

SERVICE MANUAL

# AIR-TO-WATER HEAT PUMP

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

GENERAL

***THERMA V***<sup>™</sup>

P/NO : MFL69717001

[www.lg.com](http://www.lg.com)

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## 1. General

The manual describes the process of setting up and use of the device. Servicing and maintenance of the device can only be performed by qualified personnel. Read the manual carefully before working on the device, this way you will be informed about the intended use, functionality and process of troubleshooting the device.

### Definitions

- An informed person is a person who reads this manual.
- A qualified person has a certificate of expert qualifications.
- An authorised commission contractor is trained by the manufacturer and authorised to perform commission.
- The authorised technician is trained and authorised by the manufacturer to perform maintenance and servicing of the device.
- The user uses the device according to its use.
- The installer is a person professionally trained for performing hardware and/or electro-installation work and mounting of the device.

Incorrect use of the device can lead to damage of the device, property or injury to the user or maintenance worker. To reduce risk the manual points out important information with the use of symbols.

### 1.1 Symbol

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.**

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## 1.2 General

### NOTE

- Before beginning the service procedure, it is necessary to read the service manual.
- The installation of the device has to be performed in accordance with the manual; otherwise the manufacturer does not acknowledge the warranty.
- Any remaking or replacement of original components of the device eliminates the manufacturer's guarantee for safe and functional operation. In the case of undesignated and incorrect use of the device, the manufacturer is not responsible for the consequences and will not acknowledge claims for damages in these cases. The user is solely responsible for injuries and damages on the device itself or on other objects resulting from undesignated and incorrect use of the device.

### WARNING

- Failure to comply with the manual and good practise while connecting the device to the power supply can lead to serious injury or death.
- Connecting the device to the power source can only be performed by a qualified installer.

## 1.3 Safety warnings and instructions

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 **WARNING**

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### 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 install a dedicated circuit and breaker.
  - Improper wiring or installation may cause fire or electric shock.
- For re-installation of the installed product, always contact a dealer or an Authorized Service Center.
  - There is risk of fire, electric shock, explosion, or injury.
- Do not install, remove, or re-install the unit by yourself (customer).
  - There is risk of fire, electric shock, explosion, or injury.
- 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.



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- 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.

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 **CAUTION**

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### **Installation**

- Always check for gas (refrigerant) leakage after installation or repair of product.
  - Low refrigerant levels may cause failure of product.
- Do not install the product where the noise or hot air from the 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 installing the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.
  - The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.
- Do not install the product where it is exposed to sea wind (salt spray) directly.
  - It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

### **Operation**

- Do not use the air conditioner in special environments.
  - Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.
- Do not block the inlet or outlet.
  - It may cause failure of appliance or accident.
- Make the connections securely so that the outside force of the cable may not be applied to the terminals.
  - Inadequate connection and fastening may generate heat and cause a fire.

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- 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.

## 2. Specification

### Indoor

Indoor unit		AHNW16606B0 /HN1616T NB0	
Version			
Controller		TT3000 (MD1)	
Device placement		Indoor	
Electrical data			
1f connection of the internal unit <sup>2)</sup>			
Frequency	Hz	50	
Rated voltage	V	~ 230	
Max. operational current	A	11.1	19.9
Max. electrical power	kW	2.52	4.52
Fuses <sup>6)</sup>	A	1 x C16	1 x C20
Electrical power cable <sup>1)</sup>	mm <sup>2</sup>	3 x 4	3 x 4
Electric heater		1 x 2 kW ~ 230 V	2 x 2 kW ~ 230 V
3f connection of the internal unit <sup>2)</sup>			
Frequency	Hz	50	
Rated voltage	V	3N ~ 400	
Max. operational current	A	11.1	
Max. electrical power	kW	6.52	
Fuses <sup>6)</sup>	A	3 x C16	
Electrical power cable <sup>1)</sup>	mm <sup>2</sup>	5 x 2.5	
Electric heater		3 x 2 kW ~ 230 V	
Max. external electric power <sup>2)</sup>	W	500	
Cooling system			
Max. operational pressure	MPa	5,0	
Refrigerant Pipe connections			
Pipe connection of the liquid pipe		3/8"	
Pipe connection of the gas pipe		5/8"	
Primary side (heat source) - air			
Heating and cooling			
Range of operation - min. / max. air temperature	°C	Depending on the external air - water unit	
Secondary side (heat sink) - water			
Min. / Max. pressure in the system	MPa	0,05 / 0,3 (0,5 / 3 bar)	
Recommended dimensions of pipes of the device <sup>4)</sup>	DN	25	
Heating			
Rated flow <sup>3)</sup>	m <sup>3</sup> / h	Min 1 m3/h	
Pressure drop at rated flow	kPa	10	
Range of operation - min. / max. water temperature	°C	25 / 58	
Cooling			
Range of operation - min. / max. water temperature	°C	7 / 25	
Pipe connections for the water connection			
Return line system		R1" (ext. u.)	
Supply line system		R1" (ext. u.)	
DHW – hot water connection		R1" (ext. u.)	
DHW – cold water connection		R3/4" (ext. u.)	
Volume			
DHW Tank	l	200	
Buffer tank	l	40	
Dimensions and mass			
Dimensions (W x H x D)	mm	607 x 2045 x 725	
Transport mass	kg	238	
Net mass	kg	228	
Noise			
Level of sound power	dB (A)	36	
Level of sound pressure at a distance of 1 m	dB (A)	27	
Communication			
Connection between outdoor and indoor unit		3 x 0.75 mm <sup>2</sup>	
Connection to CNS		MODBUS protocol (UTP cable – connection RJ45) – RS 485	
Connection to the internet <sup>5)</sup>		UTP cable - connection RJ45 - Ethernet	
Miscellaneous			
Protection class – indoor unit		IPX1	

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**Note :**

1) With the cable we have taken into account laying B2 from the table A.52.4 – IEC 60364-5-52. The cable in the installation pipe is fixed to the wall.

The dimensions of the electrical cables must always be checked or determined by the designing engineer of electrical installations.

2) Joint maximal load (circulation pumps, electronic valves ...) which can be connected to or powered by the internal unit, must not exceed the specified value. Higher consumers (i.e. pumps) should have their own supply.

3) The circulation pump must be dimensioned in such a way that it ensures rated flow through the device.

4) This is true for pipe connections of suitable dimensions and joint distance of up to 20m. Pipe dimensions and types of pumps must always be verified or determined by the designing engineer of electrical installations. Circulation pumps must be dimensioned in such a way so as to ensure rated voltage (see table) through the device.

5) Connection to the internet is not necessary for the operation of the device but it is necessary for remote control through the Home Cloud service.

It is also advisable for faster troubleshooting of the device's operation.

6) The size of the fuse depends on the choice of the connection power of the electrical heater.

## Outdoor

Outdoor Units		AHUW146A2		AHUW096A3	
Combination Indoor Units		AHNW16606B0		AHNW16606B0	
Power Supply		Ø / V / Hz	1/220-240/50	1 / 220-240 / 50	
Maximum Running	Cooling	A	25	19	
Current	Heating	A	25	19	
Wiring Connections	For Power Supply (Included Earth)	Number of wires	3	3	
* Capacity	Cooling(Under floor)	kW	11.0	9.0	
	Heating(Under floor)	kW	14.0	9.0	
* Power Input	Cooling(Under floor)	kW	3.04	2.88	
	Heating(Under floor)	kW	3.16	2.23	
*EER	Cooling(Under floor)	W/W	3.61	3.12	
*COP	Heating(Under floor)	W/W	4.44	4.04	
Operation Range (Min.~Max.)	Cooling	°C DB	5 ~ 48	5 ~ 48	
Outdoor Temperature	Heating	°C DB	-20 ~ 30	-20 ~ 30	
Compressor	Type	-	Hermetic Motor	Hermetic Motor	
	Model	-	GPT442MBA	GJT240MAA	
	Quantity	EA	1	1	
	Displacement	cm <sup>3</sup> /Rev.	44.2	24	
	Capacity	kW	13.92	7.41	
Compressor Motor	Type	-	Brushless	Brushless	
	Quantity	EA	1	1	
	Rated Output	W	4,000	2,137	
Refrigerant	Type	-	R410A	R410A	
	Charge	g	2,300	1,800	
	Control	-	Electronic Expansion Valve	EEV	
Refrigerant Oil	Type	-	FVC68D	FVC68D	
	Charged Volume	cc	1,300	900	
Heat Exchanger	Quantity	EA	2	1	
	Rows	EA	2	2	
	Columns	EA	32	38	
	FPI	Fins/inch	14	14	
Fan	Type	-	Propeller	Propeller	
	Quantity	EA	2	1	
	Air Flow Rate	CMM(l/s)	55	58	
Fan Motor	Model	-	BLDC	BLDC	
	Quantity	EA	2	1	
	Output	W	124	124	
Sound Power Level	Heating	dB	69	65	
Liquid Piping Connection	Type	-	Flare	Flare	
	Outer Diameter	mm(inch)	Ø 9.52 (3/8)	Ø 9.52 (3/8)	
Gas Piping Connection	Type	-	Flare	Flare	
	Outer Diameter	mm(inch)	Ø 15.88 (5/8)	Ø 15.88 (5/8)	
Piping Length (Outdoor Unit ~ Indoor Unit)	Minimum	m	3	3	
	Standard	m	7.5	7.5	
	Maximum	m	50	50	
Height Difference (Outdoor Unit ~ Indoor Unit)	Maximum	m	30	30	
Additional Refrigerant Charge		g/m	40	40	
Dimensions	Unit(W x H x D)	mm	950 x 1,380 x 330	950 x 834 x 330	
	Packed Unit(W x H x D)	mm	1,140 x 1,462 x 461	1,065 x 918 x 461	
Weight	Unit	kg	94	59	
	Packed Unit	kg	107	65	
**Rated water flow rate		LPM	40	26	

### Note :

- 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
- Wiring cable size must comply with the applicable local and national code.
- The specification may be subject to change without prior notice for purpose of improvement.
- \*\* Indoor unit Rated water flow rate.

Outdoor Units			AHUW126A3	AHUW146A3	AHUW166A3
Combination Indoor Units			AHNW16606B0	AHNW16606B0	AHNW16606B0
Power Supply		Ø / V / Hz	1 / 220-240 / 50	1 / 220-240 / 50	1 / 220-240 / 50
Maximum Running Current	Cooling	A	25	25	25
	Heating	A	25	25	25
Wiring Connections	For Power Supply (Included Earth)	Number of wires	3	3	3
* Capacity	Cooling(Under floor)	kW	10.4	11.0	12.0
	Heating(Under floor)	kW	12.0	14.0	16.0
* Power Input	Cooling(Under floor)	kW	3.30	3.53	4.00
	Heating(Under floor)	kW	2.78	3.43	4.18
* EER	Cooling(Under floor)	W/W	3.15	3.12	3.00
* COP	Heating(Under floor)	W/W	4.32	4.08	3.83
Operation Range (Min.~Max.)	Cooling	°C	5 ~ 48	5 ~ 48	5 ~ 48
Outdoor Temperature	Heating	°C	-20 ~ 30	-20 ~ 30	-20 ~ 30
Compressor	Type	-	Hermetic Motor	Hermetic Motor	Hermetic Motor
	Model	-	GPT442MAA	GPT442MAA	GPT442MAA
	Quantity	EA	1	1	1
	Displacement	cm³/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	2,300	2,300	2,300
	Control	-	EEV	EEV	EEV
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 Power Level	Heating	dB(A)	66	66	66
Liquid Piping Connection	Type	-	Flare	Flare	Flare
	Outer Diameter	mm(inch)	Ø 9.52 (3/8)	Ø 9.52 (3/8)	Ø 9.52 (3/8)
Gas Piping Connection	Type	-	Flare	Flare	Flare
	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	40	40	40
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	94	94	94
	Packed Unit	kg	107	107	107
**Rated water flow rate		LPM	34	40	46

**Note :**

- 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
- Wiring cable size must comply with the applicable local and national code.
- The specification may be subject to change without prior notice for purpose of improvement.
- \*\* Indoor unit Rated water flow rate.

Outdoor Units			AHUW128A3	AHUW148A3	AHUW168A3
Combination Indoor Units			AHNW16606B0	AHNW16606B0	AHNW16606B0
Power Supply		Ø / V / Hz	3 / 380-415 / 50	3 / 380-415 / 50	3 / 380-415 / 50
Maximum Running Current	Cooling	A	16.1	16.1	16.1
	Heating	A	16.1	16.1	16.1
Wiring Connections	For Power Supply (Included Earth)	Number of wires	5	5	5
* Capacity	Cooling(Under floor)	kW	10.4	11.0	12.0
	Heating(Under floor)	kW	12.0	14.0	16.0
* Power Input	Cooling(Under floor)	kW	3.30	3.53	4.00
	Heating(Under floor)	kW	2.78	3.43	4.18
* EER	Cooling(Under floor)	W/W	3.15	3.12	3.00
* COP	Heating(Under floor)	W/W	4.32	4.08	3.83
Operation Range (Min.~Max.)	Cooling	°C	5 ~ 48	5 ~ 48	5 ~ 48
Outdoor Temperature	Heating	°C	-20 ~ 30	-20 ~ 30	-20 ~ 30
Compressor	Type	-	Hermetic Motor	Hermetic Motor	Hermetic Motor
	Model	-	GPT442MAA	GPT442MAA	GPT442MAA
	Quantity	EA	1	1	1
	Displacement	cm <sup>3</sup> /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	2,300	2,300	2,300
	Control	-	EEV	EEV	EEV
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 Power Level	Heating	dB(A)	66	66	66
Liquid Piping Connection	Type	-	Flare	Flare	Flare
	Outer Diameter	mm(inch)	Ø 9.52 (3/8)	Ø 9.52 (3/8)	Ø 9.52 (3/8)
Gas Piping Connection	Type	-	Flare	Flare	Flare
	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	40	40	40
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	94	94	94
	Packed Unit	kg	107	107	107
**Rated water flow rate		LPM	34	40	46

**Note :**

- 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
- Wiring cable size must comply with the applicable local and national code.
- The specification may be subject to change without prior notice for purpose of improvement.
- \*\* Indoor unit Rated water flow rate.



### 3. Function Table

#### Indoor

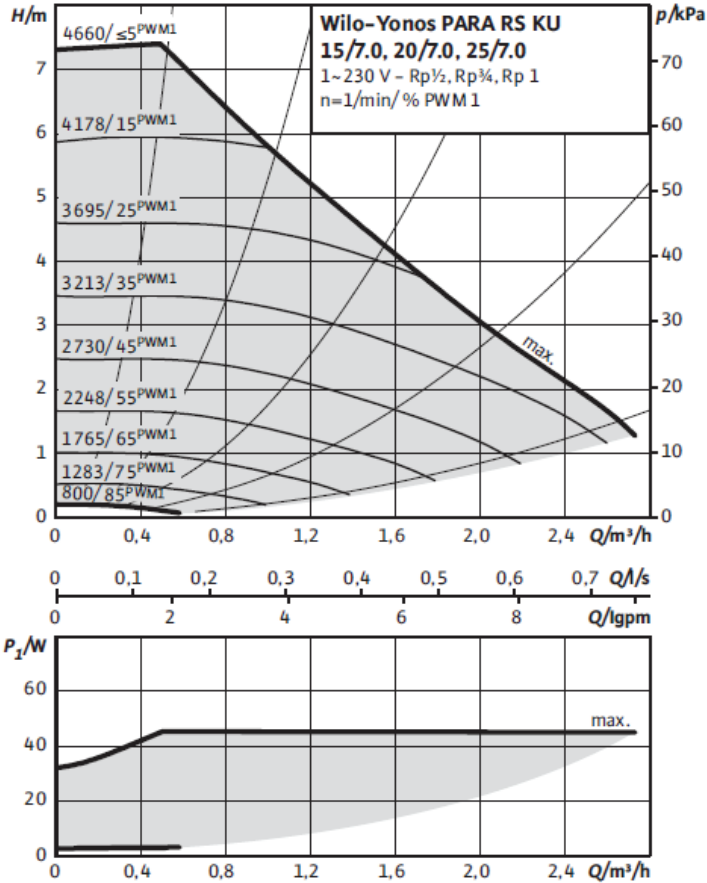
Features	Notes	Function availability
Buffer tank	ensures energy for defrost hydraulic separator to balance the heating system	40liters
Circulation pump		O
3way valve control	to switch between space heating and DHW heating	O
Electrical heater on/off	for heating and DHW	3 X 2kW max
Stop by flow switch		O
Safety valve		O
Outdoor temperature sensing	for weather dependent operation	O
modbus communication	between outdoor unit and indoor unit	O
heating loops control	1 direct, 1 mixing	O
DHW heating		O
Cooling		O
Screet drying		O
Gas/oil boiler heat utilisation (hybrid function)		O
Weather dependent heating (heating curve)		O
Web cloud service connectin	with web module	option
2 extra heating loops	2 mixings with expansion module	optoin
Pool cooling/heating	with expansion module	option
Solar / boimass heat utilisation	with expansion module	option
Room thermostat with curve correction	with KT1 or KT2 module	option
Local ON/OFF thermostat connection		option

# 4. Pump Hydraulic Performance

## Pump capacity

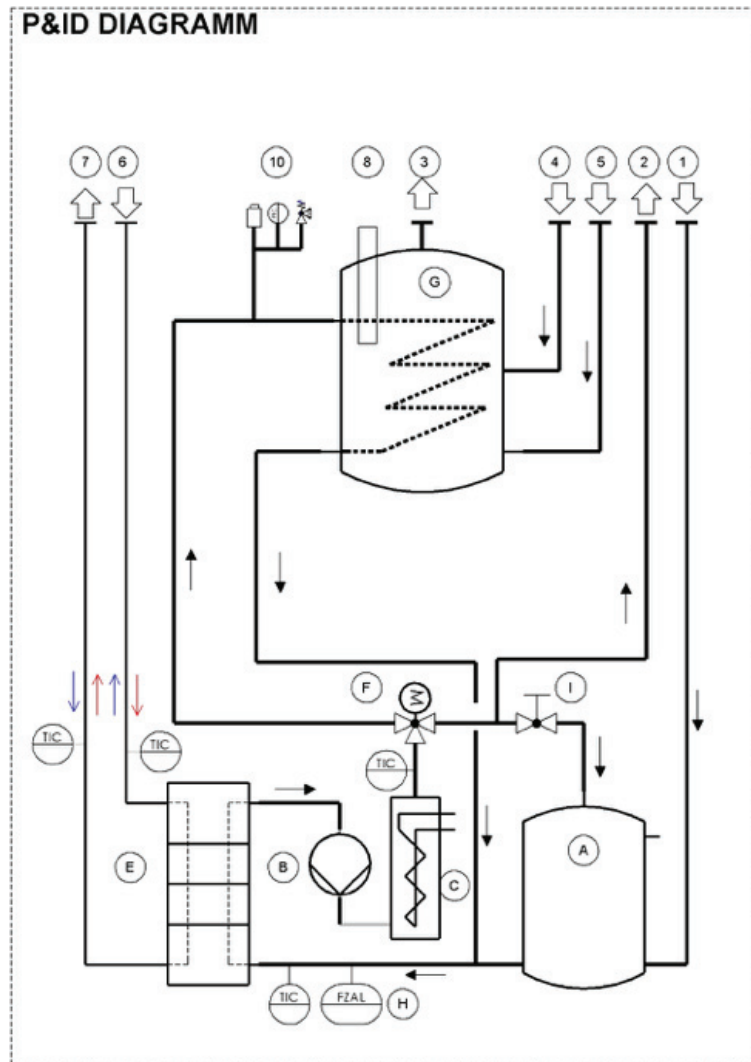
AHNW16606B0  
 Pump model : Yonos PARA RS 25/7.0 PWM1 Ku

External control via PWM 1



**⚠ WARNING**  
 Selecting a water flowrate outside the curves can cause damage to or malfunction of the unit.

## 5. Piping Diagrams



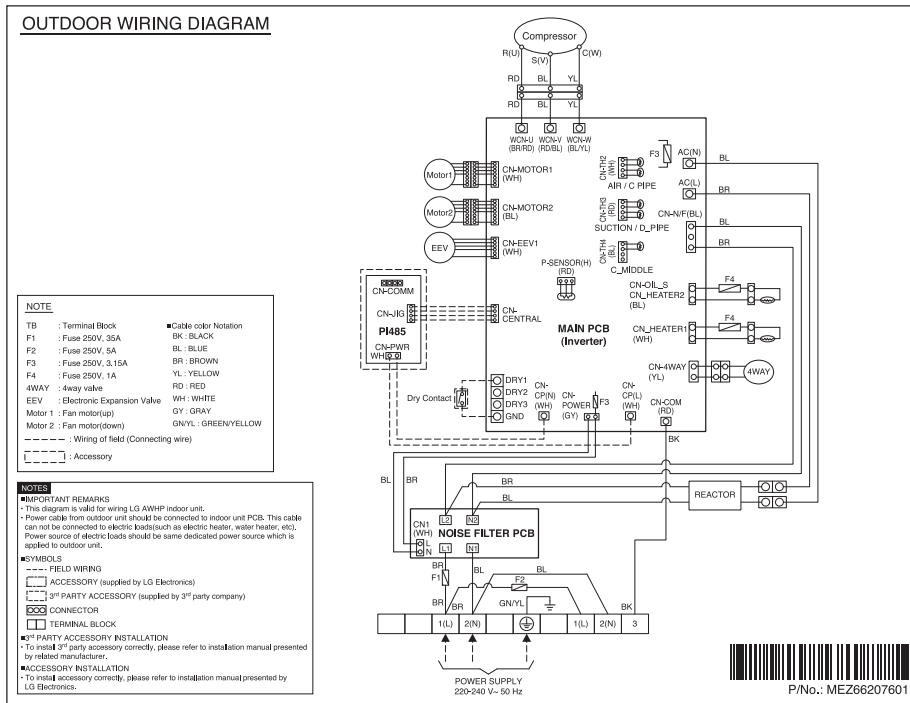
1	Return flow – heating system	A	Buffer tank
2	Flow – heating system	B	Circulating pump
3	DHW – Hot water	C	Electric flow heater
4	DHW – Circulation	D	-
5	DHW – Cold water	E	Condenser
6	ODU – gas pipe	F	3 Way Valve
7	ODU – liquid pipe	G	DHW tank
8	Mg. Anode	TIC	Temperature sensor
9	-	PIC	Pressure indicator
10	Safety group – Pressure indicator, safety valve, automatic air vent	FZAL	Flow switch



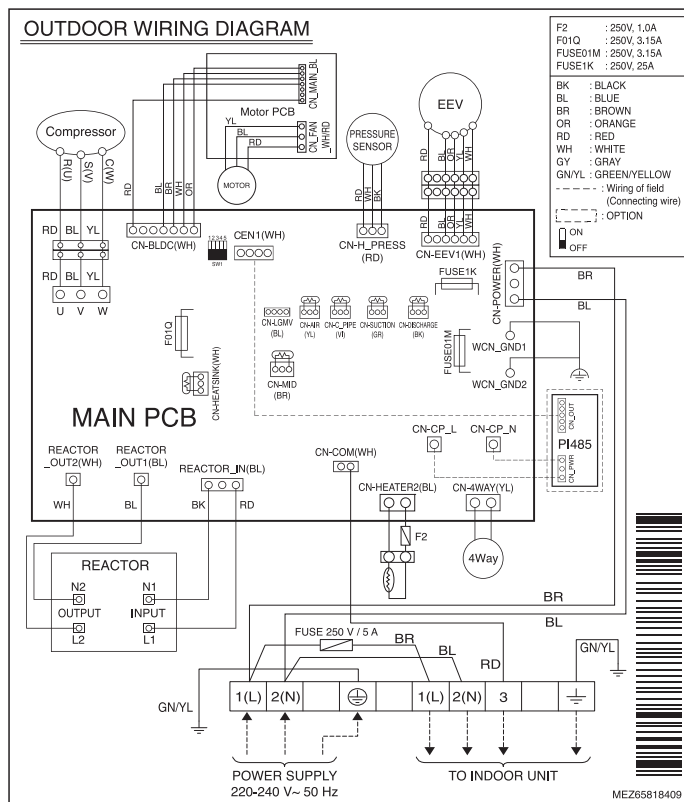
ELEMENT	TERMINAL BLOCK	DESCRIPTION
X1	L1, L2, L3, N, PE	Power cable
X2	A5, GND	Temperature sensor for external temperature
	Q11, N	Cooling valve
	Q12, N, PE	Additional external source
X3	Q7, N, PE	Circulation pump of heating cycle 1 (optional)
	Q8, N, PE	Circulation pump of heating cycle 2 (optional)
	N, Q9+, Q10-	Mixing valve of heating cycle 2 (optional)
	A7, GND	Temperature sensor of mixing-heating cycle 2 (optional)
X4	D8, GND	Switch heating/cooling and/or PV signal (optional)
	D7, GND	Thermostat of heating cycle 2 (optional)
	D6, GND	Thermostat of heating cycle 1 (optional)
	D5, GND	Remote on/off (optional)
X5	BUS-A, BUS - B, GND, 10 V	Communication with the ODU
X6	A+, B-, 12 V, GND	Communication spatial corrector (optional)
X7	A+, B-, 12 V, GND	Communication with expansion unit TT3003
1		Flow electrical heater
2		Tree way valve for switching between heating and DHW
3		<b>Basic input/output module MD1</b>
4	D4	Flow switch
5		<b>Web module (OPTIONAL)</b>
	TW Modbus	Communication with PLC
	TX Modbus	Not in use
	Ethernet	Internet connection
6	A6	Temperature sensor of the supply pipe
7	Q3	Main circulation pump
8	A1	Temperature sensor of the return line
9		<b>Process module - PLC</b>
	WM	Communication with the Web module
	TEX	MODBUS communication with the ODU
	TS	Communication with the spatial corrector
	TE2	Communication with the basic module MD1
	RQ1	ALARM dry contact
	RQ2	RESET dry contact
10		<b>Power supply ~ 230 V / 12 V</b>
	L	Phase 230 V 50 Hz
	N	Neutral 230 V 50 Hz
		Protective earth
	V-	GND
	V+	12 V dc
11	A3	Temperature sensor refrigerant pipe – condenser inlet.
12	A4	Temperature sensor refrigerant pipe – condenser outlet.
13		Membrane Keyboard
14	A2	Temperature sensor of sanitary water
C		Electrical contactor of the electrical heater
TV		Thermal protection of the electrical heater
RC		RC Filter.

