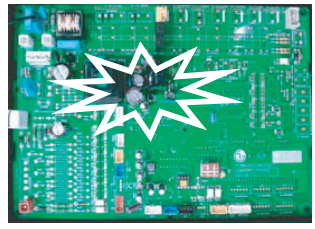
AHUW036A2



AHUW056A2
AHUW076A2
AHUW096A2



AHUW126A2
AHUW146A2
AHUW166A2



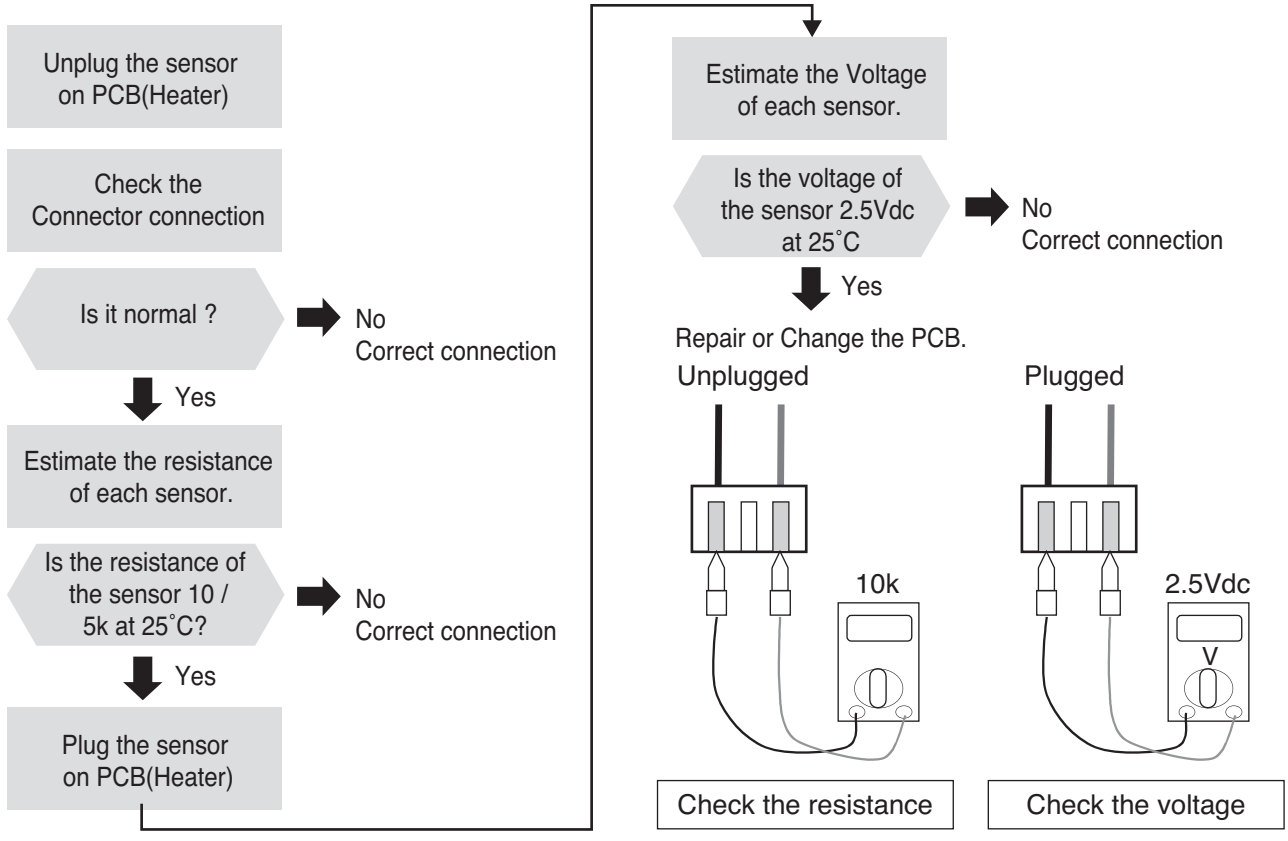
AHUW128A2
AHUW148A2
AHUW168A2

Error Code	Description	Main Reasons
21**	DC Peak(IPM Fault)	Inverter compressor drive IPM defect / inverter compressor defect
22**	Max. CT(CT2)	Increase of inverter compressor CT value
23**	DC Link Low Volt.	After inverter activation relay is ON, DC voltage recharge defect
26**	DC Comp Position Error	Inverter compressor error, causing initial activation failure
27**	PFC Fault Error	Error by overcurrent at inverter input
29**	Comp Over Current	Inverter compressor activation failure or increase of CT value
32**	D-Pipe High(Inv.)	Excessive rise of inverter compressor discharge temperature, causing compressor OFF
35**	Low Pressure Error	Excessive decrease of low pressure
41**	Inv. D-Pipe Th Error(Open/Short)	Inverter compressor discharge temperature sensor disconnection or short circuit
43**	High Pressure Sensor(Open/Short)	High pressure sensor disconnection or short circuit of inverter compressor
44**	Outdoor air Th Error(Open/Short)	Air temperature sensor disconnection or short circuit
45**	Cond. Middle Pipe Th Error(Open/Short)	Condenser Middle Pipe sensor disconnection or short circuit
46**	Suction Pipe Th Error(Open/Short)	Inverter compressor suction temperature sensor disconnection or short circuit
48**	Cond. Out-Pipe Th Error(Open/Short)	Condenser Out-Pipe sensor disconnection or short circuit
52****	PCB Communication Error	Checking the communication state between Main PCB and Inverter PCB
53**	Communication Error(PCB(Heater) ↔ PCB(Inverter))	PCB(Heater) unit does not receive signal from PCB(Inverter)
54*	Open and Reverse Phase Error	Prevention of phase unbalance and prevention of reverse rotation of constant-rate compressor
60**	EEPROM Error(Outdoor)	PCB(Inverter) EEPROM error
61**	Cond. Middle Pipe High	EEV connector diplaced/poor EEV assembly
62**	Heatsink Error(High)	PCB(Inverter) heat generation, causing the rise of heatsink temperature
73**	Overcurrent (Peak) detected at inverter input	Error by overcur'rent detection at inverter input

3. Trouble shooting Guide

Display code	Title	Cause of error	Check point & Normal condition
01	Remote room air sensor	• Connector connection error • Faulty PCB(Heater) • Faulty sensor (Open / Short)	Normal resistor : 10KΩ/ at 25˚C (Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.
02	Refrigerant inlet pipe sensor	• Connector connection error • Faulty PCB(Heater) • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C(Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.
06	Refrigerant outlet pipe sensor	• Connector connection error • Faulty PCB(Heater) • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C(Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.

Check Flow Chart

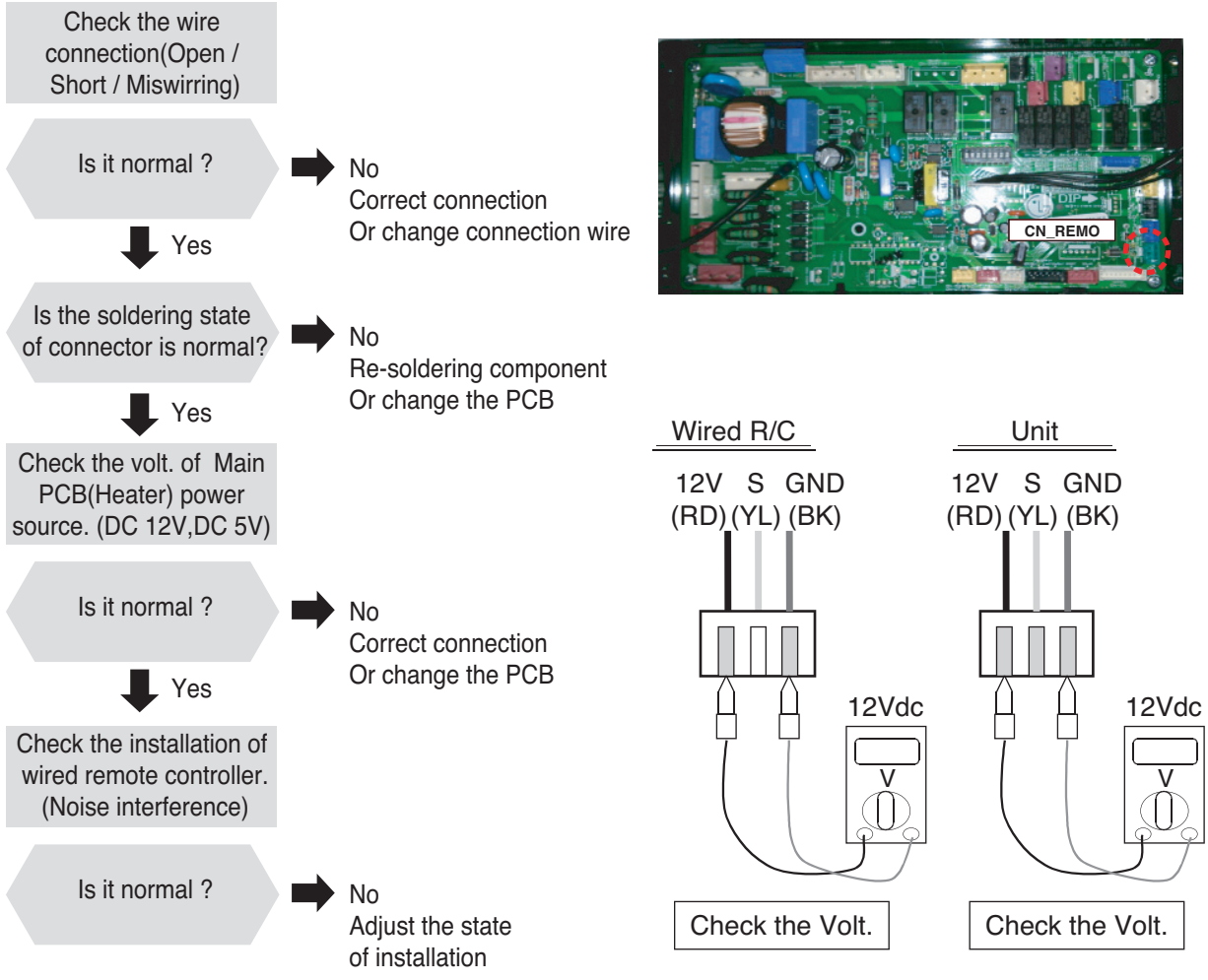


Check Point

1. Unplug the sensor on PCB(Heater).
2. Estimate the resistance of each sensor.
3. If the resistance of the sensor is 10 KΩ / 5 KΩ 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 PCB(Heater) 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(Heater).

Display code	Title	Cause of error	Check point & Normal condition
03	Communication Error (Wired remote controller)	• Connector connection error • Faulty PCB(Heater) / Remote controller • Connection wire break	• Connection of wire • Main PCB(Heater) Volt. DC12V • Noise interference

Check Flow Chart

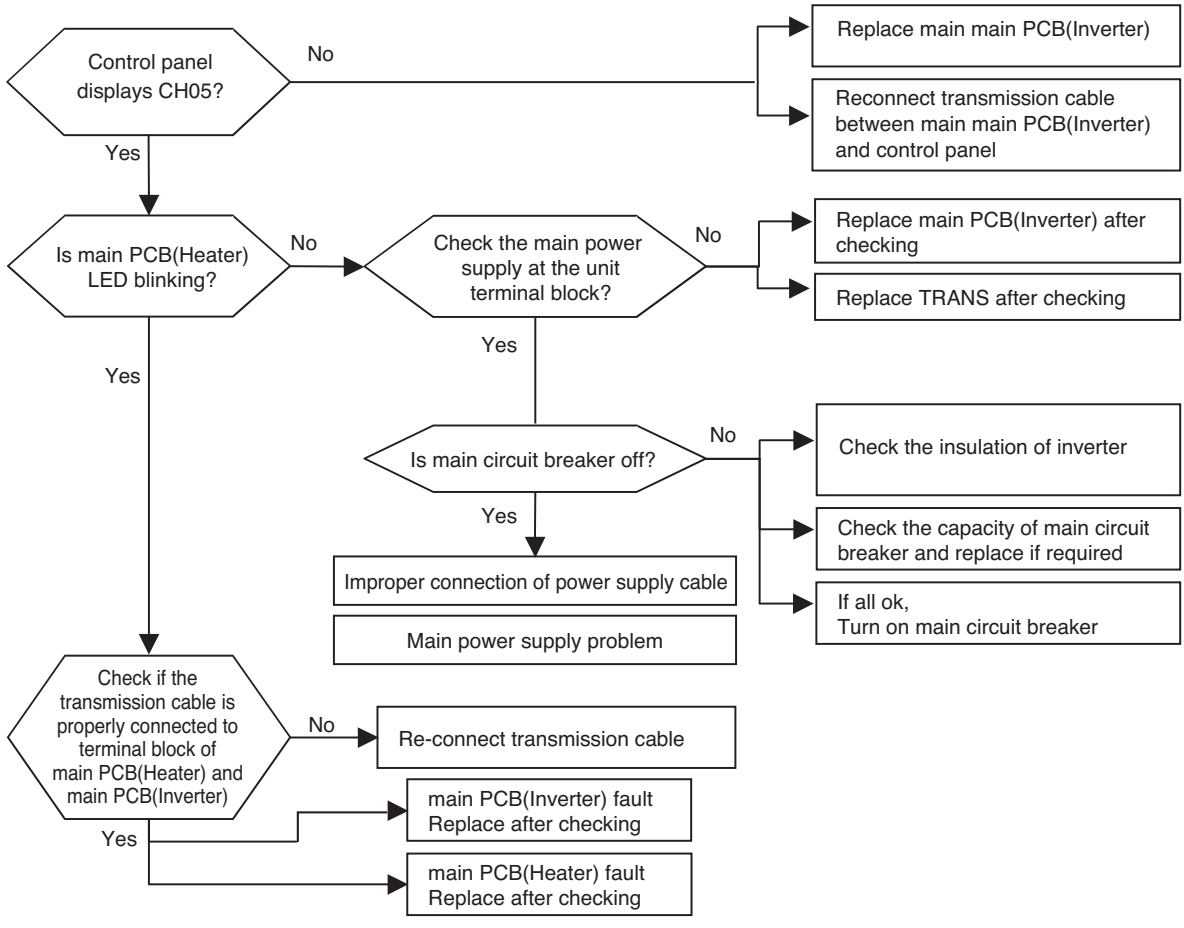


Check Point

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

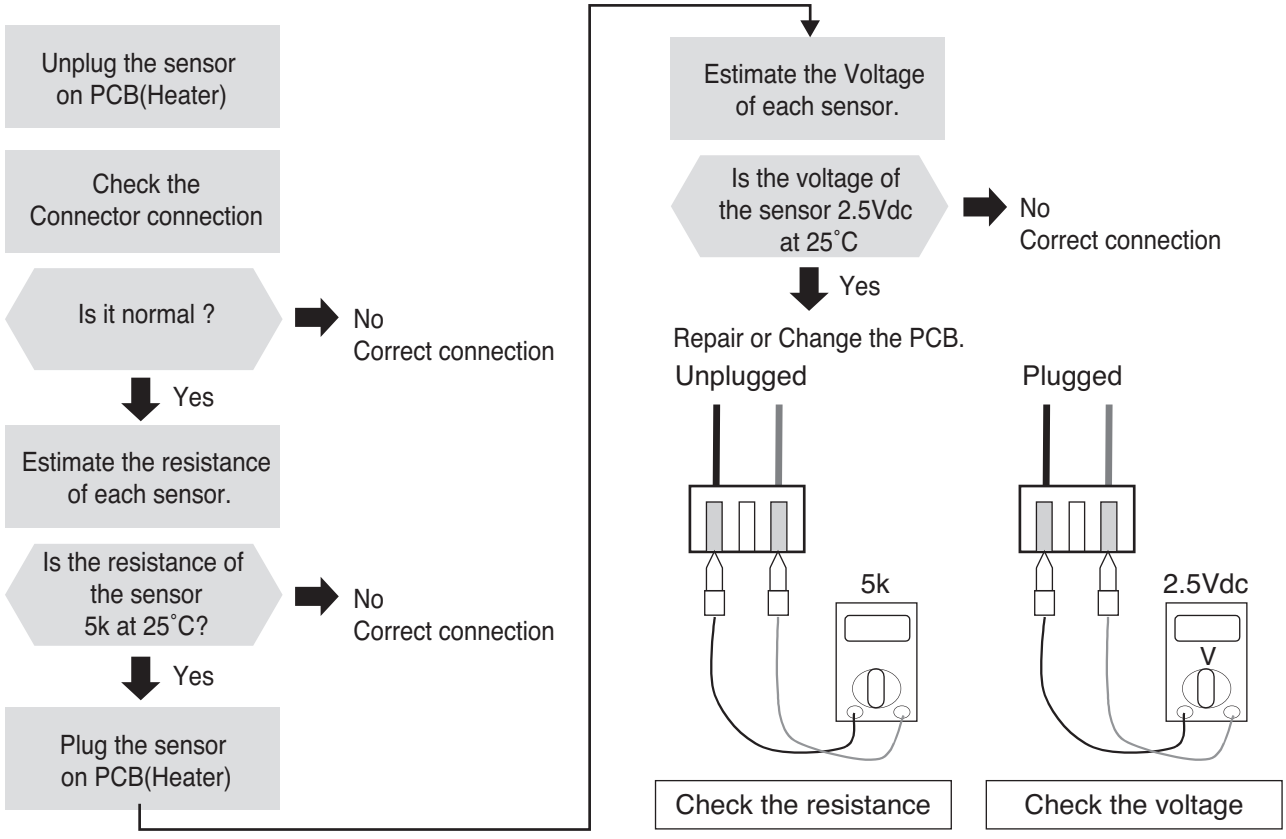
Code No.	Description	Cause	Normal Condition
05 53	Bad communication between main PCB assembly(Inverter) and main PCB assembly(Heater)	• The connector for transmission is disconnected • The connecting wires are misconnected • The communication line is broken • main PCB(Heater) is abnormal • main PCB(Inverter) is abnormal	• Wire connection between control panel and main PCB 2 should be tight

■ Error diagnosis and countermeasure flow chart



Display code	Title	Cause of error	Check point & Normal condition
08	Problem in Water Tank sensor	• Connector connection error • Faulty PCB(Heater) • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C(Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.
13	Problem in Solar-thermal sensor	• Connector connection error • Faulty PCB(Heater) • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C(Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.

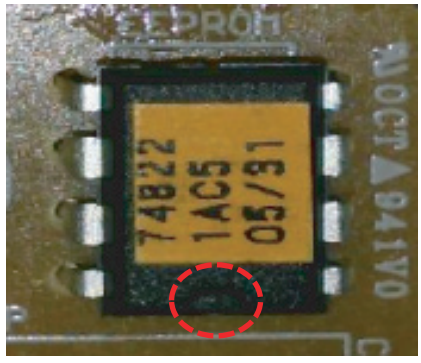
Check Flow Chart



Check Point

1. Unplug the sensor on PCB(Heater).
2. Estimate the resistance of each sensor.
3. If the resistance of the sensor is 5 KΩ 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 PCB(Heater) 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.

