Internal Use Only

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THERMA V™ System

SVC MANUAL

MODEL: AH Series

CAUTION

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

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Safety Precautions

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

■ Be sure to read before installing the product.

■ Be sure to observe the cautions specified here as they include important items related to safety.

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

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

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

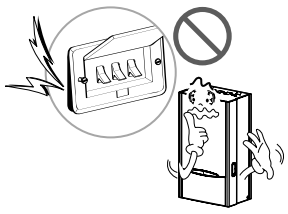
⃠	**Be sure not to do.**
❗	**Be sure to follow the instruction.**

⚠WARNING

■ Installation

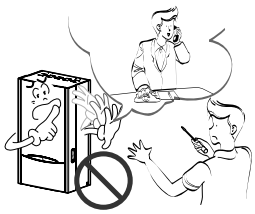
Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.

• There is risk of fire or electric shock.



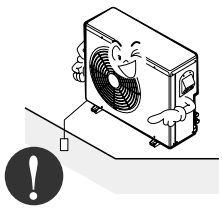
For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized Service Center.

• There is risk of fire or electric shock.



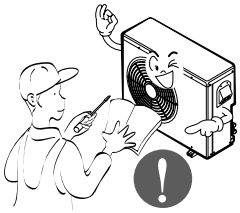
Always ground the product.

• There is risk of fire or electric shock.



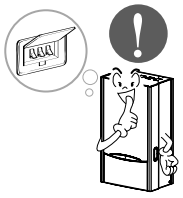
Install the panel and the cover of control box securely.

• There is risk of fire or electric shock.



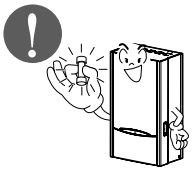
Always install a dedicated circuit and breaker.

• Improper wiring or installation may cause fire or electric shock



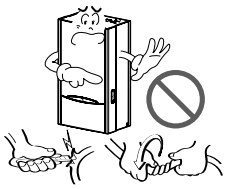
Use the correctly rated breaker or fuse.

• There is risk of fire or electric



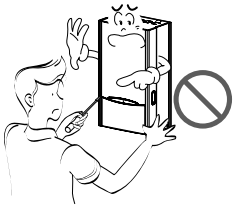
Do not modify or extend the power cable.

- There is risk of fire or electric shock.



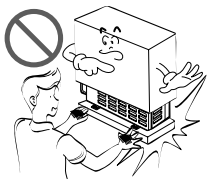
Do not install, remove, or reinstall the unit by yourself (customer).

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



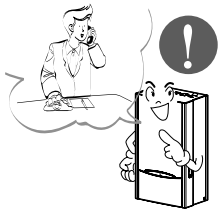
Be cautious when unpacking and installing the product.

- Sharp edges could cause injury. Especially careful on the product edges and the fins on the heat exchanger.



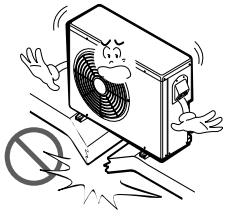
For installation, always contact the dealer or an Authorized Service Center.

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



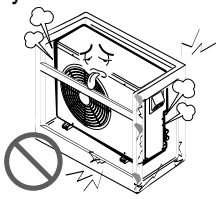
Do not install the product on a defective installation stand.

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



Be sure the installation area does not deteriorate with age.

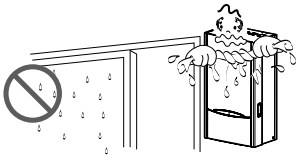
- If the base collapses, the product could fall with it, causing property damage, product failure, and personal injury.



■ Operation

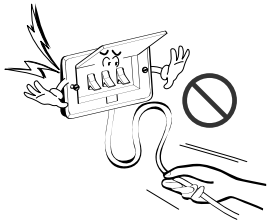
Do not let the product run for a long time when the humidity is very high and a door or a window is left open.

- Moisture may be condensed and wet or damage furniture.



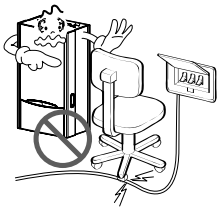
Take care to ensure that power cable could not be pulled out or damaged during operation.

- There is risk of fire or electric shock.



Do not place anything on the power cable.

- There is risk of fire or electric shock.



Do not plug or unplug the power supply plug during operation.

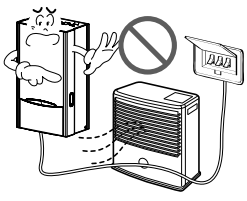
- There is risk of fire or electric shock.

Do not touch (operate) the product with wet hands.

- There is risk of fire or electric shock.

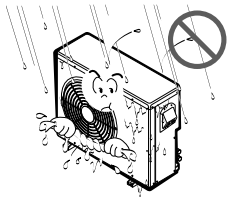
Do not place a heater or other appliances near the power cable.

- There is risk of fire or electric shock.



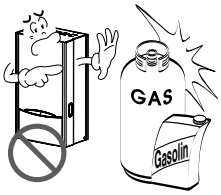
Do not allow water to run into electric parts.

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



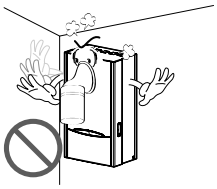
Do not store or use flammable gas or combustibles near the product.

- There is risk of fire or failure of product.



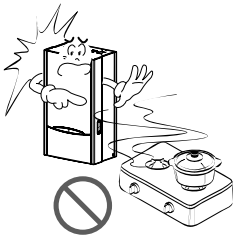
Do not use the product in a tightly closed space for a long time.

- Oxygen deficiency could occur.



When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.

- There is risk of explosion or fire.



If strange sounds, or small or smoke comes from product, turn the breaker off or disconnect the power supply cable.

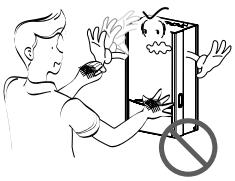
- There is risk of electric shock or fire.

Stop operation and close the window in storm or hurricane. If possible, remove the product from the window before the hurricane arrives.

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

Do not open the front cover of the indoor unit while operation. (Do not touch the electrostatic filter, if the unit is so equipped.)

- There is risk of physical injury, electric shock, or product failure.

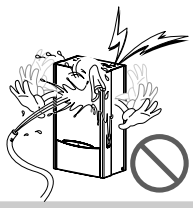


When the product is soaked (flooded or submerged), contact an Authorized Service Center.

- There is risk of fire or electric shock.

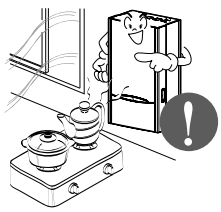
Be cautious that water could not be poured to the product directly.

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



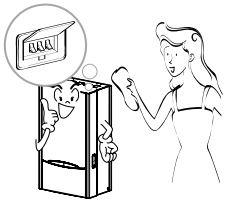
Ventilate the product from time to time when operating it together with a stove, etc.

- There is risk of fire or electric shock.



Turn the main power off when cleaning or maintaining the product.

- There is risk of electric shock.

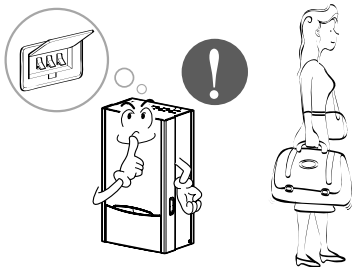


Take care to ensure that nobody could step on or fall onto the outdoor unit.

- This could result in personal injury and product damage.

Special warning about no operation for long-time

- If the product is not used for long time, we strongly recommend NOT TO SWITCH OFF THE POWER SUPPLY to the product.
- If power is not supplied, some special product-protecting actions (such as water pump anti-locking) will not performed.

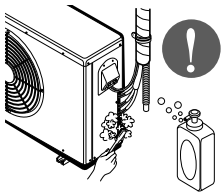


⚠CAUTION

■ Installation

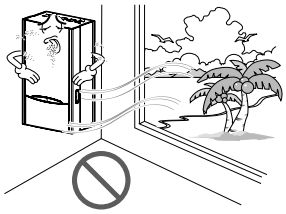
Always check for gas (refrigerant) leakage after installation or repair of product.

- Low refrigerant levels may cause failure of product.



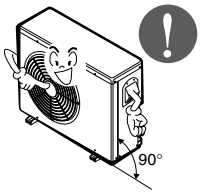
Do not install the product where it will be exposed to sea wind (salt spray) directly.

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



Keep level even when installing the product.

- To avoid vibration or water leakage.



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.

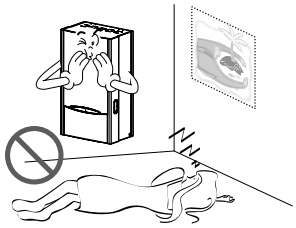
Use two or more people to lift and transport the product.

- Avoid personal injury.

■ Operation

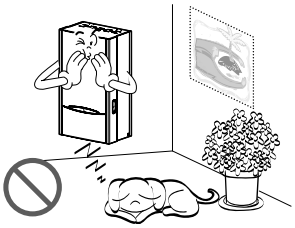
Do not lay on the cooled floor for long time when the product is in cooling operation.

• This could harm to your health.



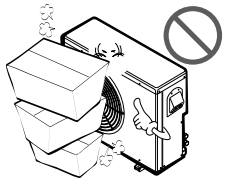
Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer product, not a precision refrigeration system.

• There is risk of damage or loss of property.



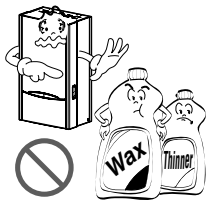
Do not block the outlet of air flow.

• It may cause product failure.



Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.

• There is risk of fire, electric shock, or damage to the plastic parts of the product.