# Outdoor Unit

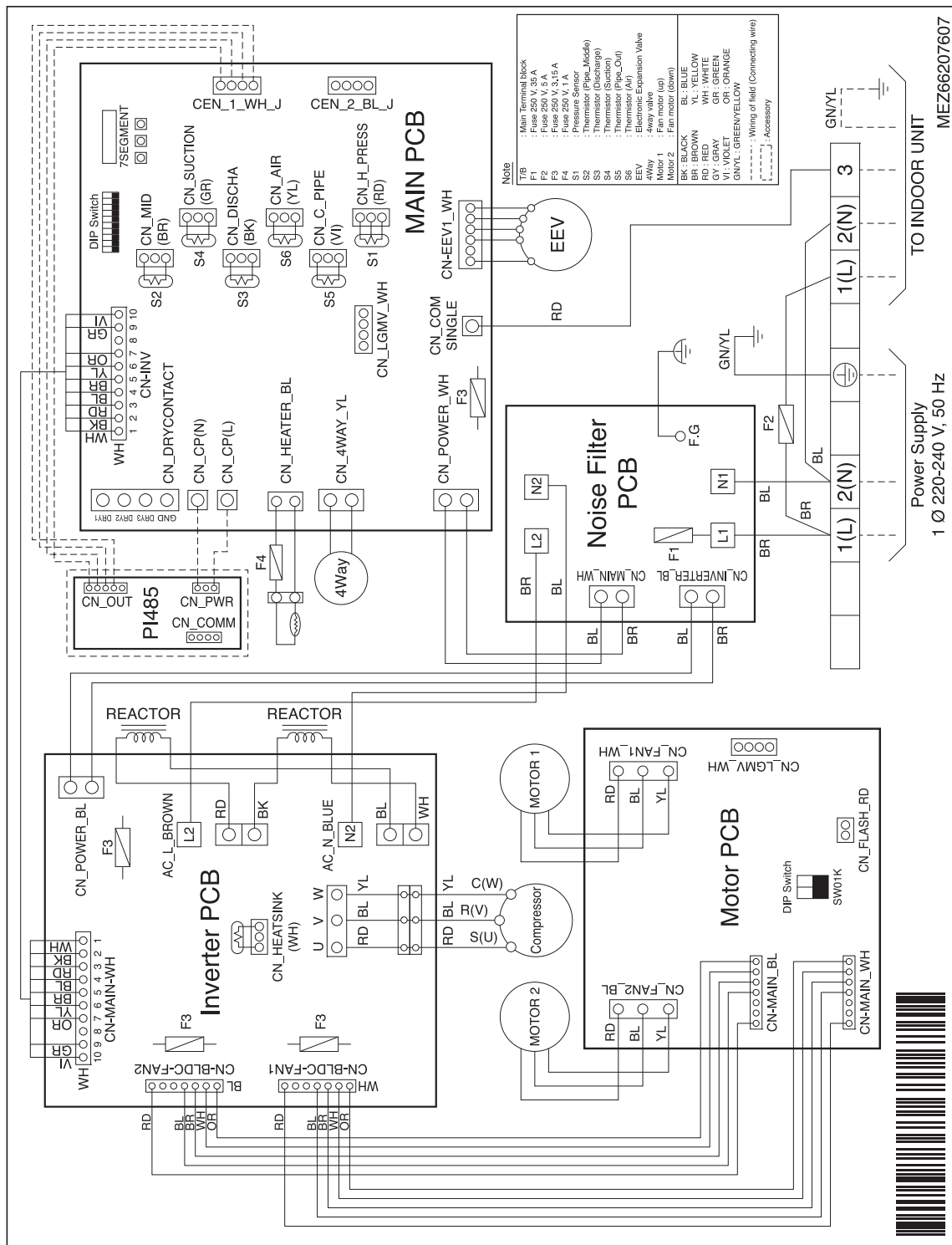
## Models : AHUW146A2

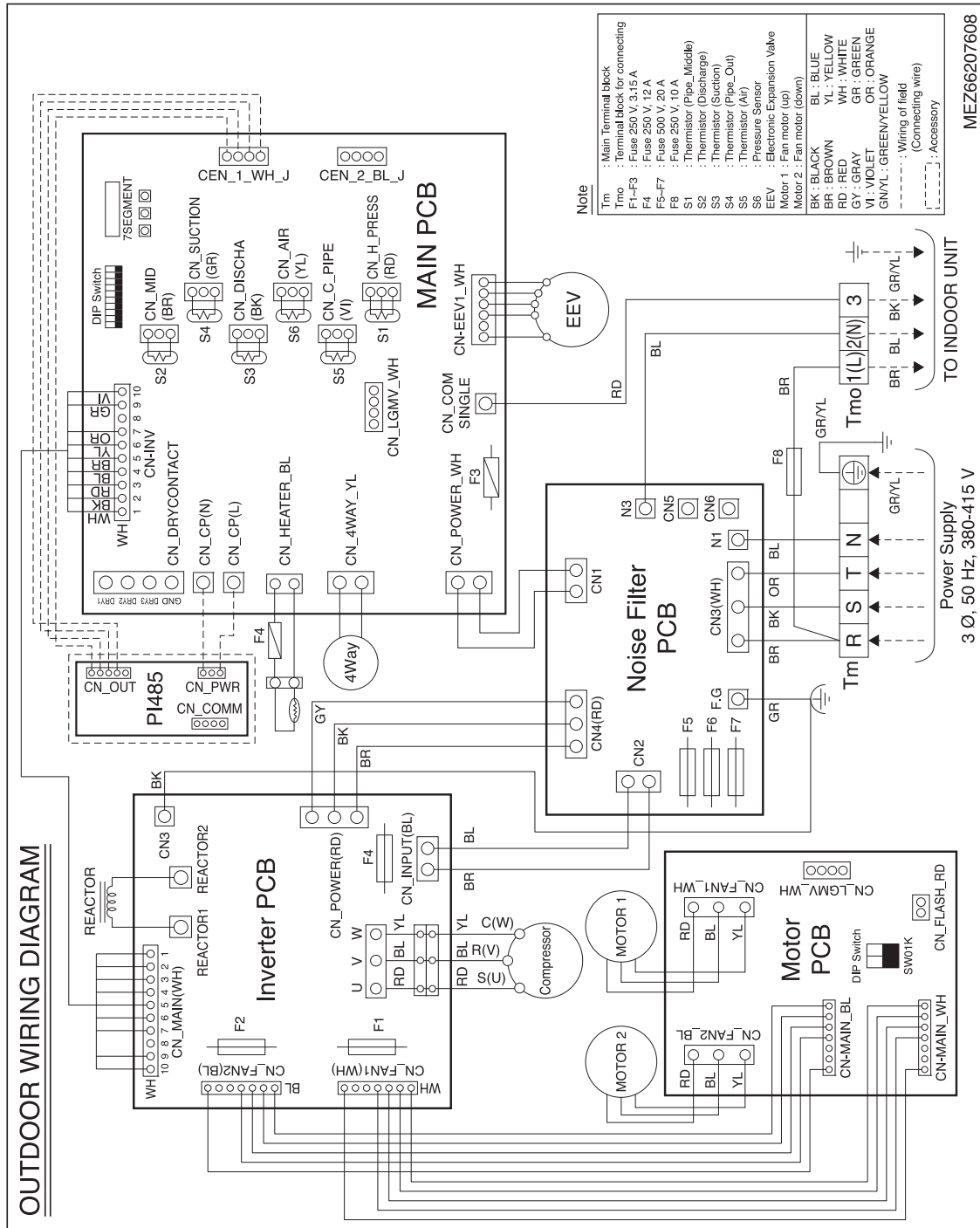


# Models : AHUW096A3



Models : AHUW166A3, AHUW146A3, AHUW126A3

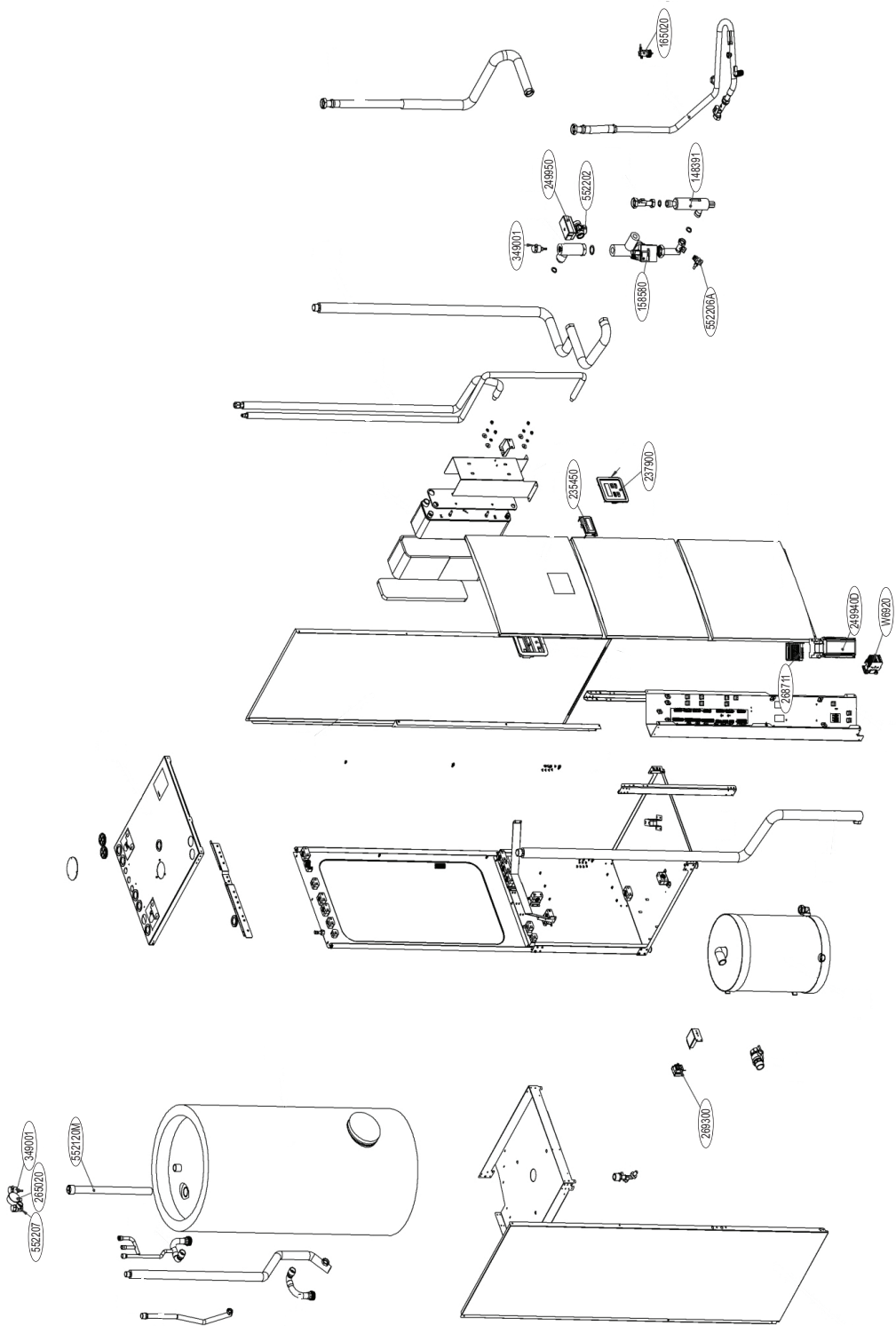






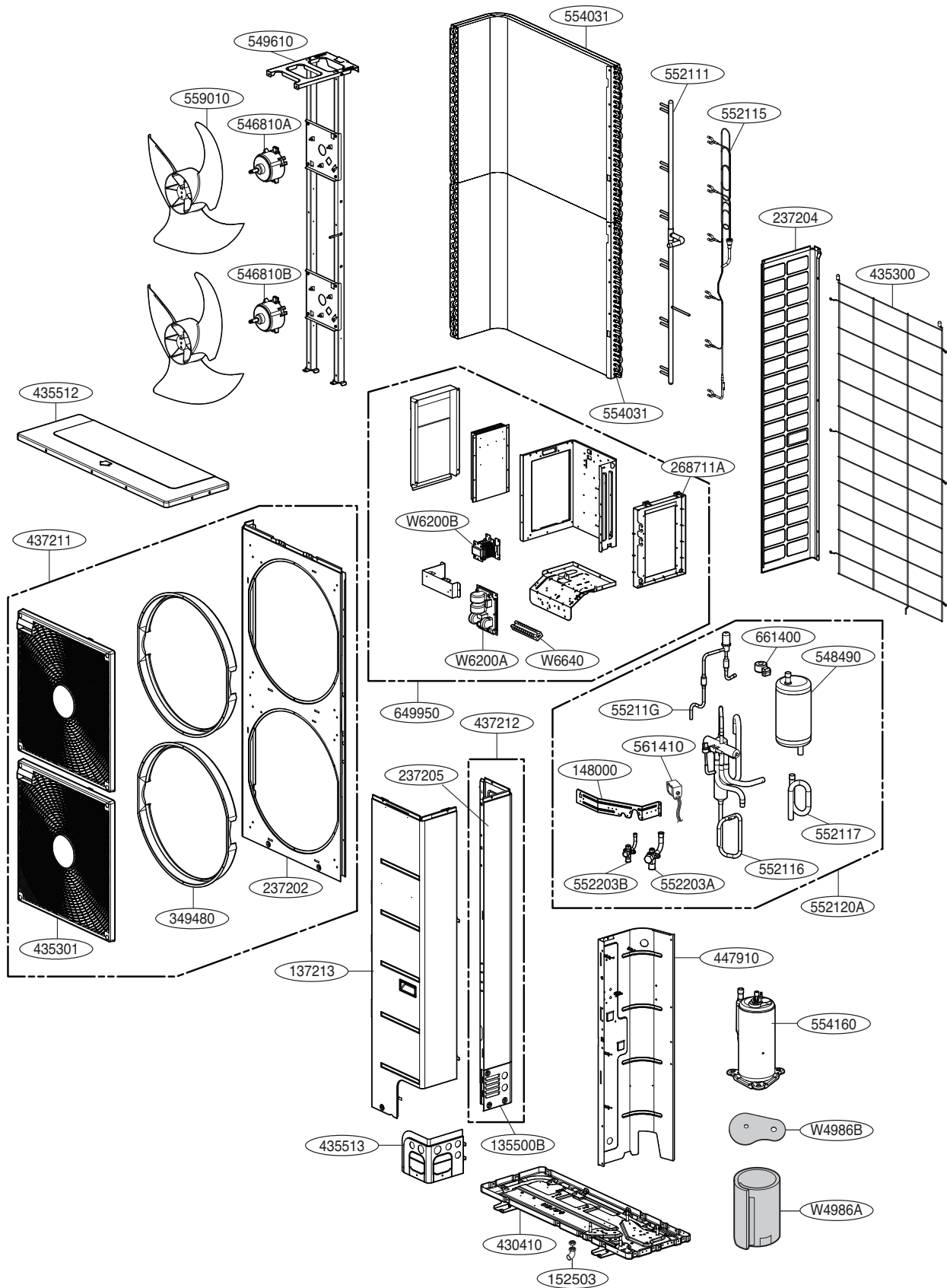
# 7. Exploded View

## Indoor Unit



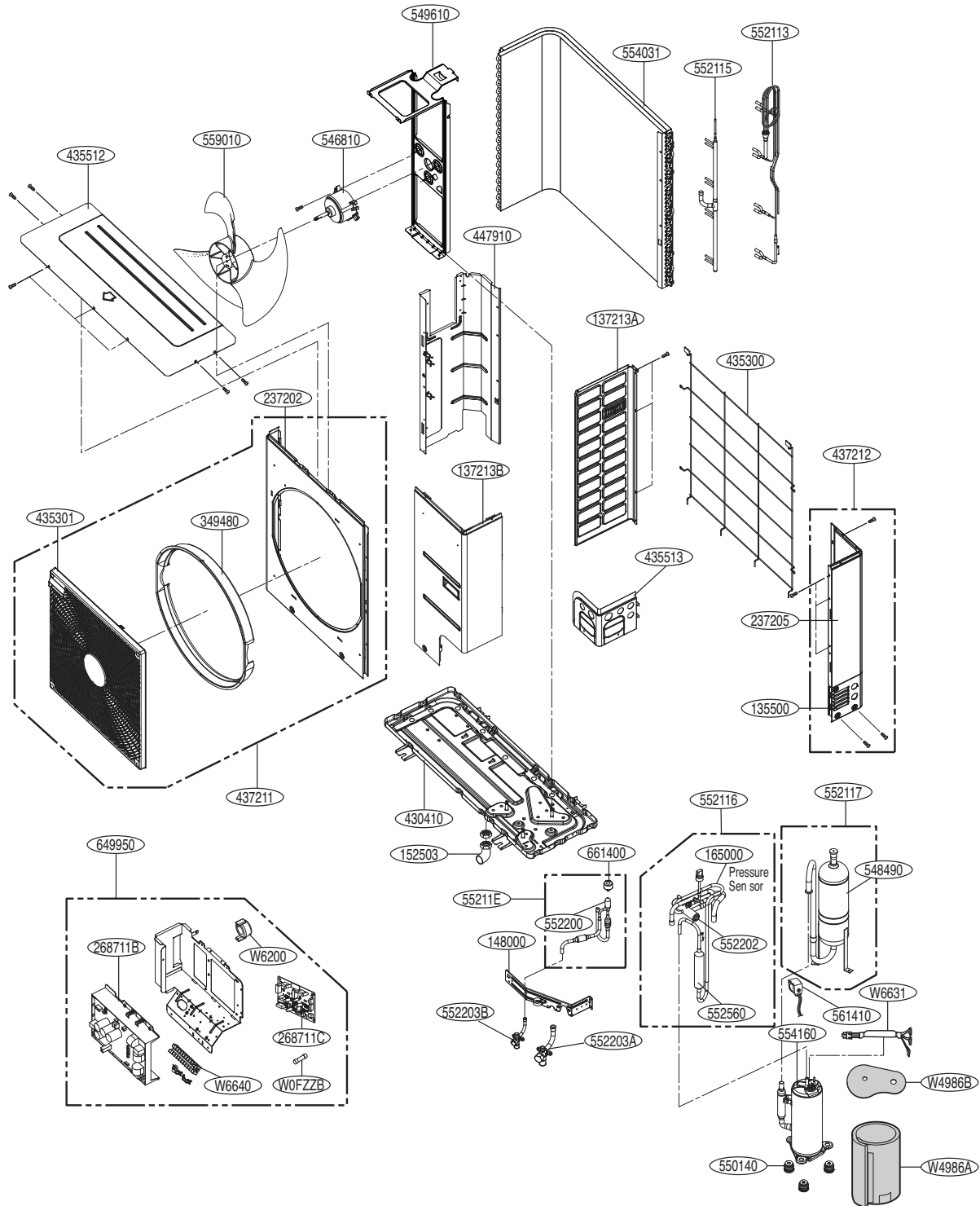
Location No.	DESCRIPTION	Kronoterm SVC P/No	LG P/No	Qty	Remark
552207	Valve,Safety	2222000017217	COV34147015	1	SAFETY VALVE 1/2 3 BAR
265020	gauge,pressure	2222000022358	COV34147016	1	MANOMETER 1/4 0-6bar
349001	Damper,Vent	2222000004071	COV34147017	2	VENT 3/8 AUTOMATIC
158580	Pump,Water	2222000084486	COV34147025	1	CIRCULATION PUMP _Wilo Pump
148391	Tank Assembly,Bucket	2222000082345	COV34147027	1	ANGULAR HEATER 6.0 kW 3x230V
552202	Valve,Reverse	2222000060718	COV34147029	1	3 WAY VALVE
249950	Case Assembly,Control	2222000034580	COV34147030	1	EMV DRIVE
552206A	Valve,Drain	2222000079611	COV34147031	1	DRAIN VALVE
235450	Display Assembly	2222000051655	COV34147032	1	PLC
237900	Window,Display	2222000044503	COV34147034	1	MEMBRANE KEYBOARD
W6920	Relay>Contact	2222000082550	COV34147036	1	ELECTRICAL CONTACTOR
249940D	Case,Control	2222000023348	COV34147037	1	RELAY PANEL
268711	PCB Assembly,Power	2222000077945	COV34147038	1	POWER SUPPLY
165020	Sensor,Flow	2222000034351	COV34147040	1	FLOW SWITCH_Sika
269300	Thermostat	2222000075866	COV34147041	1	SAFETY THERMOSTAT
552120M	Tube Assembly	2222000059859	COV34147042	1	MG ANODE
263230A	Thermistor Assembly,NTC	2222000043032	COV34147043	1	EXTERNAL SENSOR PT 1000 IP65
263230B	Thermistor Assembly,NTC	2222000040819	COV34147044	1	PT1000

**Outdoor Unit**  
**Models : AHUW146A2**



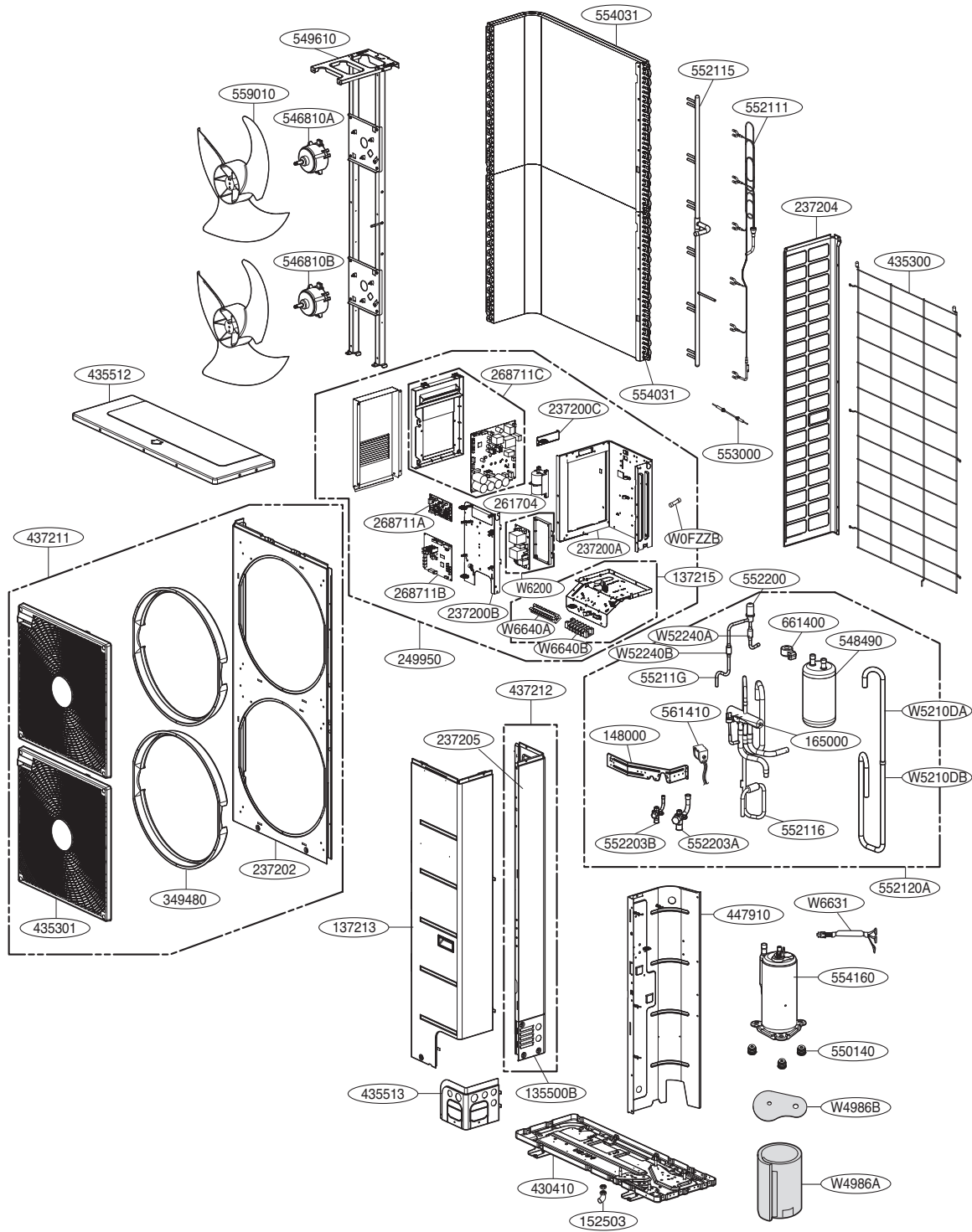
Location No.	Description	Information	Etc.
263230A	Thermistor Assembly,NTC	SUC/DIS Temperature	CN_TH3
263230B	Thermistor Assembly,NTC	PIPE/AIR Temperature	CN_TH2
263230C	Thermistor Assembly,NTC	MID-PIPE Temperature	CN_TH4
W6631A	Harness,Multi	Compressor Leadwire	-
W6631F	Harness,Single	Base Pan Heater Connector	250V 1A
W6631G	Harness,Single	Sump Heater Connector	250V 1A
553000A	Heater,Sump	Base Pan Heater	-
553000B	Heater,Sump	Sump Heater	-
W50010	Accessory Assembly	Damper / Drain Nipple	Accessory
W0FZZA	Fuse,Time Delay	Power Supply Fuse	250V 35A
W0FZZB	Fuse,Time Delay	PCB Fuse	250V 3.15A
165000	Sensor,Pressure	High Pressure Sensor	CN_PSENSOR_H