Code No.	Description	Cause	Normal Condition
09	PCB(Heater) 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



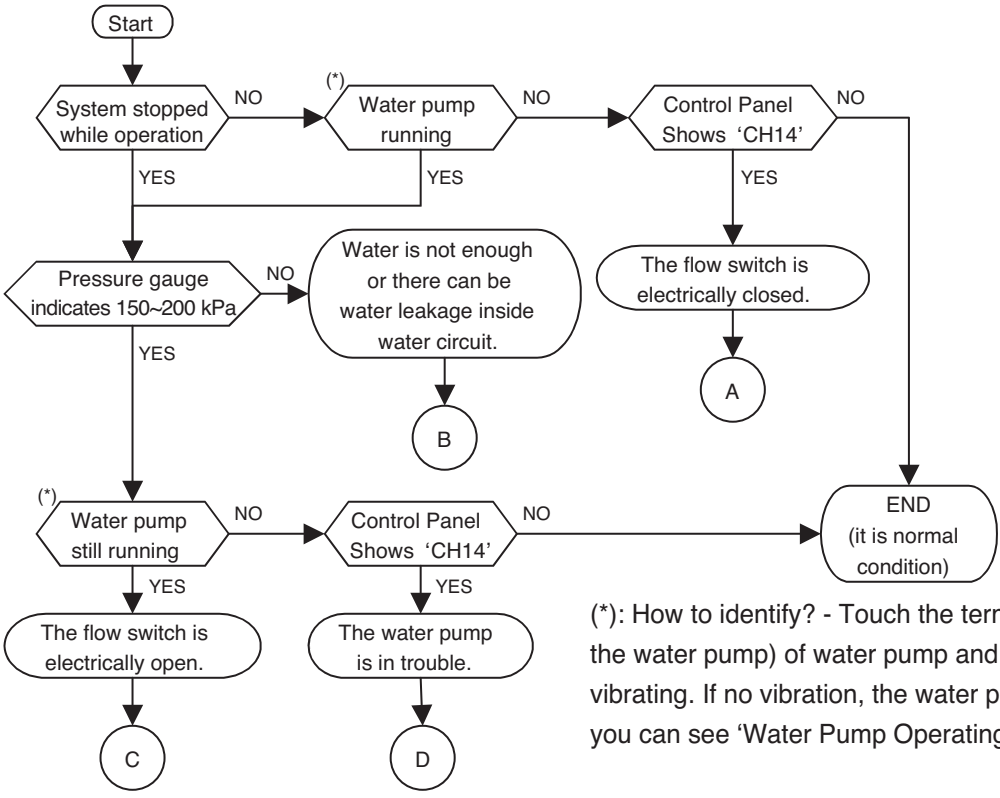
<EEPROM Direction Check Point>

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

Code No.	Description	Cause	Normal Condition
14	Problem in Flow Switch	• Flow switch is open while internal water pump is working • Flow switch is closed while internal water pump is not working • Flow switch is open while DIP switch No. 5 of main PCB(Heater) is set as ON	• Flow switch should be closed while internal water pump is working or DIP switch No. 5 of main PCB(Heater) is set as ON • Flow switch should be open while internal water pump is not working

■ Error diagnosis and countermeasure flow chart



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

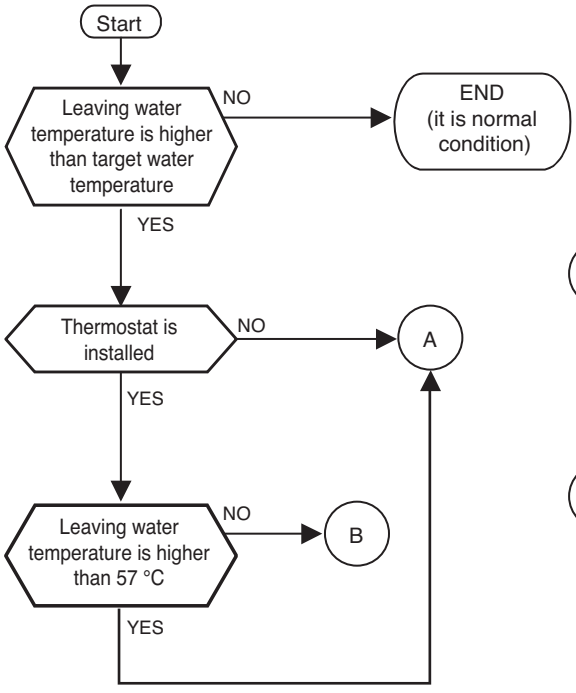
A
- Although there is not water flow inside water circuit, the flow switch detects as if water is flowing. It is due to electrically closed (or short) of flow switch or the contact of flow switch is mechanically stuck.
- Contact official After Service Center and replace the flow switch.
- Check the air vent. If there is air in the unit, it can display "CH14". Please remove the air by using the air vent.

B
- Check if water inside water circuit is fully charged. Pressure gauge at the unit should indicate 150~200 kPa.
- Also, as the hand of the pressure gauge is not react so fast according to water charging, check the pressure gauge again.
- Otherwise, there can be water leakage inside water circuit. Examine if water circuit is completely sealed.

C
- Although water is well flowing, the flow switch can not detect water flow. It is due to electrically open of flow switch or the contact of flow switch is mechanically broken.
- Contact official After Service Center and replace the flow switch.

D
- Read 'Checking Key Components of unit – Water Pump' carefully to get more detail information.
- Contact official After Service Center and replace the water pump.
- Also, check the water quality if there are particles that can yield locking at the shaft of the water pump.
- Check the air vent. If there is air in the unit, it can display "CH14". Please remove the air by using the air vent.

Code No.	Description	Cause	Normal Condition
15	Water pipe overheated	• Abnormal operation of electric heater • Leaving water temperature is above 57 °C	• Possible maximum leaving water temperature is 57 °C.



A
- This is unexpected case.
- Turn off the system and call service center.
- If the system is not turned off before it yields error code (CH15), very hot leaving water will be generated and it is harmful to human.

B
- Room air is not fully heated by under floor heating.
- Wait while room air is heated by target temperature of thermostat.

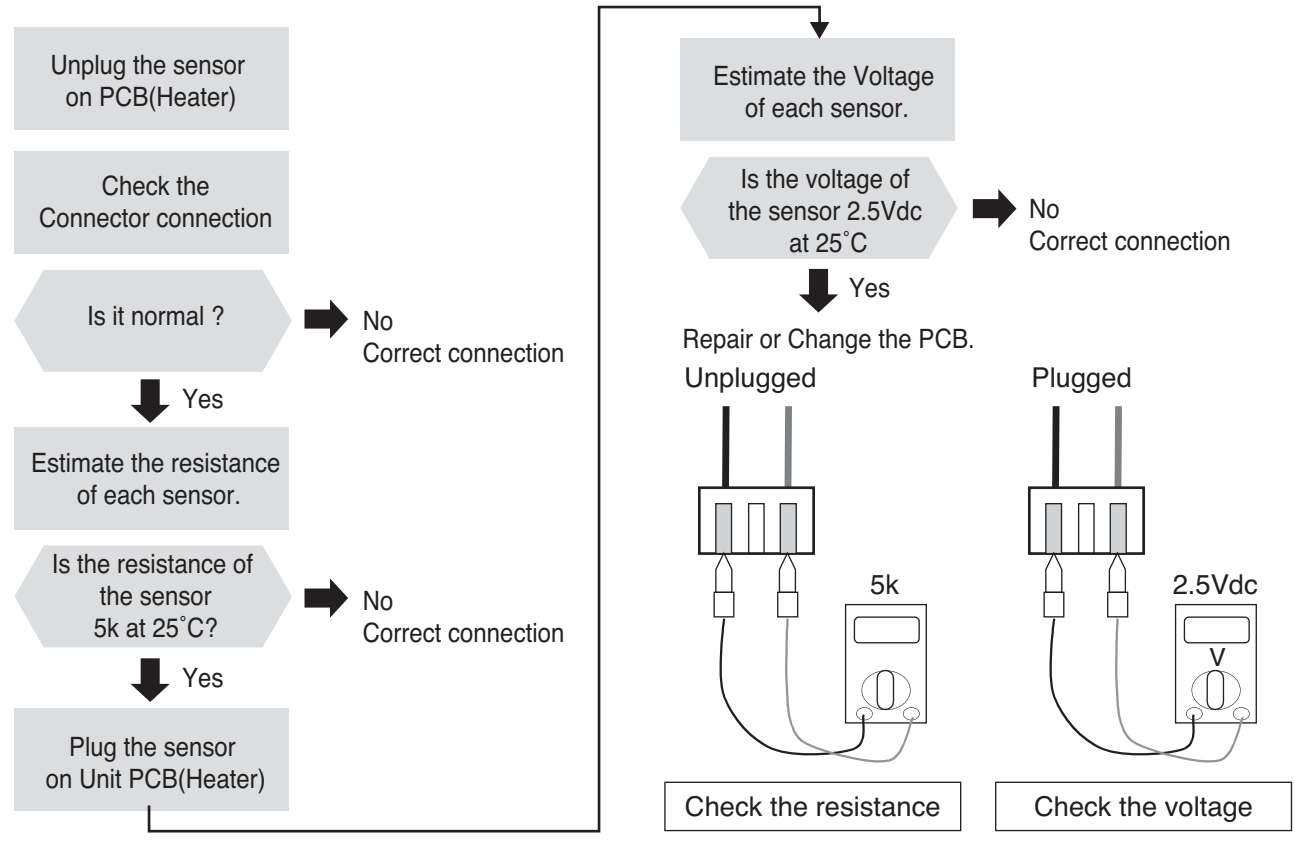
Code No.	Description	Cause	Normal Condition
16	Problem in Sensors	• It is occur when error 17,18,19 is happend at the same time.	• It is't occur when error 17,18,19 is happend at the same time.

■ Error diagnosis and countermeasure flow chart

- Refer to error code 17/18/19 Trouble shooting Guide.

Display code	Title	Cause of error	Check point & Normal condition
17	Problem in Water-inlet sensor	• Connector connection error • Faulty PCB(Heater) • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C (Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.
18	Problem in Water-outlet sensor	• Connector connection error • Faulty PCB(Heater) • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C(Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.
19	Problem in Water-interlim sensor	• Connector connection error • Faulty PCB(Heater) • Faulty sensor (Open / Short)	Normal resistor : 5KΩ/ at 25˚C(Unplugged) Normal voltage : 2.5Vdc / at 25˚C(Plugged) Refer to sensor resistance table.

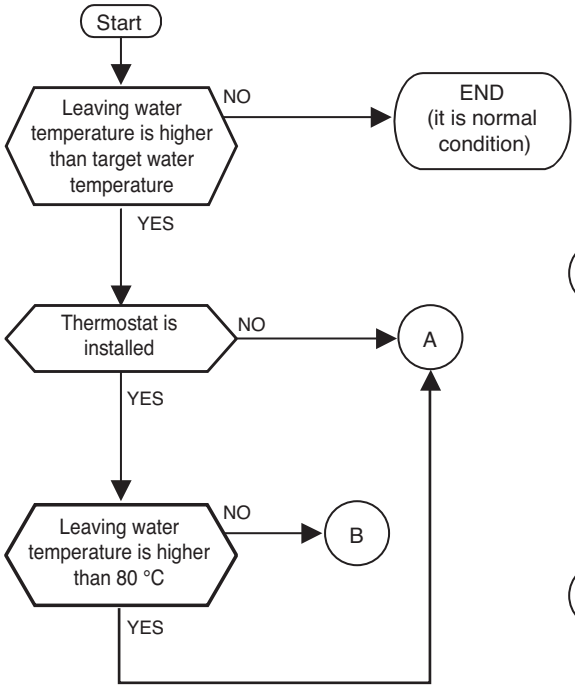
Check Flow Chart



Check Point

1. Unplug the sensor on PCB(Heater).
2. Estimate the resistance of each sensor.
3. If the resistance of the sensor is 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 PCB(Heater) 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.

Code No.	Description	Cause	Normal Condition
20	Electric Heater Overheated	• Abnormal operation of electric heater • Leaving water temperature is above 80 °C	• If there is no problem in electric heater control, possible maximum leaving water temperature is 80 °C.



A
- This is unexpected case.
- Turn off the system and call service center.
- If the system is not turned off before it yields error code (CH20), very hot leaving water will be generated and it is harmful to human.
- If Error Code (CH20) is occurred, please check thermostat, electric heater, power supply and others. Also, it is recommended to check air vent which is located on the top of the electric heater tank.

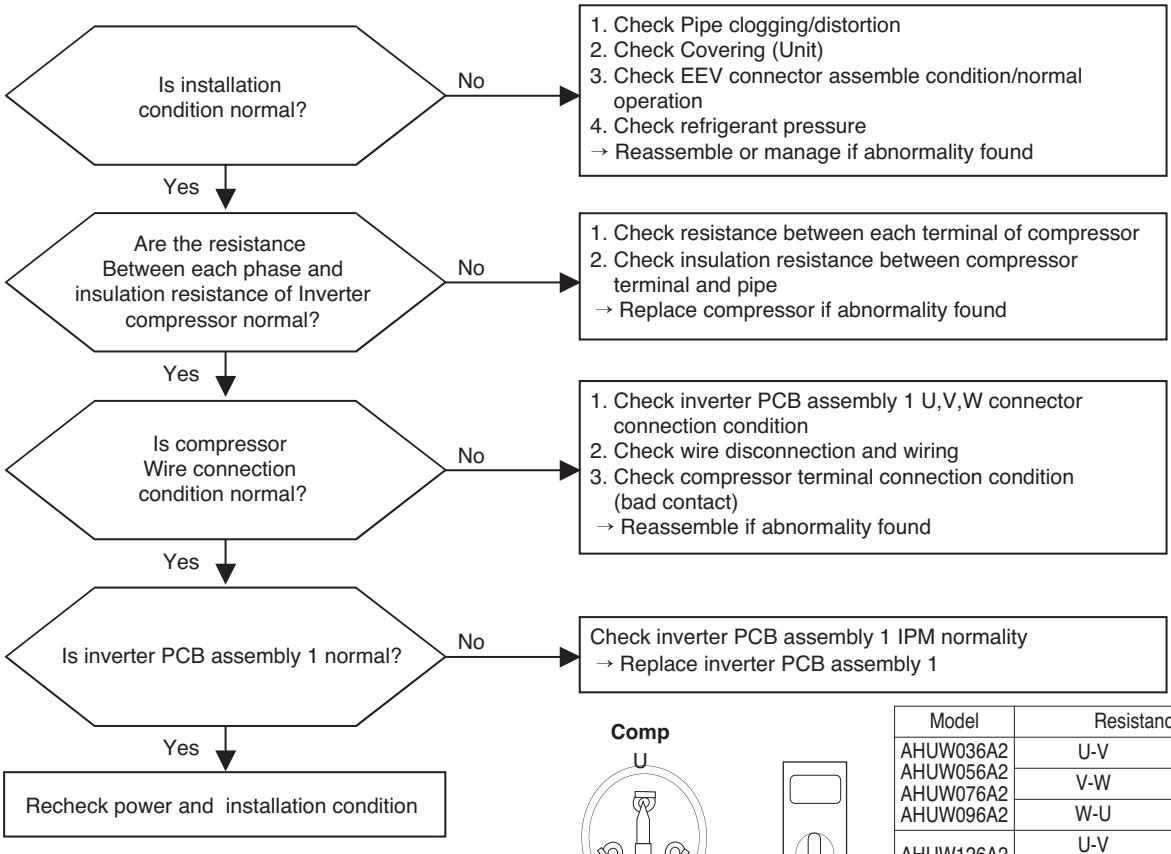
B
- Room air is not fully heated by under floor heating.
- Wait while room air is heated by target temperature of thermostat.

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

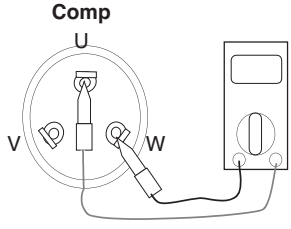
⚠ WARNING

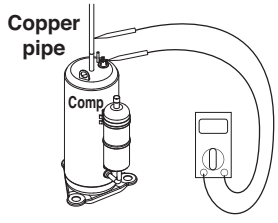
Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

■ Error Diagnosis and Countermeasure Flow Chart



■ Comp checking method

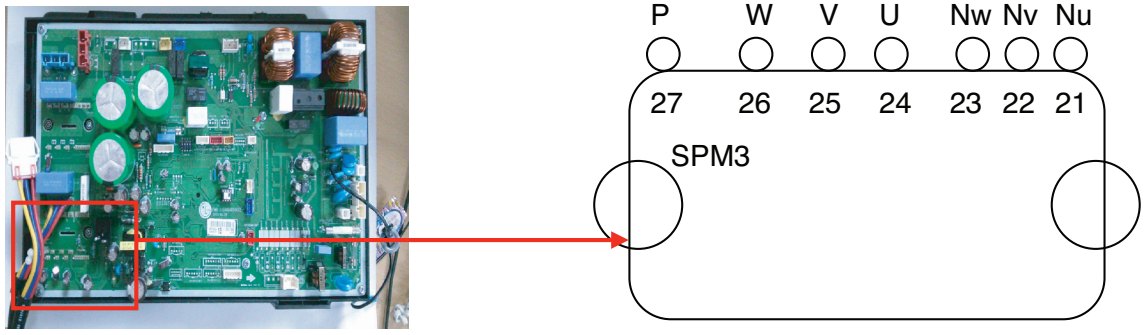




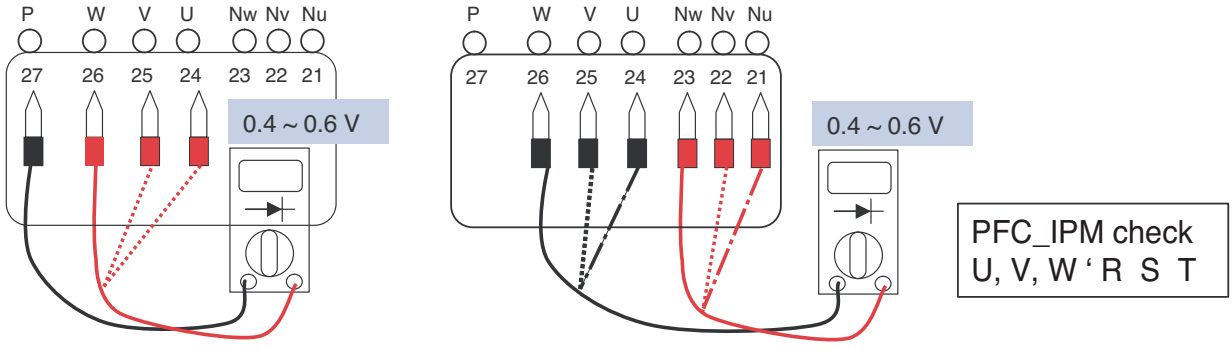
Model	Resistance(Ω) at 20°C	
AHUW036A2 AHUW056A2 AHUW076A2 AHUW096A2	U-V	0.628(at 25˚C)
	V-W	0.628(at 25˚C)
	W-U	0.628(at 25˚C)
AHUW126A2 AHUW146A2 AHUW166A2	U-V	0.438(at 25˚C)
	V-W	0.438(at 25˚C)
	W-U	0.438(at 25˚C)
AHUW128A2 AHUW148A2 AHUW168A2	U-V	0.845Ω(at 25˚C)
	V-W	0.845Ω(at 25˚C)
	W-U	0.845Ω(at 25˚C)