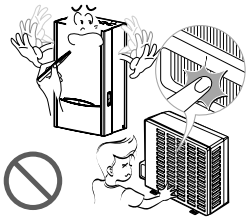


Do not step on or put anything on the product. (outdoor units)

• There is risk of personal injury and failure of product.

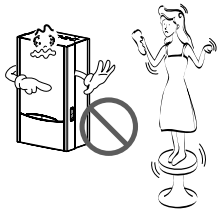
Do not insert hands or other objects into the product while it is operating.

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



Use a firm stool or ladder when cleaning or maintaining the product.

• Be careful and avoid personal injury.



Part 1
General Information

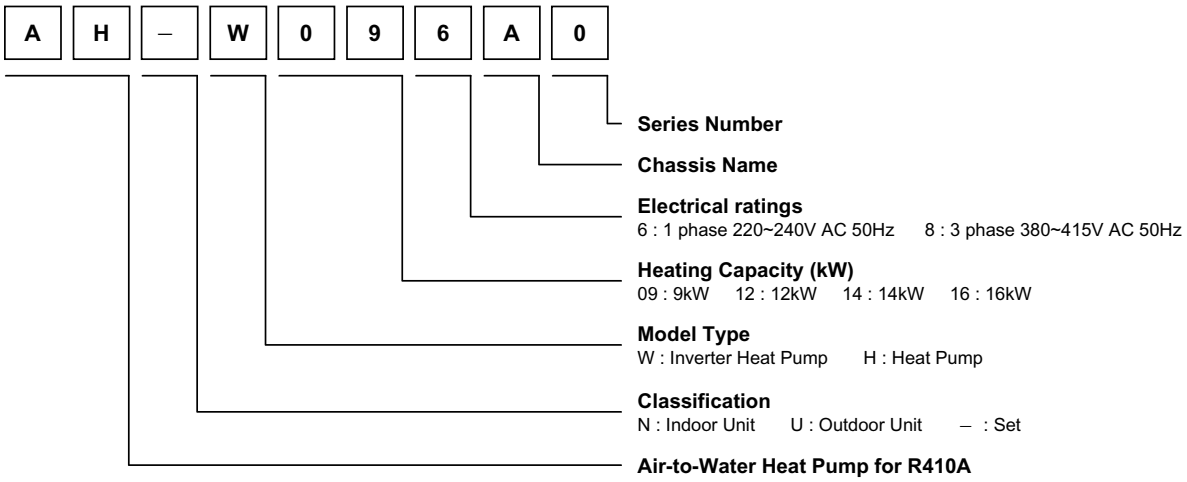
1. Model Information

With advanced inverter technology, THERMA V 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 THERMA V is presented to identify the installation procedure. Before beginning installation, read this chapter carefully and find helpful information on installation.

1. Model Information

Model number nomenclature



Model name and related information

Model Name			Capacity		Built-In Electric Heater(kW)	Power Source
Set	Indoor Unit	Outdoor Unit	Heating (kW) *1	Cooling (kW) *2		
AH-W096A0	AHNW096A0	AHUW096A0	9	8.6	4 (2+2)	1 x 220~240V x 50Hz
AH-W126A0	AHNW126A0	AHUW126A0	12	14	6 (3+3)	
AH-W146A0	AHNW146A0	AHUW146A0	14	14		
AH-W166A0	AHNW166A0	AHUW166A0	16	14		

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

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

2. Specification

Indoor

Indoor Units			AHNW096A0 (H09SNE)	AHNW126A0 (H12SNE)	AHNW146A0 (H14SNE)	AHNW166A0 (H16SNE)
Combination Outdoor Units			AHUW096A0	AHUW126A0	AHUW146A0	AHUW166A0
Nominal Power Input		W	135	205	205	205
Nominal Running Current without Electric Heater		A	0.59	0.89	0.89	0.89
Operation Range (Min.~Max.) Leaving Water Temperature	Cooling(Fan coil unit)	°C	6 ~ 30	6 ~ 30	6 ~ 30	6 ~ 30
	Cooling(Under floor)	°C	16 ~ 30	16 ~ 30	16 ~ 30	16 ~ 30
	Heating(Fan coil unit or Radiator)	°C	15 ~ 55	15 ~ 55	15 ~ 55	15 ~ 55
	Heating(Under floor)	°C	15 ~ 55	15 ~ 55	15 ~ 55	15 ~ 55
Pump	Type	-	Canned type for hot water circulation			
	Steps of Speed	EA	2 (In Max. / Med. / Min., Min. step is not used)			
	Power Input	W	135	205	205	205
	Water Flowrate Limit	LPM	At least 12	At least 15.5	At least 15.5	At least 15.5
Heat Exchanger	Type	-	Blazed Plate HEX	Blazed Plate HEX	Blazed Plate HEX	Blazed Plate HEX
	Number of Plate	EA	46	60	60	60
	Quantity	EA	1	1	1	1
Expansion Vessel	Volume	liter	8	8	8	8
	Water Pressure(Max.)	bar	3	3	3	3
	Water Pressure(Pre)	bar	1.5	1.5	1.5	1.5
Strainer	Mesh Size	mm	1 x 1	1 x 1	1 x 1	1 x 1
	Material	-	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Electric Heater	Type	-	Sheath	Sheath	Sheath	Sheath
	Number of Heating Coil	EA	2	2	2	2
	Capacity Combination	kW	2 + 2	3 + 3	3 + 3	3 + 3
	Operation	-	Automatic	Automatic	Automatic	Automatic
	Heating Steps	Step	2	2	2	2
	Power Supply	Ø / V / Hz	1/230/50	1/230/50	1/230/50	1/230/50
	Rated Current	A	16.7	25	25	25
	Maximum Current(MCA)	A	21	32	32	32
Water Circuit	Safety Valve	bar	3	3	3	3
	Entering Side Diameter	inch	Male PT 1	Male PT 1	Male PT 1	Male PT 1
	Leaving Side Diameter	inch	Male PT 1	Male PT 1	Male PT 1	Male PT 1
	Manometer	-	O	O	O	O
	Drain Valve / Fill Valve	-	O	O	O	O
	Shut Off Valve	-	O	O	O	O
	Air Vent	-	O	O	O	O
Refrigerant Circuit	Gas Side Diameter	mm(inch)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
	Liquid Side Diameter	mm(inch)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
Dimensions	Unit(W x H x D)	mm	850 x 490 x 315	850 x 490 x 315	850 x 490 x 315	850 x 490 x 315
	Packed Unit(W x H x D)	mm	1082 x 563 x 375	1082 x 563 x 375	1082 x 563 x 375	1082 x 563 x 375
Weight (Without water)	Unit	kg	52	54.5	54.5	54.5
	Packed Unit	kg	57	61.5	61.5	61.5
*Sanitary Water Tank (Field Supply)	Type	-	Indirect heating(+ Electric heater)			
	Heater Capacity	kW	Max. 3			
	Power Supply	Ø / V / Hz	1 / 230 / 50			
	Power Supply Type	-	Separated power source			
	Thermal Protector Range	°C	Max. 90			
	Relay Contactor	-	Needed			
	ELB	A	40			
	Sensor Adaptor Diameter	mm(inch)	12.7 (1/2)			
	Accessory Kit	-	LG Supply			

Note : 1. The specification may be subject to change without prior notice for purpose of improvement.

2. * : This information is given as a guideline about the connection of sanitary water tank