Models : AHUW096A3



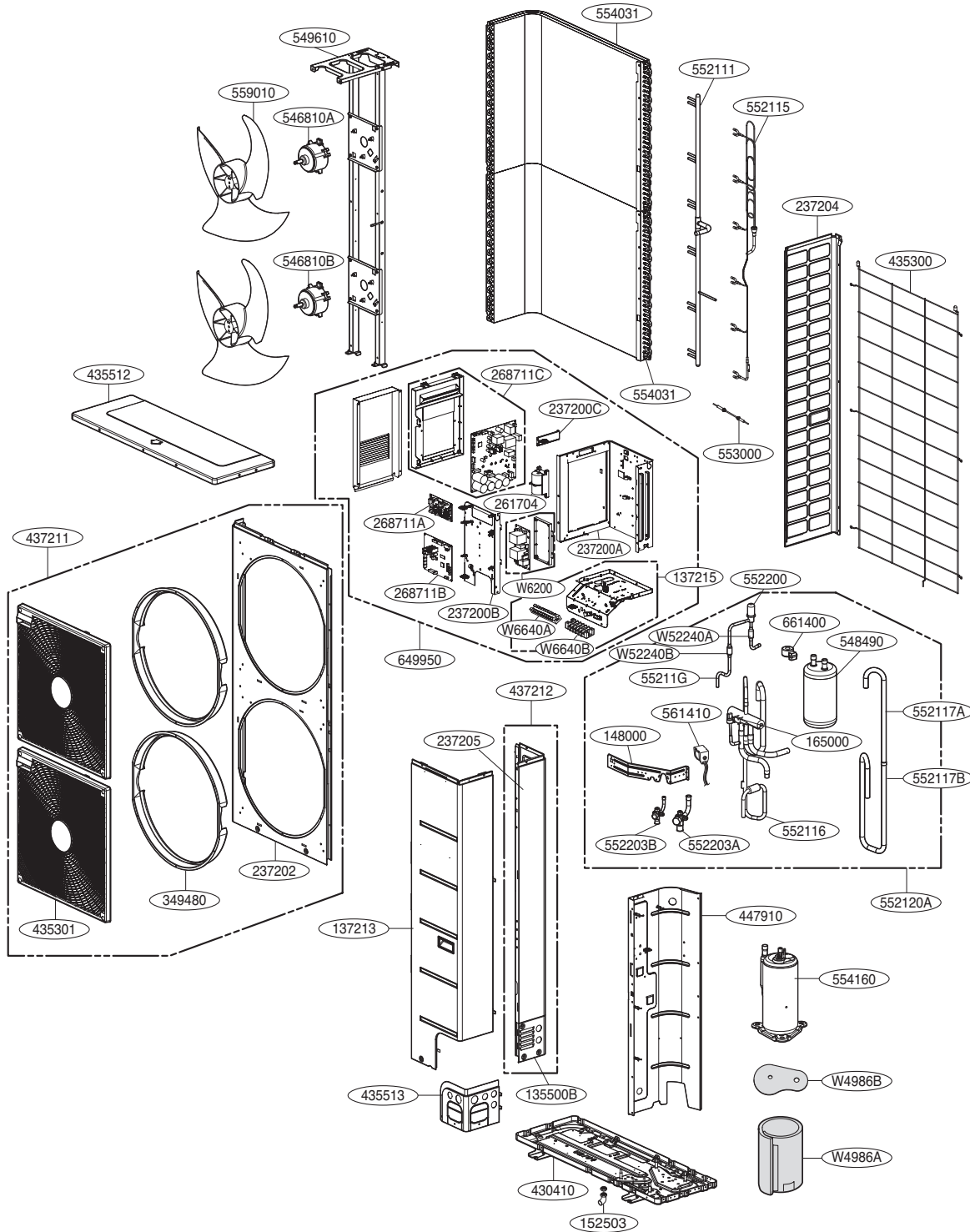
Location No.	Description	Information	Etc.
263230D	Thermistor Assembly,NTC	SUC Temperature	CN_TH4
263230E	Thermistor Assembly,NTC	DIS Temperature	CN_TH5
263230F	Thermistor Assembly,NTC	Outdoor air Temperature	CN_TH7
263230G	Thermistor Assembly,NTC	MID-PIPE Temperature	CN_TH8
263230H	Thermistor Assembly,NTC	Condenser Temperature	CN_TH6

**Models : AHUW166A3, AHUW146A3, AHUW126A3**



Location No.	Description	Information	Etc.
263230D	Thermistor Assembly,NTC	SUC Temperature	CN_TH4
263230E	Thermistor Assembly,NTC	DIS Temperature	CN_TH5
263230F	Thermistor Assembly,NTC	Outdoor air Temperature	CN_TH7
263230G	Thermistor Assembly,NTC	MID-PIPE Temperature	CN_TH8
263230H	Thermistor Assembly,NTC	Condenser Temperature	CN_TH6

**Models : AHUW168A3, AHUW148A3, AHUW128A3**



Location No.	Description	Information	Etc.
263230D	Thermistor Assembly,NTC	SUC Temperature	CN_TH4
263230E	Thermistor Assembly,NTC	DIS Temperature	CN_TH5
263230F	Thermistor Assembly,NTC	Outdoor air Temperature	CN_TH7
263230G	Thermistor Assembly,NTC	MID-PIPE Temperature	CN_TH8
263230H	Thermistor Assembly,NTC	Condenser Temperature	CN_TH6

Location No.	Description	Information	Etc.
263230D	Thermistor Assembly,NTC	SUC Temperature	CN_TH4
263230E	Thermistor Assembly,NTC	DIS Temperature	CN_TH5
263230H	Thermistor Assembly,NTC	Condenser Temperature	CN_TH6
263230F	Thermistor Assembly,NTC	Outdoor air Temperature	CN_TH7
263230G	Thermistor Assembly,NTC	MID-PIPE Temperature	CN_TH8
W6631A	Harness,Multi	Compressor Leadwire	-
W6631F	Harness,Single	Base Pan Heater Connector	250V 1A
W6631G	Harness,Single	Sump Heater Connector	250V 1A
553000A	Heater,Sump	Base Pan Heater	-
553000B	Heater,Sump	Sump Heater	-
W50010	Accessory Assembly	Damper / Drain Nipple	Accessory
W0FZZA	Fuse,Time Delay	Power Supply Fuse	250V 35A
W0FZZB	Fuse,Time Delay	PCB Fuse	250V 3.15A
165000	Sensor,Pressure	High Pressure Sensor	CN_PSENSOR_H



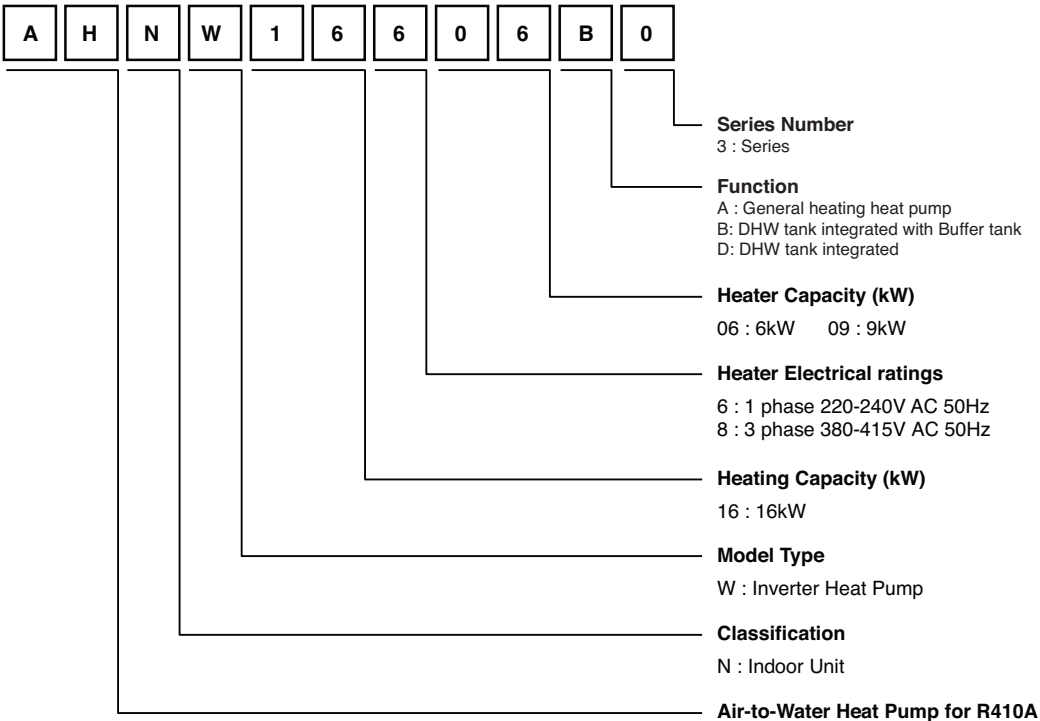
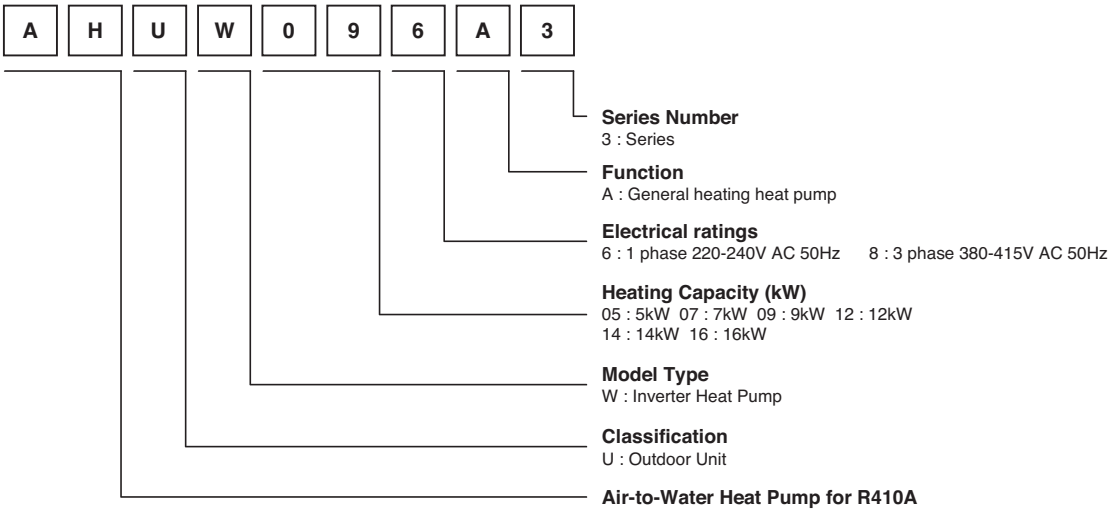
## 8. Model Information

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.

### 8.1 Model Information

#### Model number nomenclature



## Model name and related information

Model Name		Built-In Electric Heater(kW)	Capacity		Power Source
Outdoor Unit	Indoor Unit		Heating(kW) <sup>*1</sup>	Cooling(kW) <sup>*2</sup>	
AHUW146A2	AHNW16606B0	1Ø 4(2+2) 3Ø 6(2+2+2)	14.0	11.0	220-240 V ~ 50 Hz
AHUW096A3			9.0	9.0	
AHUW126A3			12.0	10.4	
AHUW146A3			14.0	11.0	
AHUW166A3			16.0	12.0	
AHUW128A3			12.0	10.4	380-415 V ~ 50 Hz
AHUW148A3			14.0	11.0	
AHUW168A3			16.0	12.0	

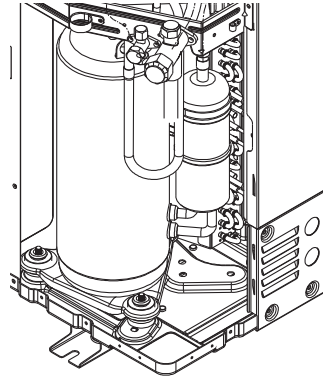
\*1 : tested under Eurovent Heating condition  
(water temperature 30°C → 35°C at outdoor ambient temperature 7°C / 6°C)

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

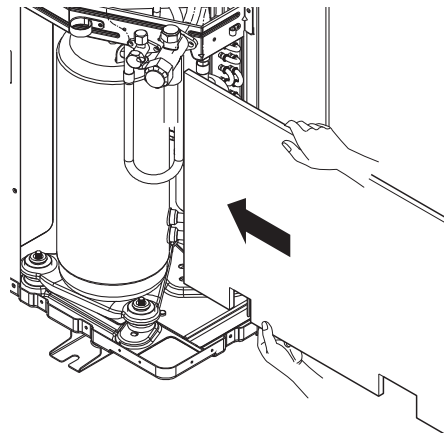
\*3 : All appliances were tested at atmospheric pressure.

## 9. 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.

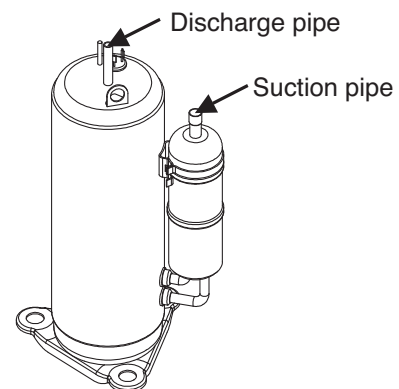


< Figure 1 >



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

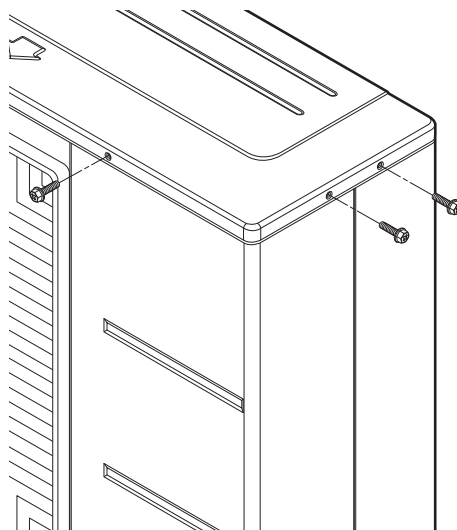
< Figure 2 >



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## 10. 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.









## 11. Trouble shooting Guide (Indoor Unit)






Supply voltage	
<b>Description of error</b>	During start-up of a bigger load (compressor, heat, additional source ...) or unsuitable supply voltage it collapses.
<b>Response</b>	The voltage of one or all electronic components of the controller assembly collapses (resets), thus does not operate properly and sends faulty information into the PLC. Constant start-up and shut-down deteriorates the accumulators of the component and drastically shortens their lifespan.
<b>Possible causes</b>	<ul style="list-style-type: none"> <li>• Inadequate supply voltage,</li> <li>• Inadequate dimensioning of circuit breaker elements of the energy network,</li> </ul>
<b>Troubleshooting</b>	<p><b>First possible error:</b></p> <ul style="list-style-type: none"> <li>• Because of fluctuations in the rated voltage of the network for more than +/- 10 % the device and controller assembly do not work properly. To correct the error, contact the electricity distributor.</li> </ul> <p><b>Second possible error:</b></p> <ul style="list-style-type: none"> <li>• Because of under-dimensioning of installation breakers the start-up of bigger loads collapses the voltage. The electrician should install suitable elements of the energy system.</li> </ul>

Humidity of the controller assembly	
<b>Description of error</b>	There are traces of water or moisture on the electronic components of the controller assembly.
<b>Response</b>	One of the components of the controller assembly or an individual component does not work properly or sends faulty information into the PLC. The most frequent indication is an error reading on the user interface "--MODULE xx - ALARM--".
<b>Possible causes</b>	<ul style="list-style-type: none"> <li>• An incorrectly wired electrical installation,</li> <li>• Pipes of the heating system without insulation,</li> <li>• Installing of the freon connection lower than the condensate outlet,</li> <li>• High humidity in the room.</li> </ul>
<b>Troubleshooting</b>	<p><b>First possible error:</b></p> <ul style="list-style-type: none"> <li>• Check the cable flow which could have moisture or condensate dripping from them and move them accordingly so the droplets sliding down the cable do not drip onto the electronic components.</li> </ul> <p><b>Second possible error:</b></p> <ul style="list-style-type: none"> <li>• Check whether the pipes of the heating system are insulated and insulate them if needed.</li> </ul> <p><b>Third possible error:</b></p> <ul style="list-style-type: none"> <li>• In case of breakthrough and installation of a freon connection from the exterior unit to the interior unit, the latter must be placed lower than the condensate drainage. Repair the hydraulic connection according to the installation manual.</li> </ul> <p><b>Fourth possible error:</b></p> <ul style="list-style-type: none"> <li>• Ensure additional ventilation of the room and ensure suitable humidity.</li> </ul>

Displaying the error	ERROR **NO WATER
<b>Description of error</b>	There was no flow 3X in a row at compressor start-up
<b>Response of internal unit controller</b>	After resolving the error, the device restarts normally by pressing the MENU button
<b>Possible causes</b>	<ul style="list-style-type: none"> <li>• Not enough water in the heating system,</li> <li>• Circulation pump turned off or malfunctioning,</li> <li>• Damaged flow switch,</li> <li>• Bad water quality or dirt.</li> </ul>
<b>Troubleshooting</b>	<p><b>First possible error:</b></p> <ul style="list-style-type: none"> <li>• Check whether the system is properly filled with water. The pressure on the manometer of the internal unit must be 1.5 ~ 2.0 bar.</li> <li>• In case the pressure in system is still falling despite adding water, there is a chance of leakage. Check whether the water part of the system is tight.</li> </ul> <p><b>Second possible error:</b></p> <ul style="list-style-type: none"> <li>• Check the operation of the circulation pump - whether it is turned on and functioning. In case it is not functioning, it needs to be replaced.</li> </ul> <p><b>Third possible error:</b></p> <ul style="list-style-type: none"> <li>• Despite the fact that there is enough water in the system and that it flows flawlessly or that there is enough flow, the flow switch indicates an error. The flow switch is in the incorrect position (normally opened - normally closed) or it is mechanically defective and has to be replaced.</li> </ul> <p><b>Fourth possible error:</b></p> <ul style="list-style-type: none"> <li>• Bad water quality or dirt. Check the water quality, if it contains possible particles or dirt which could lead to blockage of the circulation pump.</li> </ul>

Displaying the error	-Defrost T.Flow ALARM-
<b>Description of error</b>	Low outlet temperature during defrosting
<b>Response of internal unit controller</b>	After resolving the error, the device restarts normally by pressing the  button (MENU).
<b>Possible causes</b>	<ul style="list-style-type: none"> <li>• The outlet temperature during defrosting is too low.</li> </ul>
<b>Troubleshooting</b>	<ul style="list-style-type: none"> <li>• The minimal temperature of the supply line (outlet water temperature) during defrosting is 20°C.</li> <li>• The error can occur when the heating system is cold and the device cannot get enough heat needed for defrosting from the heating system. The heating system needs to be sufficiently heated (the use of the flow electric heater integrated into the internal unit is possible).</li> </ul>

Displaying the error	MODULE 1 - ALARM	
Description of error	Failure of module 1	
Response of internal unit controller	The device automatically restarts after the error is resolved	
Possible causes	<ul style="list-style-type: none"> <li>• The wiring of the relay panel of module 1 is damaged or not implemented correctly.</li> <li>• The relay panel of module 1 is damaged or defective.</li> </ul>	
Troubleshooting	<ol style="list-style-type: none"> <li>1. Turn off power supply and turn it back on. Wait to see if the communication resumes.</li> <li>2. Error of the module 1 relay panel wiring:               <ol style="list-style-type: none"> <li>a. Check the wiring of module 1 relay panel according to the electrical wiring scheme. If an error is found in the wiring, resolve it.</li> </ol> </li> <li>3. The relay panel of module 1 is damaged or defective:               <ol style="list-style-type: none"> <li>a. Carry out an inspection in case there is damage or inadequacy, the relay panel of module 1 must be replaced.</li> <li>b. Check the user interface if there is communication between PLC, MBIO12.</li> </ol> </li> </ol>	
	1 <b>MODULE 1 ALARM</b>	The reading of the error in the first line of the PLC controller interface. Hold the  key to display  <b>- SERVICE-DISPLAY -</b> To enter the menu, press the  (ENTER) key. Hold the  key to display the lower part.
	2 <b>MODULE 1. 45 73 Bet:0</b>	<b>Bet:0</b> – no problems with the connection with MD1 <b>Bet:5</b> – Bet > 0 means there is no 100% connection between modules. Modules not used in the system have a value of <b>Bet:9</b> , which means the modules do not and must not report. Use keys  and  to navigate to other modules.
	<ol style="list-style-type: none"> <li>4. If the module is physically present and reports with <b>Bet:9</b>, check the module itself if the signal LED diode RUN, RX and TX is lit (on newer models it flashes):  <b>RUN</b> – MBIO12 is operational,  <b>RX. TX</b> - the signal means there is communication between MBIO12 and PLC</li> <li>5. Check whether all bridges are on their designated spots (see chapter 2.6.1).</li> </ol>	

Displaying the error	MODULE 2 - ALARM	
Description of error	Failure of module 2	
Response of internal unit controller	The device automatically restarts after the error is resolved	
Possible causes	<ul style="list-style-type: none"> <li>• The wiring of the expansion relay panel of module 2 is damaged or not implemented correctly.</li> <li>• The expansion relay panel of module 2 is damaged or defective:</li> </ul>	
Troubleshooting	<ol style="list-style-type: none"> <li>1. Turn off power supply and turn it back on. Wait to see if the communication resumes.</li> <li>2. Error of the module 2 relay panel wiring:               <ol style="list-style-type: none"> <li>a. Check the wiring of module 2 relay panel according to the electrical wiring scheme. If an error is found in the wiring, resolve it.</li> </ol> </li> <li>3. The relay panel of module 2 is damaged or defective:               <ol style="list-style-type: none"> <li>a. Carry out an inspection; in case there is damage or inadequacy, the relay panel of module 2 must be replaced.</li> <li>b. Check the user interface if there is communication between PLC, MBIO12.</li> </ol> </li> </ol>	
	1 <b>MODULE 2 - ALARM</b>	<p>The reading of the error in the first line of the PLC controller interface. Hold the  key to display</p> <p><b>- SERVICE-DISPLAY -</b></p> <p>To enter the menu, press the  (ENTER) key.</p> <p>Hold the  key to display the lower part.</p>
	2 <b>MODULE 2. 45 73 Bet:0</b>	<p><b>Bet:0</b> – no problems with the connection with MD2</p> <p><b>Bet:5</b> – Bet &gt; 0 means there is no 100% connection between modules.</p> <p>Modules not used in the system have a value of <b>Bet:9</b>, which means the modules do not and must not report.</p> <p>Use keys  and  navigate to other modules.</p>
	<ol style="list-style-type: none"> <li>4. If the module is physically present and reports with <b>Bet:9</b>, check the module itself if the signal LED diode RUN, RX and TX is lit (on newer models it flashes):           <ul style="list-style-type: none"> <li><b>RUN</b> – MBIO12 is operational,</li> <li><b>RX. TX</b> - the signal means there is communication between MBIO12 and PLC</li> </ul> </li> <li>5. Check whether all bridges are on their designated spots (see chapter 2.6.1).</li> </ol>	



Displaying the error	Position of temperature sensor
ERROR Sensor 1	MD1:A1 – temperature sensor for inlet water (return line)
ERROR Sensor 2	MD1:A2 – temperature sensor for DHW
ERROR Sensor 3	MD1:A3 - temperature sensor of the entry of the refrigerant into the condenser
ERROR Sensor 4	MD1:A4 - temperature sensor of the exit of the refrigerant from the condenser
ERROR Sensor 5	MD1:A5 – temperature sensor for outdoor temperature
ERROR Sensor 6	MD1:A6 – temperature sensor for outlet water (supply line)
ERROR Sensor 7	MD1:A7 – temperature sensor of mixing-heating cycle 2
ERROR Sensor 10	MD2:A2 – temperature sensor of mixing-heating cycle 3
ERROR Sensor 11	MD2:A3 – temperature sensor of mixing-heating cycle 4
ERROR Sensor 12	MD2:A4 – buffer tank temperature sensor
ERROR Sensor 13	MD2:A5 – temperature sensor of alt. source

Displaying the error	ERROR .Thermostat
Description of error	Spatial corrector error
Response of internal unit controller	The device automatically restarts after the error is resolved
Possible causes	<ul style="list-style-type: none"> <li>• The communication cable between the internal unit and spatial thermostat is damaged,</li> <li>• Faulty wiring of the spatial thermostat,</li> <li>• Faulty setting of the spatial thermostat on the basic controller of the internal unit Termotronic 3000.</li> </ul>
Troubleshooting	<p><b>The communication cable is damaged:</b></p> <ul style="list-style-type: none"> <li>• Check whether the connecting communication cable is in working order. In case an error or damage is found, it is necessary to replace the communication cable.</li> </ul> <p><b>Faulty wiring of the spatial thermostat:</b></p> <ul style="list-style-type: none"> <li>• Check whether the wiring of the spatial thermostat is implemented properly - see instructions for connecting the spatial thermostat. In case the wiring is not implemented properly, correct it according to the instructions for connecting the spatial thermostat.</li> </ul> <p><b>Faulty setting:</b></p> <ul style="list-style-type: none"> <li>• Check the settings and correct them if needed. See instructions for connecting the spatial thermostat.</li> </ul>