Terminal	Insulation Resistance
U-panel	≥ 10MΩ
V-panel	≥ 10MΩ
W-panel	≥ 10MΩ

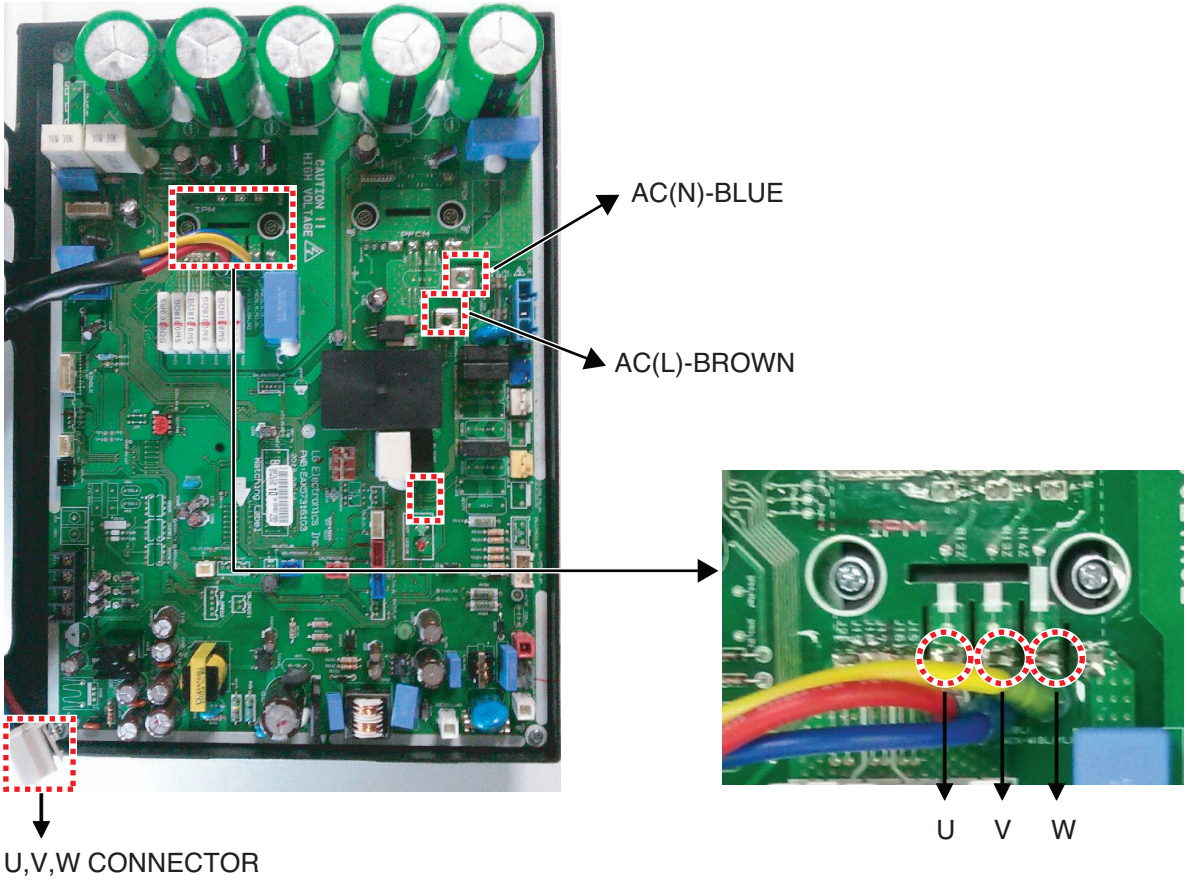
▶ AHUW056A2/AHUW076A2/AHUW096A2



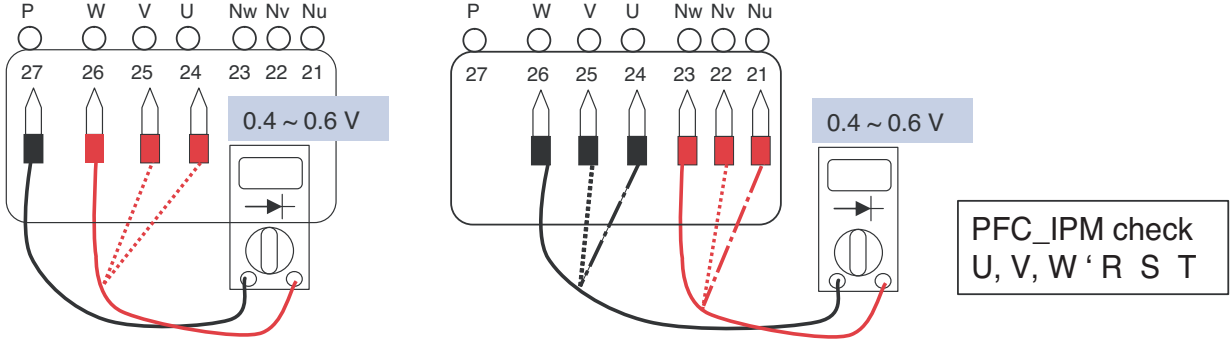
1. Wait PCB(Inverter) DC voltage is discharged after main power off.
2. Pull out V, V, W COMP connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short(0Ω) or open(hundreds MΩ), PCB(Inverter) needs to be replaced.(IPM damaged)
5. Set the multi tester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



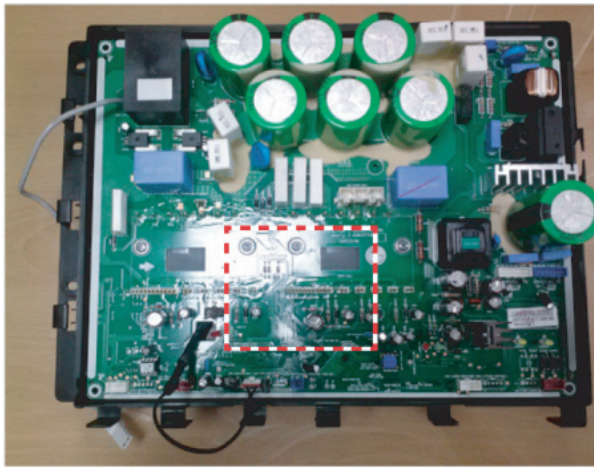
▶ AHUW126A2/AHUW146A2/AHUW166A2

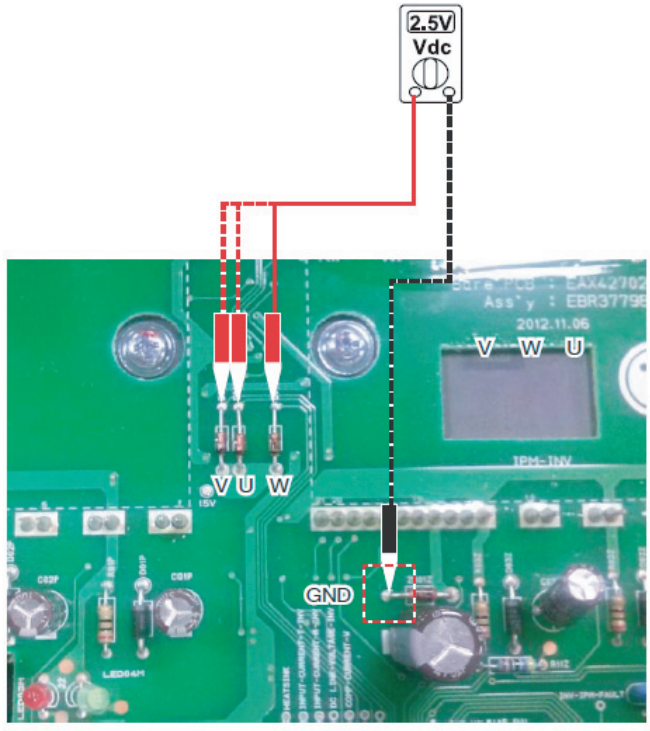


1. Wait PCB(Inverter) DC voltage is discharged after main power off.
2. Pull out AC(L), AC(N) connectors and U,V,W COMP Connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short(0Ω) or open(hundreds MΩ), PCB needs to be replaced.(IPM damaged)
5. Set the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

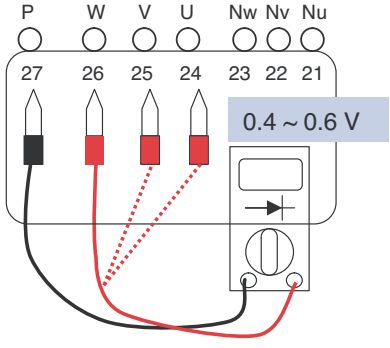


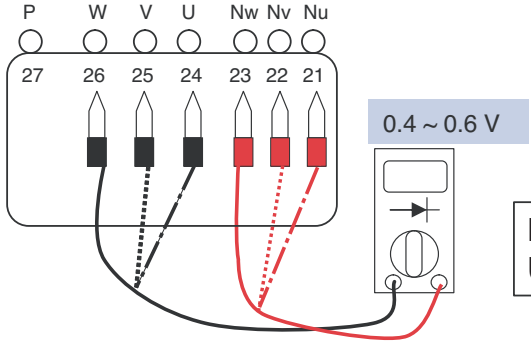
▶ AHUW128A2/AHUW148A2/AHUW168A2





1. Wait PCB(Inverter) DC voltage is discharged after main power off.
2. Pull out AC(L), AC(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(Inverter) needs to be replaced.(PCB damaged).





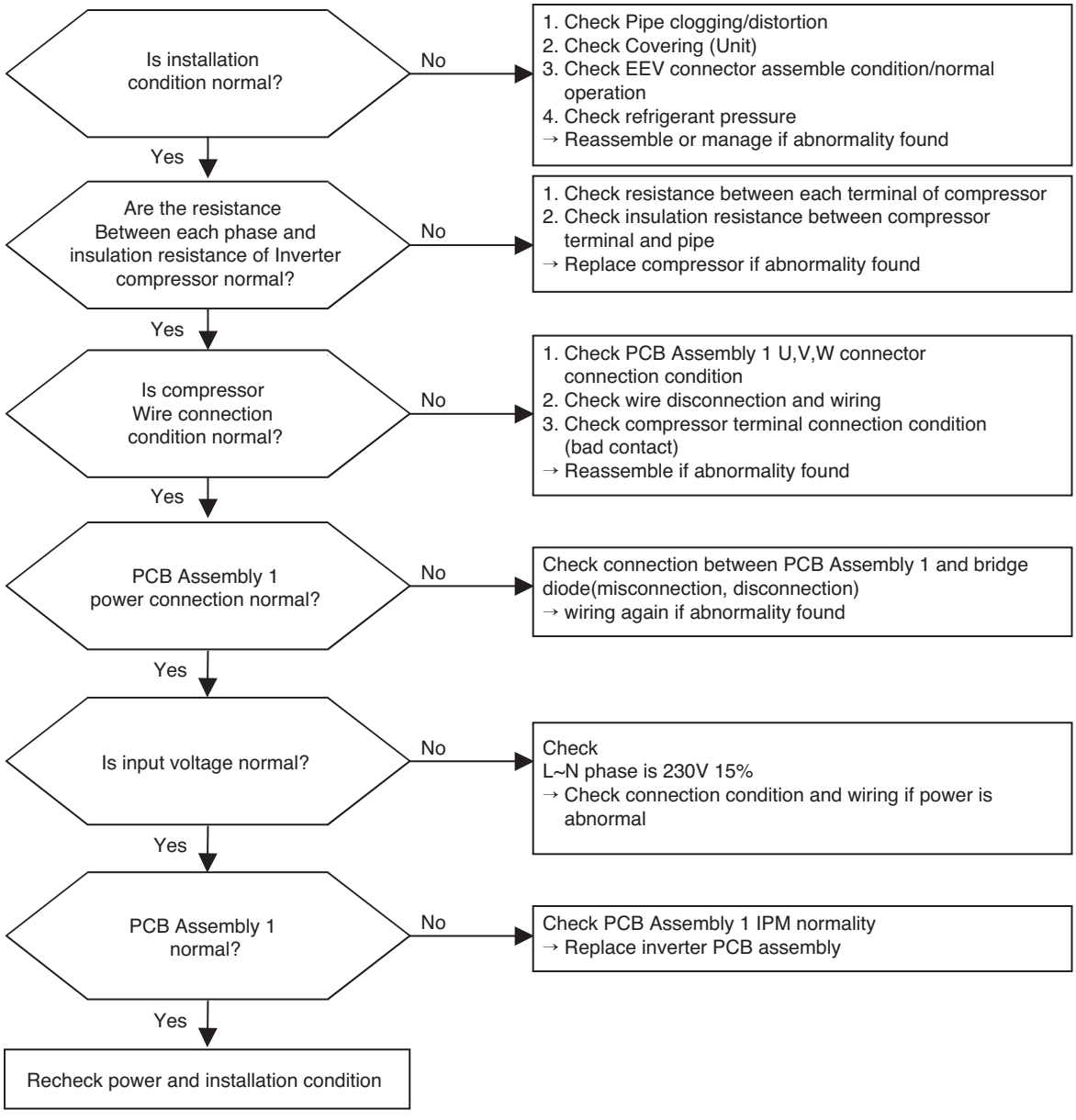
PFC_IPM check
U, V, W ‘ R S T

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(Inverter) 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.

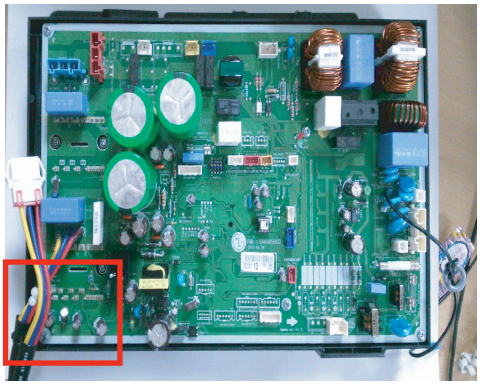
■ Error Diagnosis and Countermeasure Flow Chart

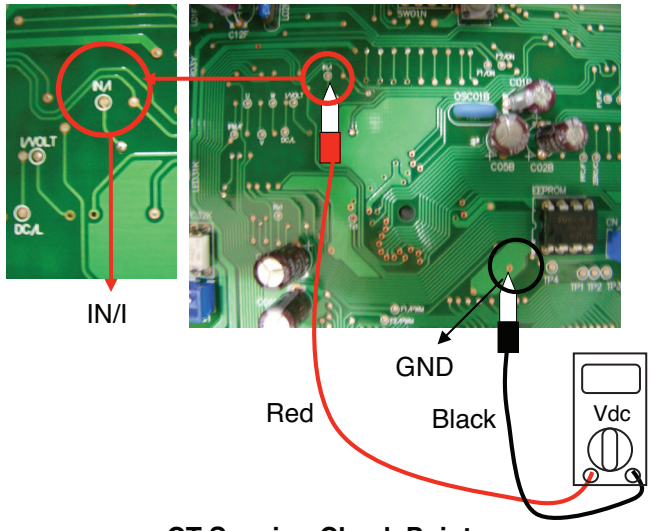


Check Point

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
   (AHUW056A2/AHUW076A2/AHUW096A2 - Check output the CT Sensor : DC 2.5±0.2V
   AHUW126A2/AHUW146A2/AHUW166A2 - Check output pin 2.3 of the CT Sensor : DC 2.5±0.2V
   AHUW128A2/AHUW148A2/AHUW168A2 - Check input_current_T_PFC and R_PFC of the CT sensor : DC 2.5±0.2V)

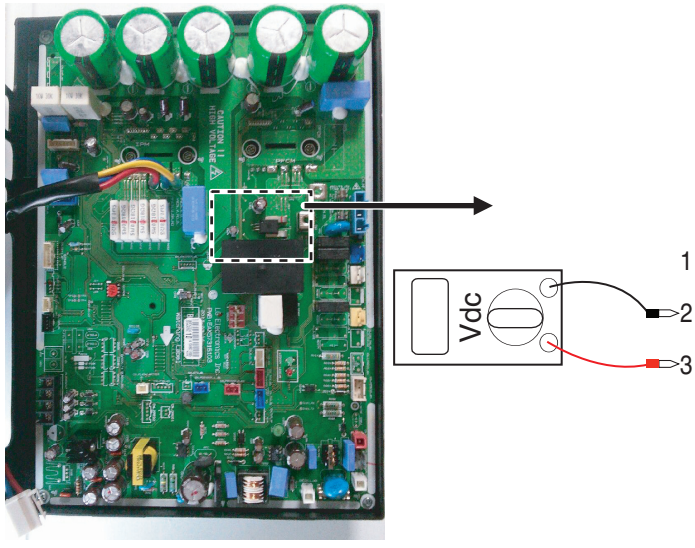
▶ AHUW056A2/AHUW076A2/AHUW096A2



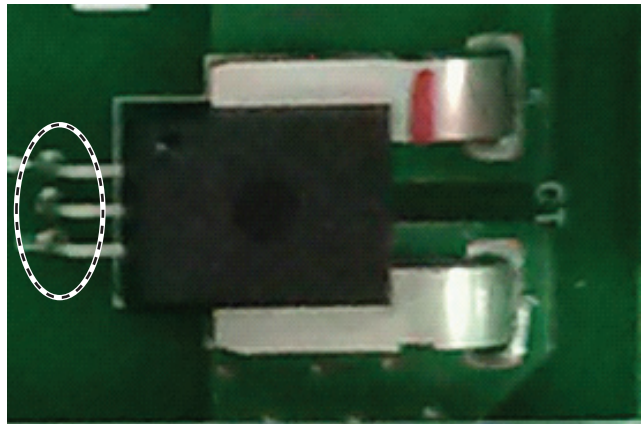


<CT Sensing Check Point>

▶ AHUW126A2/AHUW146A2/AHUW166A2



< Inverter PCB>



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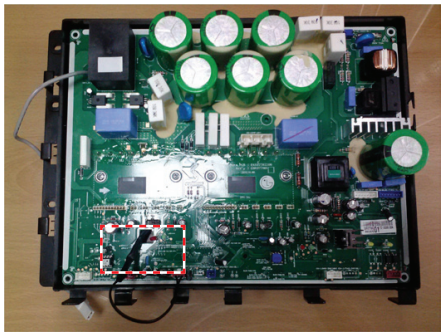
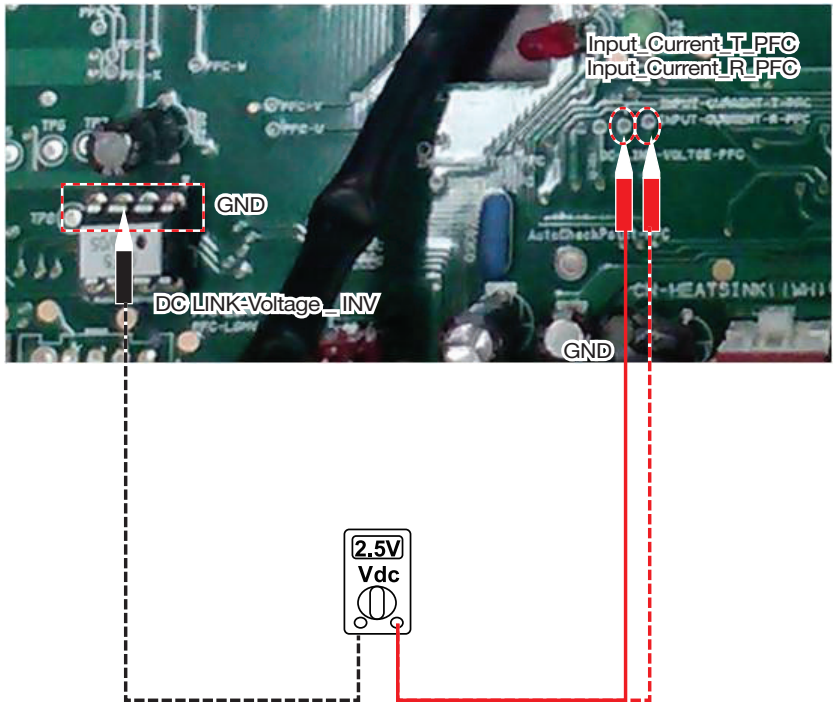
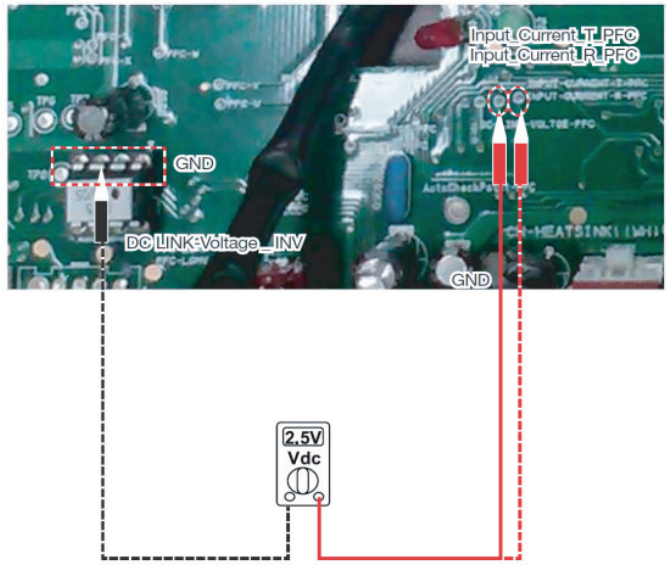


4kW



▶ AHUW128A2/AHUW148A2/AHUW168A2

<Inverter PCB>



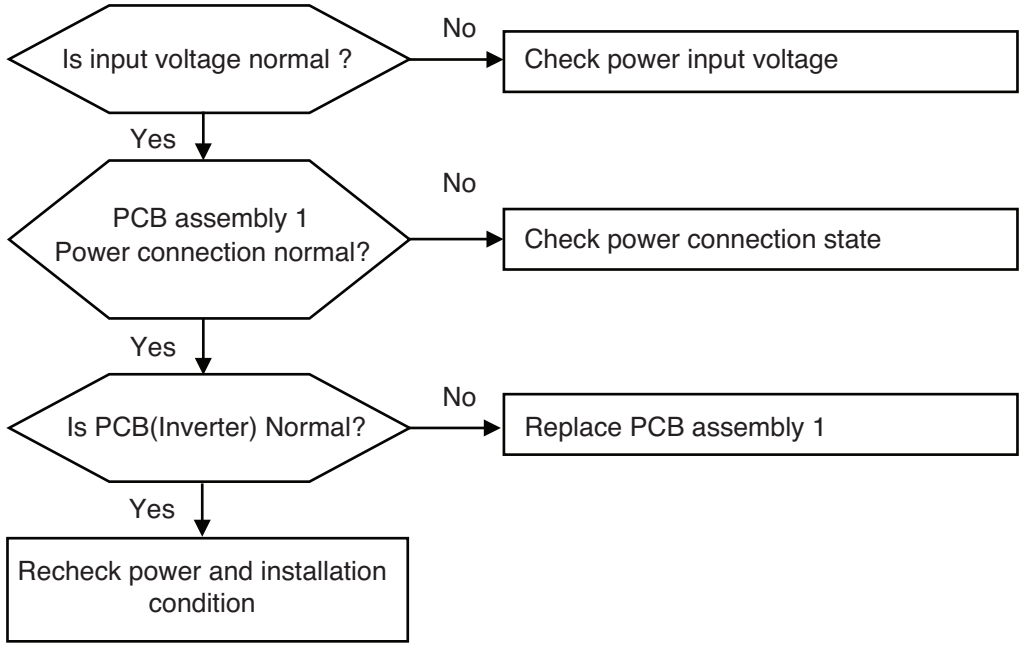
<CT Sensing Check Point >

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(Inverter) 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.