Outdoor

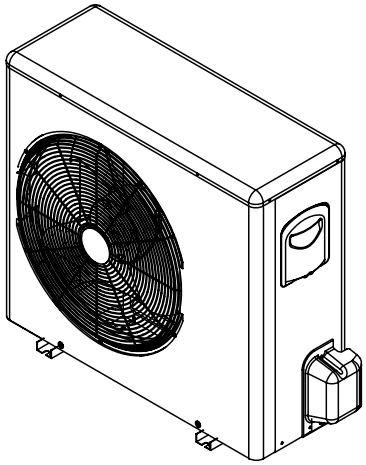
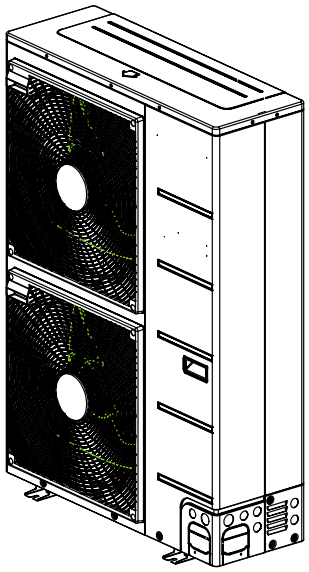
Outdoor Units			AHUW096A0(H09SNE)	AHUW126A0(H12SNE)	AHUW146A0(H14SNE)	AHUW166A0(H16SNE)
Combination Indoor Units			AHNW096A0	AHNW126A0	AHNW146A0	AHNW166A0
Power Supply		Ø / V / Hz	1/220~240/50	1/220~240/50	1/220~240/50	1/220~240/50
Maximum Running Current	Cooling	A	24	32	32	32
	Heating	A	24	32	32	32
Wiring Connections	For Power Supply (Included Earth)	Number of wires	3	3	3	3
	For Connection with Indoor Unit (Included Earth)	Number of wires	4	4	4	4
* Capacity	Cooling(Under floor)	kW	8.60	14.0	14.0	14.0
	Heating(Under floor)	kW	9.00	12.0	14.0	16.0
* Power Input	Cooling(Under floor)	kW	2.70	4.40	4.40	4.40
	Heating(Under floor)	kW	2.20	2.67	3.17	3.80
* EER	Cooling(Under floor)	W/W	3.19	3.18	3.18	3.18
* COP	Heating(Under floor)	W/W	4.10	4.50	4.42	4.20
** Capacity	Cooling(Fan coil unit)	kW	5.83	9.50	9.50	9.50
	Heating(Fan coil unit or Radiator)	kW	7.49	9.99	11.7	13.3
** Power Input	Cooling(Fan coil unit)	kW	2.24	3.65	3.65	3.65
	Heating(Fan coil unit or Radiator)	kW	2.30	2.79	3.41	4.01
** EER	Cooling(Fan coil unit)	W/W	2.60	2.60	2.60	2.60
** COP	Heating(Fan coil unit or Radiator)	W/W	3.26	3.58	3.43	3.32
Operation Range(Min.~Max.) Outdoor Temperature	Cooling	°C DB	5~48	5~48	5~48	5~48
	Heating	°C DB	-20~30	-20~30	-20~30	-20~30
Compressor	Type	-	Hermetic Motor	Hermetic Motor	Hermetic Motor	Hermetic Motor
	Model	-	5KD240XAE21	5JD420XAD22	5JD420XAD22	5JD420XAD22
	Quantity	EA	1	1	1	1
	Displacement	cm^3/Rev.	24	42.4	42.4	42.4
	Capacity	kW	7.28	13.4 (at 57.5Hz)	13.4 (at 57.5Hz)	13.4 (at 57.5Hz)
Compressor Motor	Type	-	Brushless	Brushless	Brushless	Brushless
	Quantity	EA	1	1	1	1
	Rated Output	W	1,700	3,000	3,000	3,000
Refrigerant	Type	-	R410A	R410A	R410A	R410A
	Charge	g(oz)	1,800(63.5)	3,000(105.8)	3,000(105.8)	3,000(105.8)
	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve
Refrigerant Oil	Type	-	FV50S	FV50S	FV50S	FV50S
	Charged Volume	cc	900	1300	1300	1300
Heat Exchanger	Quantity	EA	1	2	2	2
	Rows	EA	2	2	2	2
	Columns	EA	36	32	32	32
	FPI	Fins/inch	18	17	17	17
Fan	Type	-	Propeller	Propeller	Propeller	Propeller
	Quantity	EA	1	2	2	2
	Air Flow Rate	CMM(l/s)	58(967)	60(1,000)	60(1,000)	60(1,000)
Fan Motor	Model	-	SIC-72FW-F1124-3	SIC-72FW-F1124-3	SIC-72FW-F1124-3	SIC-72FW-F1124-3
	Quantity	EA	1	2	2	2
	Output	W	124	124	124	124
Sound Pressure Level	Cooling	dB(A)+3	51	55	55	55
	Heating	dB(A)+3	53	57	57	57
Liquid Piping Connection	Type	-	Flare	Flare	Flare	Flare
	Outer Diameter	mm(inch)	9.52(3/8)	9.52(3/8)	9.52(3/8)	9.52(3/8)
Gas Piping Connection	Type	-	Flare	Flare	Flare	Flare
	Outer Diameter	mm(inch)	15.88(5/8)	15.88(5/8)	15.88(5/8)	15.88(5/8)
Piping Length (Outdoor Unit ~ Indoor Unit)	Minimum	m	3	3	3	3
	Standard	m	7.5	7.5	7.5	7.5
	Maximum	m	50	50	50	50
Height Difference (Outdoor Unit ~ Indoor Unit)	Maximum	m	30	30	30	30
Additional Refrigerant Charge		g/m	30	60	60	60
Dimensions	Unit(W x H x D)	mm	870 x 800 x 320	950 x 1,355 x 330	950 x 1,355 x 330	950 x 1,355 x 330
	Packed Unit(W x H x D)	mm	1,022 x 870 x 437	1,140 x 1462 x 461	1,140 x 1462 x 461	1,140 x 1462 x 461
Weight	Unit	kg	56	105	105	105
	Packed Unit	kg	61	116	116	116

Note :

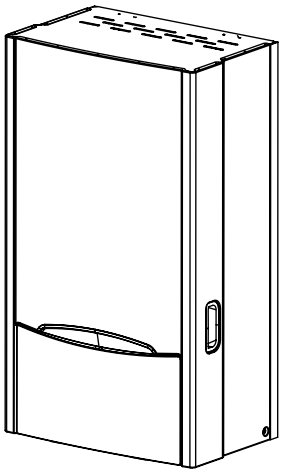
1. Capacities and power inputs are based on the following conditions:
   * : Cooling conditions - Indoor Water Temperature 23°C/18°C; Outdoor Air Temperature 35°CDB
   Heating conditions - Indoor Water Temperature 30°C/35°C; Outdoor Air Temperature 7°CDB/6°CWB
   Standard piping length 7.5m
   ** : Cooling conditions - Indoor Water Temperature 12°C/7°C; Outdoor Air Temperature 35°CDB
   Heating conditions - Indoor Water Temperature 40°C/45°C; Outdoor Air Temperature 7°CDB/6°CWB
   Standard piping length 7.5m
2. Wiring cable size must comply with the applicable local and national code.
3. The specification may be subject to change without prior notice for purpose of improvement.

2. External Apprearance

2.1 Outdoor Unit

AH-W096A0.	AH-W126A0, AH-W146A0, AH-W166A0
	

2.2 Indoor Unit



Part 2
Features & Controls

1. List of Function

Category	Function	AHNW096A0 (H09SNE)	AHNW126A0 (H12SNE)	AHNW146A0 (H14SNE)	AHNW166A0 (H16SNE)
Installation	Drain pump	-	-	-	-
	E.S.P. control	-	-	-	-
	Electric heater(operation)	O	O	O	O
	High ceiling operation	-	-	-	-
Reliability	Hot start	-	-	-	-
	Self diagnosis	O	O	O	O
	Soft dry operation	-	-	-	-
Convenience	Auto changeover	-	-	-	-
	Auto cleaning	-	-	-	-
	Auto operation(artificial intelligence)	-	-	-	-
	Auto restart operation	O	O	O	O
	Child lock	O	O	O	O
	Forced operation	-	-	-	-
	Group control	-	-	-	-
	Sleep mode	-	-	-	-
	Timer(on/off)	O	O	O	O
	Timer(weekly)	O	O	O	O
	Two thermistor control	-	-	-	-
Individual control	Standard wired remote controller(control panel)	O	O	O	O
	Deluxe wired remote controller	-	-	-	-
	Simple wired remote controller	-	-	-	-
	Wired remote controller(for hotel use)	-	-	-	-
	Wireless remote controller(simple)	-	-	-	-
	Wireless LCD remote control	-	-	-	-
CAC network function	General central controller (Non LGAP)	-	-	-	-
	Dry contact	PQDSA	PQDSA	PQDSA	PQDSA
	Network Soluation(LGAP)	O	O	O	O
	PDI(power distribution indicator)	-	-	-	-
	PI 485	-	-	-	-
Special function kit	Zone control	-	-	-	-
	CTIE	-	-	-	-
	Electro thermostat	-	-	-	-
Others	Remote room temperature sensor (TH8)	PQRSTA0	PQRSTA0	PQRSTA0	PQRSTA0
AWHP	Anti-Condensation on floor (cooling)	O	O	O	O
	Water Pump ON / OFF Control	O	O	O	O
	Flow Switch Control	O	O	O	O
	Thermostat Interface (230V AC)	O	O	O	O
	Thermostat Interface (24V AC)	O	O	O	O
	Sanitary Tank Heating	O	O	O	O
	Solar-Thermal Interface with Sanitary Tank	O	O	O	O
	PHEX Anti-Freezing Control	O	O	O	O
	Water Pump Forced Operation	O	O	O	O
	Autosetting according to Ambient Temperature	O	O	O	O
	Silent Operation	O	O	O	O
	Anti-overheating of Water Pipe	O	O	O	O
	Emergency Operation	O	O	O	O

Notes

O : Applied, X : Not applied, – : No relation

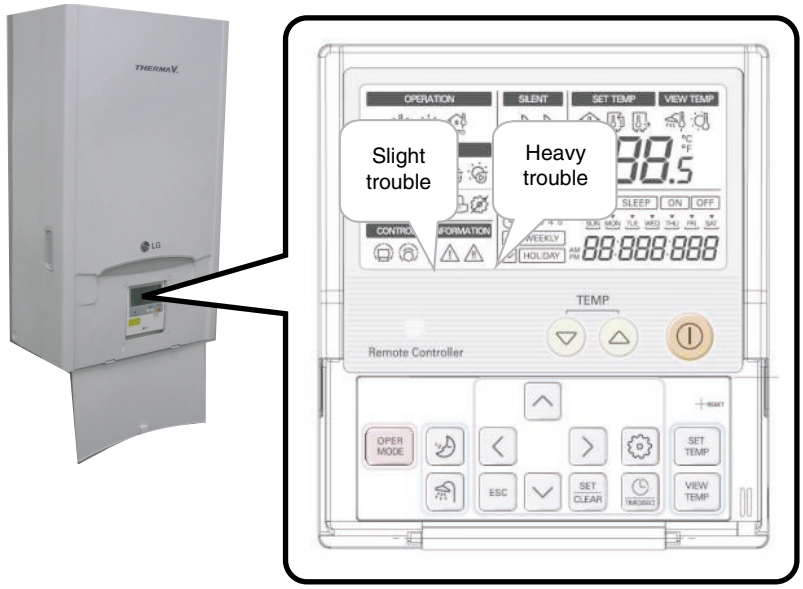
* TH8 : Refer to 'Chapter 8. Piping Diagram' of 'Part 2. Indoor Unit (Hydro kit)'