Displaying the error	Caution flow: xx s
Description of error	No flow
Response of internal unit controller	-
Possible causes	Disturbances in water flow.
Troubleshooting	<p><b>The error is displayed in the diagnostics display:</b></p> <ul style="list-style-type: none"> <li>• If it appears less than 3x in a row when the compressor is switched on, the device continues to function normally.</li> <li>• Otherwise, "ERROR **NO WATER**" is displayed.</li> </ul>

Displaying the error	ERROR .Sensors
Description of error	Sensor error
Response of internal unit controller	The device automatically restarts after the error is resolved
Possible causes	<ul style="list-style-type: none"> <li>• The temperature sensor is not appropriately connected to the controller.</li> <li>• The temperature sensor is damaged</li> </ul>
Troubleshooting	<p><b>Check the connection of the temperature sensor PT1000:</b></p> <ul style="list-style-type: none"> <li>• In case of faulty connection of the temperature sensor PT1000, it must be connected accurately.</li> </ul> <p><b>Check the operation of the temperature sensor PT1000:</b></p> <ul style="list-style-type: none"> <li>• Check the operation of the temperature sensor PT1000 (resistance 1000 Ohm at 0°C - see the resistance table for sensors PT1000); if a malfunction of the temperature sensor is detected, it must be replaced.</li> </ul>

Displaying the error	ALARM RTC FAIL
Description of error	An error is detected on the PLC frequency oscillator, it affects the normal operation of the meters.
Response of internal unit controller	The device will not restart until the error is resolved.
Possible causes	/
Troubleshooting	<p><b>The reset of the error by pressing and holding ENTER does not help:</b></p> <ul style="list-style-type: none"> <li>• Replace the PLC module.</li> </ul>

Displaying the error	ALARM DHW
Description of error	HP did not reach the minimal temperature 3x
Response of internal unit controller	After resolving the error, the device restarts normally by pressing the MENU button
Possible causes	<ul style="list-style-type: none"> <li>• Too low water flow through the heat exchanger in the DHW,</li> <li>• The heat exchanger in the DHW is too small,</li> <li>• The temperature sensor in the DHW is not positioned correctly.</li> </ul>
Troubleshooting	<p><b>Too low water flow through the heat exchanger in the DHW:</b></p> <ul style="list-style-type: none"> <li>• The flow in the circulation pump responsible for heating DHW must be appropriately reset or the operation of the circulation pump must be checked.</li> </ul> <p><b>The heat exchanger in the DHW is too small:</b></p> <ul style="list-style-type: none"> <li>• Error in the design of the heating system or choice of DHW for hot sanitary water.</li> </ul> <p><b>The temperature sensor in the boiler is located too low:</b></p> <ul style="list-style-type: none"> <li>• Because of water layering and constant influx of cold water into the DHW, this position is inappropriate. The sensors have to be placed higher, the recommended position is somewhere in the middle of the DHW.</li> </ul>

Displaying the error	MODULE INV ALARM
Description of error	Lost communication with the external device
Response of internal unit controller	The device automatically restarts after the error is resolved
Possible causes	<ul style="list-style-type: none"> <li>• The external or the internal unit is disconnected,</li> <li>• The communication cable between external and internal unit is damaged,</li> <li>• The process module on the internal unit (Display module) is damaged,</li> <li>• The Module PI485 (modbus converter) on the external unit is damaged.</li> </ul>
Troubleshooting	<p><b>The external or the internal unit is disconnected:</b></p> <ul style="list-style-type: none"> <li>• Check whether the external or internal unit are properly powered or turned on.</li> </ul> <p><b>The communication cable between external and internal unit is damaged:</b></p> <ul style="list-style-type: none"> <li>• Check whether the connecting cable is suitable, otherwise, replace it.</li> </ul> <p><b>The process module on the internal unit (Display module) is damaged:</b></p> <ul style="list-style-type: none"> <li>• In case it is not functioning, it needs to be replaced.</li> </ul> <p><b>The Module PI485 (modbus converter) on the external unit is damaged:</b></p> <ul style="list-style-type: none"> <li>• In case it is not functioning, it needs to be replaced.</li> </ul>

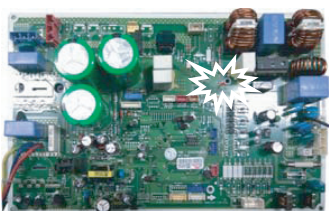
## 12. Trouble shooting Guide (Outdoor Unit)

### Main PCB assembly(Inverter)

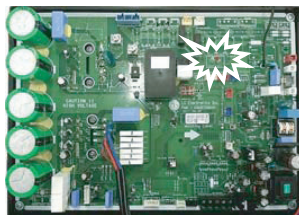
- Red LED means error no. 10's digit, and green LED means 1's digit, and when red and green simultaneously blink, it means 100's unit.

Ex) Inverter compressor IPM defect Error : error number 21

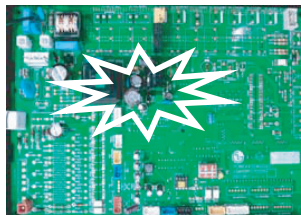
Error Code	Description	LED 1 (Red)	LED 2 (Green)
21	Inverter compressor IPM defect	2times ●	1time ●



AHUW096A3



AHUW146A2  
AHUW126A3  
AHUW146A3  
AHUW166A3



AHUW128A3  
AHUW148A3  
AHUW168A3

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(Indoor) ↔ PCB(Inverter))	PCB(Indoor) 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 displaced/poor EEV assembly
62**	Heatsink Error(High)	PCB(Inverter) heat generation, causing the rise of heatsink temperature
67***	Fan Lock Error	Restriction of Fan motor
73**	Overcurrent (Peak) detected at inverter input	Error by overcurrent detection at inverter input

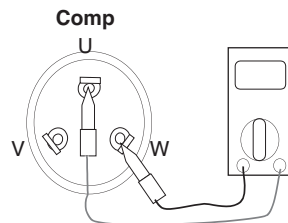
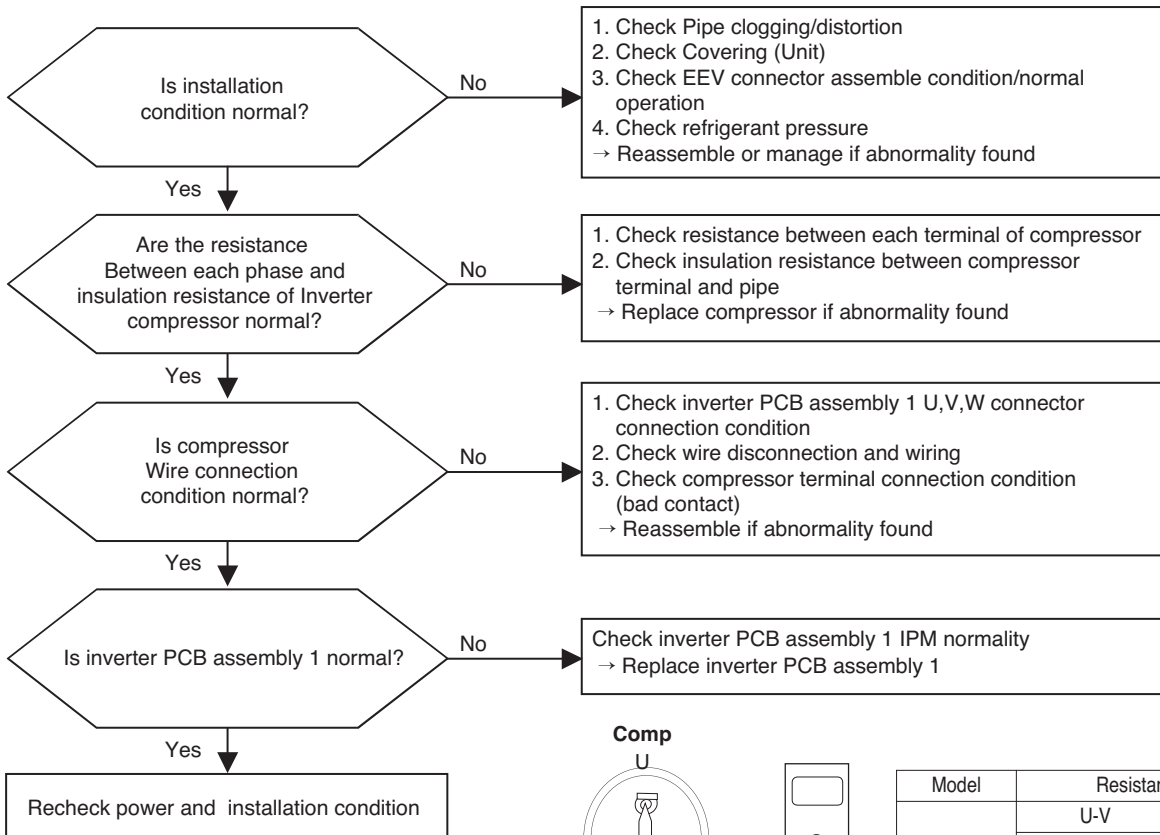
Display code	Title	Cause of error	Check point & Normal condition
21	DC PEAK (IPM Fault)	<ul style="list-style-type: none"> <li>Instant over current</li> <li>Over Rated current</li> <li>Poor insulation of IPM</li> </ul>	<ul style="list-style-type: none"> <li>An instant over current in the U,V,W phase               <ul style="list-style-type: none"> <li>Comp lock</li> <li>The abnormal connection of U,V,W</li> </ul> </li> <li>Over load condition               <ul style="list-style-type: none"> <li>Overcharging of refrigerant Pipe length.</li> <li>Outdoor Fan is stop</li> </ul> </li> <li>Poor insulation of compressor</li> </ul>



## WARNING

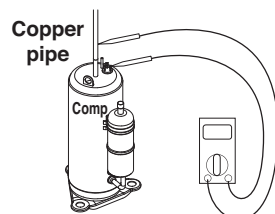
Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

## ■ Error Diagnosis and Countermeasure Flow Chart



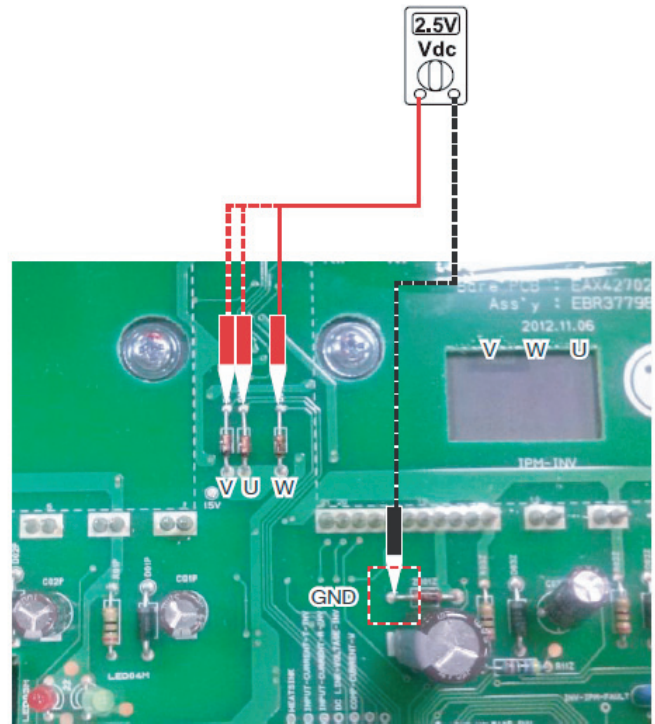
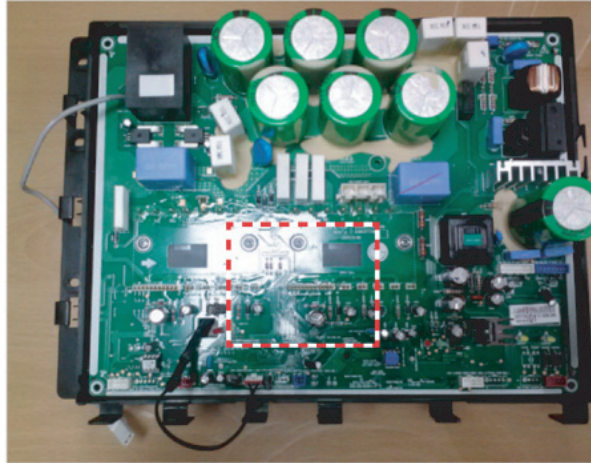
Model	Resistance(Ω) at 20°C	
	AHUW146A2	U-V
	V-W	0.438(at 25°C)
	W-U	0.438(at 25°C)

## ■ Comp checking method

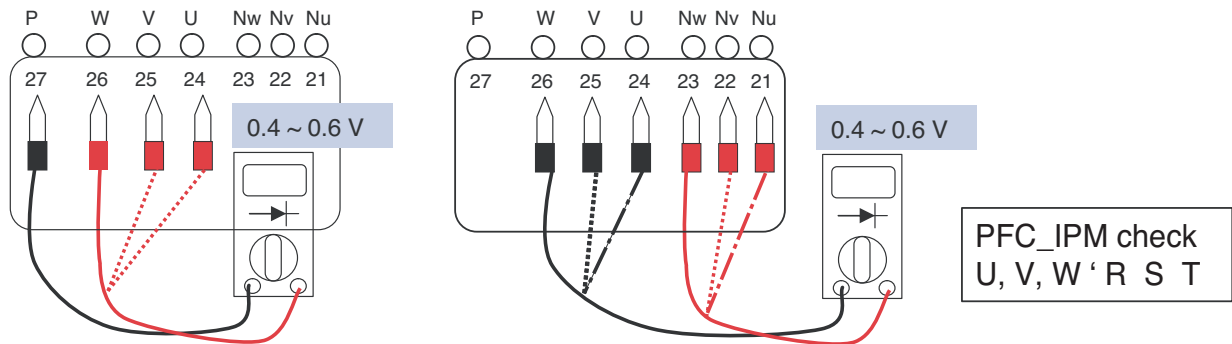


Terminal	Insulation Resistance
U-panel	≥ 10MΩ
V-panel	≥ 10MΩ
W-panel	≥ 10MΩ

▶ AHUW096A3

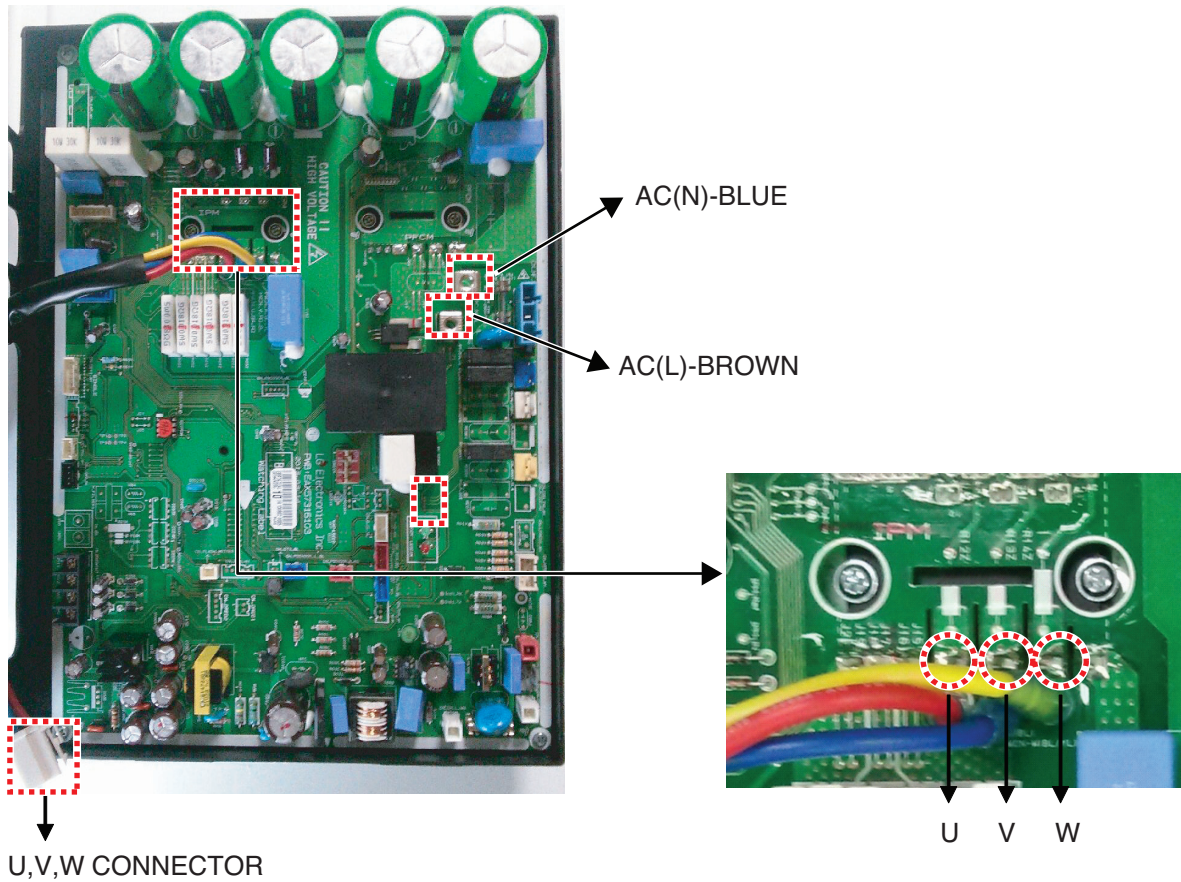


1. Wait PCB(Inverter) DC voltage is discharged after main power off.
2. Pull out AC(L), AC(N) connectors and U,V,W COMP Connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short( $0\Omega$ ) or open(hundreds  $M\Omega$ ), PCB needs to be replaced.(IPM 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).

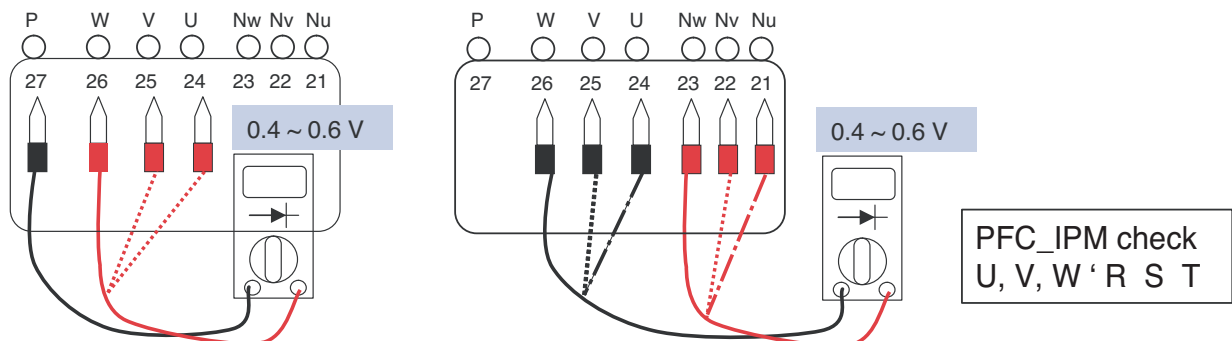




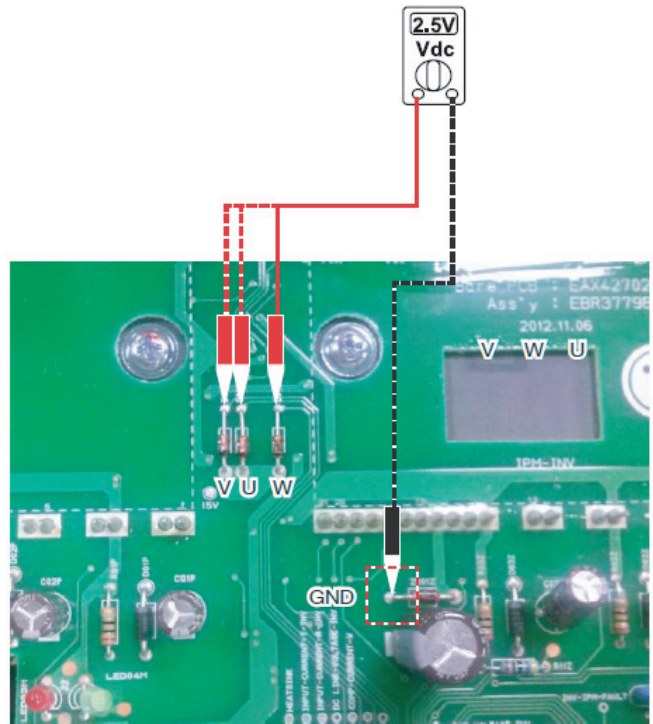
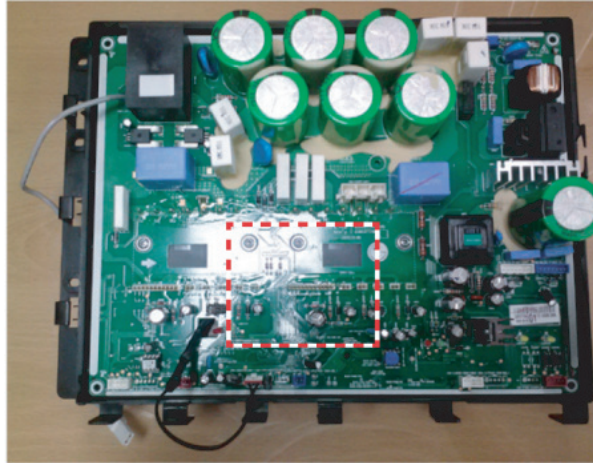
▶ AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3



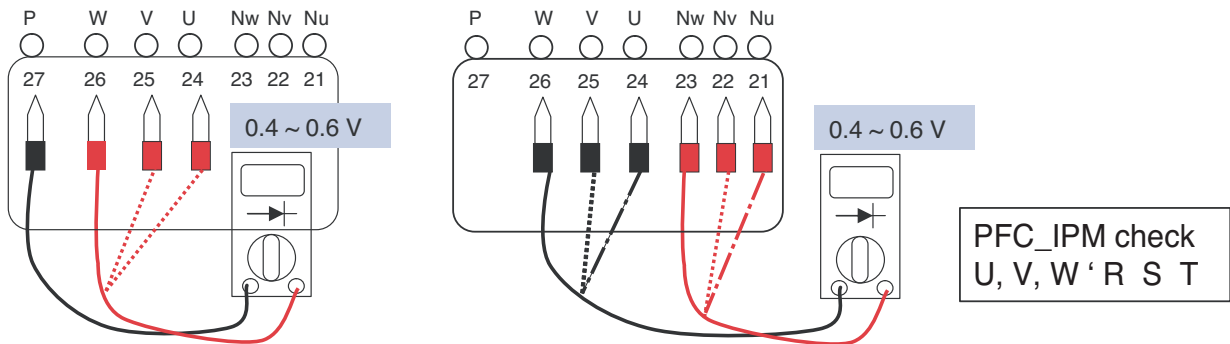
1. Wait PCB(Inverter) DC voltage is discharged after main power off.
2. Pull out AC(L), AC(N) connectors and U,V,W COMP Connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short( $0\Omega$ ) or open(hundreds  $M\Omega$ ), PCB needs to be replaced.(IPM 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).



▶ AHUW128A3/AHUW148A3/AHUW168A3



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( $0\Omega$ ) or open(hundreds  $M\Omega$ ), 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).