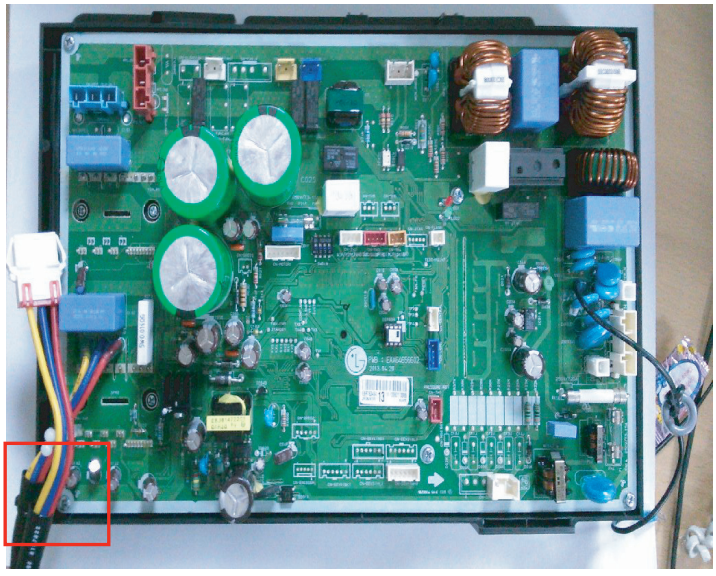
■ Error Diagnosis and Countermeasure Flow Chart

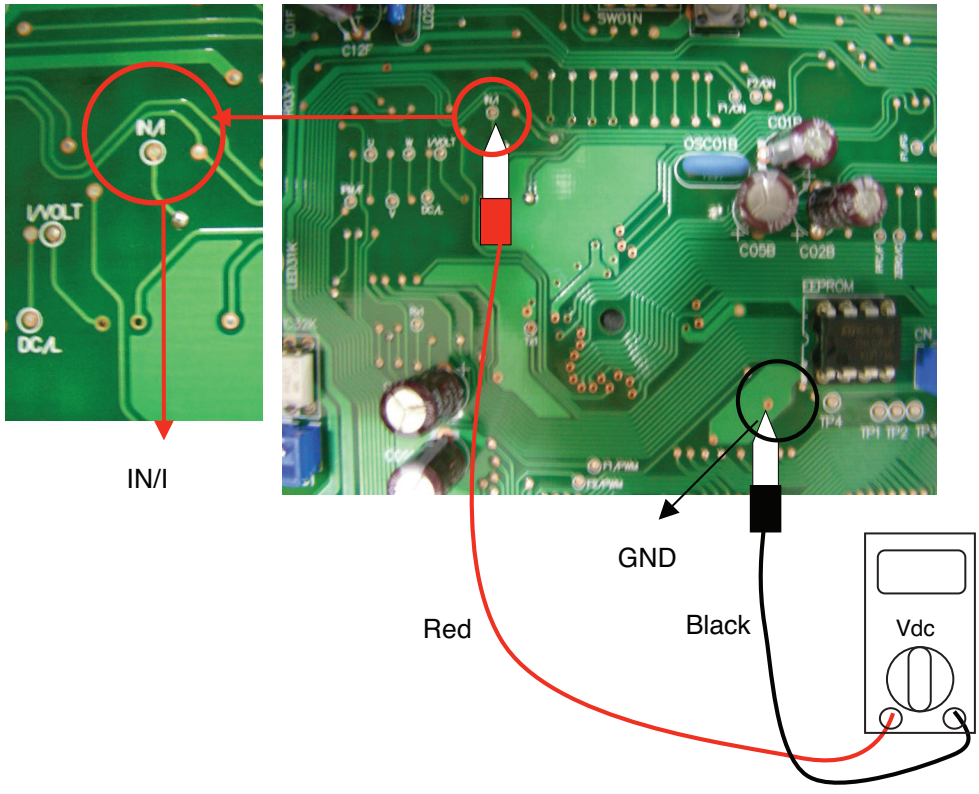


Check Point

1. Check the WCN_P(L),P(N) Connection condition at the main PCB(Heater). (Refer to wiring diagram)
2. Check the DC Link voltage at not operating(280V ↑)
3. Check the DC Link voltage at Comp operating(340V ↑)
4. Check DC Link Sensing Signal(AHBW**6A0) :2.4~2.8V (Refer the Picture)
5. Check DC Link Sensing Signal(AHBW**8A0) :0.4~0.6V (Refer the Picture)

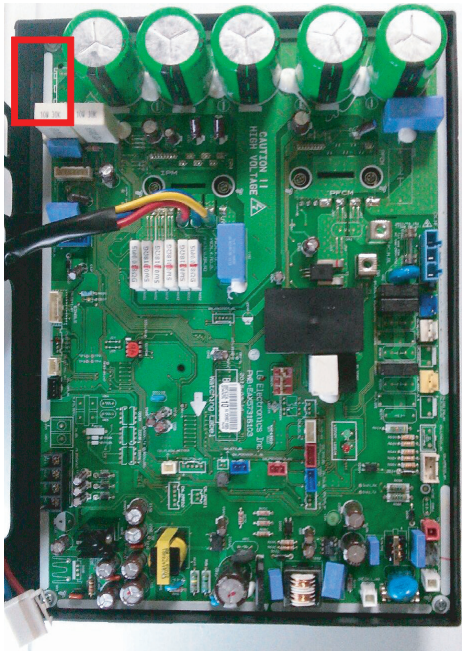
* AHUW056A2/AHUW076A2/AHUW096A2

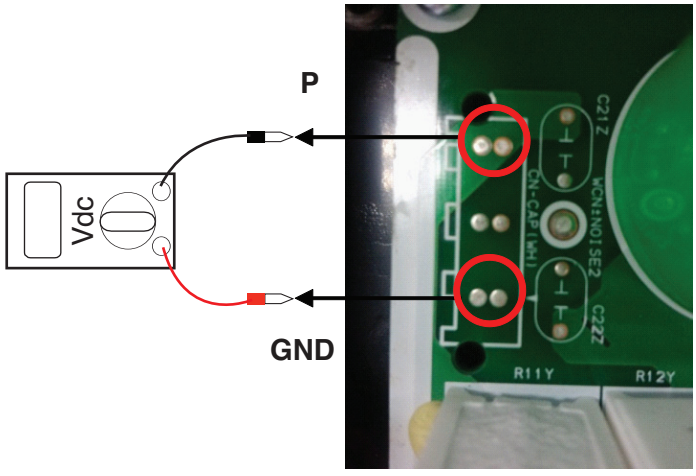




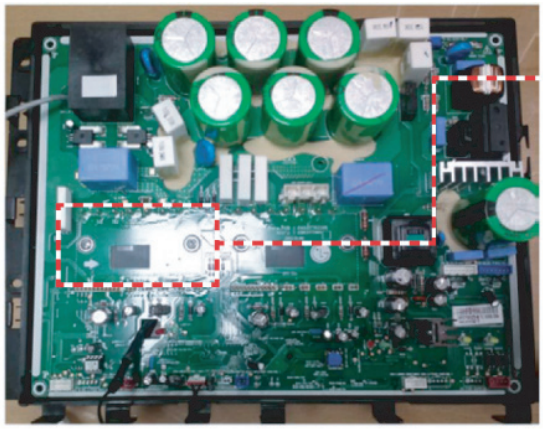
<CT Sensing Check Point>

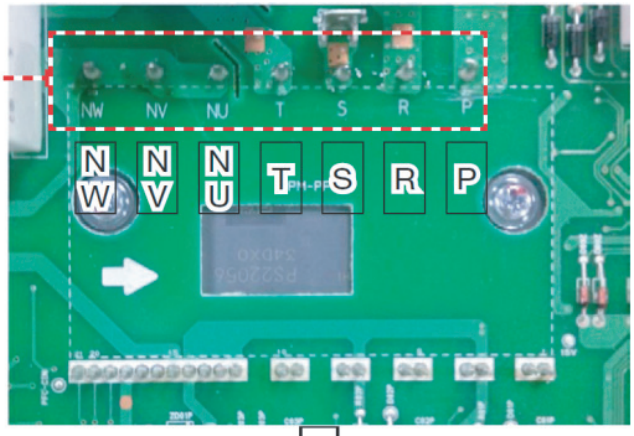
▶ AHUW126A2/AHUW146A2/AHUW166A2

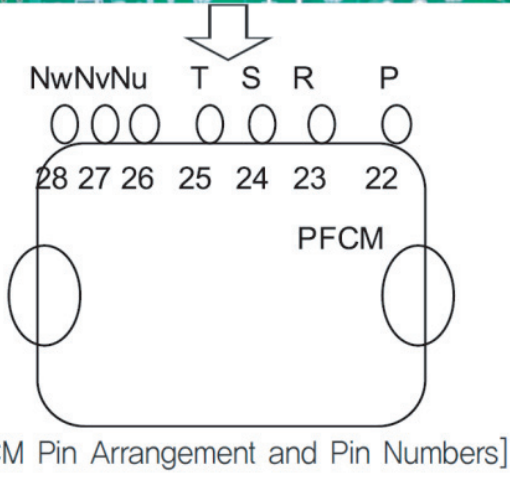




▶ AHUW128A2/AHUW148A2/AHUW168A2







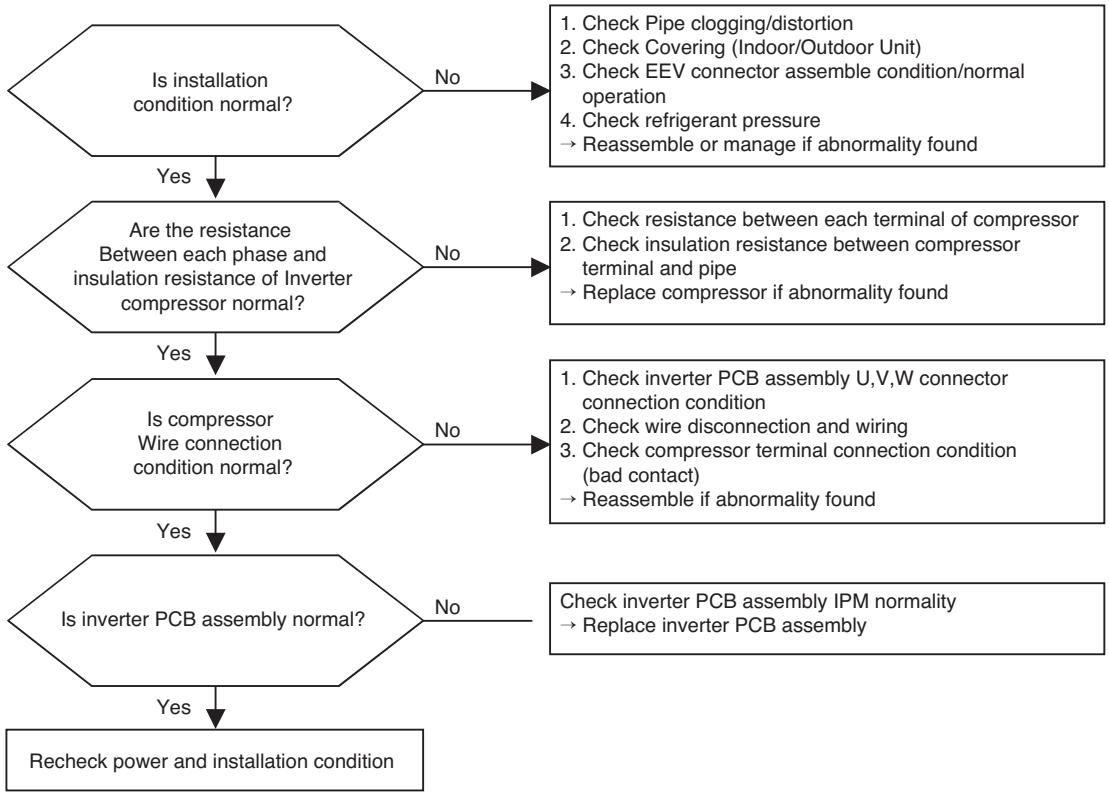
[PFCM Pin Arrangement and Pin Numbers]

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.

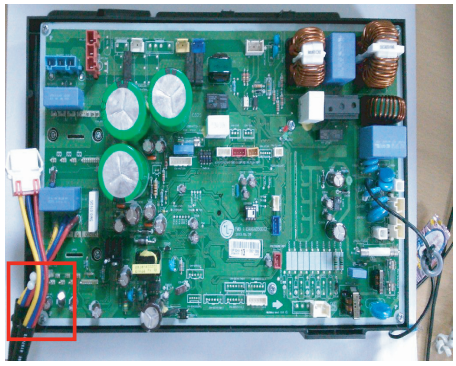
⚠ WARNING

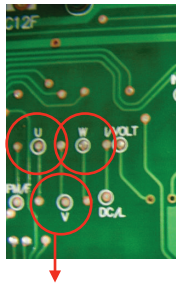
Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

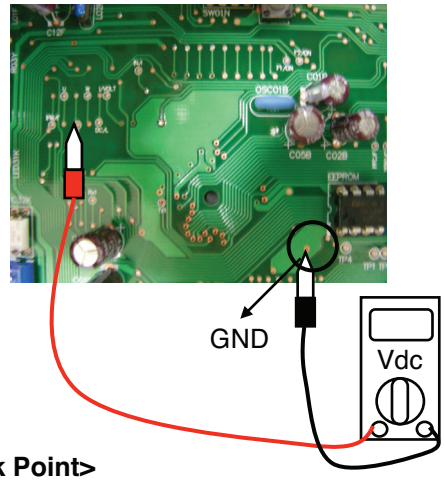
■ Error Diagnosis and Countermeasure Flow Chart