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

2. Features

1. Summarized Features

1.1 Emergency Control



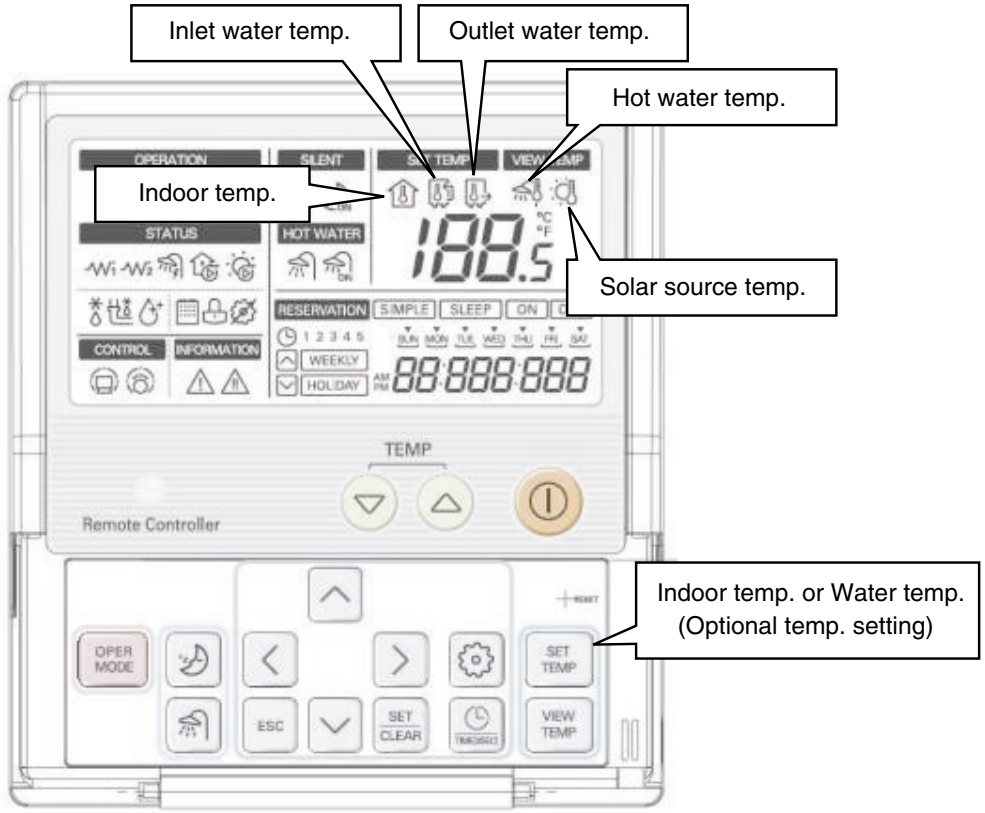
Easy checking of system failure

- Slight / Heavy trouble

Emergency operating

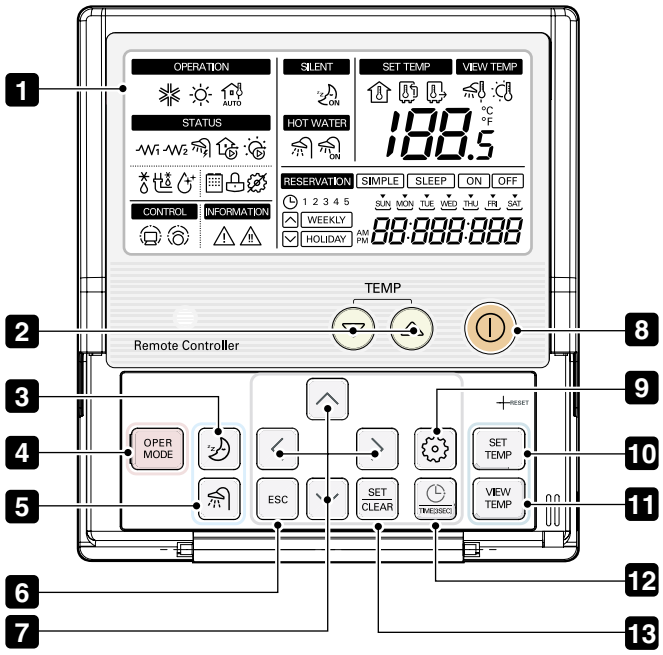
- Heavey trouble
- Electric heater ON
- Secure at least heating before A/S

1.2 Easy Setting Feature



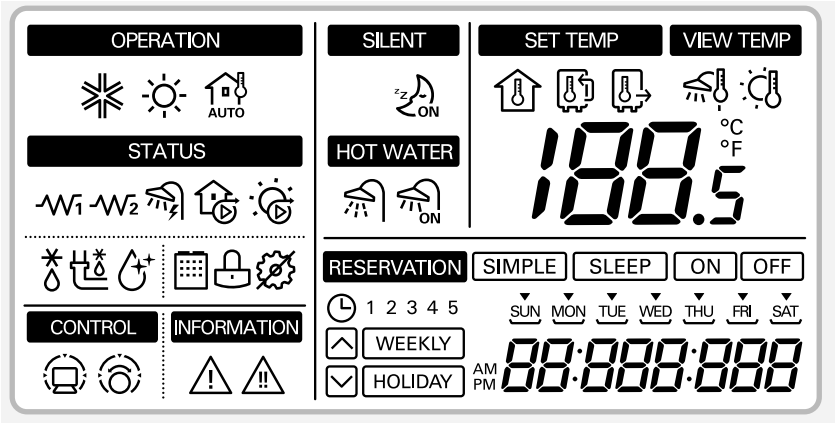
1.5 Control Panel

• Controller Configuration



1. Display Panel
2. Change Temperature Button
3. Silent Mode On / Off Button
4. Mode Selection Button
5. Water Heating Enable / Disable Button
6. ESC Button
7. Direction Button (Up, Down, Left, Right)
8. Power Button
9. Function Setting Button
10. Temperature Setting Mode Button
11. Temperature View Mode Button
12. Programming Button
13. Set / Clear button

• Display Panel



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

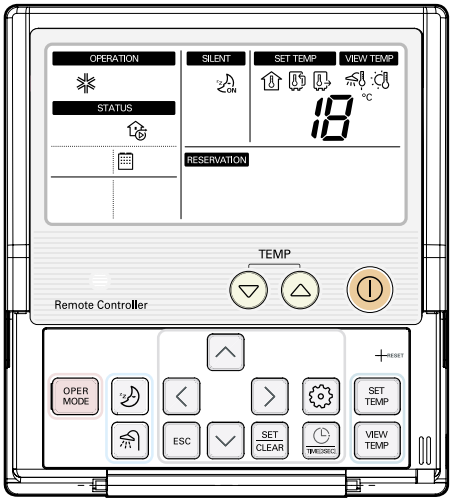
2. Special Function

2.1 Child Lock Function

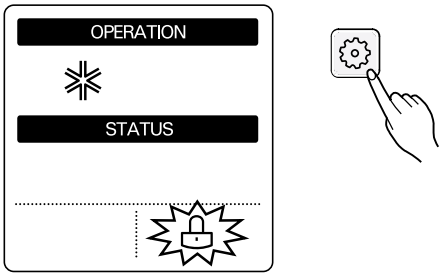
This function prevents children or others from tampering with the control buttons on the unit.

• All the buttons on indoor display panel will blocked.

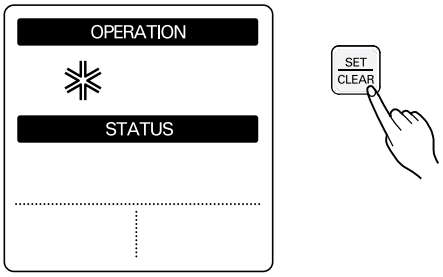
The function is used to restrict children to not to use the AWHP carelessly.(CL is an abbreviated form of Child Lock.)



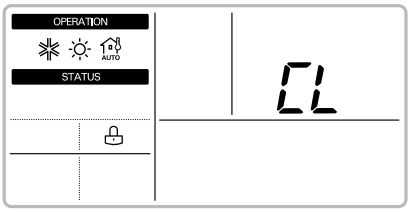
1 Press Function Setting Button to enter user setting mode.
(The segment will be flashed)



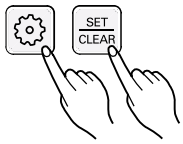
2 Press set / clear button to finish the selection.
The segment will be disappear.



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



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



2.2 Sleep Timer Operation

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

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

2.3 Timer(On/Off)

2.3.1 On-Timer Operation

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

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

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

2.3.2 Off-Timer Operation

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

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

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

2.4 Weekly Program

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

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

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

Operation Time Table (Example)