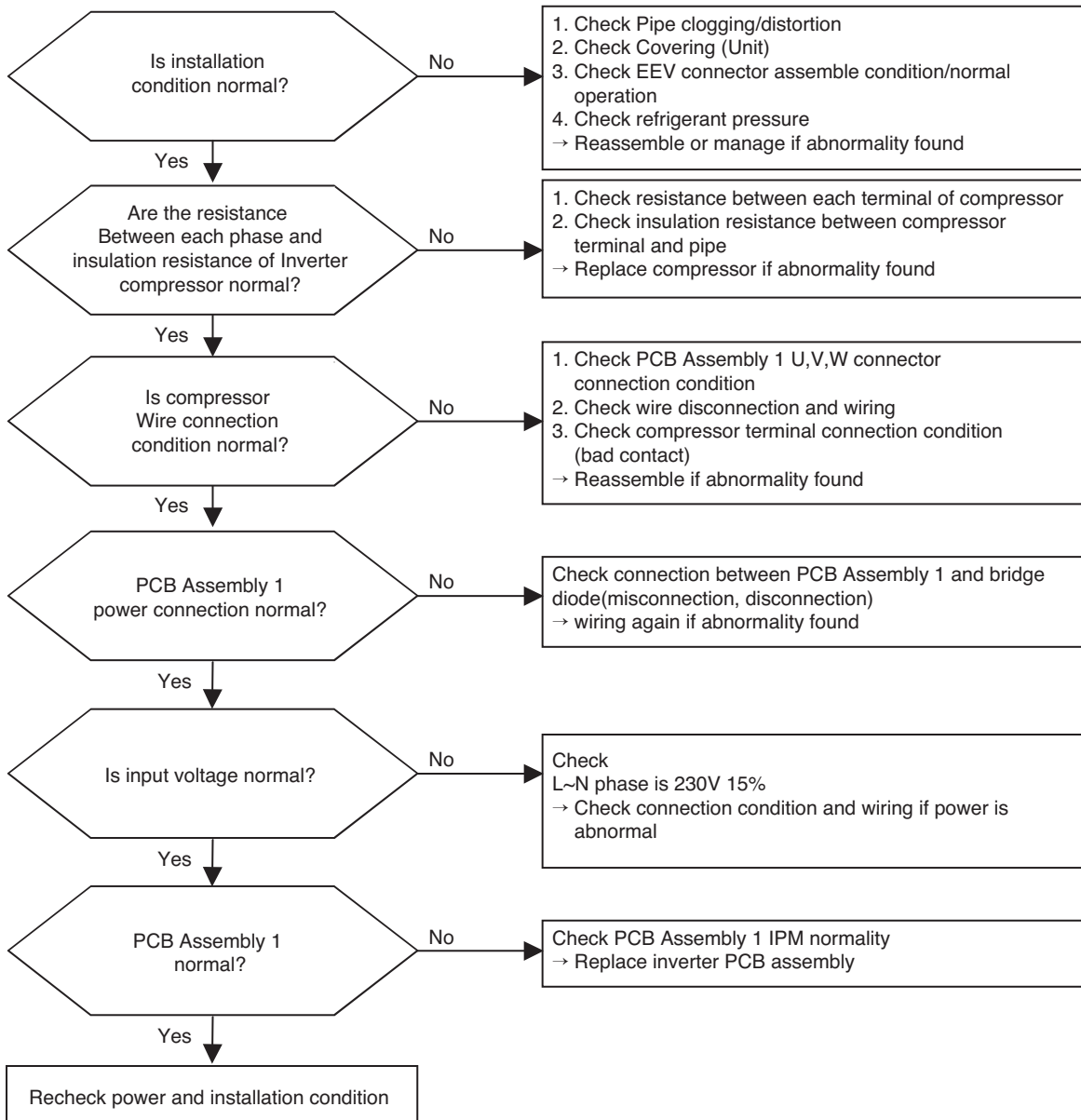
Display code	Title	Cause of error	Check point & Normal condition
22	Max. C/T	Input Over Current	1. Malfunction of Compressor 2. Blocking of Pipe 3. Low Voltage Input 4. Refrigerant, Pipe length, Blocked...



## WARNING

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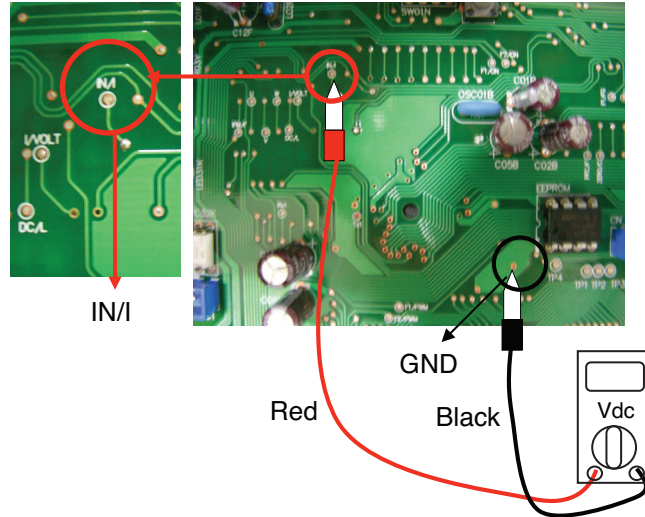
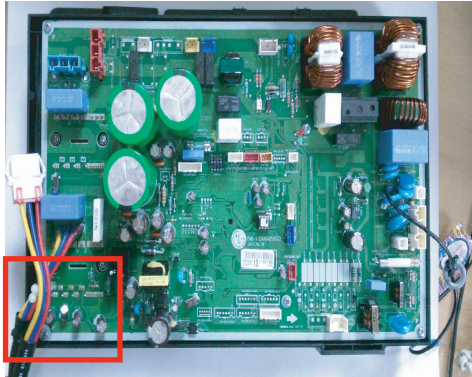
## ■ Error Diagnosis and Countermeasure Flow Chart



## Check Point

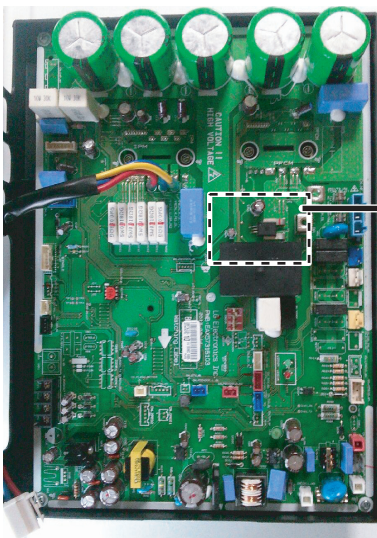
1. Check the power source.(230V  $\pm$ 15%)
2. Check the fan operation is right.
3. Check the current.
4. Check the install condition.
5. Check the CT Sensor Output signal  
(AHUW096A3 - Check output the CT Sensor : DC 2.5 $\pm$ 0.2V  
AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3 - Check output pin 2.3 of the CT Sensor : DC 2.5 $\pm$ 0.2V  
AHUW128A3/AHUW148A3/AHUW168A3 - Check input\_current\_T\_PFC and R\_PFC of the CT sensor : DC 2.5 $\pm$ 0.2V)

### ► AHUW096A3

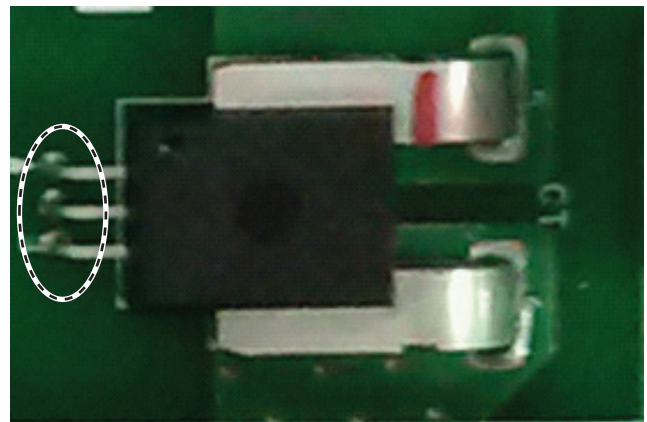
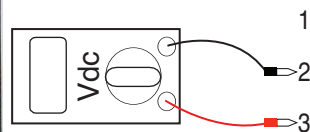


<CT Sensing Check Point>

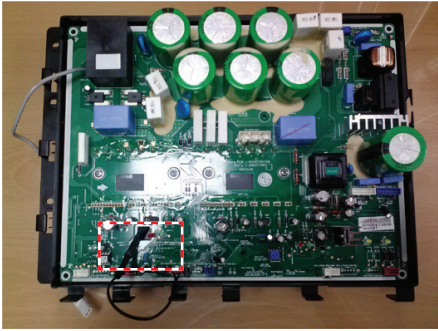
### ► AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3



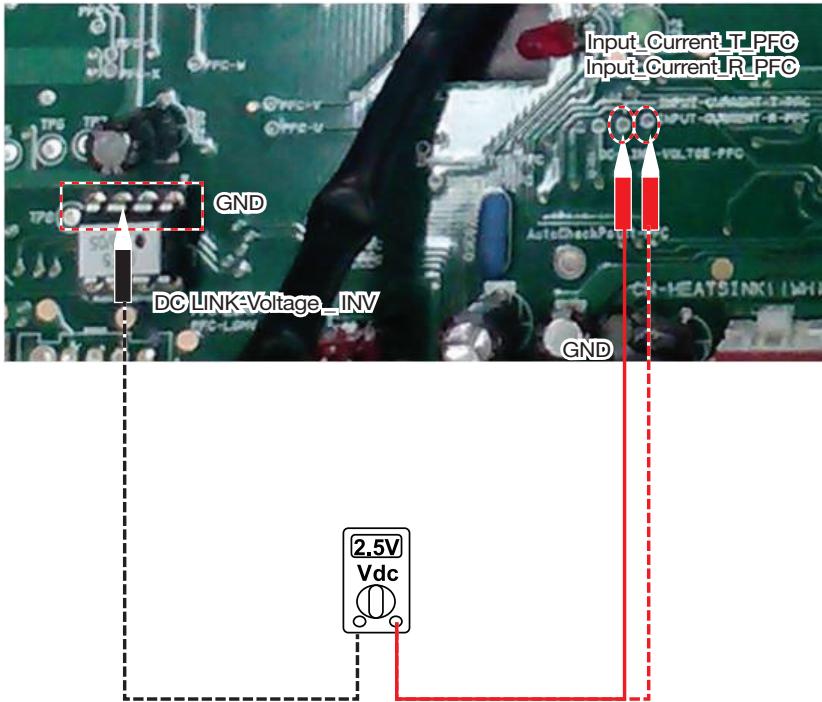
< Inverter PCB>



<CT Sensing Check Point>



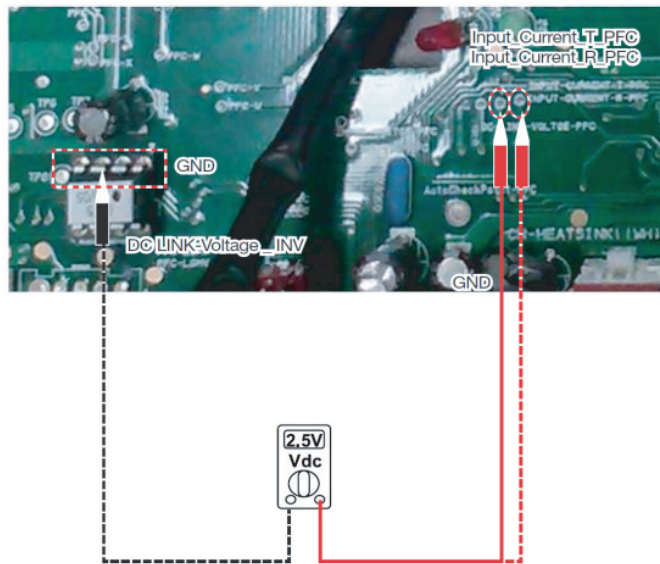
4kW



► AHUW128A3/AHUW148A3/AHUW168A3



<Inverter PCB>



<CT Sensing Check Point >

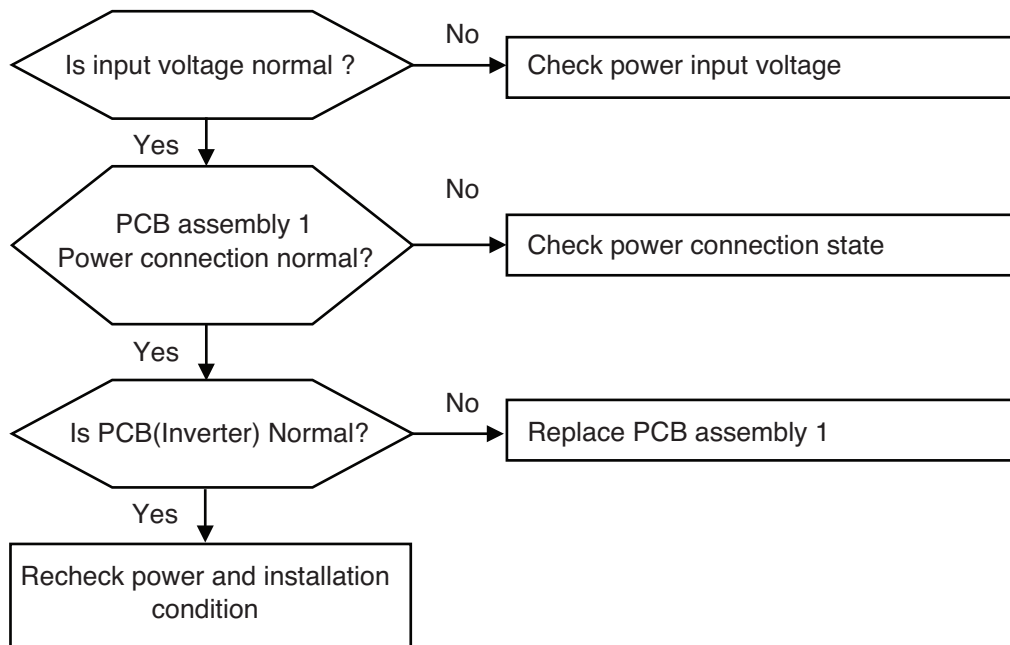
Display code	Title	Cause of error	Check point & Normal condition
23	DC Link High / Low Volt	<ul style="list-style-type: none"> <li>• DC Link Voltage is above 420Vdc</li> <li>• DC Link Voltage is below 140Vdc</li> </ul>	<ul style="list-style-type: none"> <li>• Check CN_(L), CN_(N) Connection</li> <li>• Check Input Voltage</li> <li>• Check PCB DC Link voltage sensor parts</li> </ul>



## WARNING

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### ■ Error Diagnosis and Countermeasure Flow Chart

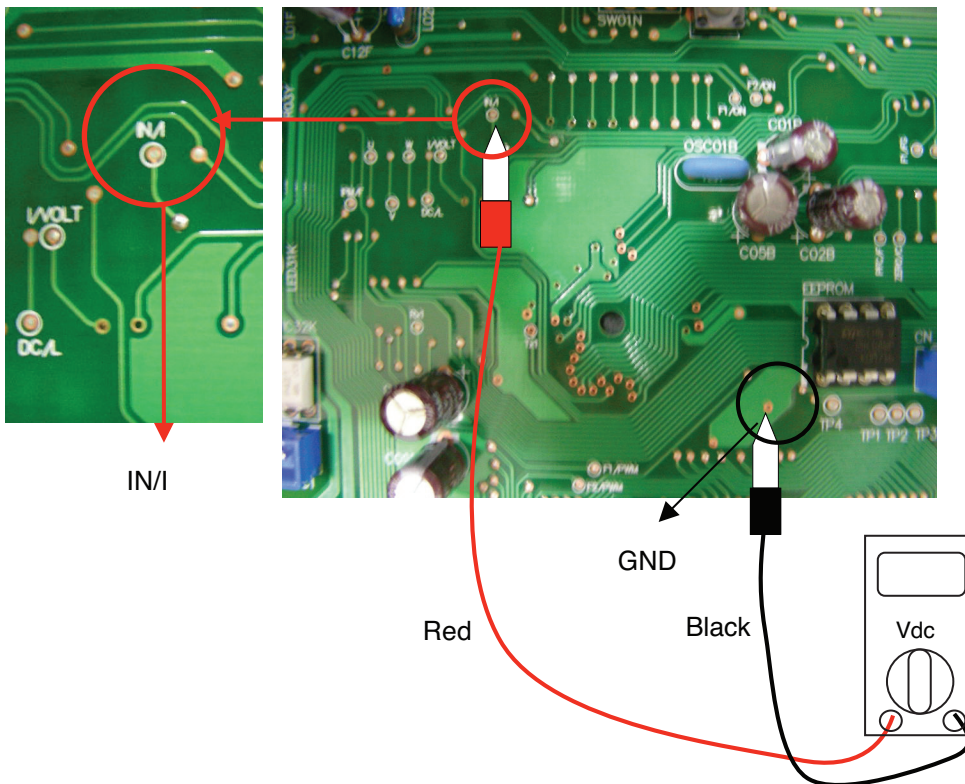
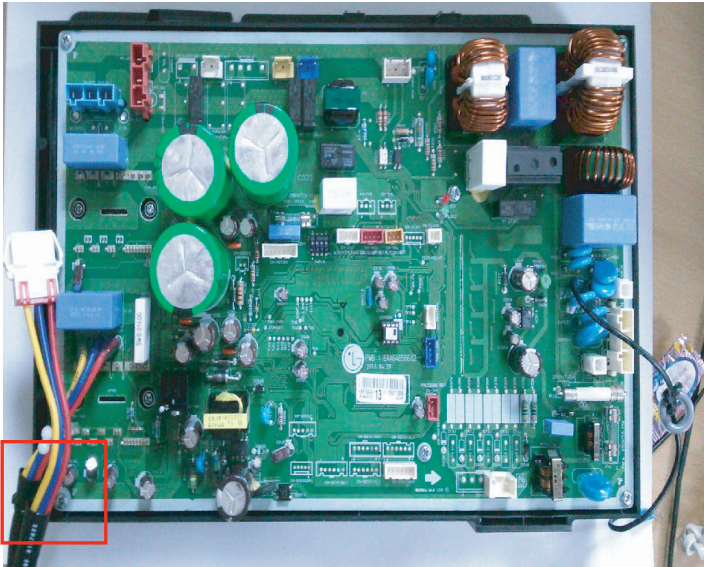




## Check Point

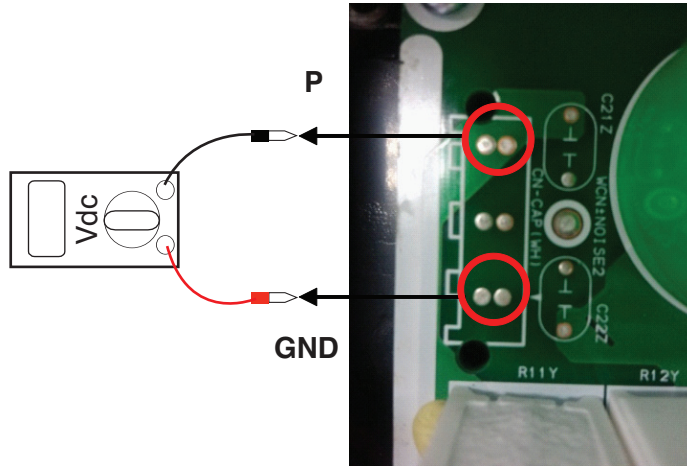
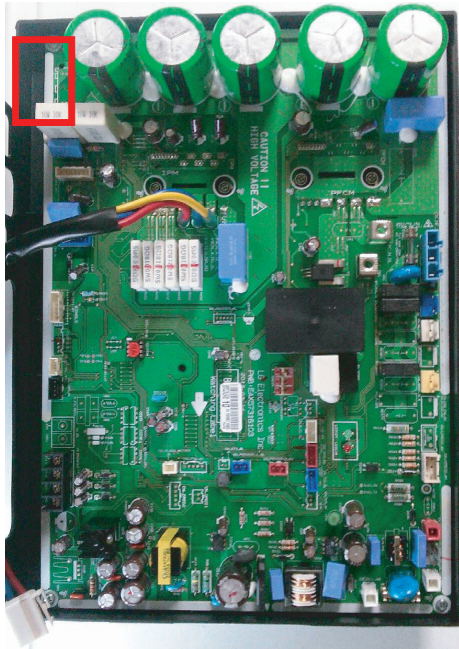
1. Check the WCN\_P(L),P(N) Connection condition at the main PCB(Heater). (Refer to wiring diagram)
2. Check the DC Link voltage at not operating(280V ↑)
3. Check the DC Link voltage at Comp operating(340V ↑)
4. Check DC Link Sensing Signal(AHUW\*\*6A2): 2.4~2.8V (Refer the Picture)
5. Check DC Link Sensing Signal(AHUW\*\*8A2): 0.4~0.6V (Refer the Picture)

### \* AHUW096A3

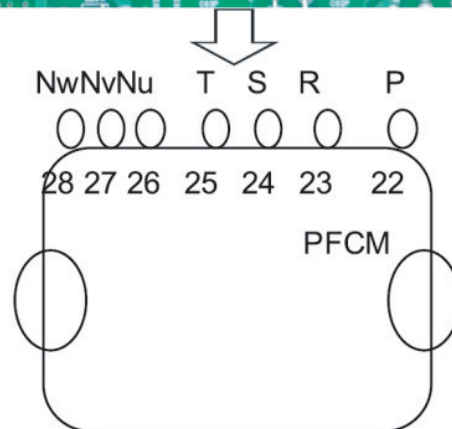
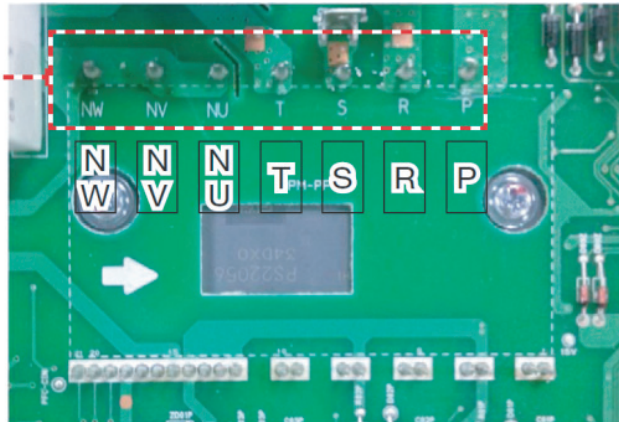
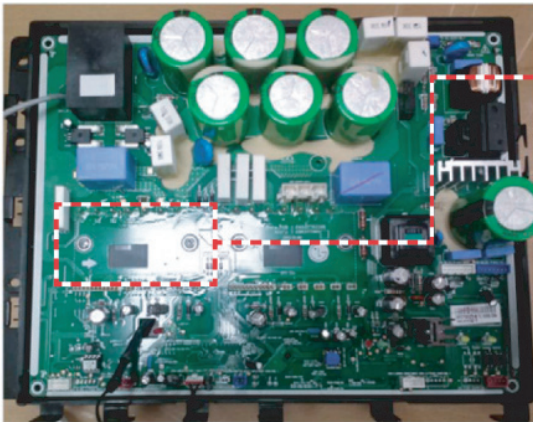


<CT Sensing Check Point>

► AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3



► AHUW128A3/AHUW148A3/AHUW168A3



[PFCM Pin Arrangement and Pin Numbers]

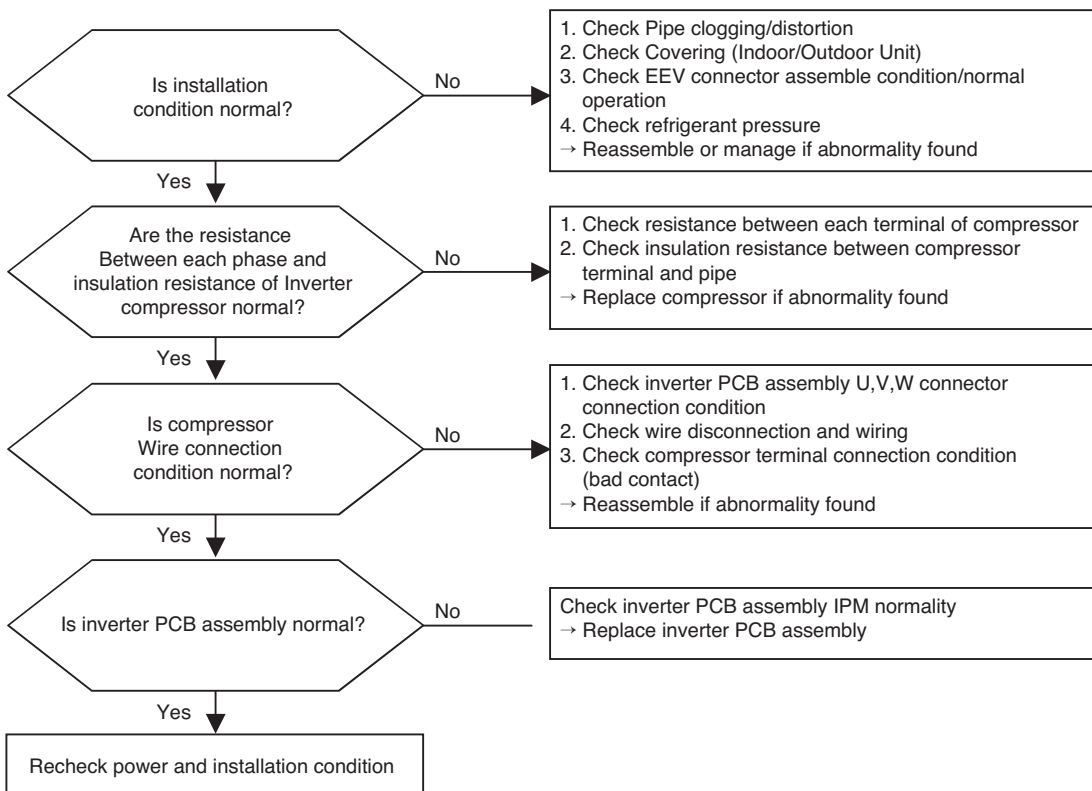
Display code	Title	Cause of error	Check point & Normal condition
26	DC Compressor Position	<ul style="list-style-type: none"> <li>Compressor Starting fail error</li> </ul>	<ul style="list-style-type: none"> <li>Check the connection of comp wire "U,V,W"</li> <li>Malfunction of compressor</li> <li>Check the component of "IPM", detection parts.</li> </ul>