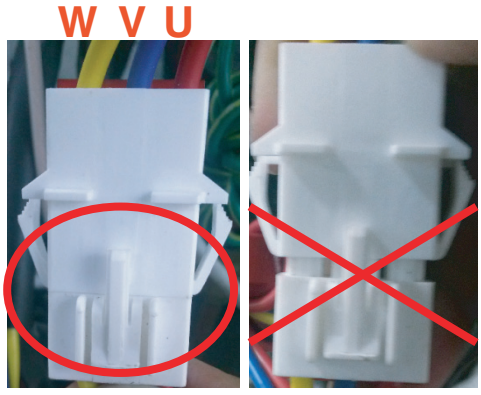
▶ AHUW056A2/AHUW076A2/AHUW096A2





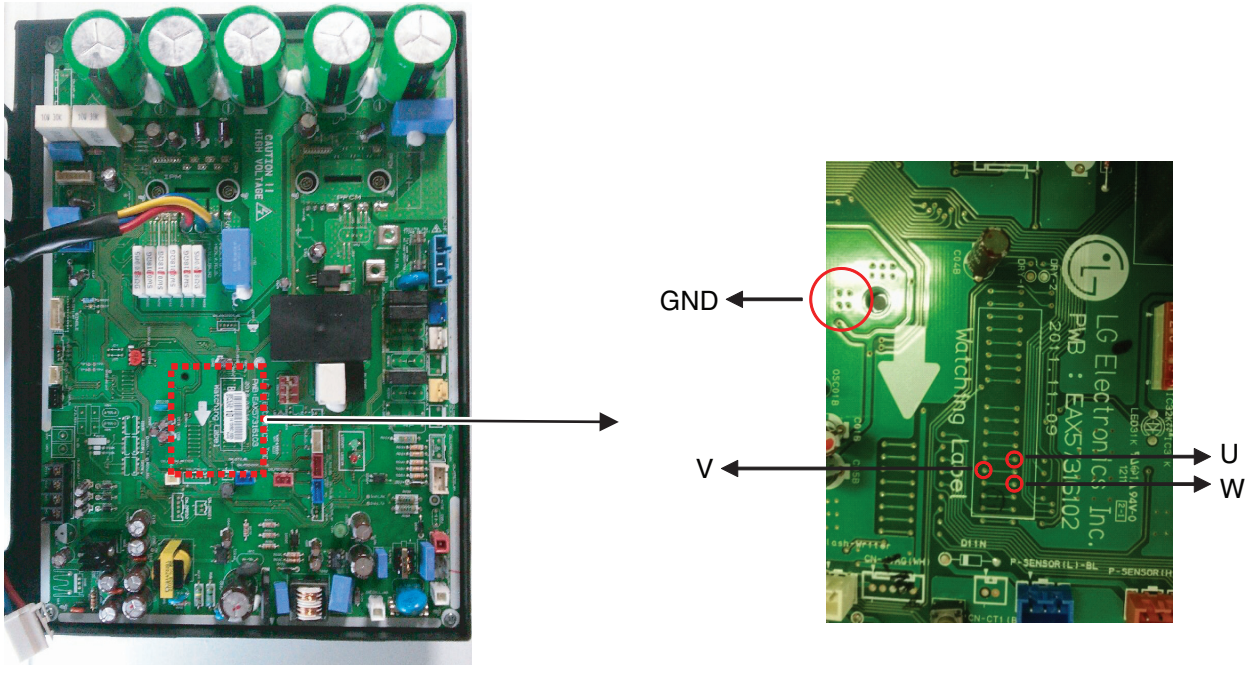


<CT Sensing Check Point>

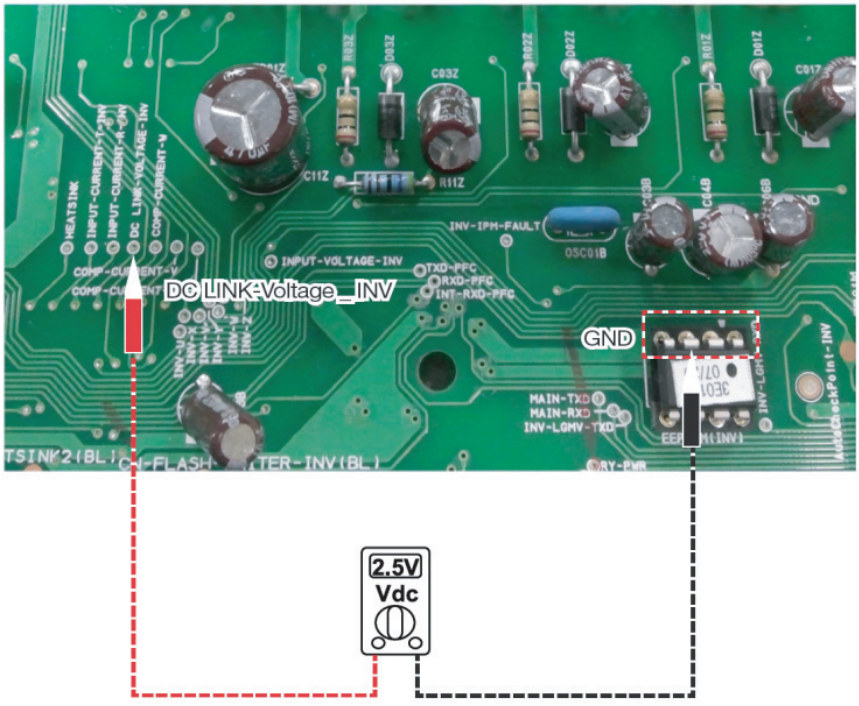


<WVC connector check>

▶ AHUW126A2/AHUW146A2/AHUW166A2



▶ AHUW128A2/AHUW148A2/AHUW168A2

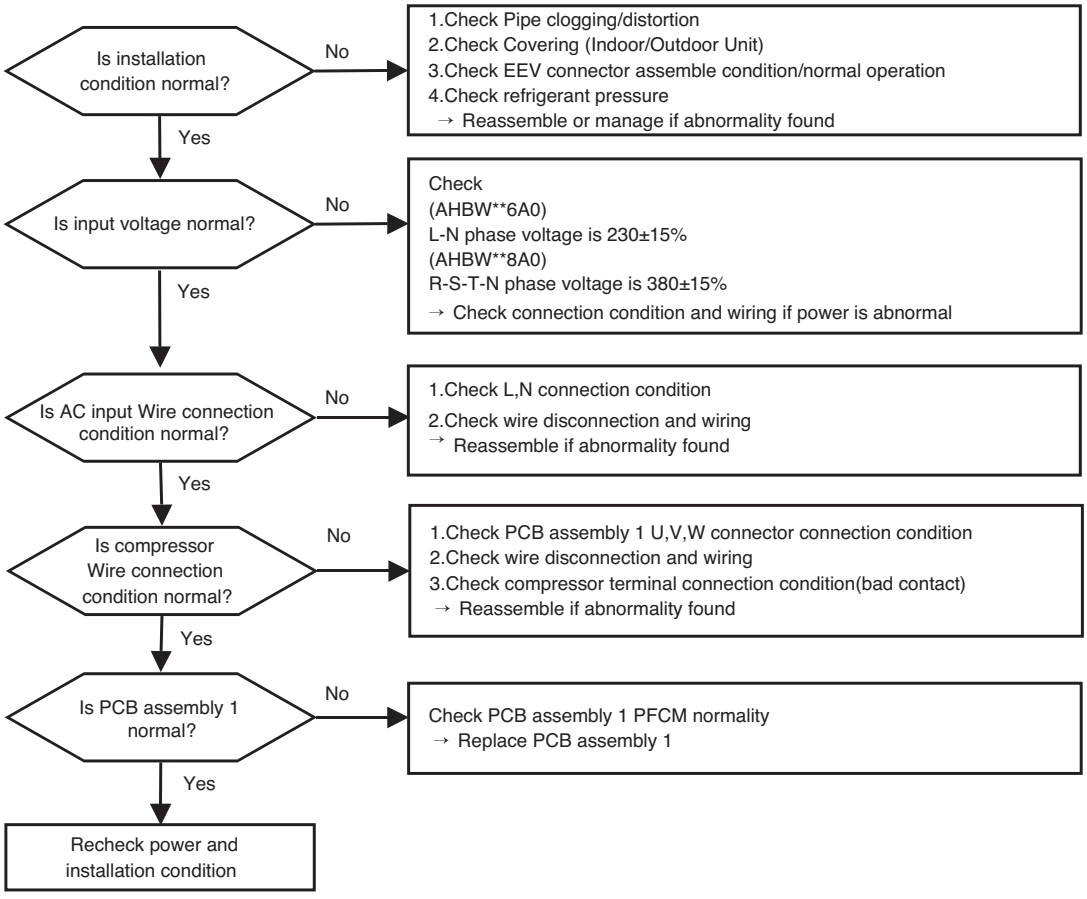


Display code	Title	Cause of error	Check point & Normal condition
27	AC Input Instant over Current Error	PCB(Inverter) input current is over 100A(peak) for 2us	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Input voltage abnormal (L,N) 4. Power line assemble condition abnormal 5. PCB assembly 1 Damage (input current sensing part)

⚠ WARNING

Before checking PCB(Inverter) 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.

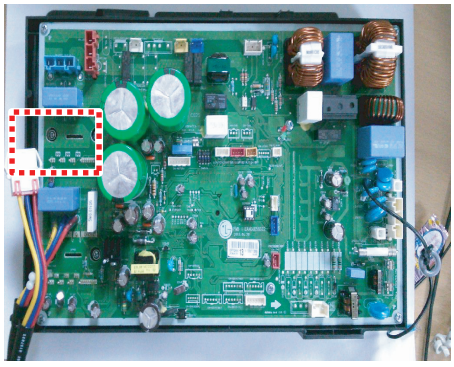
② Check short between input signal pin which are placed below PFC Module

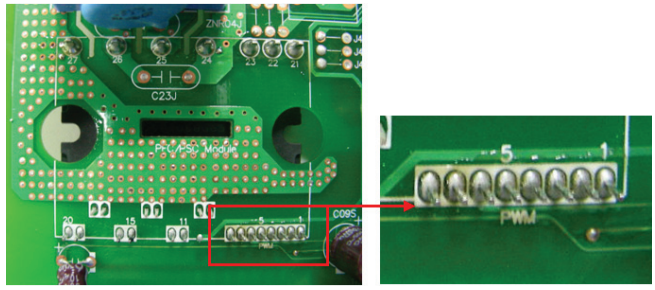
③ Replace PCB assembly 1 if it is short between pins except No.4,5 pins.

⚠ CAUTION

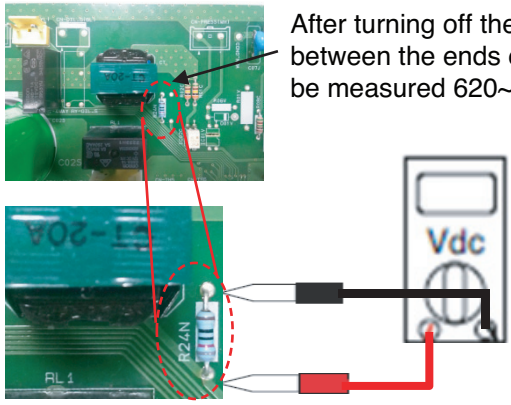
PFCM module No.4,5 pins are internal short state.

▶ AHUW056A2/AHUW076A2/AHUW096A2



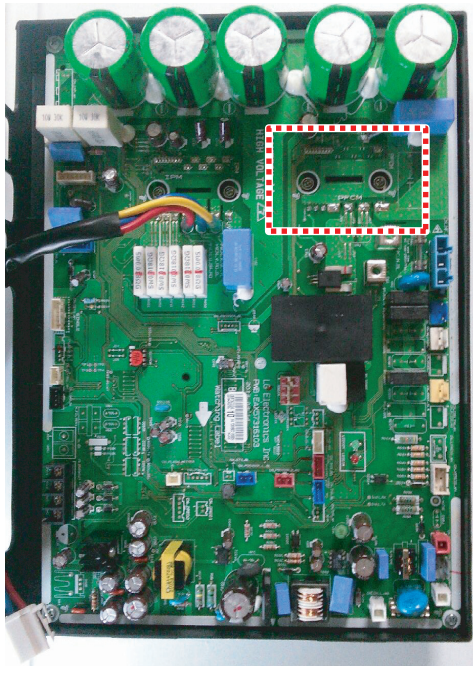


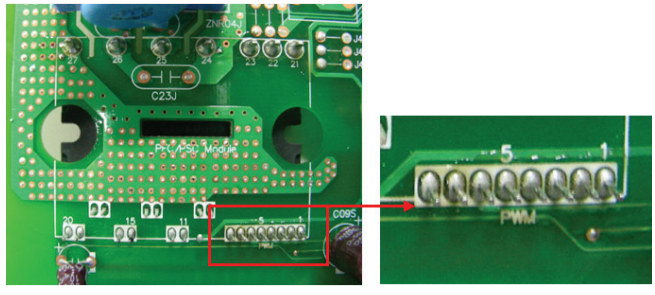
<Short Check Point>



After turning off the main power R24N between the ends of the resistance will be measured 620~670Ω.

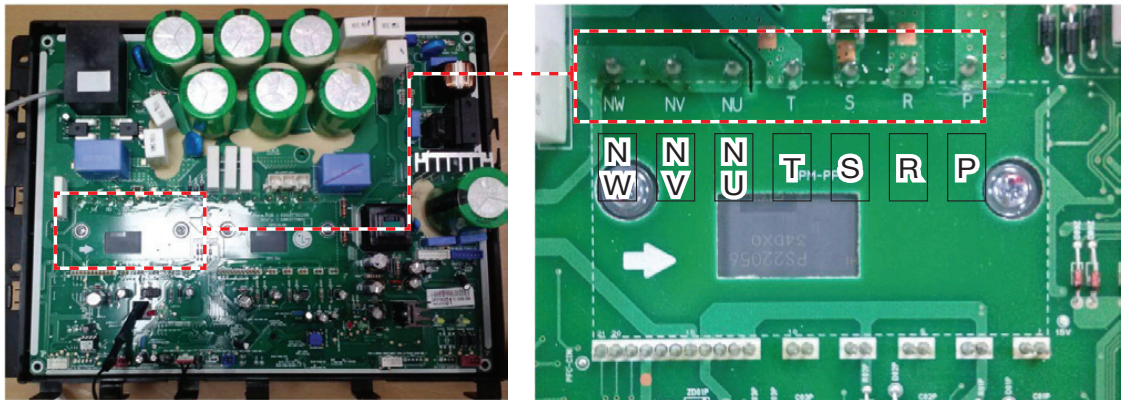
▶ AHUW126A2/AHUW146A2/AHUW166A2





<Short Check Point>

▶ AHUW128A2/AHUW148A2/AHUW168A2



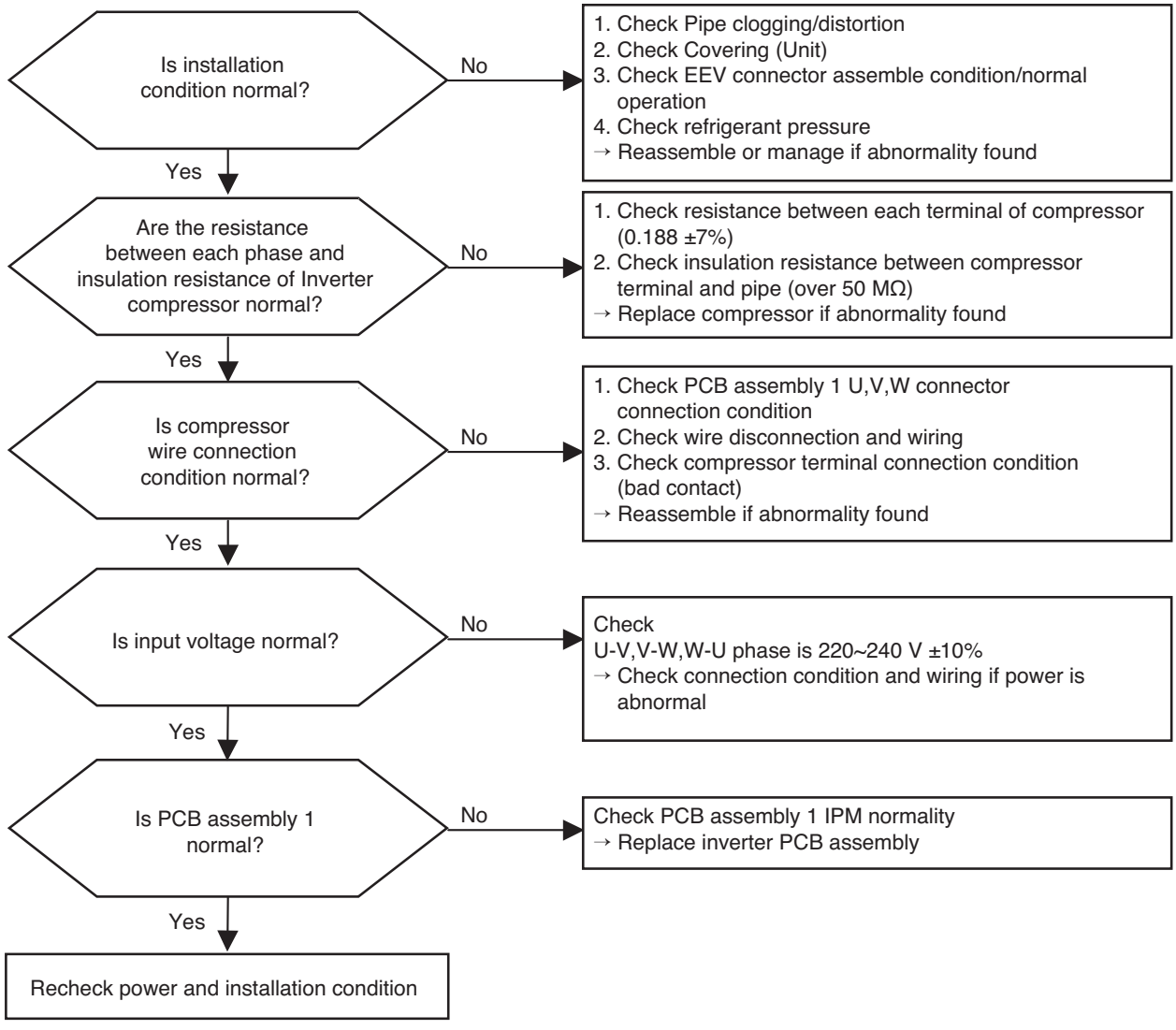
Display code	Title	Cause of error	Check point & Normal condition
29	Inverter compressor over current	(AHBW**6A0) Inverter Compressor input current is 30A. (AHBW**8A0) Inverter Compressor input current is 24A.	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU PCB assembly 1 damage

⚠ WARNING

Before checking PCB(Inverter) 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

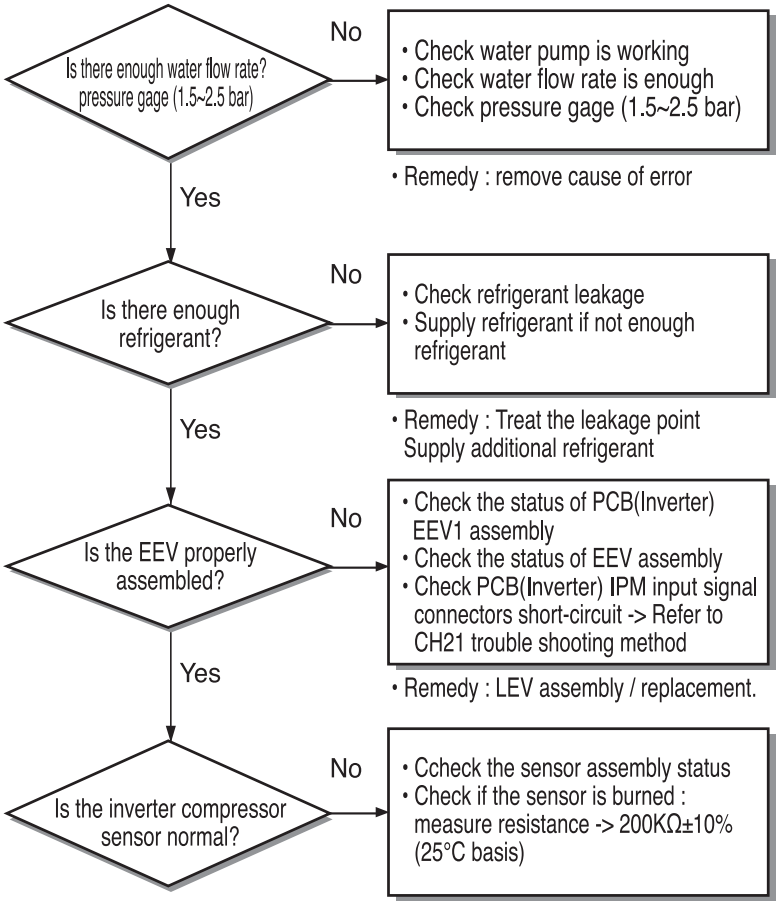
Check Flow Chart



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

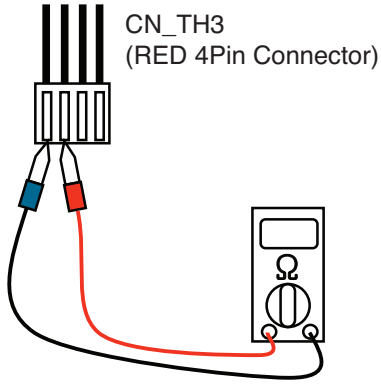
WARNING

Before checking PCB(Inverter) 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.