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

3. System Set-up

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

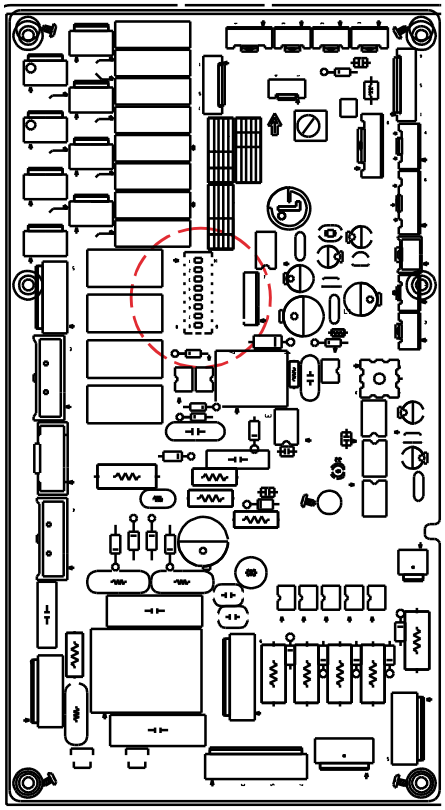
3.1 DIP Switch Setting

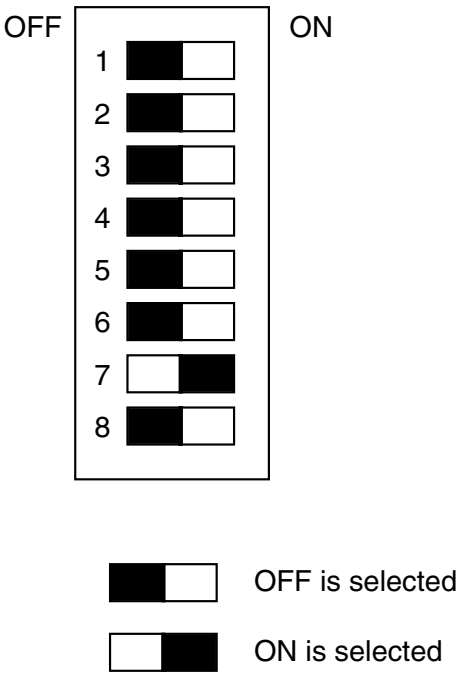
⚠CAUTION

Turn off electric power supply before setting DIP switch

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

General Information





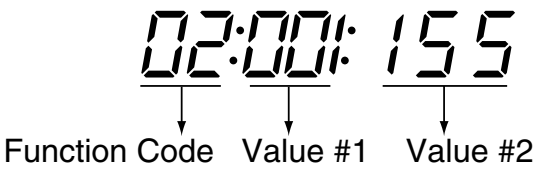
DIP Switch Setting

Description	Setting	Default
Role when central controller is equipped	1  As Slave 1  As Slave	1 
Accessory installation information	2  3  Indoor unit + Outdoor unit is installed 2  3  Indoor unit + Outdoor unit + Sanitary water tank is installed 2  3  Indoor unit + Outdoor unit + Sanitary water tank + Solar thermal system is installed	2  3 
Emergency operation Level	4  High temperature cycle 4  Low temperature cycle	4 
External water pump installation information	5  External water pump is NOT installed 5  External water pump is installed	5 
Selecting electric heater capacity	6  7  Full capacity is used (6kW except AH-W096A0, 4kW for AH-W096A0) 6  7  Half capacity is used (3kW except AH-W096A0, 2kW for AH-W096A0) 6  7  Electric heater is not used	6  7 
Thermostat installation information	8  Thermostat is NOT installed 8  Thermostat is installed	8 

3.2 Control Panel Setting

Summary

Example of Fuction Code Display



Common Setting

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

Note: • If you press any kind of button during this mode, Test Run mode will be finished.
• After running 18 minutes under test run mode, system will automatically turn OFF.

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

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

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

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

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

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

• **Function Code 06** : Auto Dry Contact
This function allows the Dry contact-indoor unit operate under Auto Run mode or Manual mode with remote control panel.

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

Temperature Range Setting

• **Function Code 11** : Setting Air Temperature in Cooling Mode
Determine cooling setting temperature range when air temperature is selected as setting temperature.

⚠WARNING

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

• **Function Code 12** : Setting Leaving Water Temperature in Cooling Mode
Determine cooling setting temperature range when leaving water temperature is selected as setting temperature.

⚠WARNING

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

⚠WARNING

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

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

⚠WARNING

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

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

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

⚠WARNING

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

Temperature Control Parameter Setting and Etc

• **Function Code 21** : Setting Electric Heater On/Off temperature
Using Half capacity of electric heater : when DIP Switch No. 6 and 7 is set as 'OFF-ON' :
- Value #1 : outdoor air temperature where half capacity of electric heater starts operation.
- Value #2 : not used.
- Example : If Value #1 is set as '-1' and DIP Switch No 6. and 7 is set as 'OFF-ON', then half capacity of electric heater will start operation when outdoor air temperature is below -1°… and current leaving water temperature or room air temperature is much belower than target leaving water temperature or target room air temperature.

Using Full capacity of electric heater : when DIP Switch No. 6 and 7 is set as 'OFF-OFF' :
- Value #1 : base outdoor air temperature.
- Value #2 : temperature gap (it means 'how much colder than base outdoor air temperature?')
- Example : If Value #1 is set as '-1' and Value #2 is set as '3' and DIP Switch No 6. and 7 is set as 'OFF-OFF', then full capacity of electric heater will start operation when outdoor air temperature is below -4°C (-4 = Value #1 – Value #2) and current leaving water temperature or room air temperature is far much belower than target leaving water temperature or target room air temperature.

• **Function Code 22** : Setting Cut-off Temperature in Cooling Mode (FCU setting included)
Determine leaving water temperature when the product is turned off. This function is used fr preventing condensation on the floor in cooling mode.
- Value #1 : cut-off temperature. Value #1 is valid when Value #2 is '01 (that means, FCU is installed)'.
- Value #2 : determines if FCU is installed or not. '01' means 'FCU is NOT installed', and '00' means 'FCU is installed.'
- Example : If Value #1 is set as '10' and Value #2 is '01' and actually FCU is NOT installed in the water loop, the product stop operation in cooling mode when the leaving water temperature is below 10 °C.
- Example : If Value #1 is set as '10' and Value #2 is '00' and actually FCU is installed in the water loop, the Value #1 is not used and the product do NOT stop operation in cooling mode when the leaving water temperature is below 10 °….

⚠WARNING

FCU Installation
• If FCU is used, related 2way valve should be installed and connected to the indoor unit PCB.
• If Value #2 is set as '00' but FCU or 2way valve is NOT installed, the product can abnormal operation.

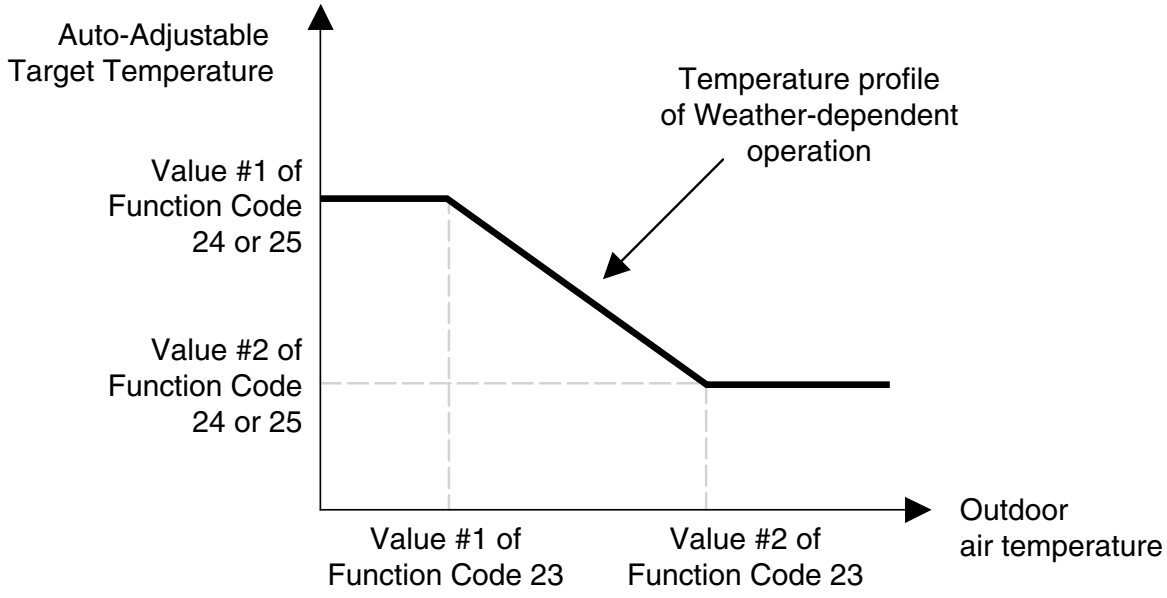
Function Code 23 and 24 : Setting Weather-dependent operation Mode

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

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

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

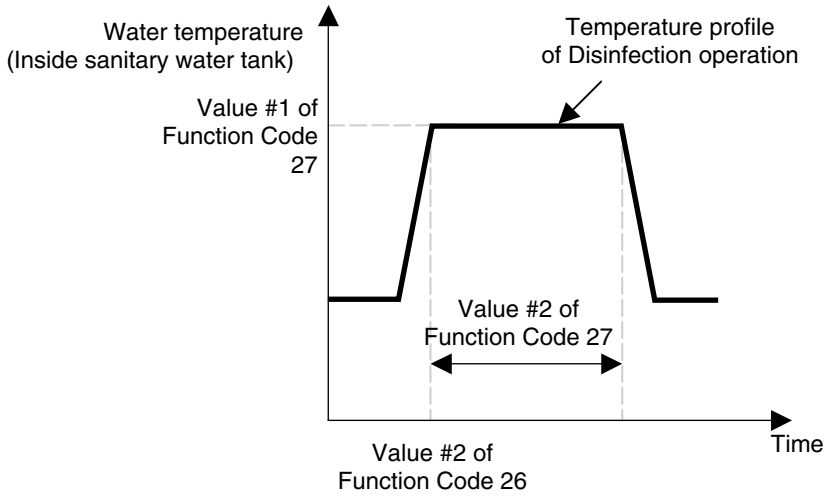
Note : Weather-dependent operation is applied for heating mode only.