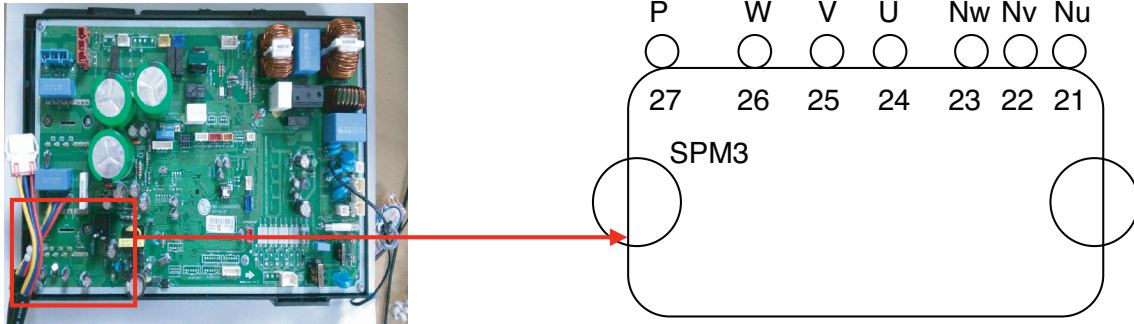
## WARNING

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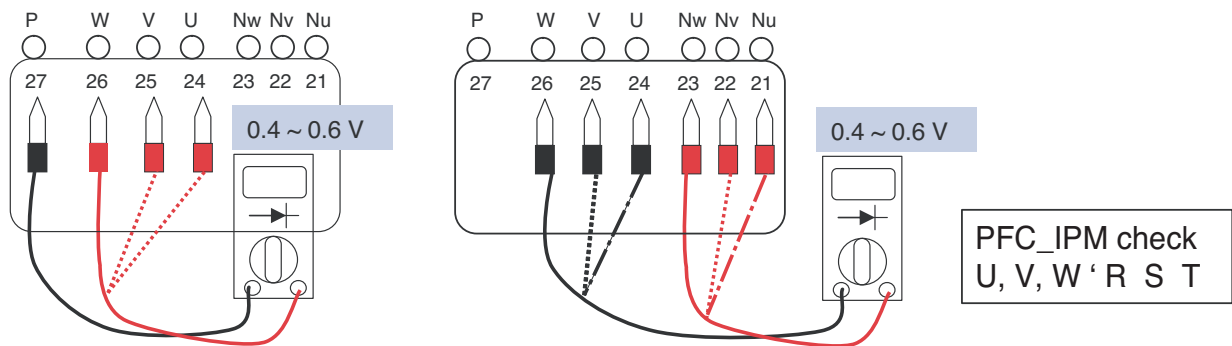
## ■ Error Diagnosis and Countermeasure Flow Chart



# 1. IPM Check



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



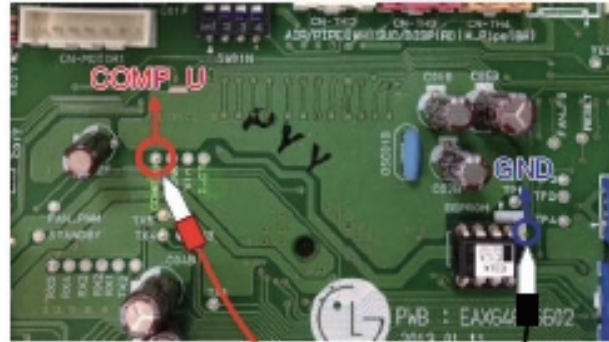
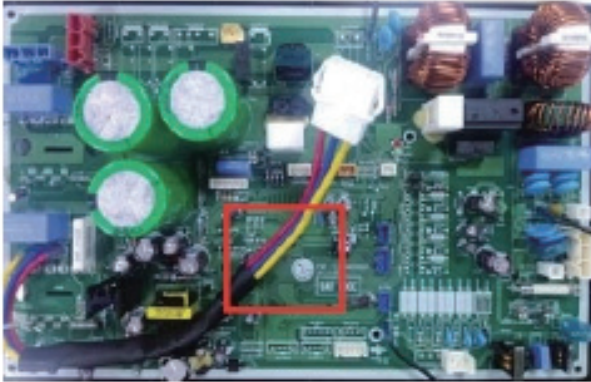


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## 2. CT Sensing Check

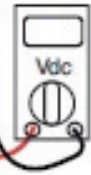
• Inspecting PCB phase current sensing circuit

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



Red

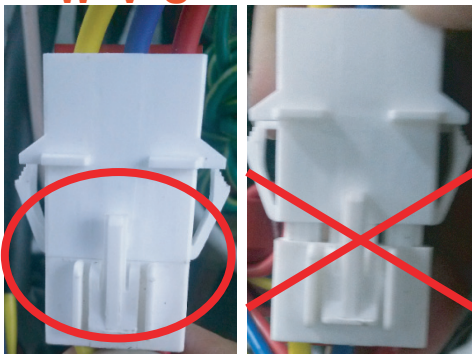
Black



<CT Sensing Check Point>

## 3. Connector Check

W V U



<WVC connector check>

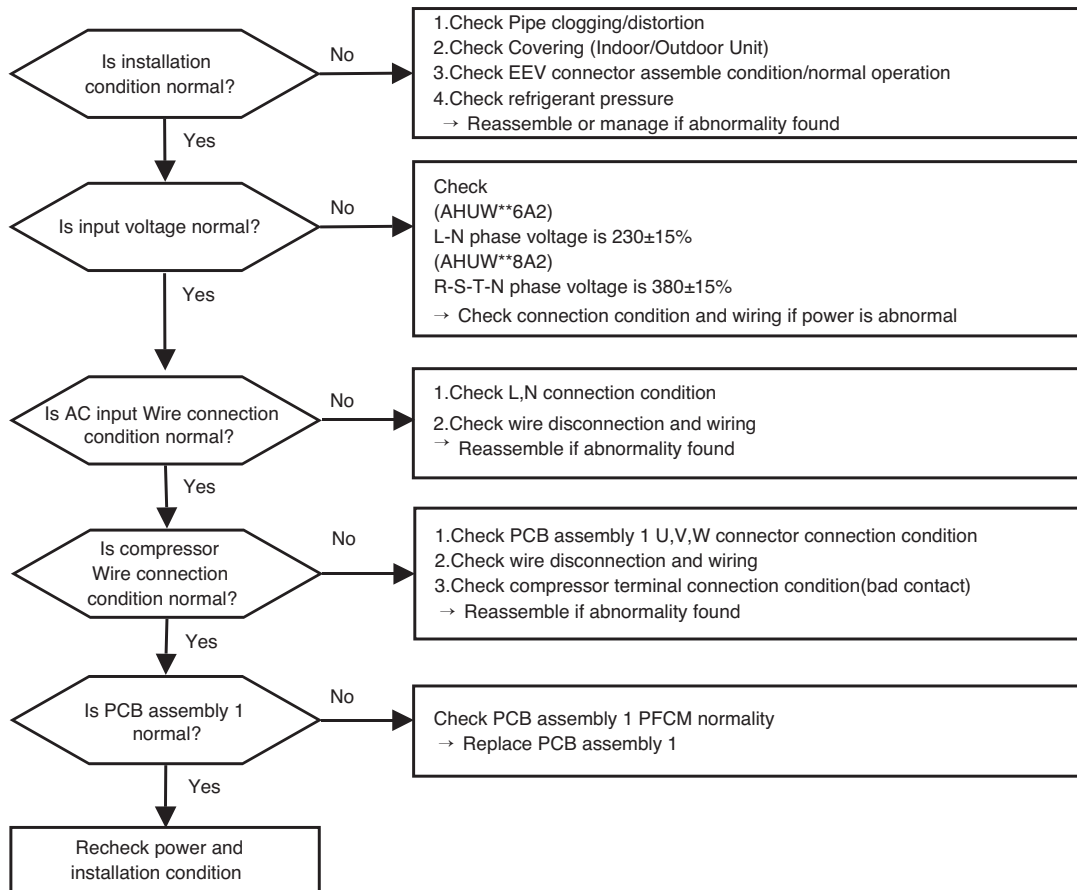
Display code	Title	Cause of error	Check point & Normal condition
27	AC Input Instant over Current Error	PCB(Inverter) input current is over 100A(peak) for 2us	<ol style="list-style-type: none"> <li>1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge)</li> <li>2. Compressor damage (Insulation damage/Motor damage)</li> <li>3. Input voltage abnormal (L,N)</li> <li>4. Power line assemble condition abnormal</li> <li>5. PCB assembly 1 Damage (input current sensing part)</li> </ol>



## WARNING

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## ■ Error Diagnosis and Countermeasure Flow Chart



\* PFCM Module checking method

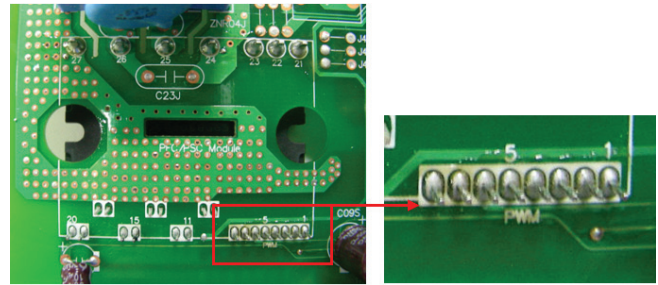
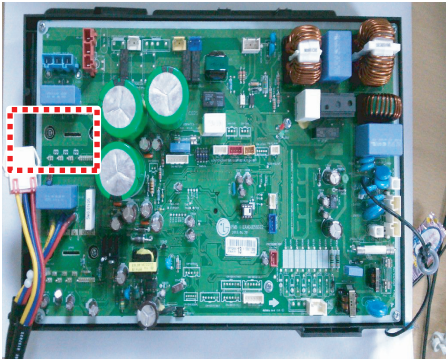
- ① Set the multi tester to diode mode.
- ② Check short between input signal pin which are placed below PFC Module
- ③ Replace PCB assembly 1 if it is short between pins except No.4,5 pins.



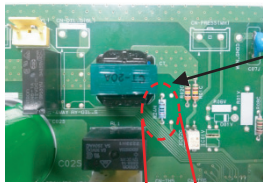
## CAUTION

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

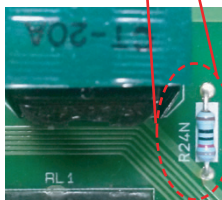
▶ AHUW096A3



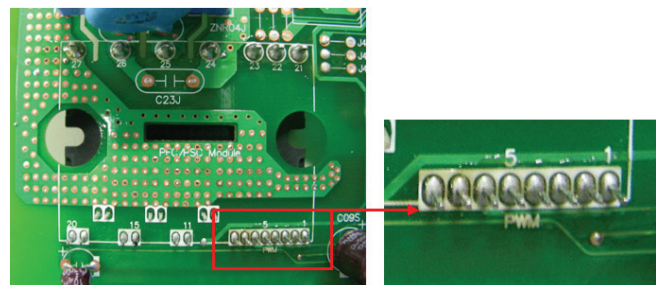
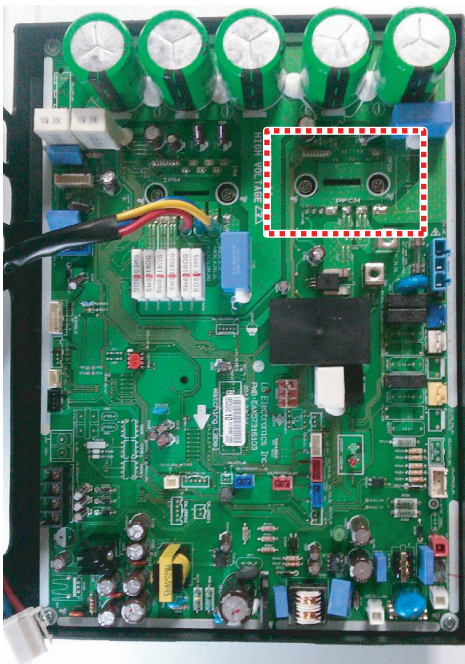
<Short Check Point>



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

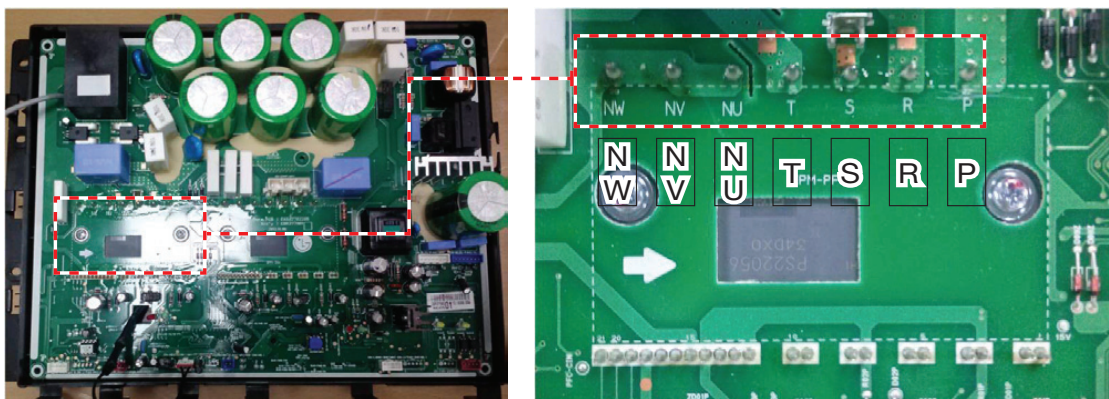


▶ AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3



<Short Check Point>

► AHUW128A3/AHUW148A3/AHUW168A3





Display code	Title	Cause of error	Check point & Normal condition
29	Inverter compressor over current	(AHUW**6A2) Inverter Compressor input current is 30A. (AHUW**8A2) Inverter Compressor input current is 24A.	<ol style="list-style-type: none"> <li>1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. over-charge)</li> <li>2. Compressor damage(Insulation damage/Motor damage)</li> <li>3. Input voltage low</li> <li>4. ODU PCB assembly 1 damage</li> </ol>

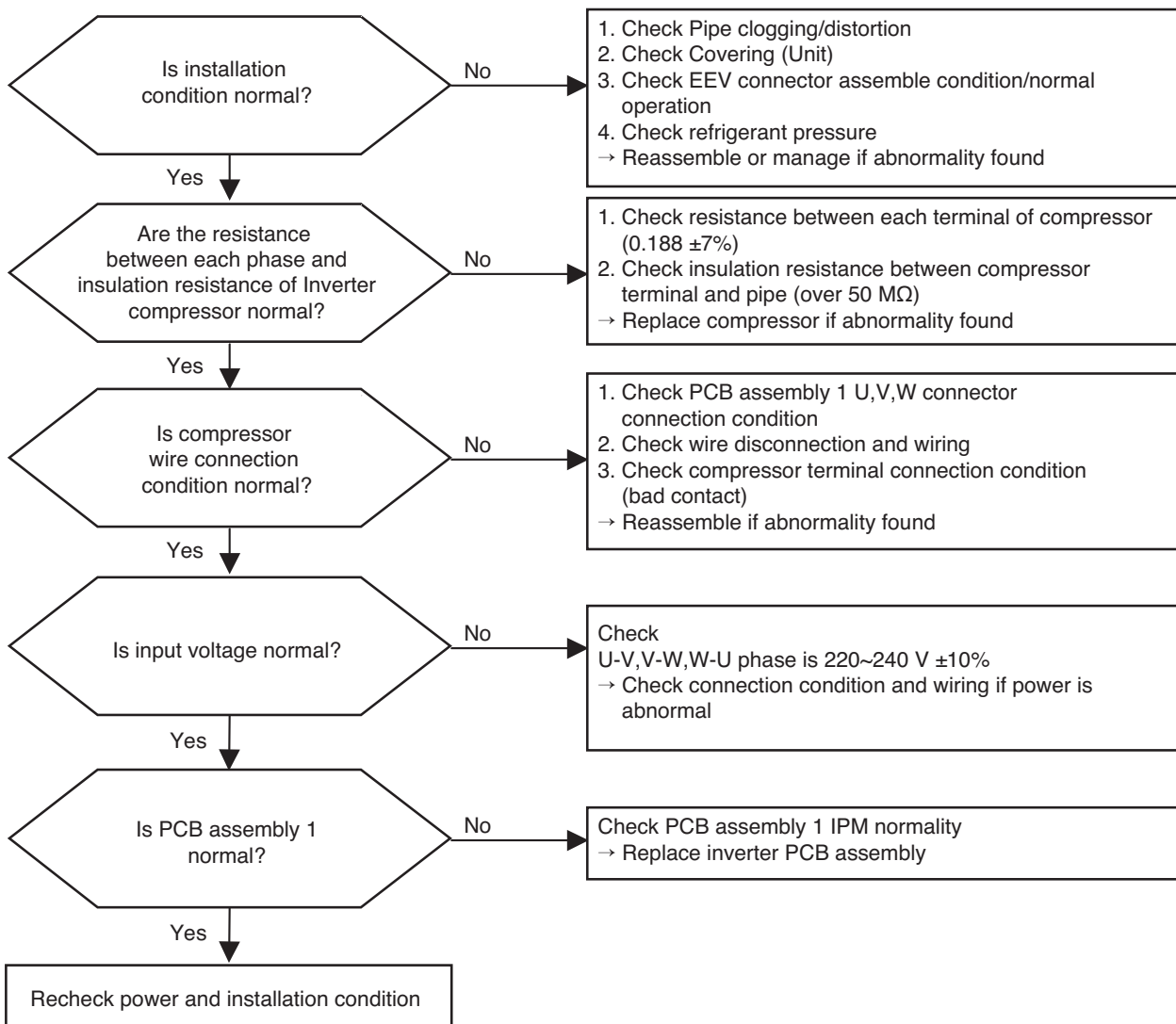


## WARNING

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

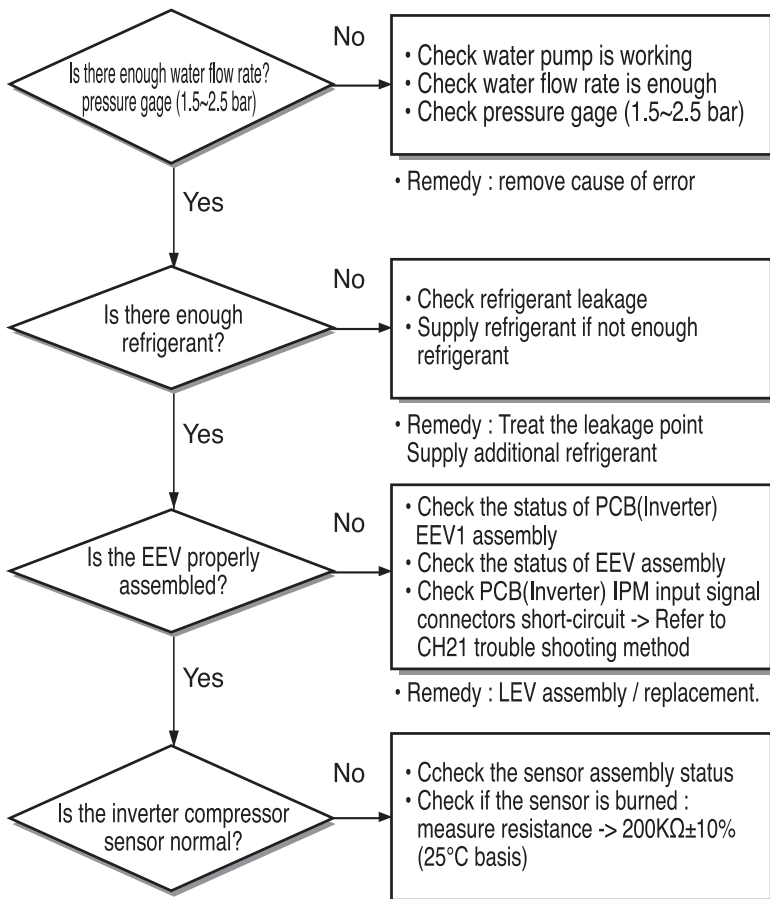


Display code	Title	Cause of error	Check point & Normal condition
32	High temperature in Discharge pipe of the inverter compressor	<ul style="list-style-type: none"> <li>• Overload operation (Outdoor fan constraint, screened, blocked)</li> <li>• Refrigerant leakage (insufficient)</li> <li>• Poor INV Comp Discharge sensor</li> <li>• LEV connector displaced / poor LEV assembly</li> </ul>	<ul style="list-style-type: none"> <li>• Check outdoor fan constraint/ screened/ flow structure</li> <li>• Check refrigerant leakage</li> <li>• Check if the sensor is normal</li> <li>• Check the status of EEV assembly</li> </ul>



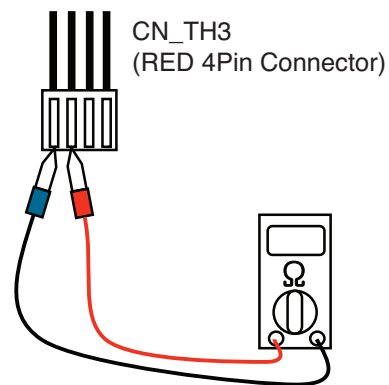
## WARNING

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.



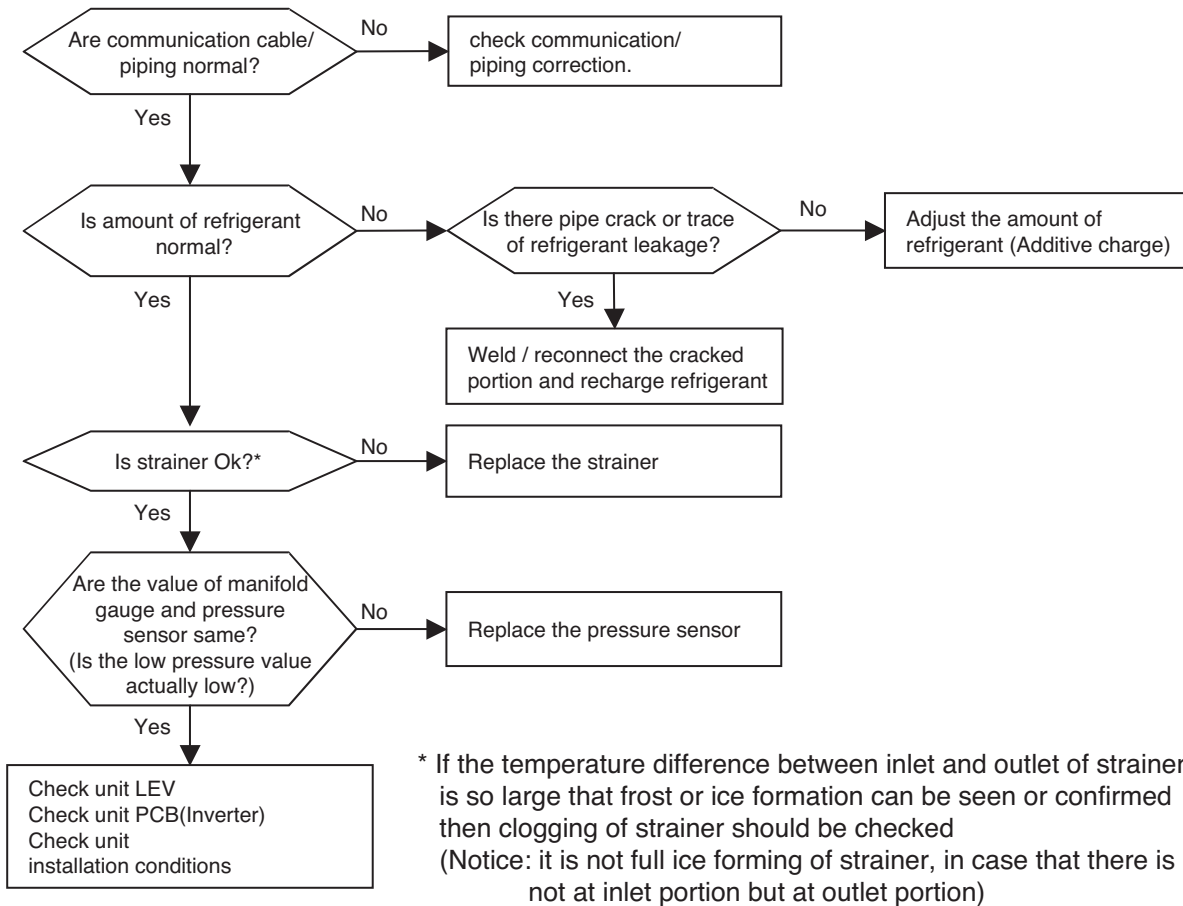
### • Inspecting Inverter Compressor Discharge Sensor

1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between inverter discharge sensor connector pins.
3. Measure resistance value of  $200\text{K}\Omega \pm 10\%$ ,  $25^\circ\text{C}$  basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. ( $1\text{M}\Omega$  or more)



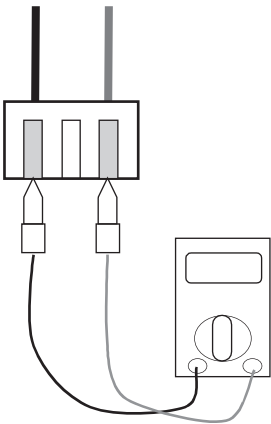
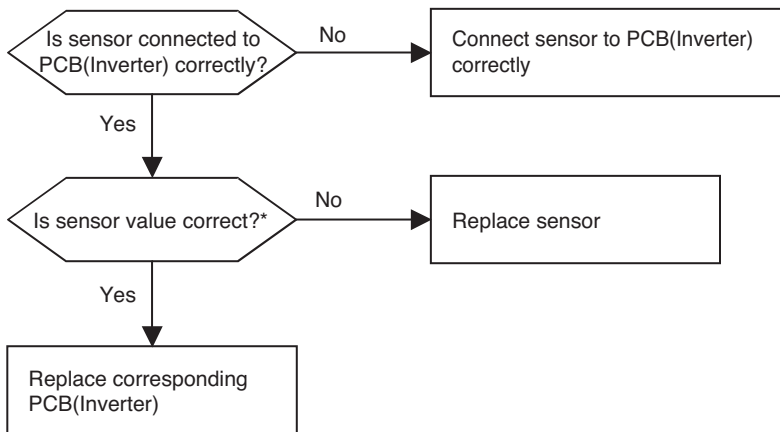
Display code	Title	Cause of error	Check point & Normal condition
35	Low Presser Error	Excessive decrease of low pressure	<ul style="list-style-type: none"> <li>• Defective low pressure sensor</li> <li>• Defective unit fan</li> <li>• Refrigerant shortage/leakage</li> <li>• Deformation because of damage of refrigerant pipe</li> <li>• Defective unit EEV</li> <li>• Covering / clogging (unit covering during the cooling mode / unit filter clogging during heating mode)</li> <li>• SVC valve clogging</li> <li>• Defective unit PCB(Inverter)</li> <li>• Defective unit pipe sensor</li> </ul>