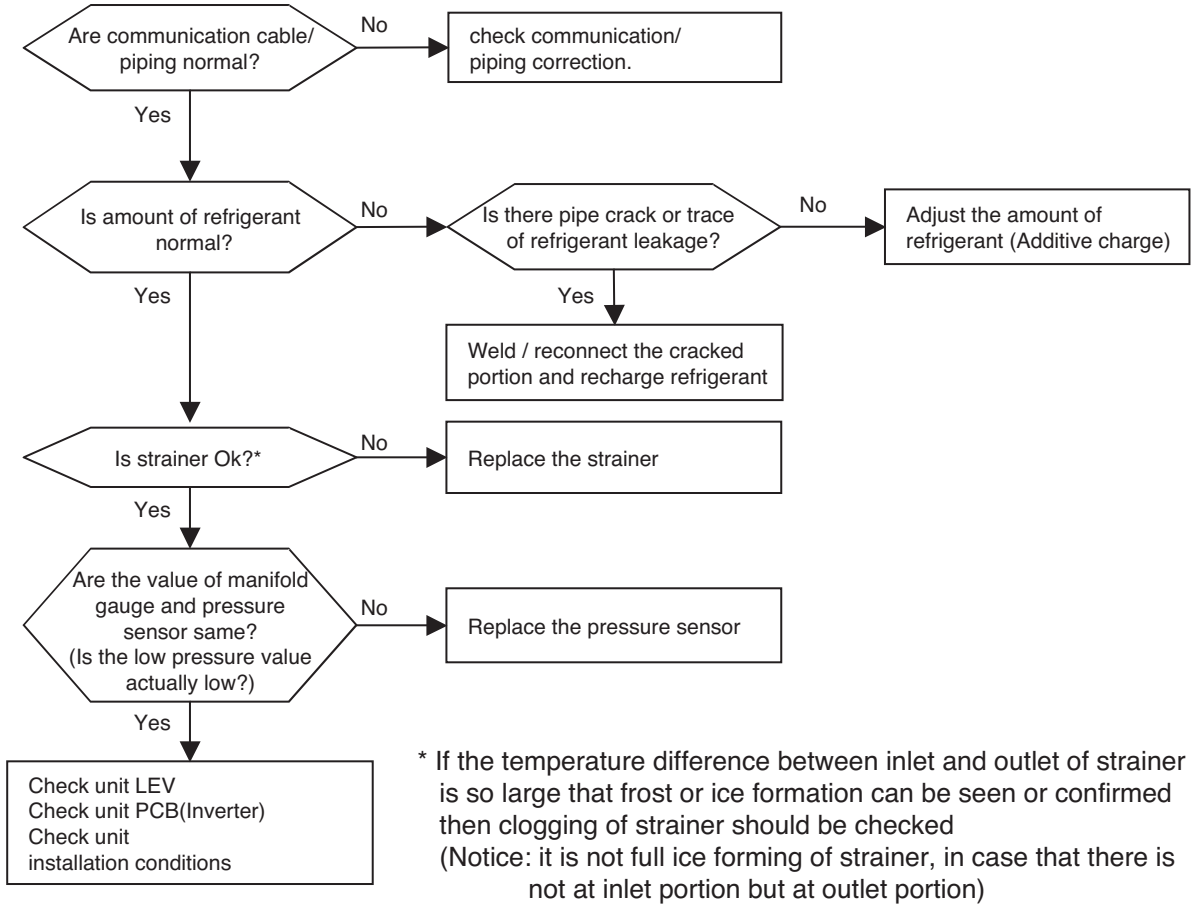
- **Inspecting Inverter Compressor Discharge Sensor**

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 unit fan • Refrigerant shortage/leakage • Deformation because of damage of refrigerant pipe • Defective unit EEV • Covering / clogging (unit covering during the cooling mode / unit filter clogging during heating mode) • SVC valve clogging • Defective unit PCB(Inverter) • Defective unit pipe sensor

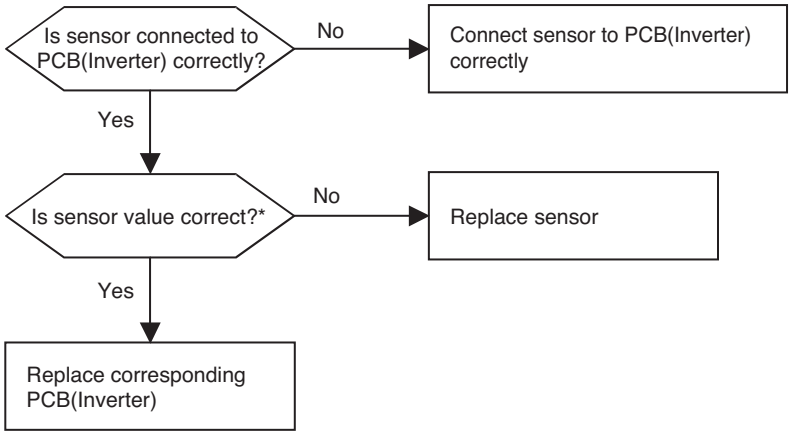
■ Error diagnosis and countermeasure flow chart

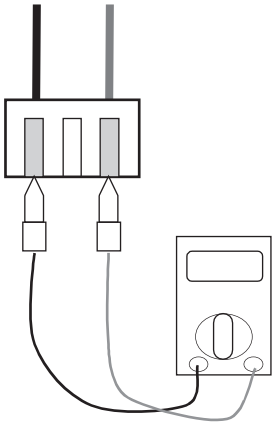


* If the temperature difference between inlet and outlet of strainer is so large that frost or ice formation can be seen or confirmed then clogging of strainer should be checked
(Notice: it is not full ice forming of strainer, in case that there is not at inlet portion but at outlet portion)

Display code	Title	Cause of error	Check point & Normal condition
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(Inverter)
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(Inverter)
45	Condenser Mid-pipesensor	• 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(Inverter)
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(Inverter)
48	Condenser Out-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(Inverter)

■ Error Diagnosis and Countermeasure Flow Chart

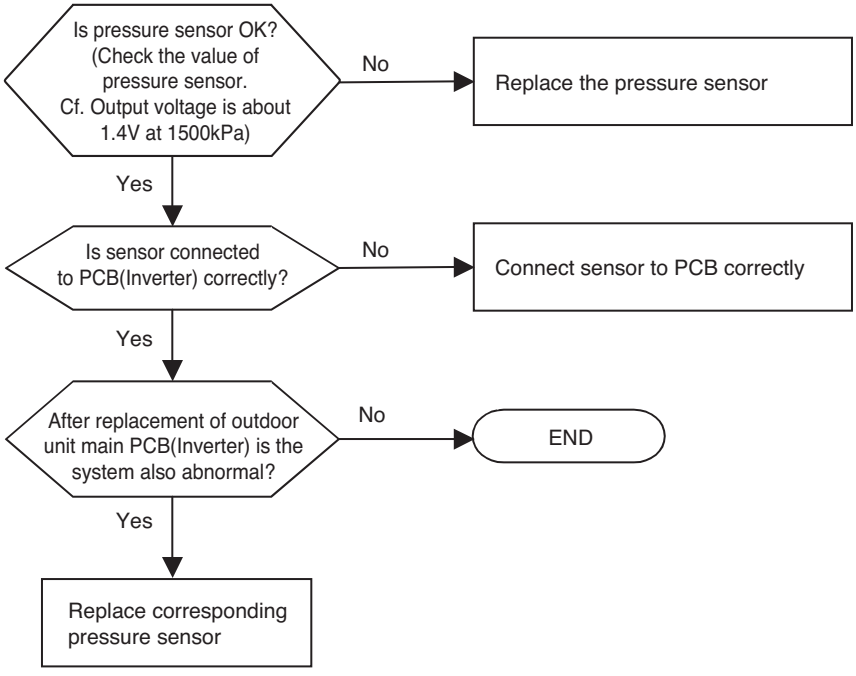




Check Point

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(Inverter) • Bad connection high pressure connector • Defect of high pressure connector (Open/Short) • Defect of connector PCB(Inverter) (Open/Short) • Defect of PCB(Inverter)

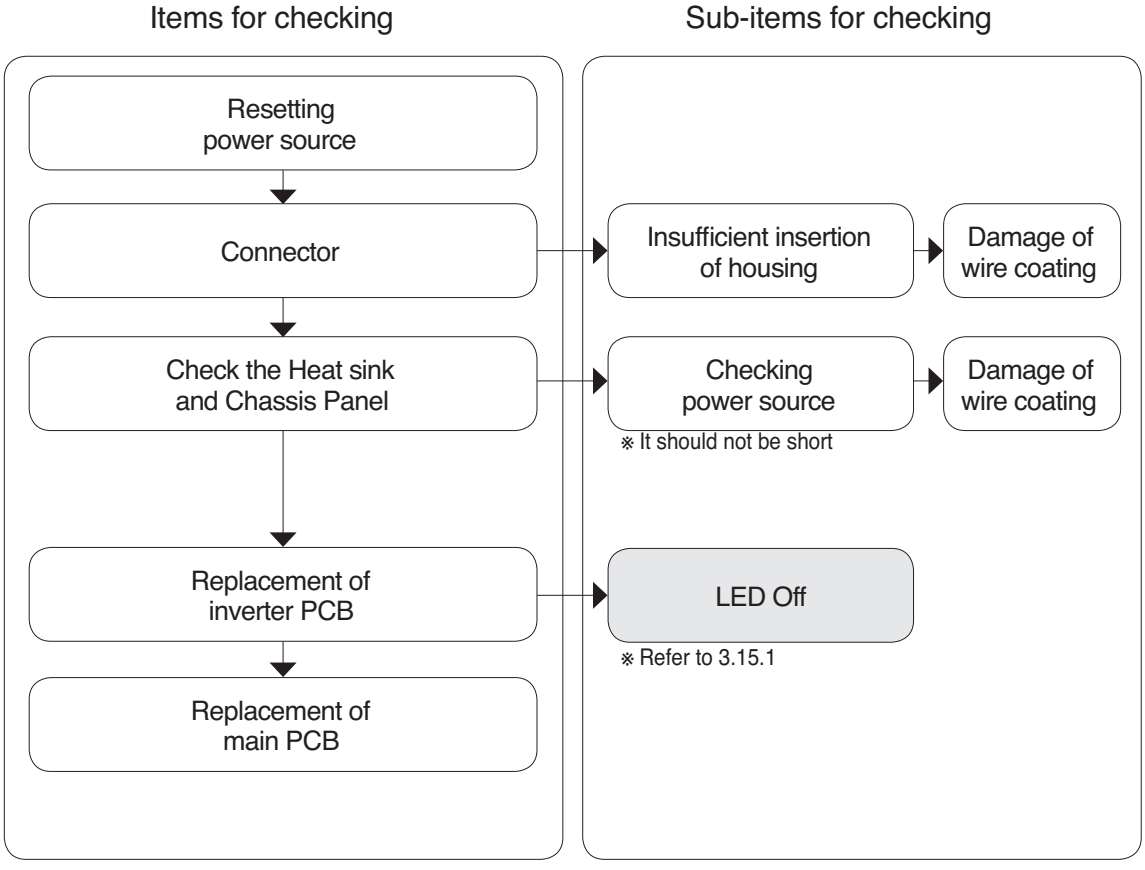


Display code	Title	Cause of error	Check point & Normal condition
52	PCB Communication Error	Checking the communication state between Main PCB and Inverter PCB	• Generation of noise source interfering with communication

WARNING

Before checking PCB(Inverter) 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.

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



▶ AHUW128A2/AHUW148A2/AHUW168A2

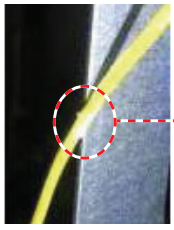
Purpose	Installation environment interfering the communication	Items for checking	Checking method of afulty points

① Insufficient insertion of wires

OK

NG

② Damage of wire coating
: Interference with wires or wire coating damage with chopping



③ Inverter PCB LED
: Replacement of inverter PCB during LED Off after resetting

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

⚠ WARNING

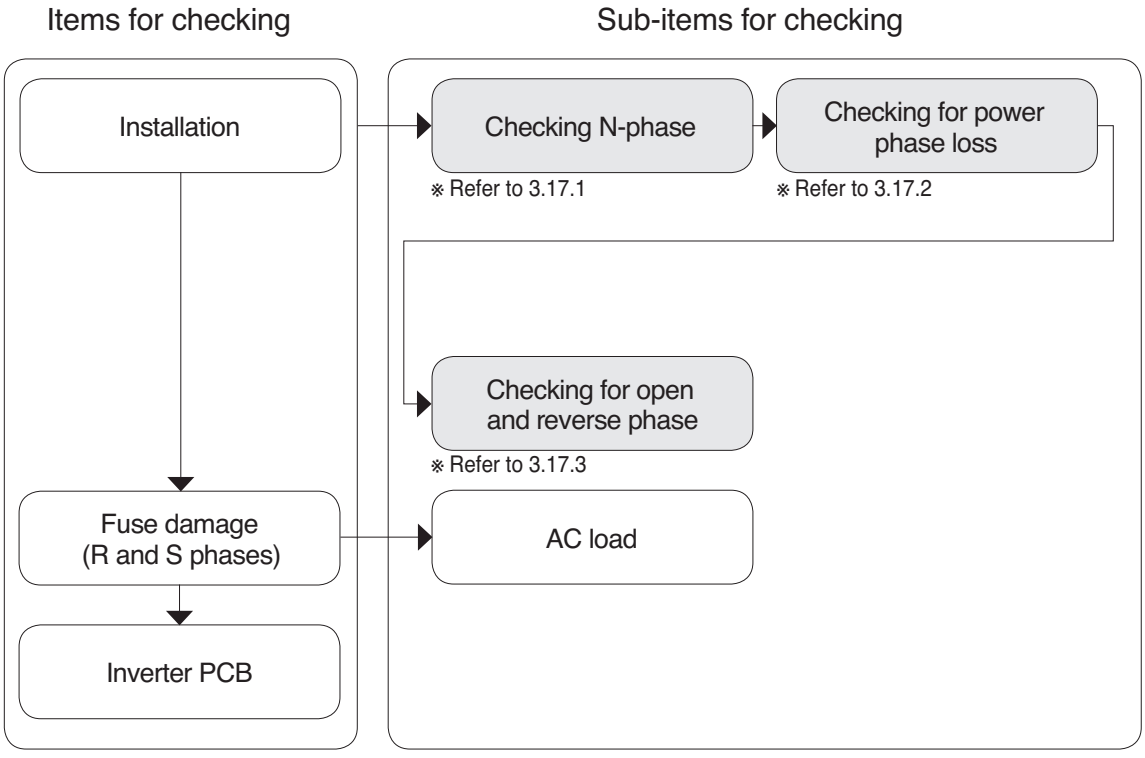
Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

Check Point

1. Check the input power AC230V.
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. Make sure you have connected to the communication line soldering
   (If you do not connect by soldering, a communication error(CH05/CH53) occurs by noise)

Display code	Title	Cause of error	Check point & Normal condition
54	Open and Reverse Phase Error	Prevention of phase unbalance and prevention of reverse rotation of constant-rate compressor	Main power wiring fault

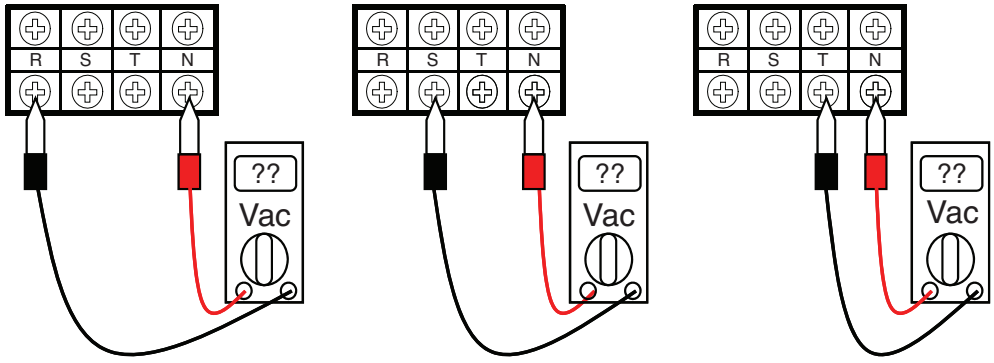
■ Error diagnosis and countermeasure flow chart



▶ AHUW128A2/AHUW148A2/AHUW168A2

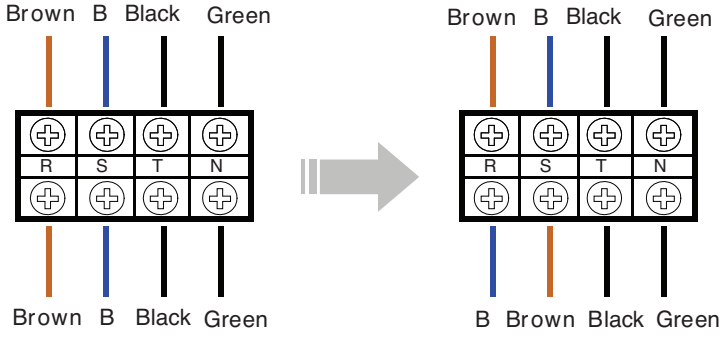
■ Judgment Method of R,S,T phase loss

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



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

- Operation with replacement of R and S phases only

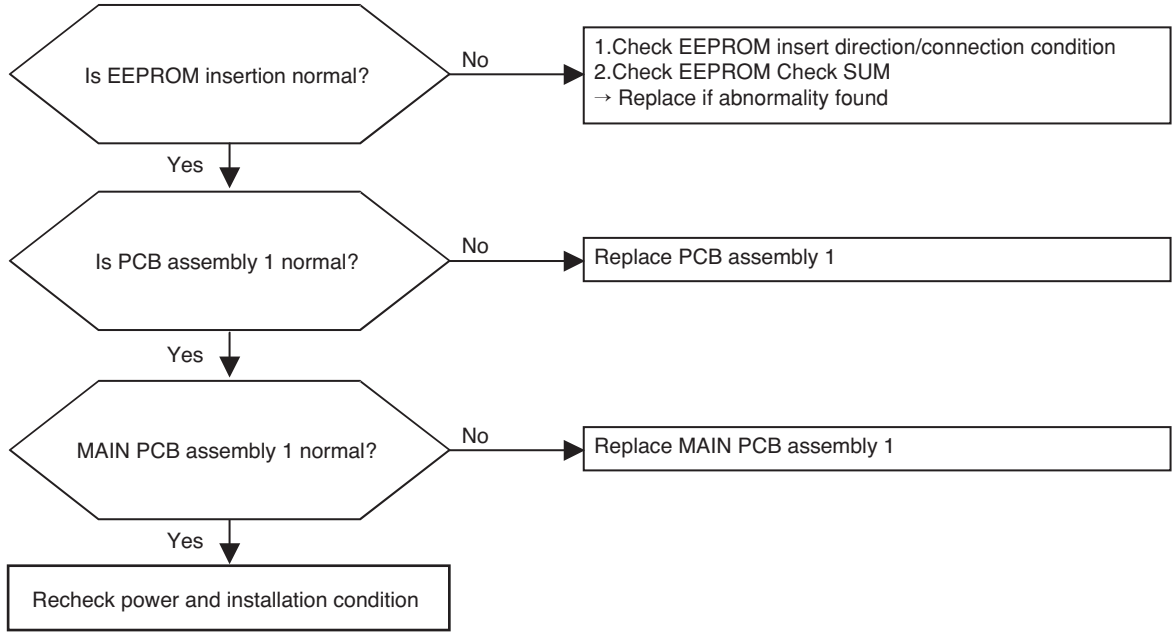


Display code	Title	Cause of error	Check point & Normal condition
60	PCB(Inverter) & Main EEPROM check sum error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU Inverter & Main PCB assembly 1 damage

WARNING

Before checking PCB(Inverter) 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.