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

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

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



⚠WARNING

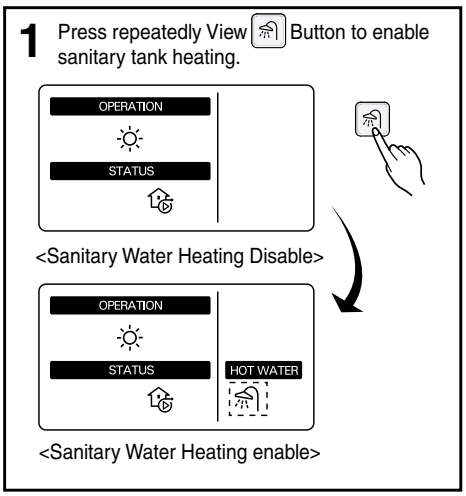
Vales of Function Code 26

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

⚠CAUTION

Sanitary water heating should be enable

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

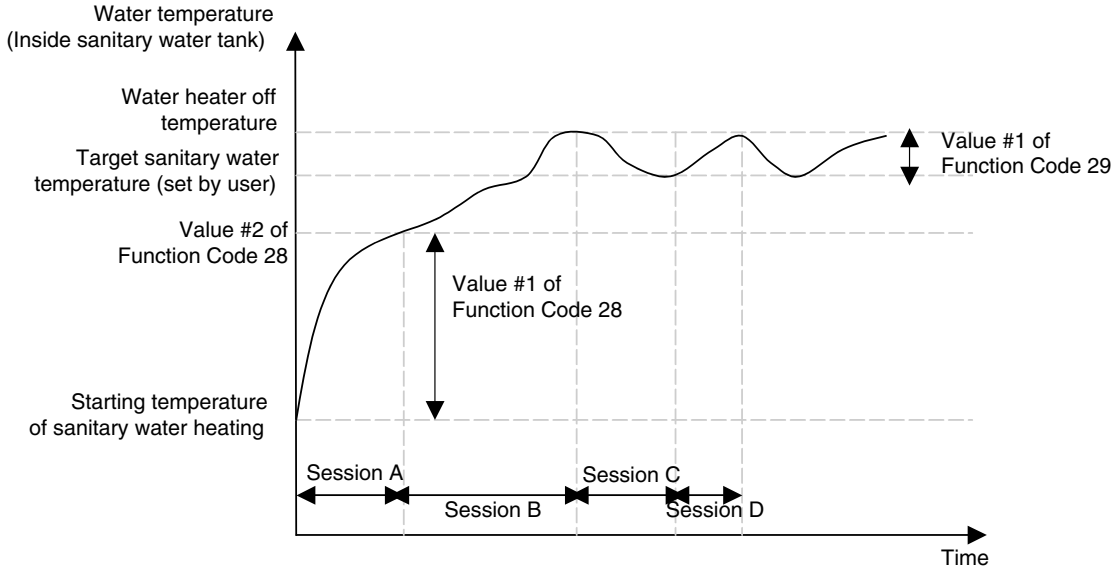


• **Function Code 28 and 29** : Setting control parameter for Sanity water heating operation

Descriptions for each parameters are as following.

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

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



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

• **Function Code 2A** : Miscellaneous setting

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

3. Control logic

1. Compressor

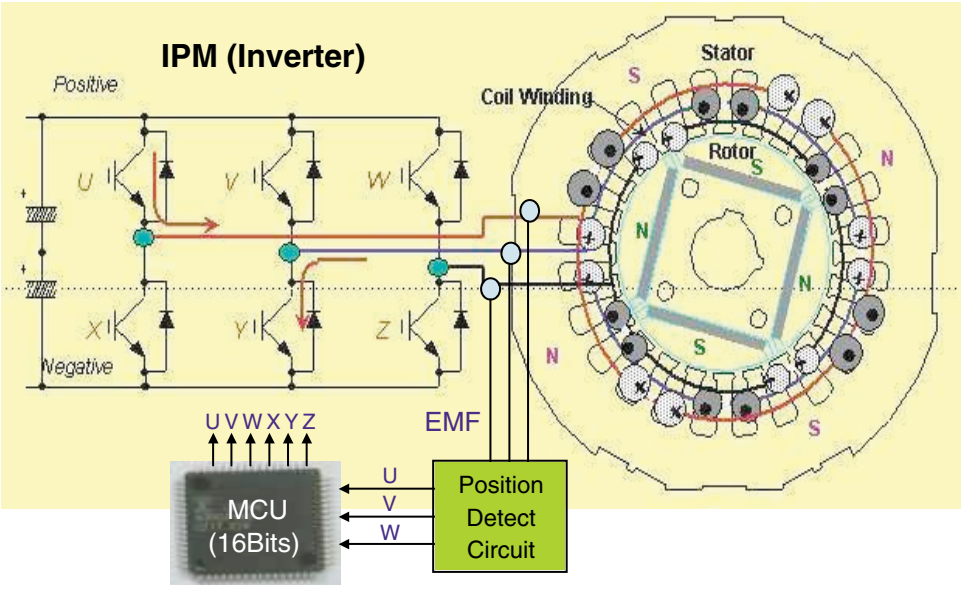
1.1 Basic principle

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

$$RPM = \frac{120\ f}{P}$$

RPM → Revolutions/Minute
f → Frequency
P → Number of poles

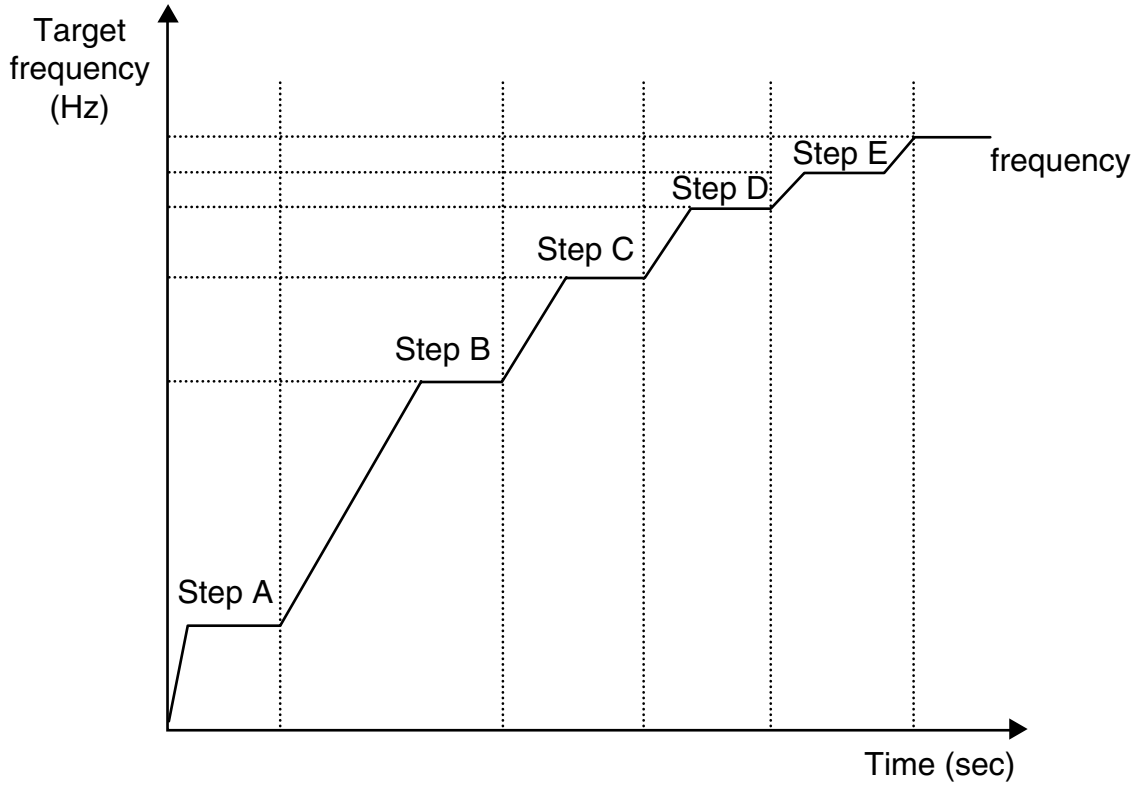
BLDC Motor



1.2 Inverter compressor starting

: Target Frequency calculation method

- Step A = Step 1 Frequency (Min. frequency : 20~25Hz)
- Step B = (Step A + Target Frequency) / 2
- Step C = (Step B + Target Frequency) / 2
- Step D = (Step C + Target Frequency) / 2
- Step E = (Step D + Target Frequency) / 2