### ■ Error diagnosis and countermeasure flow chart



Display code	Title	Cause of error	Check point & Normal condition
41	D-pipe sensor (Inverter)	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
44	Air sensor	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
45	Condenser Mid-pipesensor	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
46	Suction Pipe sensor	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
48	Condenser Out-pipe sensor	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>

## ■ Error Diagnosis and Countermeasure Flow Chart

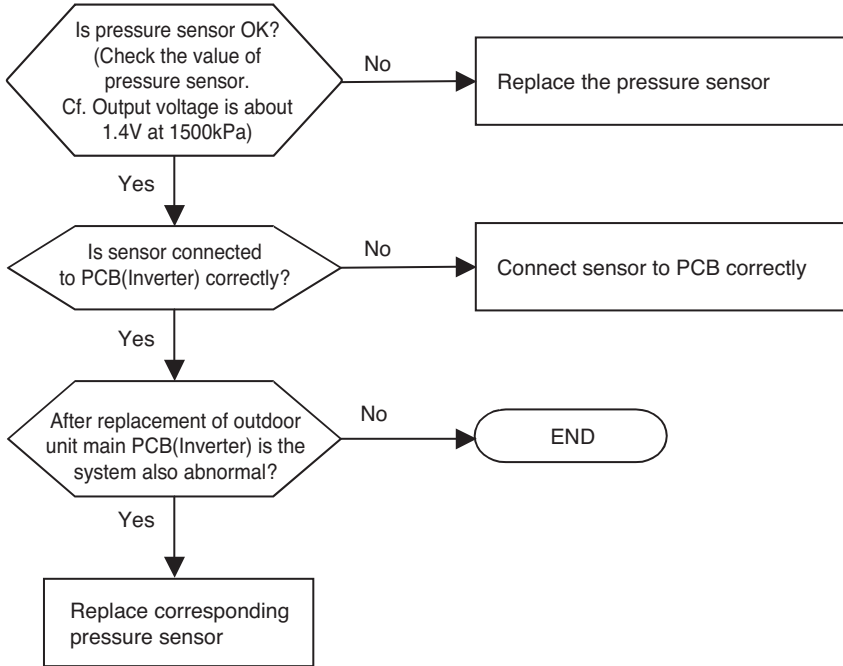


### Check Point

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)	<ul style="list-style-type: none"> <li>• Bad connection of connector PCB(Inverter)</li> <li>• Bad connection high pressure connector</li> <li>• Defect of high pressure connector (Open/Short)</li> <li>• Defect of connector PCB(Inverter) (Open/Short)</li> <li>• Defect of PCB(Inverter)</li> </ul>



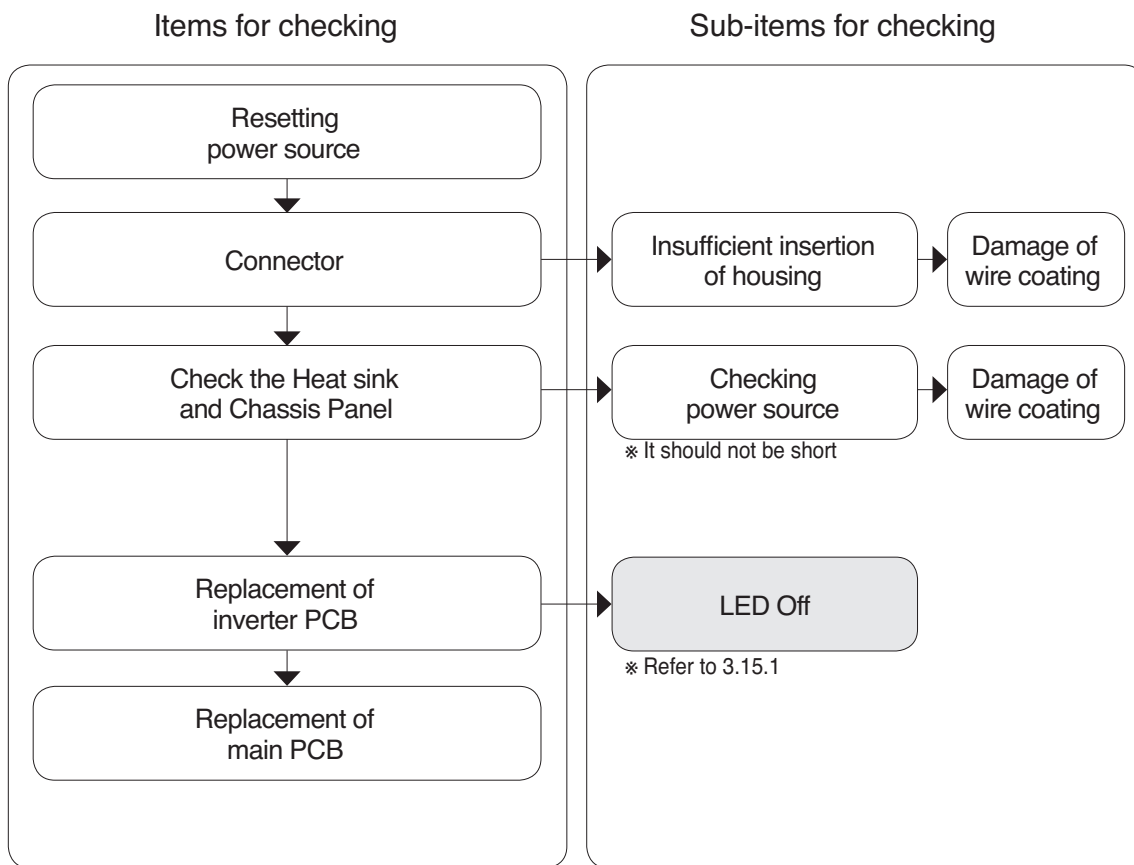
Display code	Title	Cause of error	Check point & Normal condition
52	PCB Communication Error	Checking the communication state between Main PCB and Inverter PCB	• Generation of noise source interfering with communication



## 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 product off.



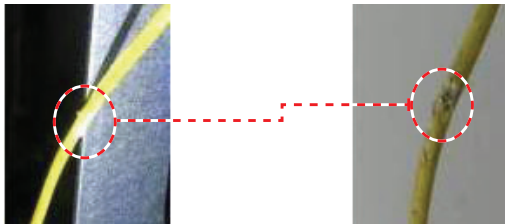
▶ AHUW128A3/AHUW148A3/AHUW168A3

Purpose	Installation environment interfering the communication	Items for checking	Checking method of afulty points
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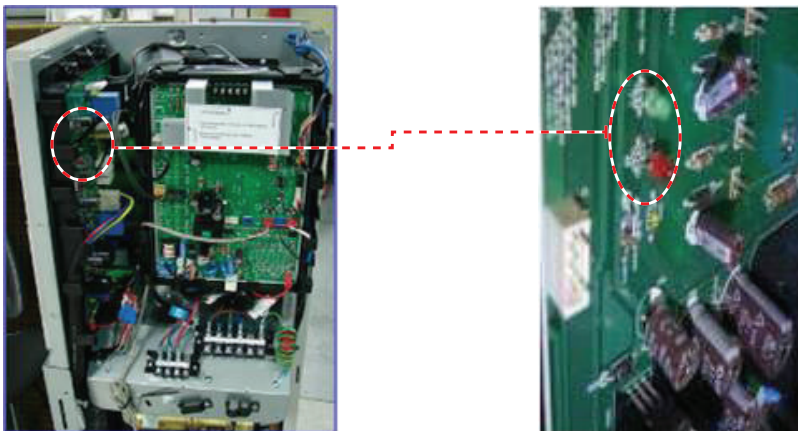
① Insufficient insertion of wires



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	<ul style="list-style-type: none"> <li>• Power input AC 230V.</li> <li>• The connector for transmission is disconnected.</li> <li>• The connecting wires are misconnected.</li> <li>• The communication line is shorted at GND.</li> <li>• Transmission circuit of PCB(Inverter) is abnormal.</li> <li>• Transmission circuit of PCB(Heater) is abnormal.</li> </ul>



## WARNING

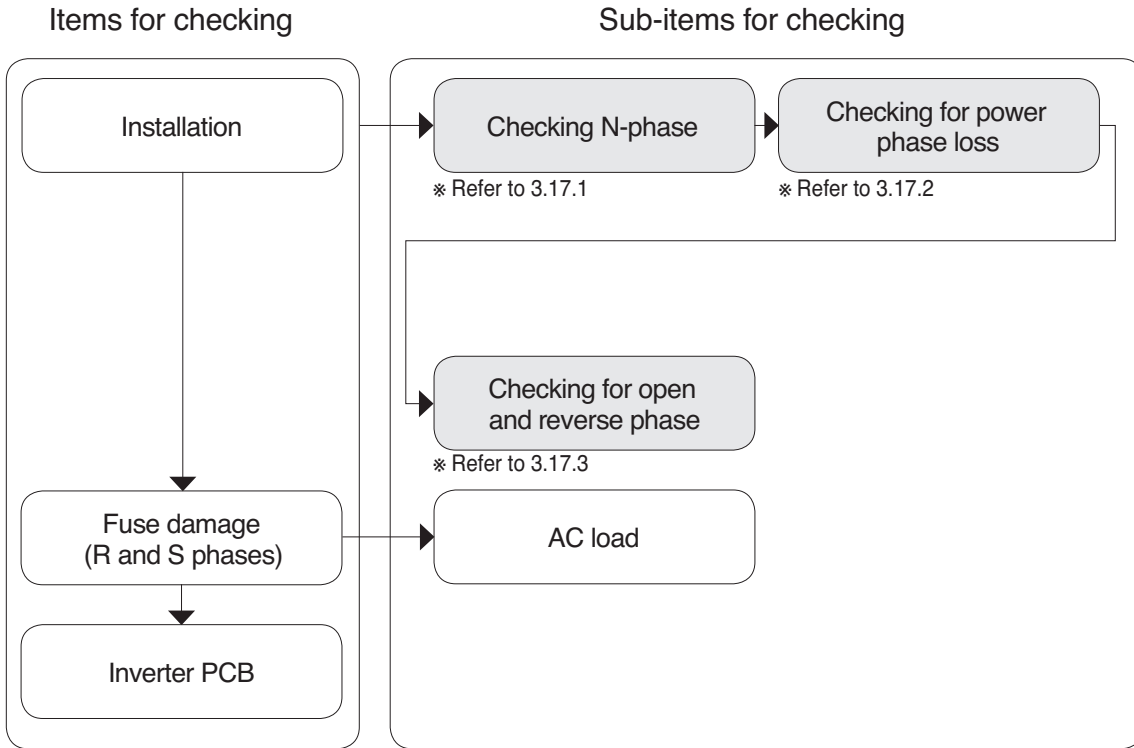
Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

## Check Point

1. Check the input power AC 230 V.
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

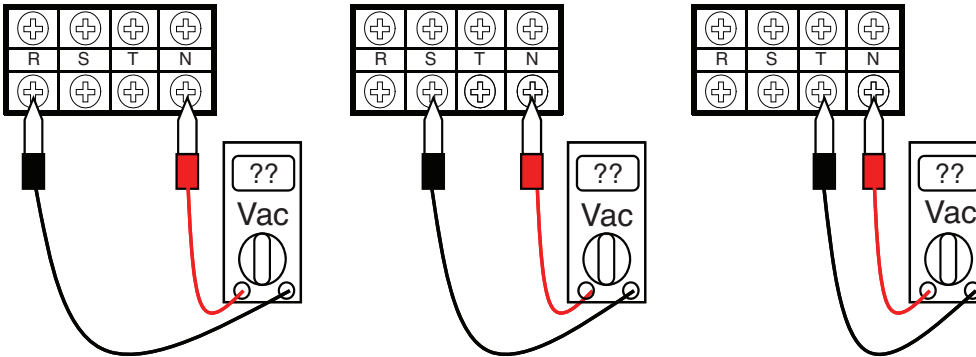
■ Error diagnosis and countermeasure flow chart



## ▶ AHUW128A3/AHUW148A3/AHUW168A3

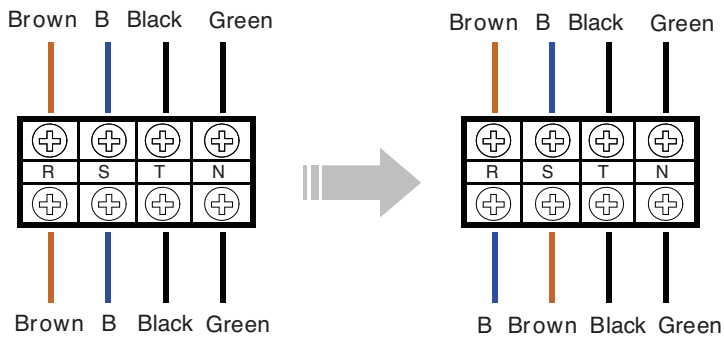
### ■ Judgment Method of R,S,T phase loss

- 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

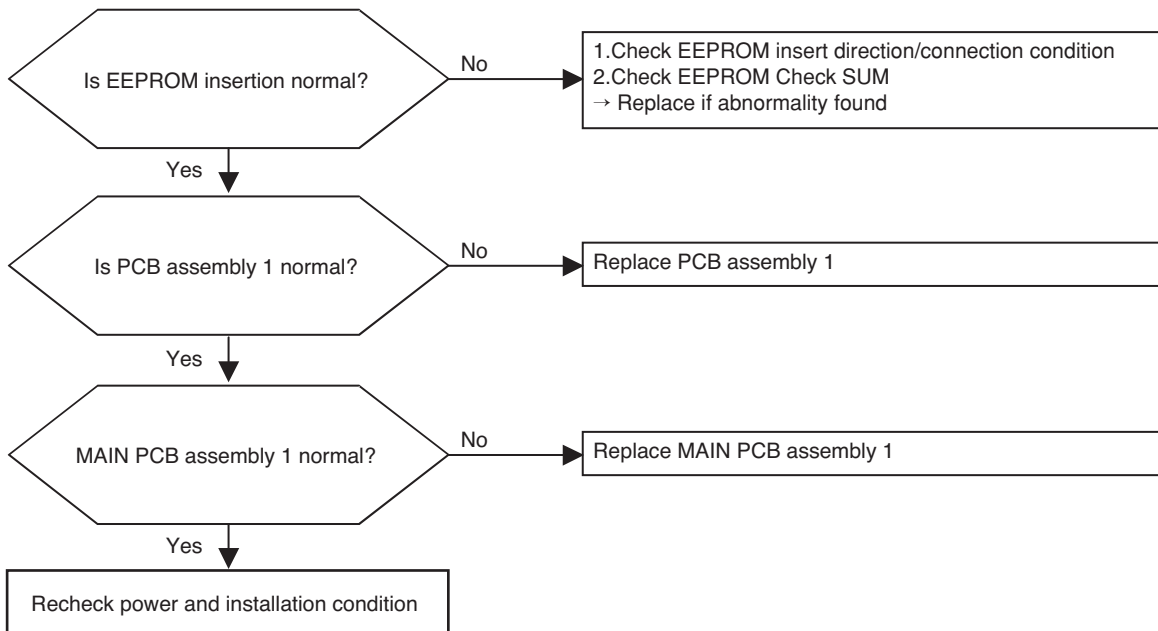


Display code	Title	Cause of error	Check point & Normal condition
60	PCB(Inverter) & Main EEPROM check sum error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU Inverter & Main PCB assembly 1 damage

## WARNING

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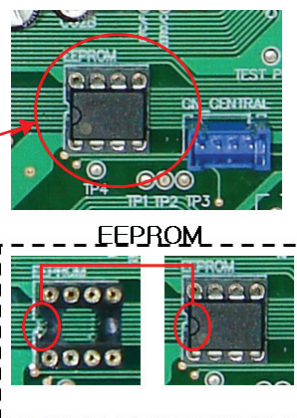
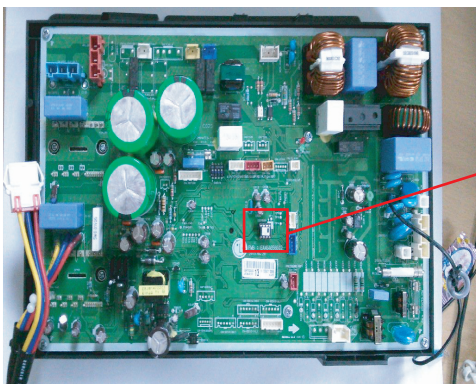
## ■ Error Diagnosis and Countermeasure Flow Chart



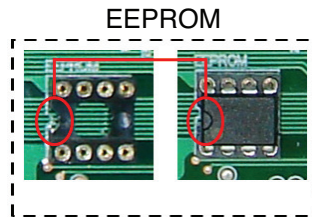
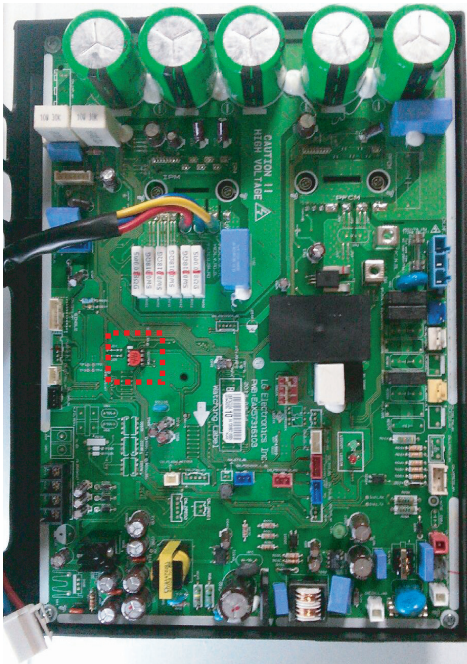
## Check Point

- Check the EEPROM Check sum & Direction

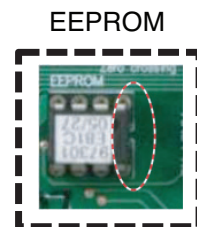
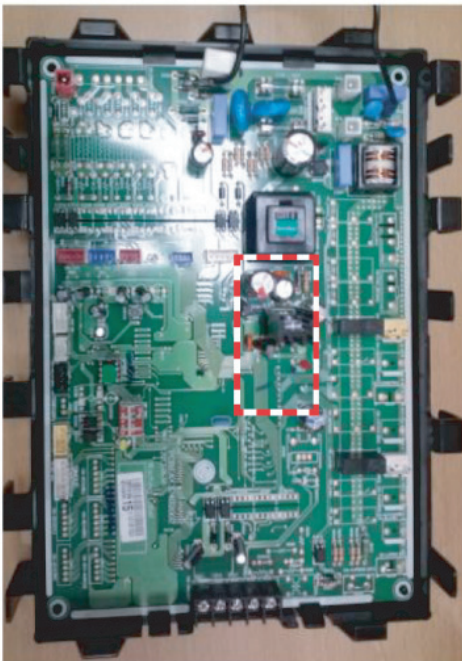
### ▶ AHUW096A3



▶ AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3



▶ AHUW128A3/AHUW148A3/AHUW168A3



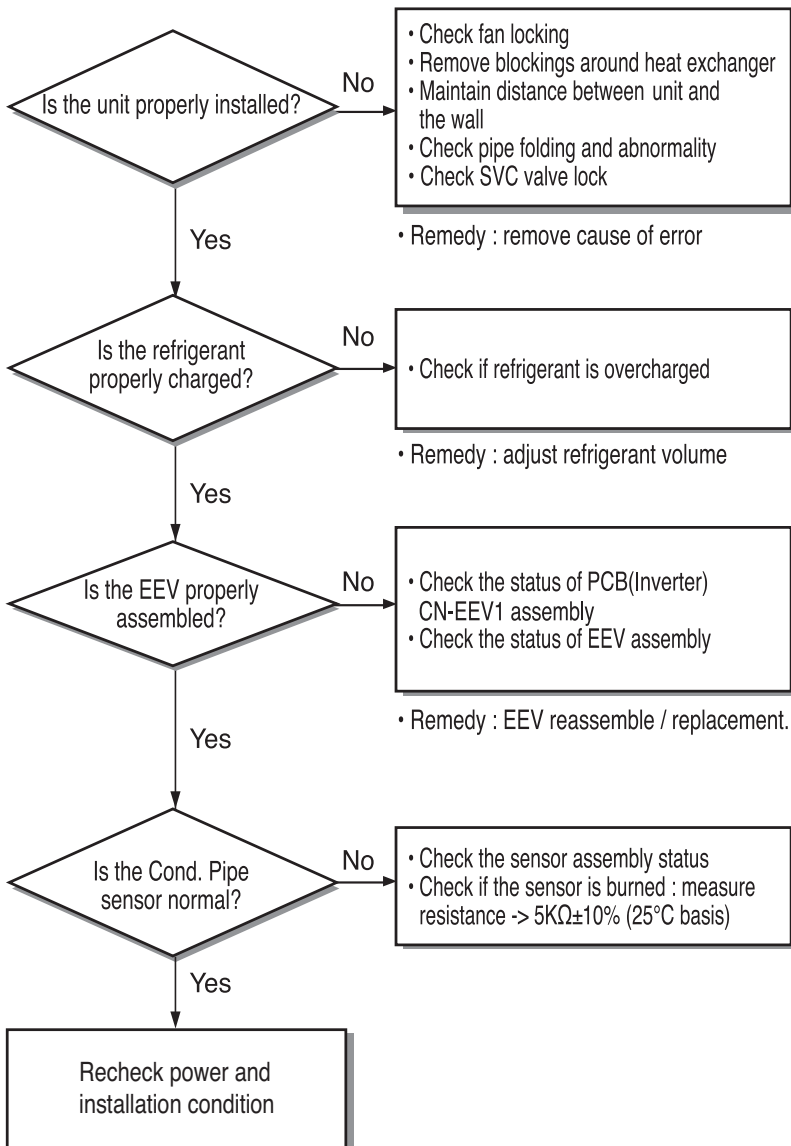


Display code	Title	Cause of error	Check point & Normal condition
61	High temperature in Cond. Pipe	<ul style="list-style-type: none"> <li>• Overload operation (Outdoor fan constraint, screened, blocked)</li> <li>• Unit heat exchanger contaminated</li> <li>• EEV connector displaced / poor EEV assembly</li> <li>• Poor Cond. Pipe sensor assembly / burned</li> </ul>	<ul style="list-style-type: none"> <li>• Check outdoor fan constraint / screened / flow structure</li> <li>• Check if refrigerant overcharged</li> <li>• Check the status of EEV assembly</li> <li>• Check the status of sensor assembly / burn</li> </ul>



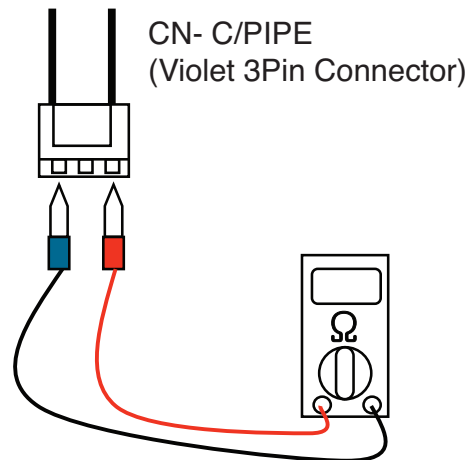
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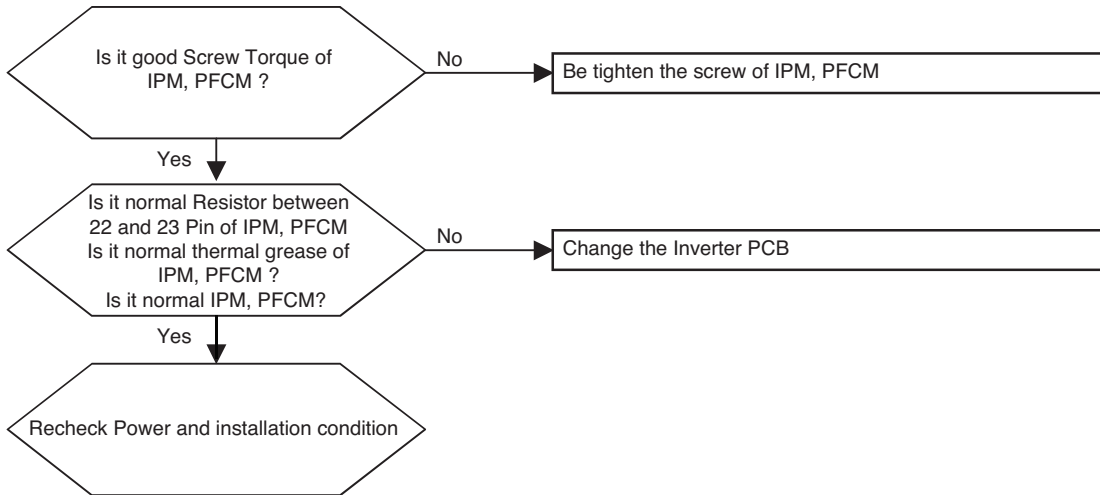
### • Inspecting Cond. Pipe Sensor

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  $5k\Omega \pm 10\%$ ,  $25^{\circ}\text{C}$  basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. ( $1M\Omega$  or more)