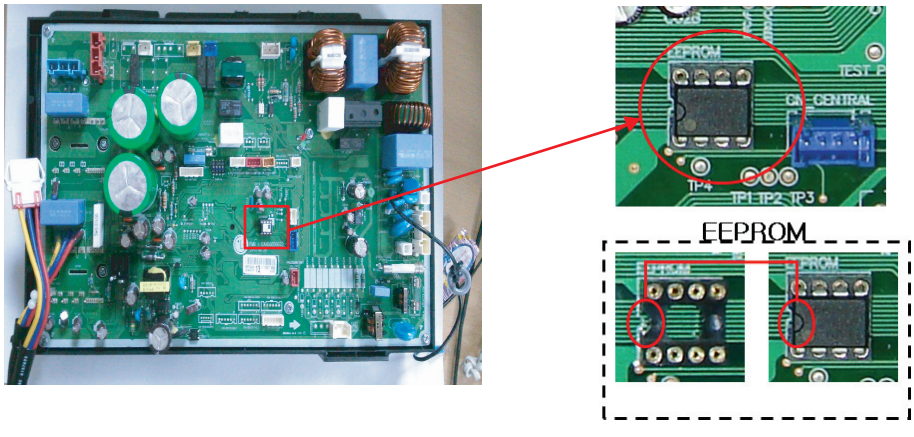
■ Error Diagnosis and Countermeasure Flow Chart



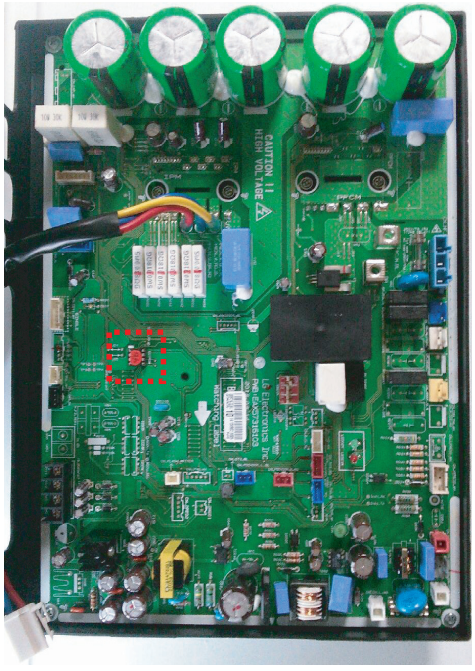
Check Point

- Check the EEPROM Check sum & Direction

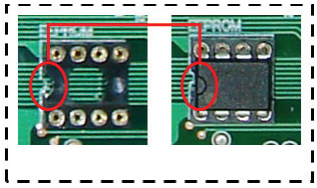
▶ AHUW056A2/AHUW076A2/AHUW096A2



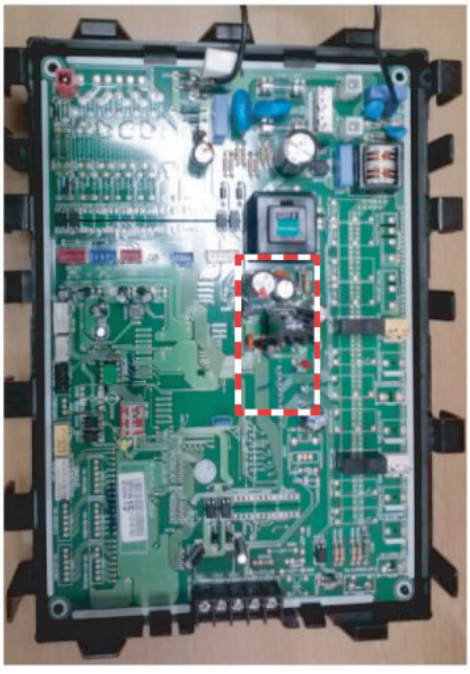
▶ AHUW126A2/AHUW146A2/AHUW166A2



EEPROM



▶ AHUW128A2/AHUW148A2/AHUW168A2

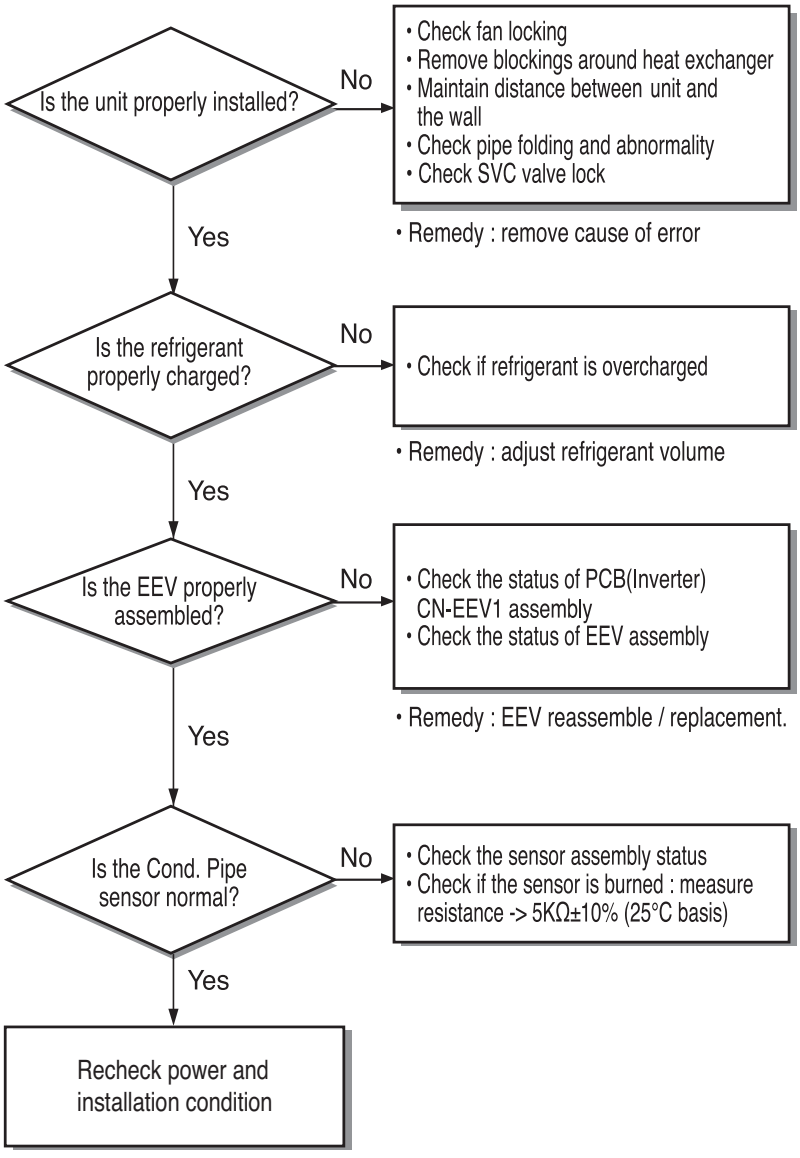


EEPROM

Display code	Title	Cause of error	Check point & Normal condition
61	High temperature in Cond. Pipe	• Overload operation (Outdoor fan constraint, screened, blocked) • 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

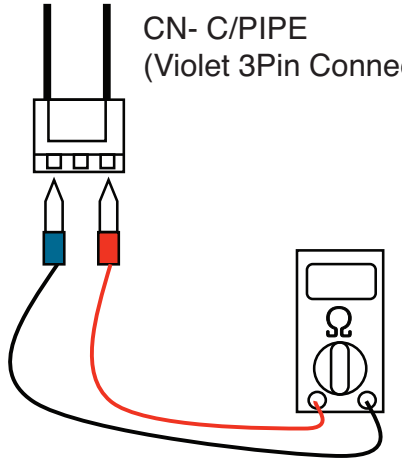
WARNING

Before checking PCB(Inverter) 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.



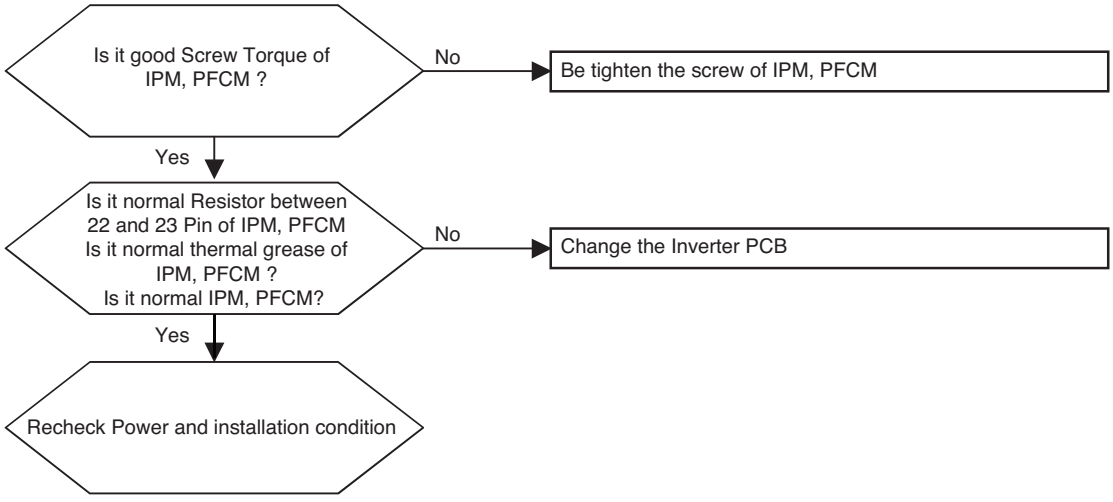
• Inspecting Cond. Pipe Sensor

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)



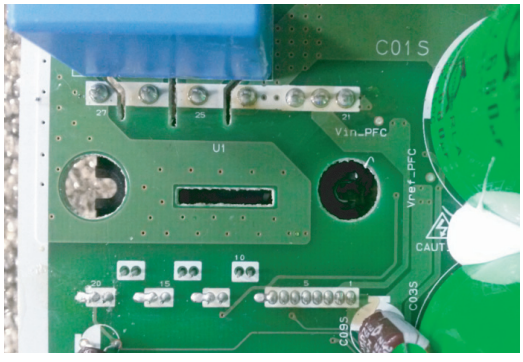
Display code	Title	Cause of error	Check point & Normal condition
62	Heat sink Temp, High error	Heatsink sensor detected high temp.(85°C)	1. Part no. : EBR37798101~09 - Check the heatsink sensor : 10kΩat 25°C(Unplugged) - Check the outdoor fan is driving rightly 2. Part no. : EBR37798112~21 - Check the soldered condition in the 22,23 pin of IPM, PFCM - Check the screw torque of IPM, PFCM - Check the spreadable condition of thermal grease on IPM, PFCM - Check the outdoor fan is driving rightly

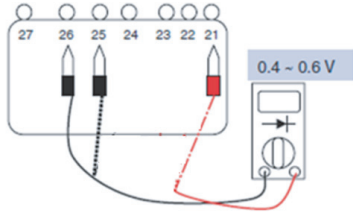
■ Error Diagnosis and Countermeasure Flow Chart



Check Point

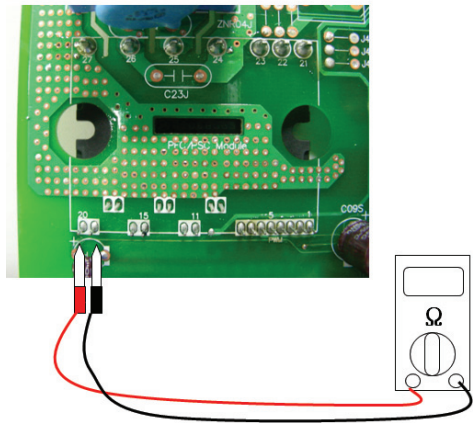
1. Check resistance between No.19 pin and NO.20 pin of PCB PFC module
2. Resistance value should be in 7kΩ ±10%.(at 25°C).





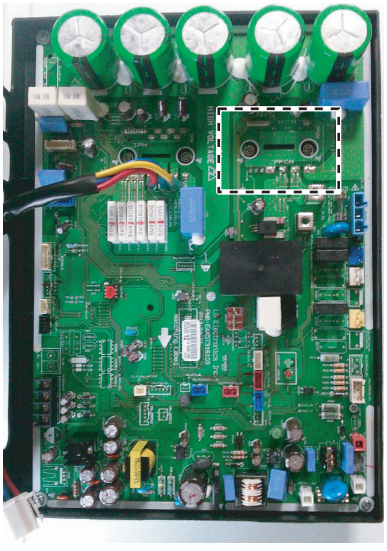
<Check the PFCM>

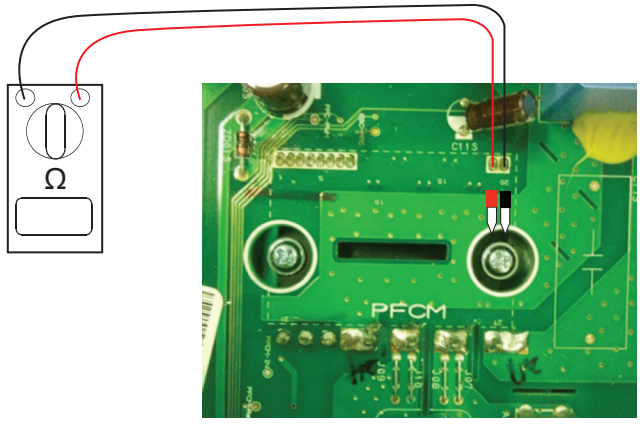
▶ AHUW056A2/AHUW076A2/AHUW096A2



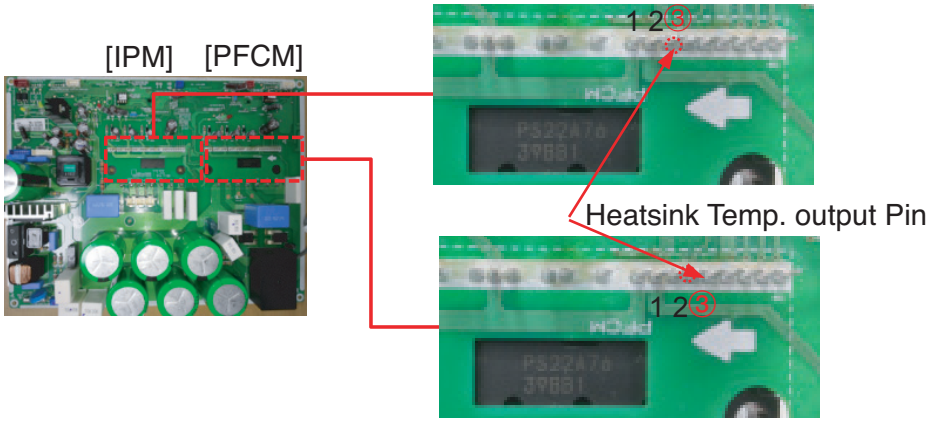
PFCM:
Measuring resistance
between No.19,20 pin

▶ AHUW126A2/AHUW146A2/AHUW166A2



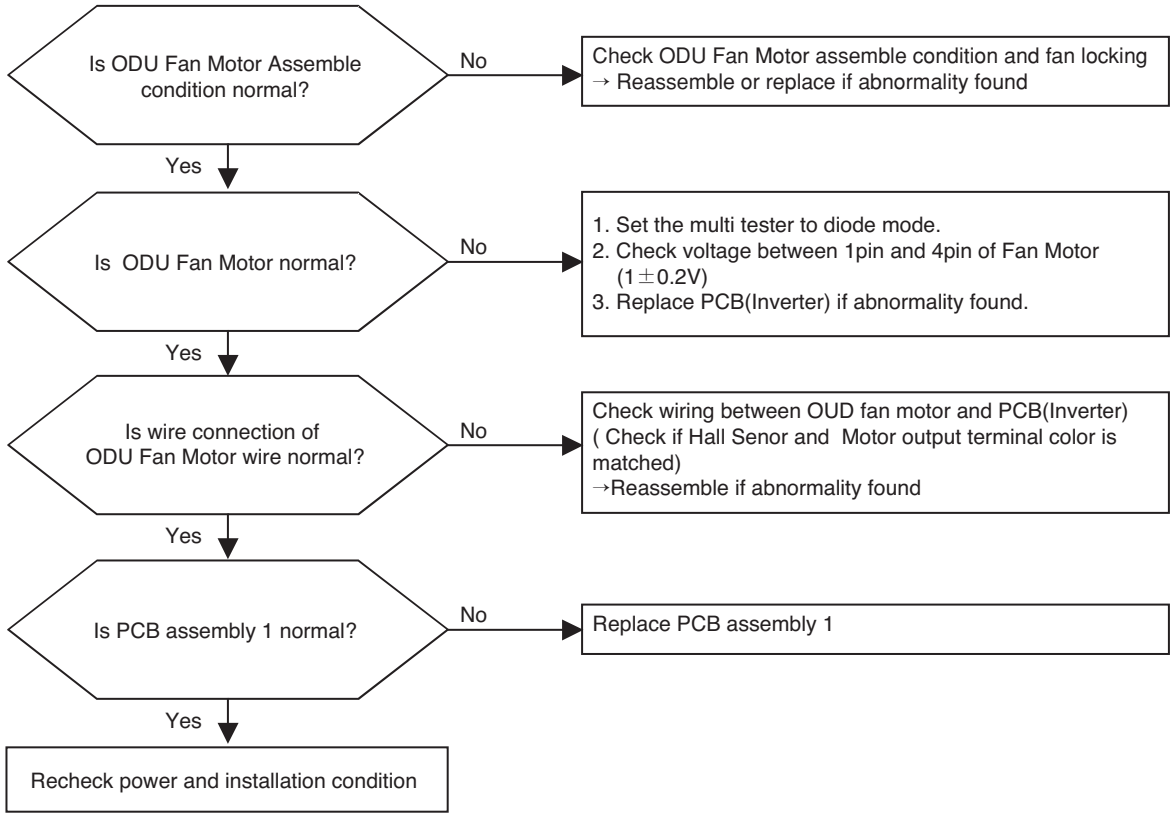


▶ AHUW128A2/AHUW148A2/AHUW168A2



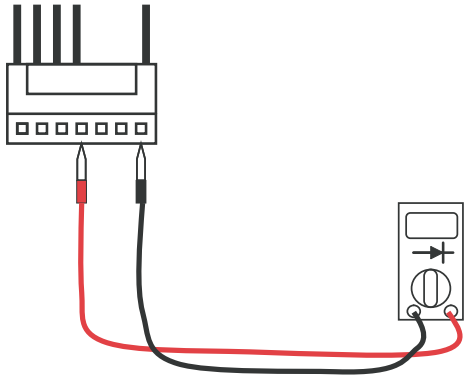
Display code	Title	Cause of error	Check point & Normal condition
67	Fan Lock Error	Fan RPM is 10RPM or less for 5 sec. when ODU fan starts or 40 RPM or less after fan starting.	1. ODU fan locking 2. Heatsink assembly of PCB assembly 1 condition abnormal 3. Defect of temperature sensing circuit part defect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

■ Error Diagnosis and Countermeasure Flow Chart

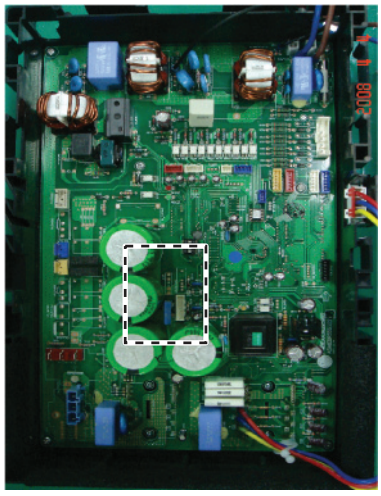


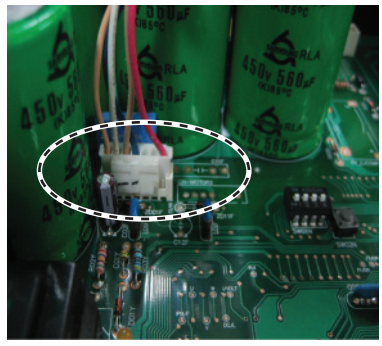
Check Point

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 220-240 V~ at once.
   Check error code again, after replacing the abnormal part (Fan Motor or PCB) first.