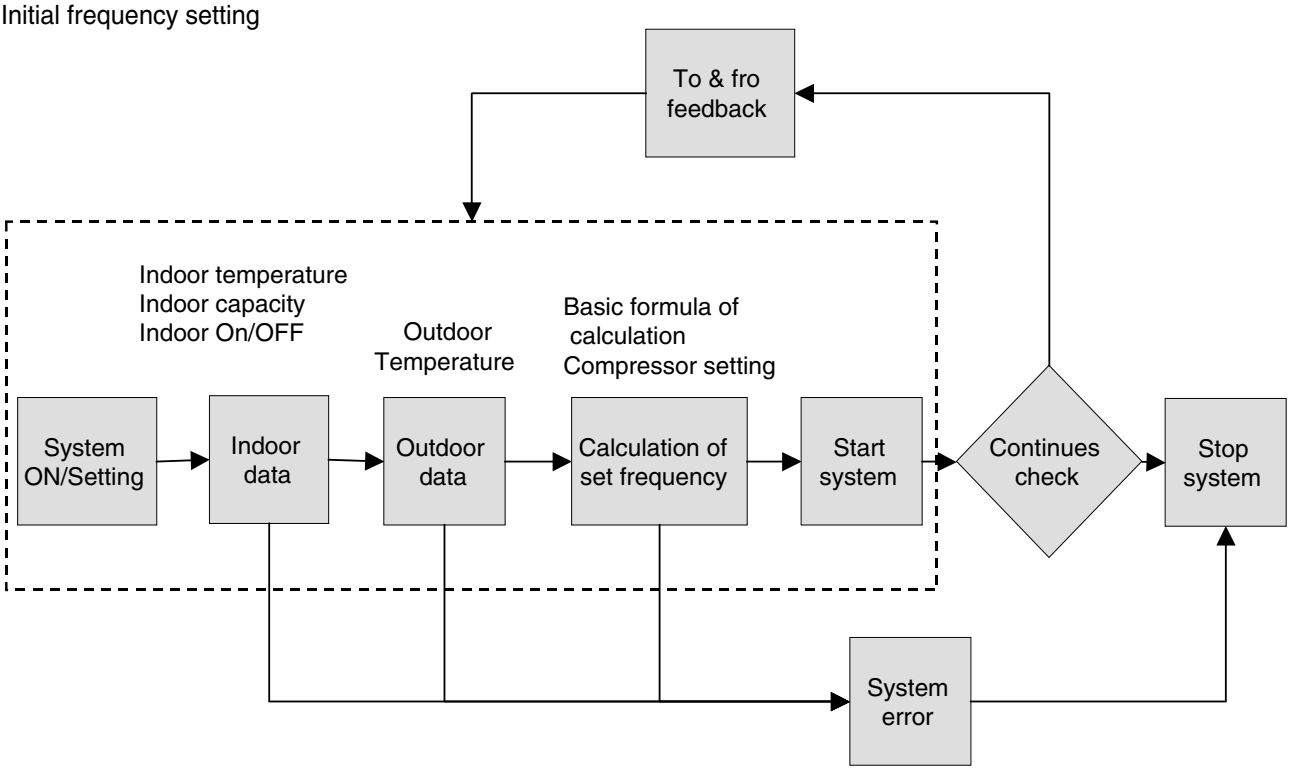


2. Step(frequency) control

2.1 Frequency control

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

1. Indoor unit capacity value.
2. Temperature compensation factor
3. Initial frequency setting



2.2 Primary step setting

: Capacity steps of compressor are decided by ∑Qj (Summation of capacity code), TA0(Outdoor temp.), TW(Inlet Water temp.),DTW(Difference Outlet Water temp. and Setting Outlet Water temp.), DTR(Difference Air Indoor temp. and Setting Air temp.), OP_ind(a number of Operating Indoors).

Comp_Step=(Step_base+ Long-piping) x ΔStep_TAO x Δstep_TW x Δstep_DTW + Δstep_OP_ind ....(1)
Comp_Step=(Step_base+Long-piping) x ΔStep_TAO x Δstep_TW x Δstep_DTR + Δstep_OP_ind.....(2)

✻ Between formular (1) and (2) only one formular is applied by system setting.

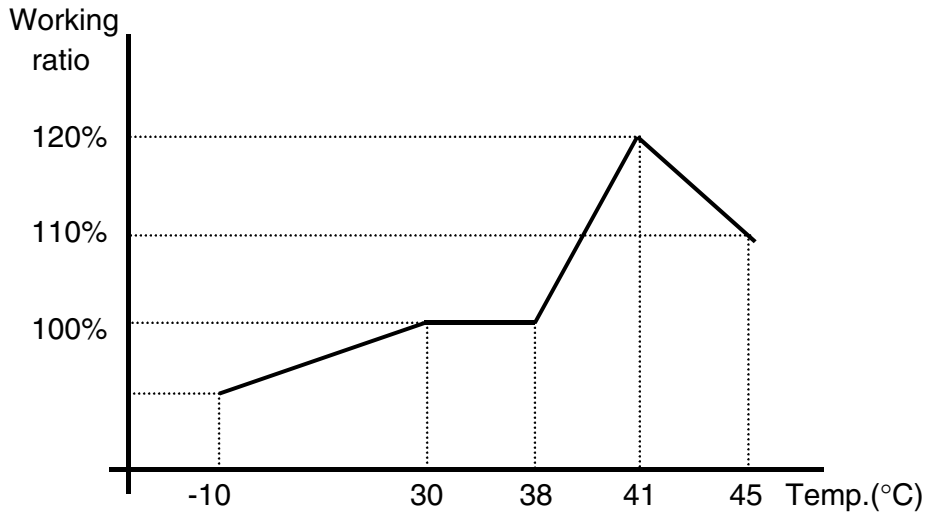
Step_base	Standard frequency step by ∑Qj (Summation of capacity code)
ΔStep_TAO	Step compensation by TAO (Outdoor temp.)
ΔStep_TW	Step compensation by TW (Water inlet temp.)
ΔStep_DTW	Step compensation of temperature difference Outlet Water temp. and Setting temp.
ΔStep_DTR	Step compensation of temperature difference Indoor Air temp. and Setting temp.
ΔStep_OP_ind	a number of Operating indoor units
Long-piping	Comp. Step compensation by setting long piping

✻ If target frequency step (Step base) exceeds maximum step, the Step base value follows the maximum step value.

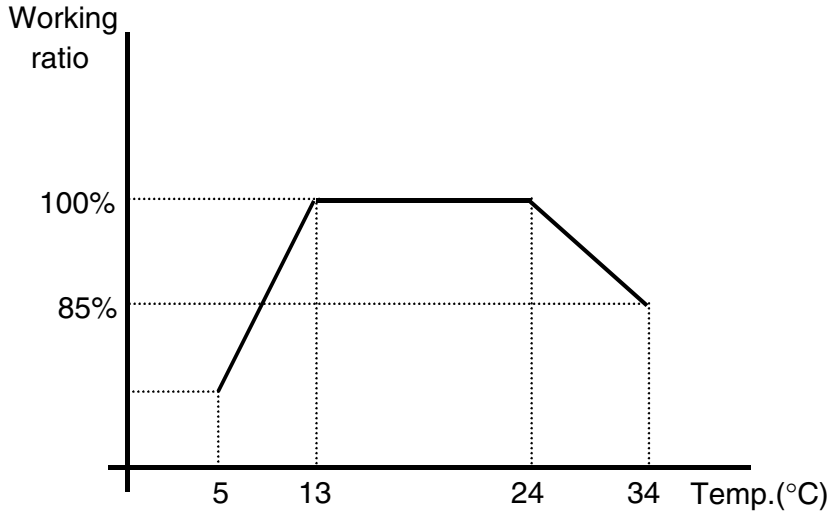
✻ The compressor get the minimum step in case Step base value is lower than the minimum step of operating capacity.

2.3 Setting value / Cooling

∆Step TAO : step compensation by Outdoor temp.



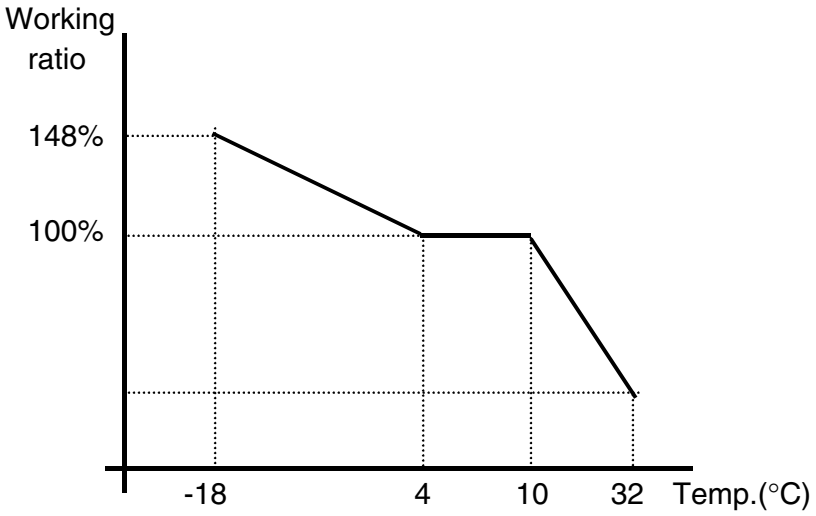
∆Step TW: step compensation by Inlet water temp.



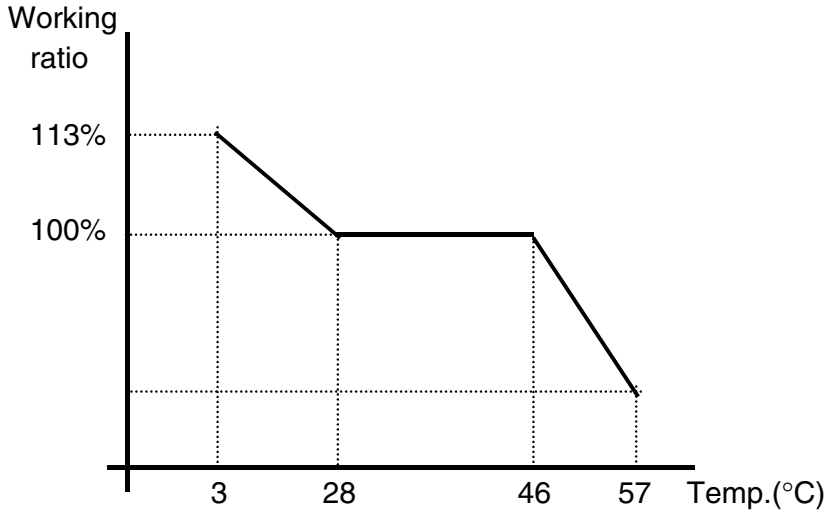
∆Step DTW : Step Compensation of temperature difference between Inlet water temp. and setting temp.

2.4 Setting value / Heating

∆Step TAO : step compensation by Outdoor temp.



∆Step TW: step compensation byInlet water temp.



∆Step DTW: Step Compensation of temperature difference between Inlet water temp. and setting temp.