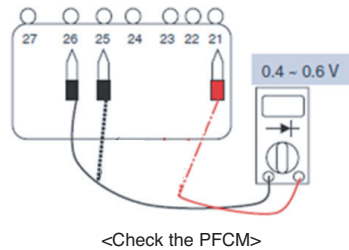
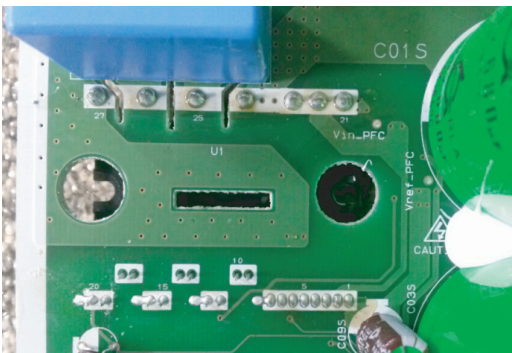
Display code	Title	Cause of error	Check point & Normal condition
62	Heat sink Temp, High error	Heatsink sensor detected high temp.(85°C)	1. Part no. : EBR37798101~09 - Check the heatsink sensor : 10□/at 25°C(Unplugged) - Check the outdoor fan is driving rightly 2. Part no. : EBR37798112~21 - Check the 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

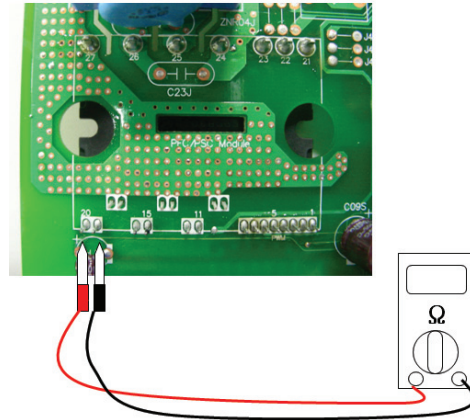
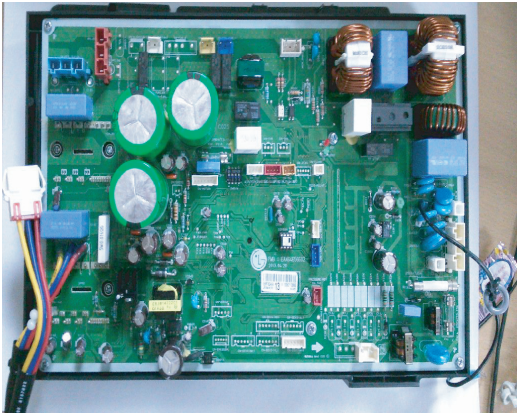


### Check Point

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

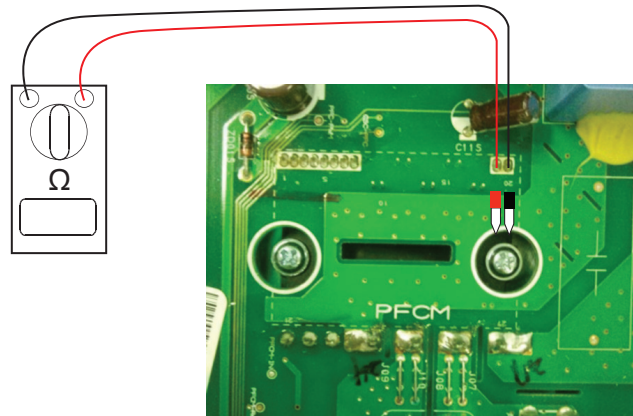
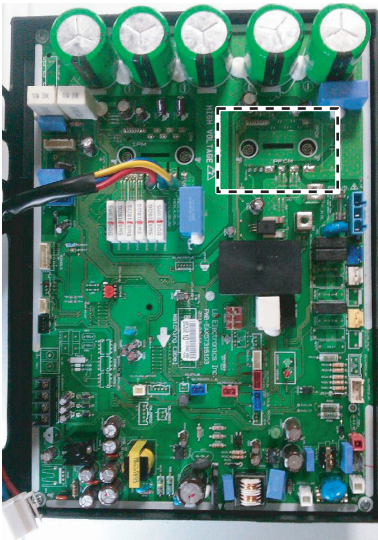


▶ AHUW096A3

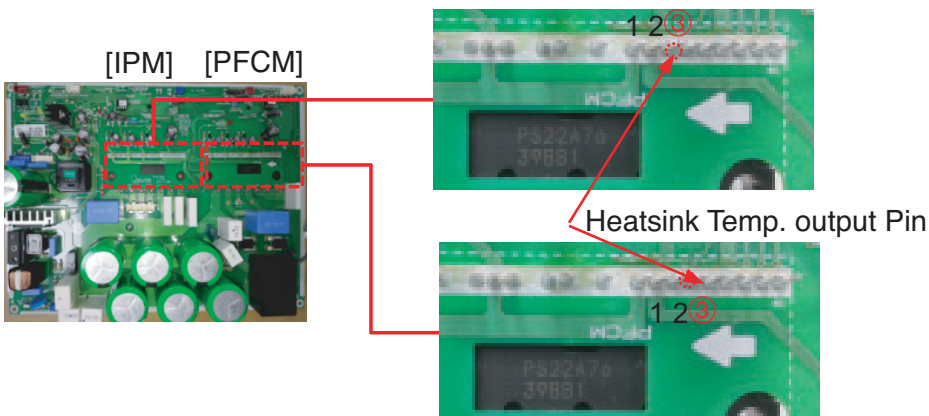


PFCM:  
Measuring resistance  
between No.19,20 pin

▶ AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3

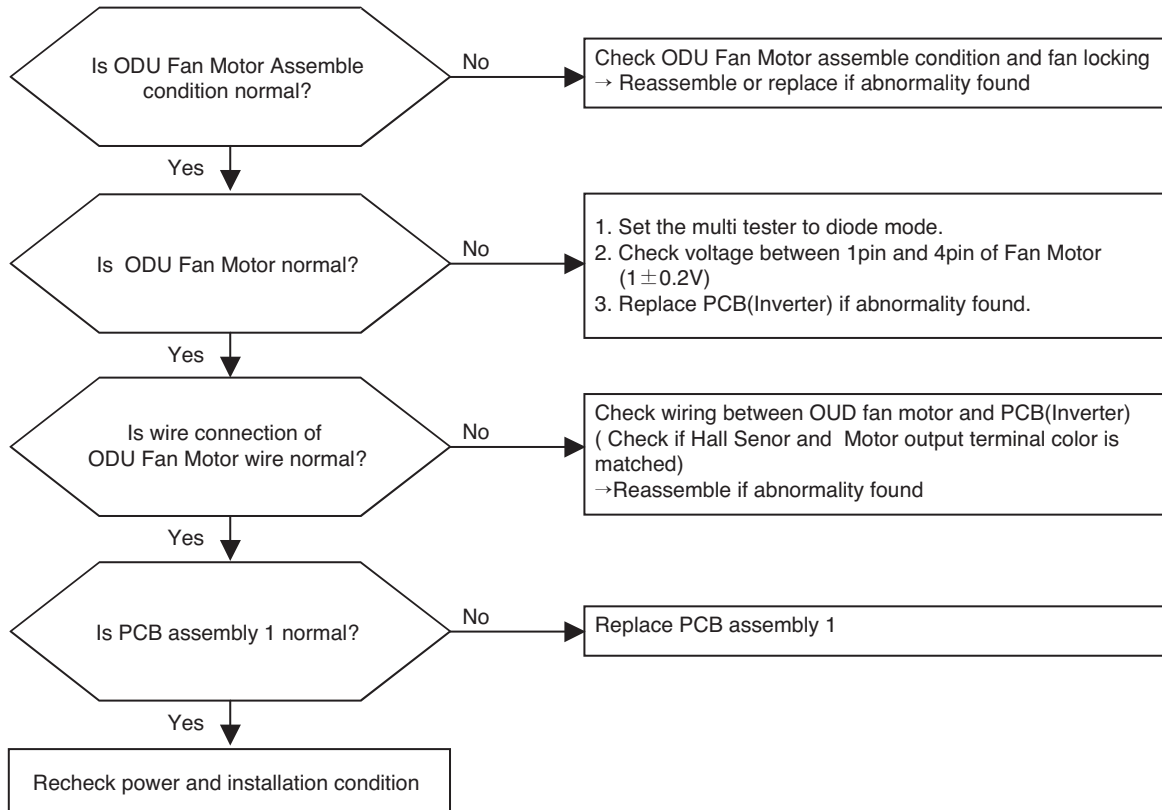


▶ AHUW128A3/AHUW148A3/AHUW168A3



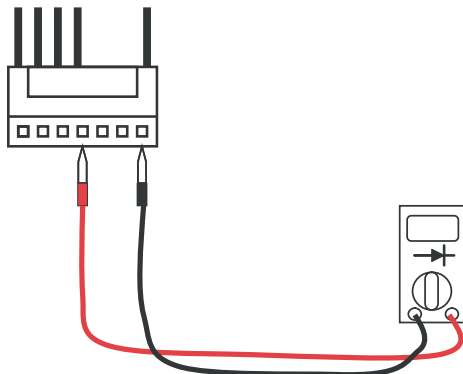
Display code	Title	Cause of error	Check point & Normal condition
67	Fan Lock Error	Fan RPM is 10RPM or less for 5 sec. when ODU fan starts or 40 RPM or less after fan starting.	1. ODU fan locking 2. Heatsink assembly of PCB assembly 1 condition abnormal 3. Defect of temperature sensing circuit part defect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

### ■ Error Diagnosis and Countermeasure Flow Chart



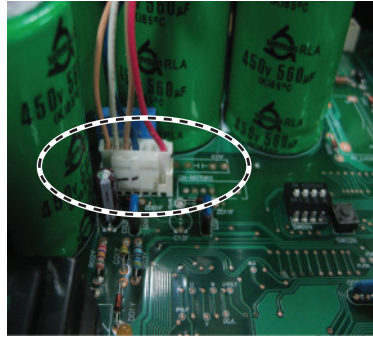
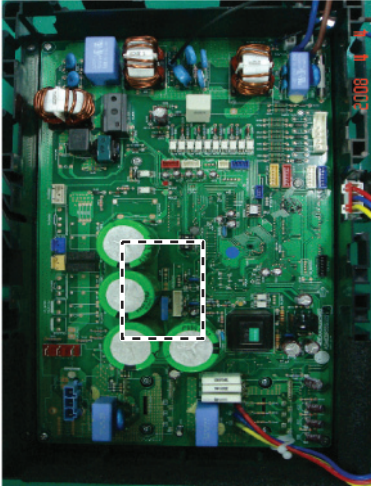
### Check Point

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



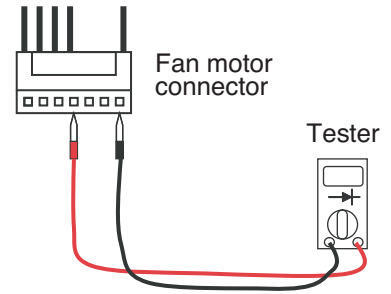


▶ AHUW096A3

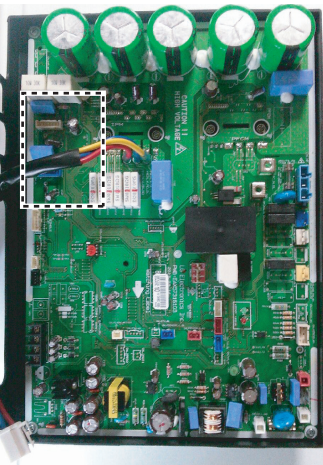


<Main PCB>

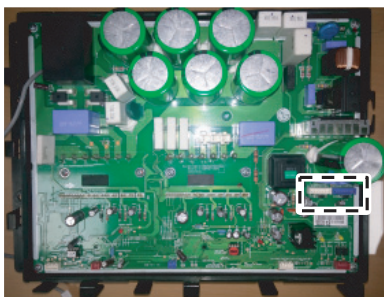
Check voltage between 1pin and 4pin of fan motor



▶ AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3

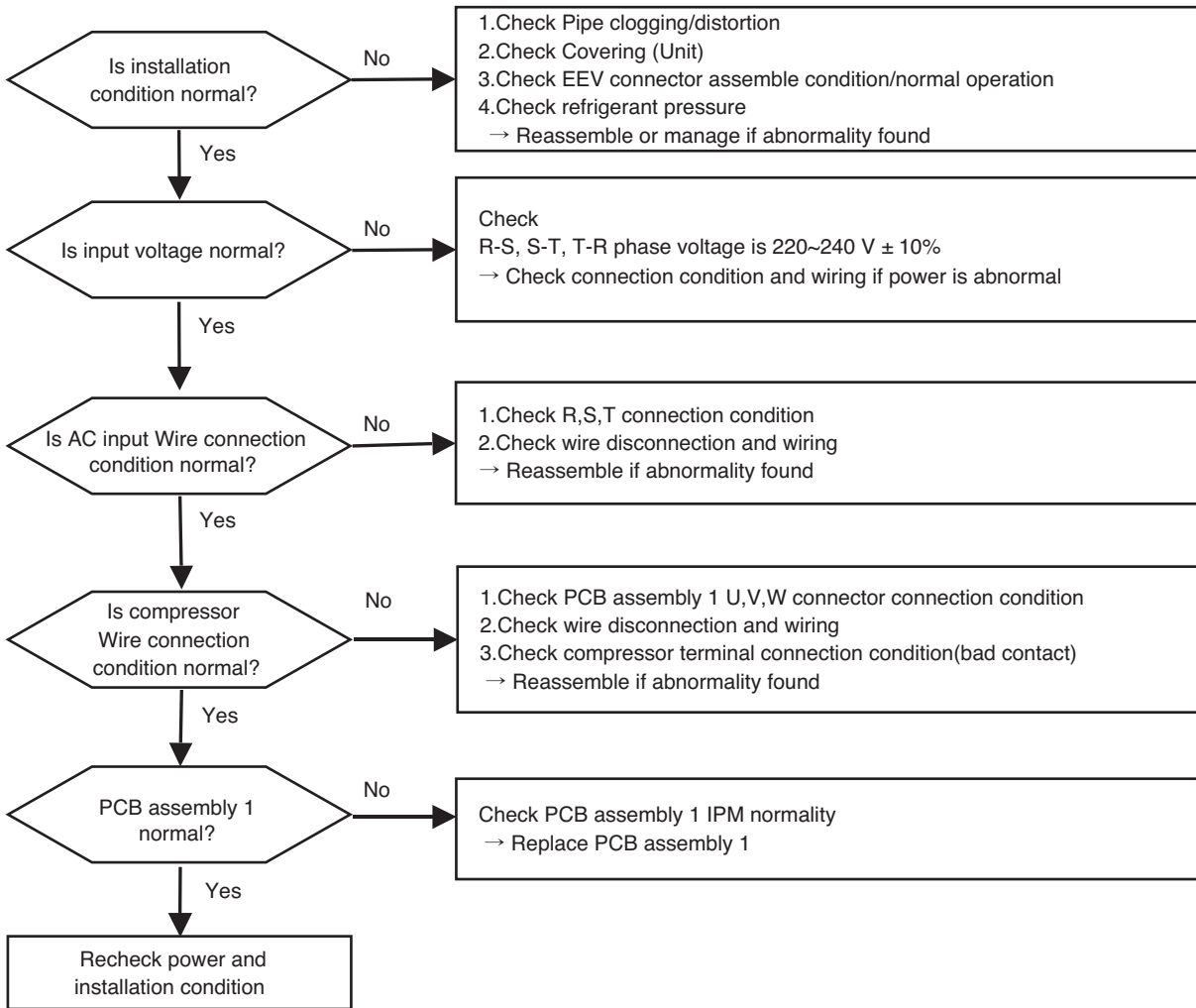


▶ AHUW128A3/AHUW148A3/AHUW168A3

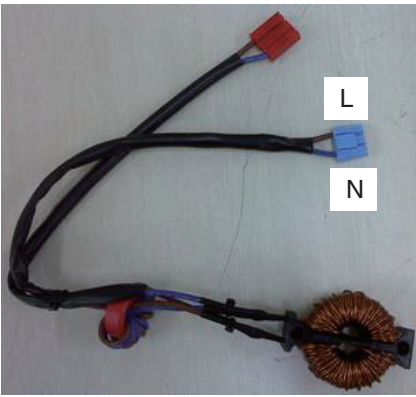


Display code	Title	Cause of error	Check point & Normal condition
73	AC input instant over current error (Matter of software)	(AHUW**6A2) PCB(Inverter) input power current is over 48A(Peak) for 2ms. (AHUW**8A2) PCB(Inverter) input power current is over 27A(Peak) for 2ms.	<ol style="list-style-type: none"> <li>1. Overload operation (Pipe clogging/Covering/EEV defect/Ref.overcharge)</li> <li>2. Compressor damage (Insulation damage/Motor damage)</li> <li>3. Input voltage abnormal</li> <li>4. Power line assemble condition abnormal</li> <li>5. PCB assembly 1 damage (input current sensing part)</li> </ol>

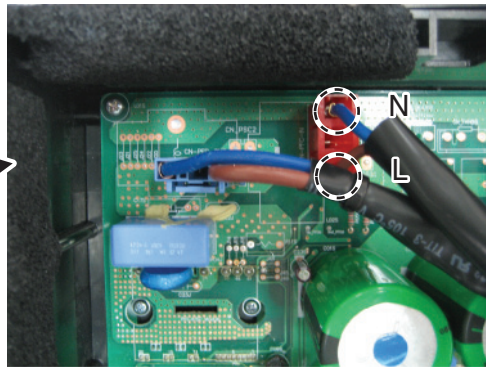
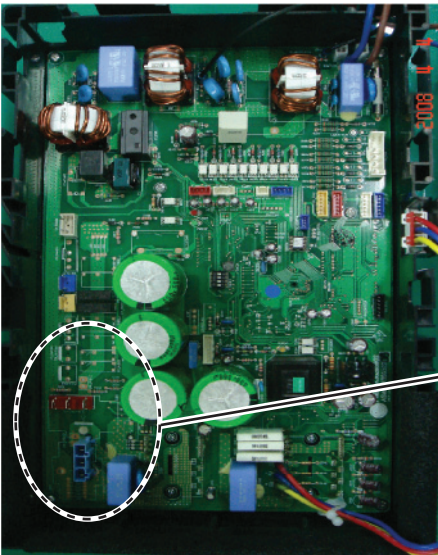
### ■ Error Diagnosis and Countermeasure Flow Chart



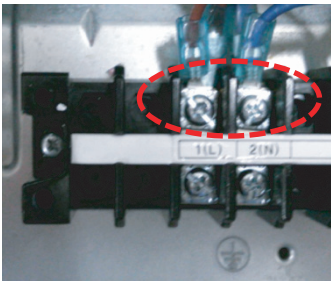
▶ AHUW096A3



< Noise Filter wiring Check Point >



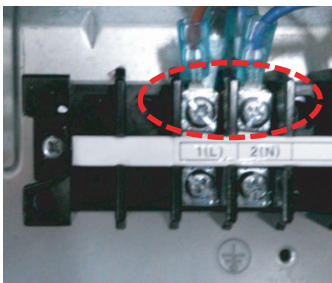
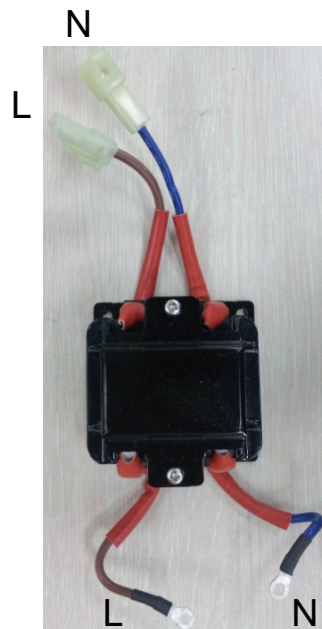
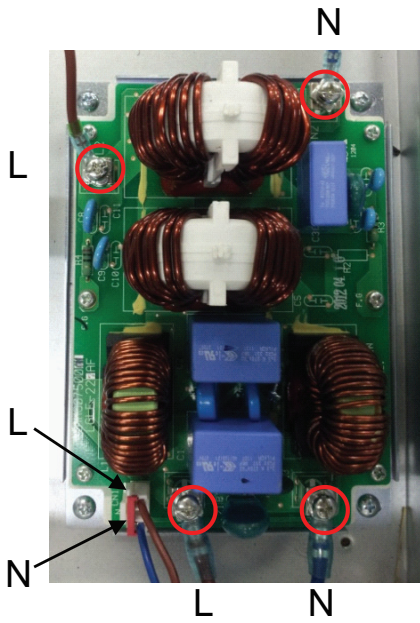
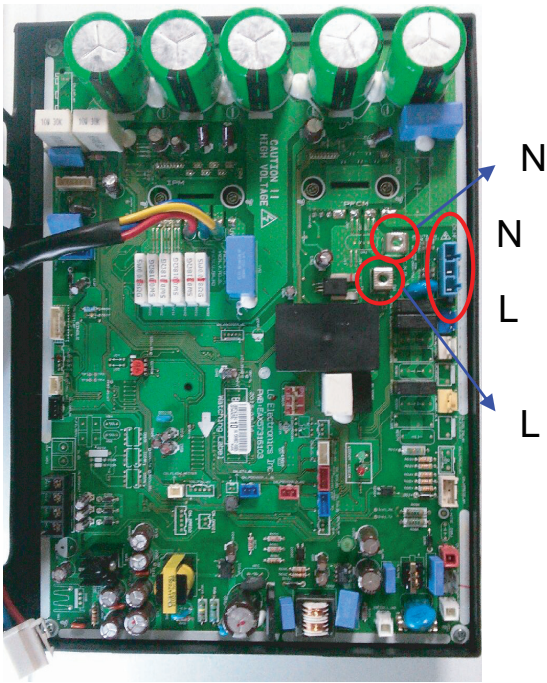
< Main PCB wiring Check Point >



< Input Power Source Check Point >

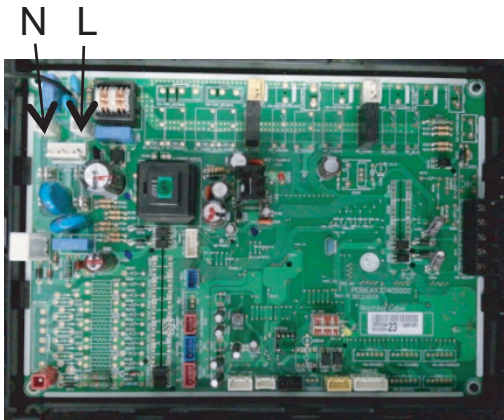
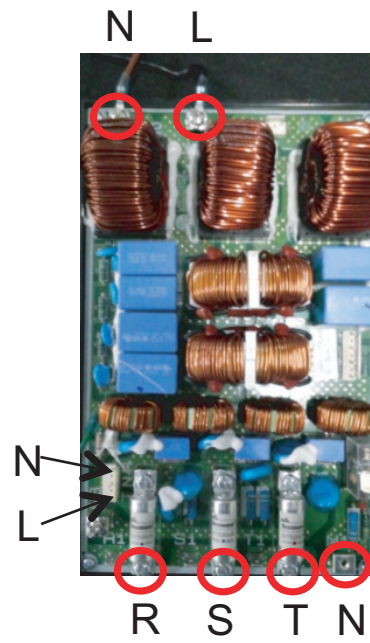
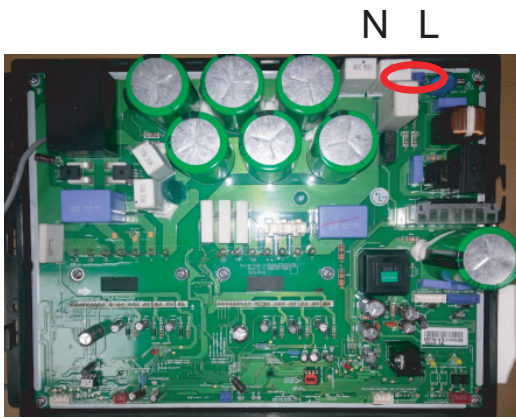


► AHUW146A2/AHUW126A3/AHUW146A3/AHUW166A3





► AHUW128A3/AHUW148A3/AHUW168A3



## Sensor resistance table (In Outdoor Unit)

### 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

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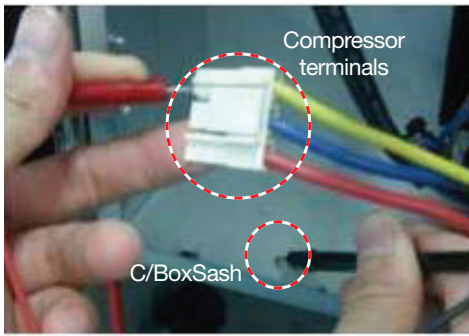
**Heatsink Temp**

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

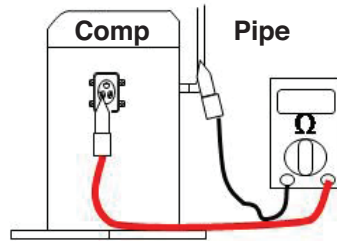
**D-Pipe Temp**

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.



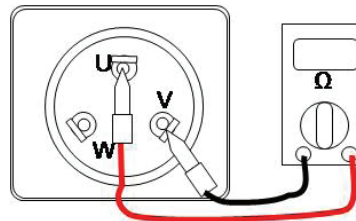
Terminal	Insulation Resistance
U-panel	$\geq 10M\Omega$
V-panel	$\geq 10M\Omega$
W-panel	$\geq 10M\Omega$

1. Turn the switch of the tester to "Resistance" mode and check the resistance
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. If any disorder is found, measure the line resistance between the terminals of the compressor as shown below.
6. If the compressor is found to be normal, any compressor 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