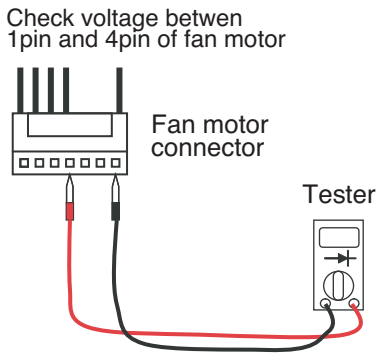


▶ AHUW056A2/AHUW076A2/AHUW096A2

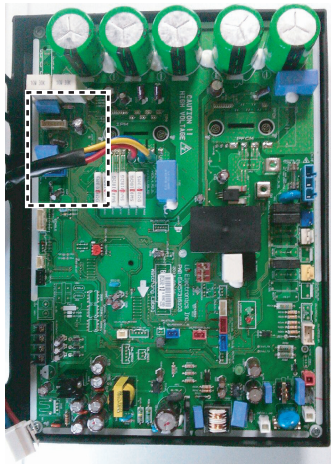


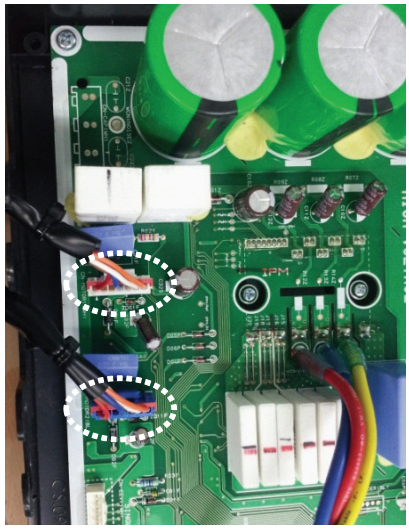


<Main PCB>

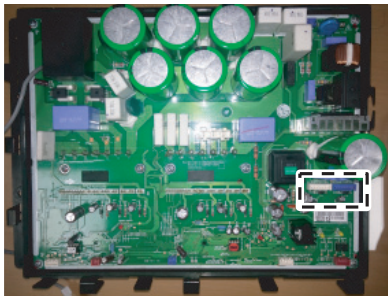


▶ AHUW126A2/AHUW146A2/AHUW166A2



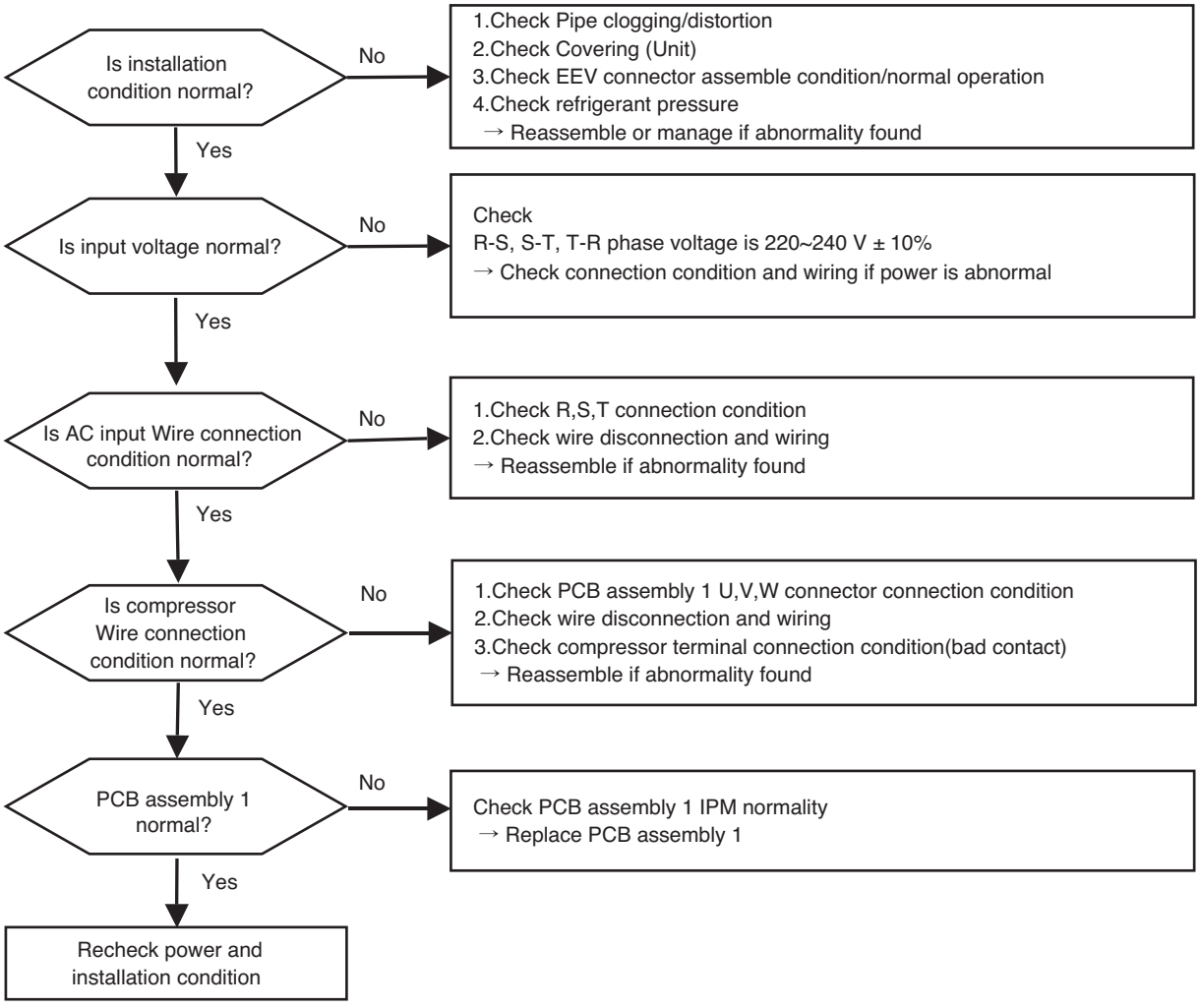


▶ AHUW128A2/AHUW148A2/AHUW168A2

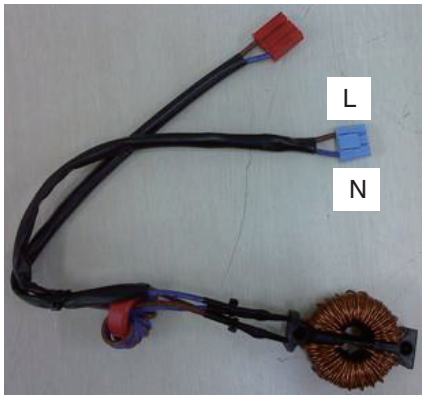


Display code	Title	Cause of error	Check point & Normal condition
73	AC input instant over current error (Matter of software)	(AHBW**6A0) PCB(Inverter) input power current is over 48A(Peak) for 2ms. (AHBW**8A0) PCB(Inverter) input power current is over 27A(Peak) for 2ms.	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref.overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Input voltage abnormal 4. Power line assemble condition abnormal 5. PCB assembly 1 damage (input current sensing part)

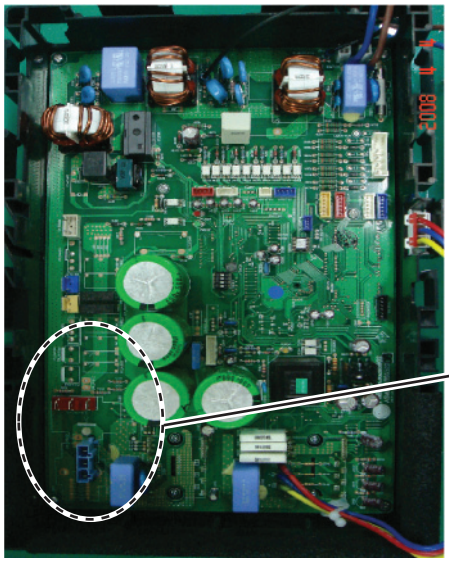
■ Error Diagnosis and Countermeasure Flow Chart

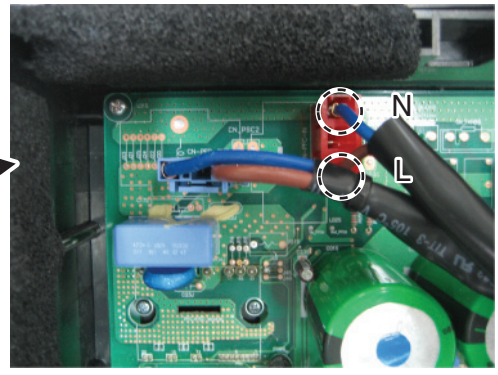


▶ AHUW056A2/AHUW076A2/AHUW096A2

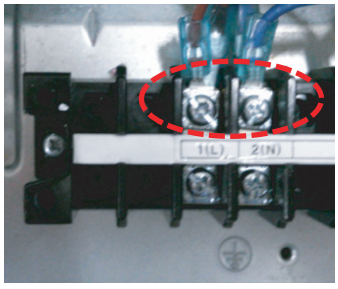


< Noise Filter wiring Check Point >



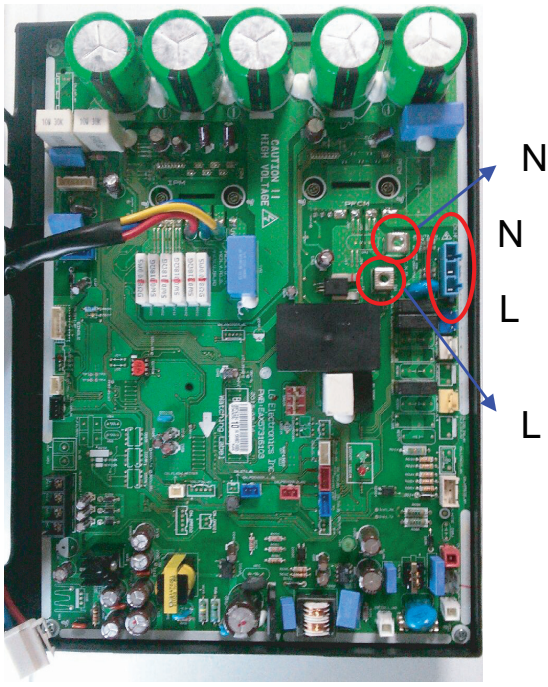


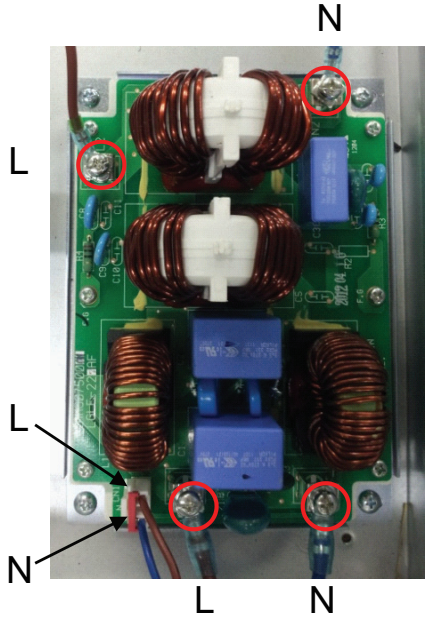
< Main PCB wiring Check Point >

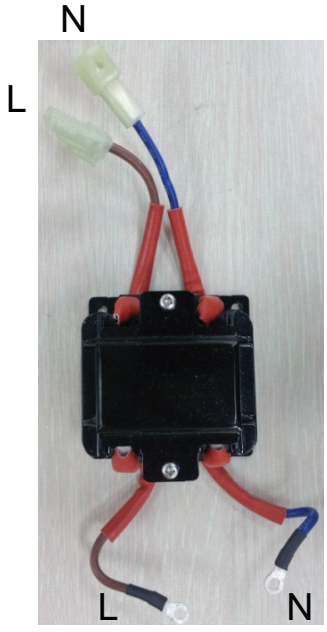


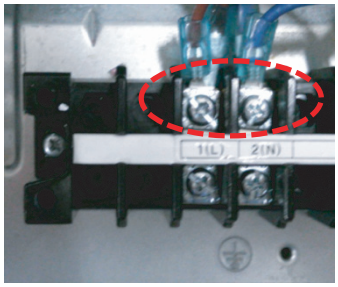
< Input Power Source Check Point >

▶ AHUW126A2/AHUW146A2/AHUW166A2

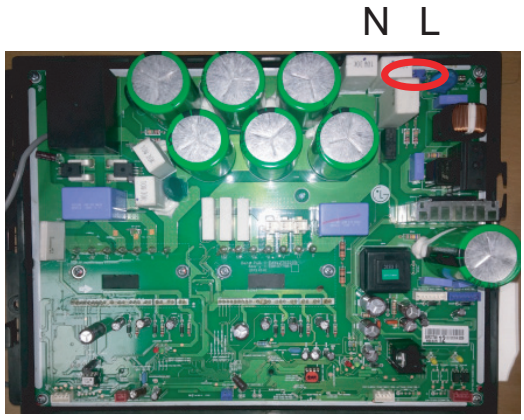


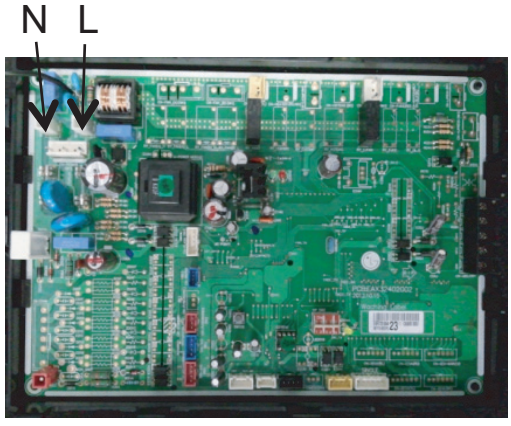


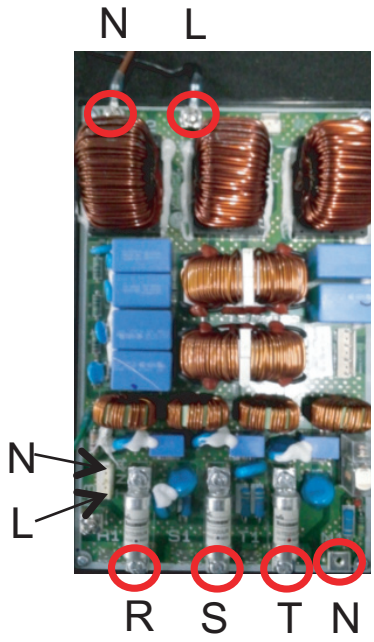




▶ AHUW128A2/AHUW148A2/AHUW168A2







Sensor resistance table

Pipe Temp

B Constant	3977	
Std Temp	25	
Resistance	5	
Temp	Resistance	Volt
-30	102.17	4.714
-25	73.49	4.611
-20	53.55	4.481
-15	39.5	4.322
-10	29.48	4.131
-5	22.24	3.91
0	16.95	3.661
5	13.05	3.389
10	10.14	3.102
15	7.94	2.808
20	6.28	2.515
25	5	2.232
30	4.01	1.965
35	3.24	1.717
40	2.64	1.493
45	2.16	1.293
50	1.78	1.116
55	1.48	0.962
60	1.23	0.828
65	1.03	0.714
70	0.87	0.615
75	0.74	0.531
80	0.63	0.459
85	0.54	0.397
90	0.46	0.345
95	0.4	0.3
100	0.34	0.262

Air Temp

B Constant	3977	
Std Temp	25	
Resistance	10	
Temp	Resistance	Volt
-30	204.35	4.72
-25	146.97	4.62
-20	107.09	4.492
-15	79	4.336
-10	58.95	4.149
-5	44.47	3.931
0	33.9	3.685
5	26.09	3.416
10	20.27	3.131
15	15.89	2.838
20	12.55	2.546
25	10	2.262
30	8.03	1.994
35	6.49	1.745
40	5.28	1.519
45	4.32	1.316
50	3.56	1.137
55	2.95	0.981
60	2.46	0.846
65	2.06	0.729
70	1.74	0.628
75	1.47	0.542
80	1.25	0.469
85	1.07	0.406
90	0.92	0.353
95	0.79	0.307
100	0.68	0.268

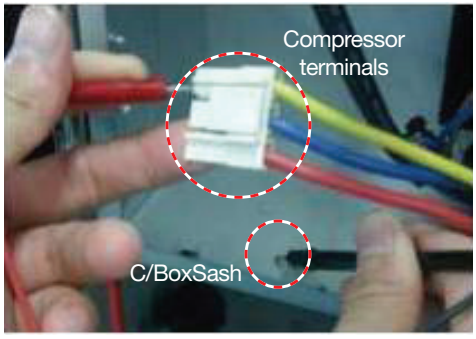
Heatsink Temp

B Constant	3970	
Std Temp	25	
Resistance	10	
Temp	Resistance	Volt
-30	102.17	4.71
-25	73.49	4.61
-20	53.55	4.48
-15	39.5	4.32
-10	29.48	4.13
-5	22.24	3.91
0	16.95	3.66
5	26.05	4.73
10	20.25	4.66
15	15.87	4.57
20	12.55	4.47
25	10	4.35
30	8.03	4.21
35	6.49	4.06
40	5.28	3.89
45	4.33	3.71
50	3.57	3.52
55	2.96	3.32
60	2.47	3.11
65	2.07	2.9
70	1.74	2.69
75	1.48	2.48
80	1.26	2.28
85	1.07	2.09
90	0.92	1.9
95	0.8	1.73
100	0.69	1.57

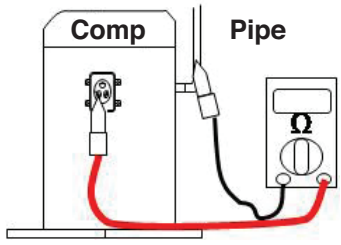
D-Pipe Temp

B Constant	3500	
Std Temp	25	
Resistance	200	
Temp	Resistance	Volt
-30	2845.99	4.969
0	585.66	4.851
5	465.17	4.814
10	372.49	4.77
15	300.58	4.717
20	244.33	4.657
25	200	4.587
30	164.79	4.508
35	136.64	4.418
40	113.98	4.318
45	95.62	4.208
50	80.65	4.088
55	68.38	3.958
60	58.27	3.82
65	49.88	3.674
70	42.9	3.522
75	37.05	3.365
80	32.14	3.205
85	27.99	3.043
90	24.46	2.88
95	21.46	2.719
100	18.89	2.561
110	14.79	2.255
120	11.72	1.972
130	9.4	1.716
140	7.62	1.487
150	6.24	1.287

■ How to check the insulation resistance between the compressor and panel



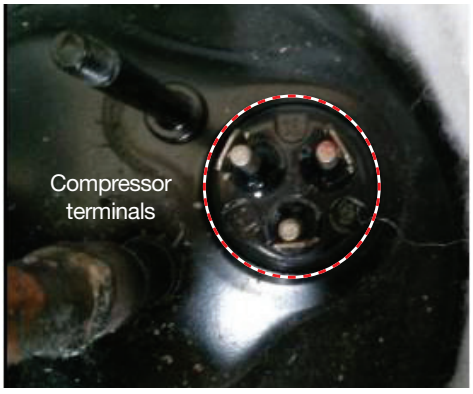
Measure the resistance between a compressor terminal and panel.



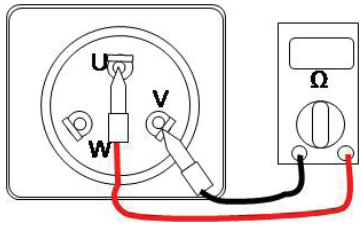
Terminal	Insulation Resistance
U-panel	≥ 10MΩ
V-panel	≥ 10MΩ
W-panel	≥ 10MΩ

1. Turn the switch of the tester to “Resistance" mode and check th eresistance
2. Measure the resistance between the terminals.
3. “0Ω” means the short of compressor phase. (Replace the compressor)
4. Refer to the compressor resistance standards.
5. I f any disorder is found, measure the line resistance between the terminals of the comperssor as shown below.
6. If the compressor is found to be normal, any compr essor connection wire may have a fault.

■ How to check the U, V, and W phase resistance



Measure the line resistance between the compressor terminals.



Model		GKT141MAC	GKT176MAB	GJT240MAA
Windings Resistance (at 25°C)	U-V	1.040 ±7% Ω	1.125±7% Ω	0.628 ±7% Ω
	V-W	1.040 ±7% Ω	1.125±7% Ω	0.628 ±7% Ω
	W-U	1.040 ±7% Ω	1.125±7% Ω	0.628 ±7% Ω

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