3. Reversing valve operation

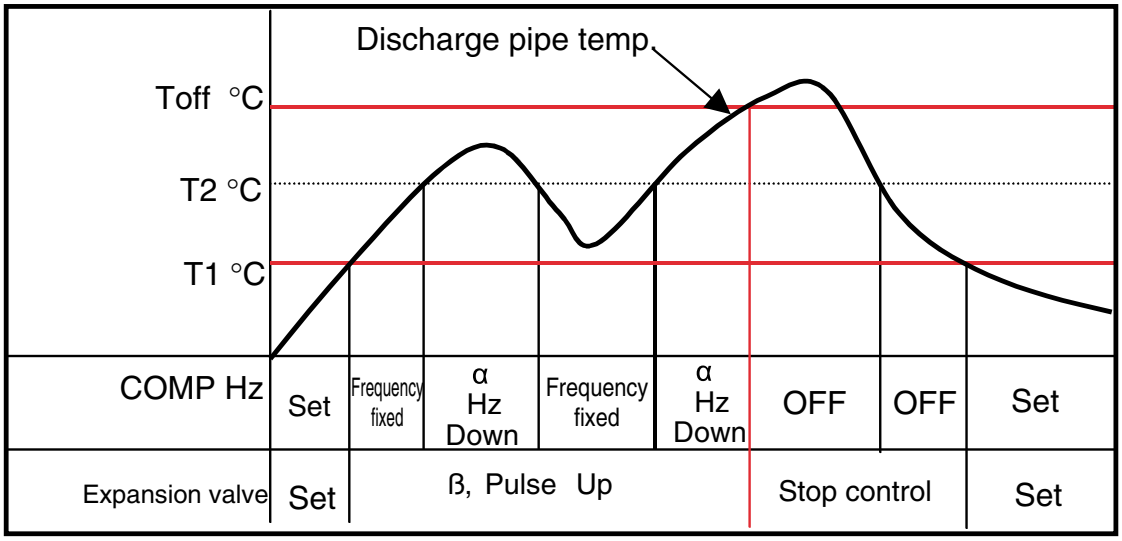
1. At the starting (outdoor is powered on,indoor is not) reversing valve continues OFF(cooling).
2. For the cooling and defrosting operation :valve OFF, for the heating operation :valve ON
3. Method of changing mode from heating to defrosting : As defrosting starts Inverter compressor Hz is lowered to 30Hz for 5 sec and the valve is OFF for the defrost mode.
4 . Method of changing mode from defrosting to heating : As the defrosting is finished inverter compressor frequency is lowered to 30Hz for 10 sec. And the valve is ON for the heating mode.
5. If the operating mode is changed to heating from cooling, “3 min. restarting rule” is applied, and reversing valve position is changed within 30 sec. after compressor turns OFF.
6. If the compressor is stopped during heating mode by remote controller operation or error mode, reversing valve position is changed to OFF in 30 sec. after compressor turns OFF.
7. If the compressor is stopped during heating mode by Thermistor signal, reversing valve will remain in heating position.

4. Discharge pipe temperature control

1) There can be two error situations for discharge pipe temperature.
   a) Sensor is failed (error code for sensor failure will be generated)
   b) Abnormal high temperature at discharge pipe (error code for high discharge will be generated)
   Both cases unit will stop.

Compressor working

1. If discharge pipe temperature < T1 No limitation on compressor frequency
2. T1°C ≤ discharge pipe temperature < T2°C → Compressor frequency stop increasing & Expansion valve up by ß pulse
   T2 ≤ discharge pipe temperature < Toff (Hysteresis control) → Compressor frequency down by a pulse & Expansion valve up by ß pulse in every 30 second.
   If EEV is in the starting control it will follow starting control first.
3. Discharge pipe temperature ≥ Toff then compressor will be OFF and System will stop if this situation occurs 10 times in 1 hour and error code will be generated also self diagnosis will start.



Model	T2	Toff	°C Hz	EEV ß, pulse
AHUW166A0	95°C	105°C	5	8

5. Input Current Control

5.1 Function

Controlling total current to protect power semiconductor devices from burn-out by the low current (including connecting mistake) and over current.

Operating process

1. Detection : check the output DC voltage of Current Transformer(CT).

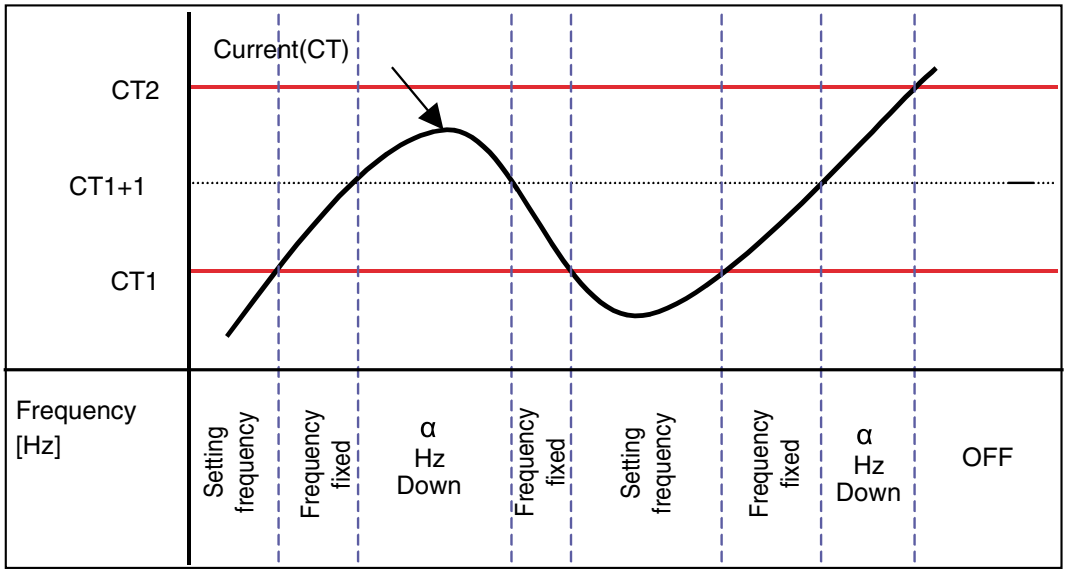
5.2 Operating process

CT 1 detection :

1) If total current exceeds CT1 value, reduce inverter operation by 1 step.
   - Step down 5Hz from current step.
   - If new Hz is below Minimum Hz(30Hz) of operation (cooling & heating), then turn off the compressor.
2) After step down, still if the total current exceed CT1 for more than 5 sec.
   then step down inverter operation by 1 more step.
3) If the current continue below CT1 for more than 1 min., return the to setting step Hz.

CT 2 detection :

1) If total current exceeds CT2 turn off compressor.
   And after 3 min turn on the compressor and check the current again.
2) If CT2 occurs 10 times in 1 hour,stop the operation and shows Self-Diagnosis Error Mode 22



Model	Cooling (CT 1)	Heating (CT 1)	Cooling & Heating (CT 2)	Frequency Down
AHUW166A0	26A	24A	29A	5Hz

6. Outdoor Fan Control

6.1 Function

Working of outdoor fan are different in different models.
Some models are single fan, some are two fan type.

6.2 Operating process

Control logic of outdoor fan depends on outdoor temperature.

1. DC motor fan control

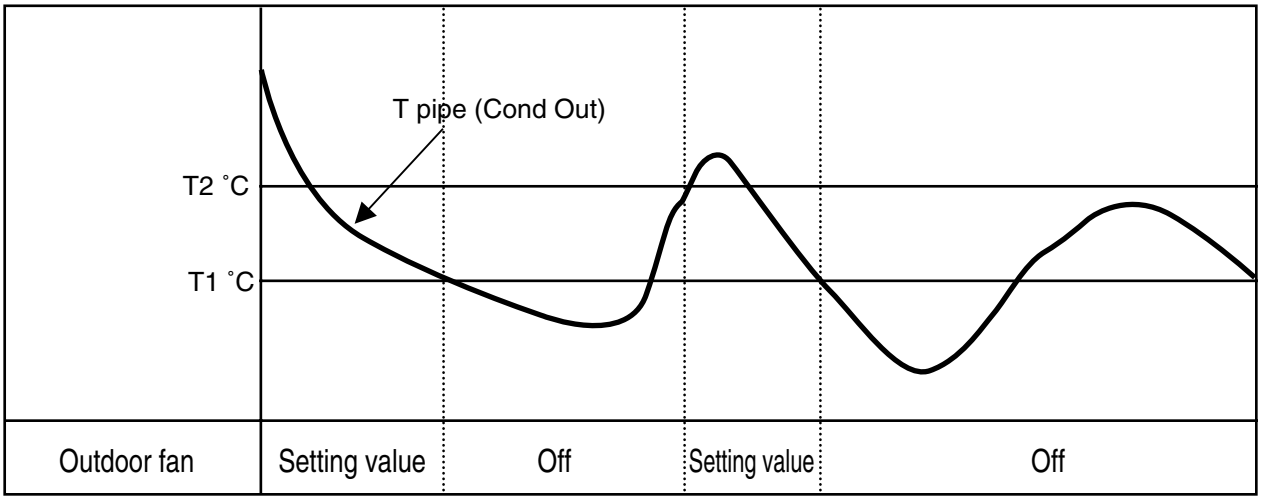
Model	RPM		
	Base Step	Max Step	Min Step
AHUW166A0	670	700	200

Outdoor Temperature	Cooling Step	Outdoor Temperature	Heating Step
41~45°C	Base Step+2	22~26°C	Base Step-4
38~41°C	Base Step+1	18~22°C	Base Step-3
28~38°C	Base Step	14~18°C	Base Step-2
24~28°C	Base Step-2	10~14°C	Base Step-1
18~24°C	Base Step-4	4~10°C	Base Step
14~18°C	Base Step-6	0~4°C	Base Step+1
9~14°C	Base Step-7	-4~0°C	Base Step+2
2~9°C	Base Step-8	-8~-4°C	Base Step+3
-3~2°C	Base Step-9	-	-

Low ambient cooling: In this situation outdoor fan works in ON/OFF control.

If the pipe temperature ≤ T1 and it is falling rapidly in that case compressor will run for 5 min & then it will go in low ambient control.

After the system is stopped by CT cut or heat sink cut-off, cycle will return to the normal operating control.



Model	T1°C	T2°C
AHUW166A0	6°C	11°C

7. Defrost Control

7.1 Function

:These are controls of compressor, fan of outdoor unit, reversing valve, and EEV..

7.2 Starting to the defrosting operation

A) Defrost operation will be started when all the conditions below are matched simultaneously
Accumulation time of operation and the period after completion of defrost = 35min (Outdoor air temperature –3˚C)

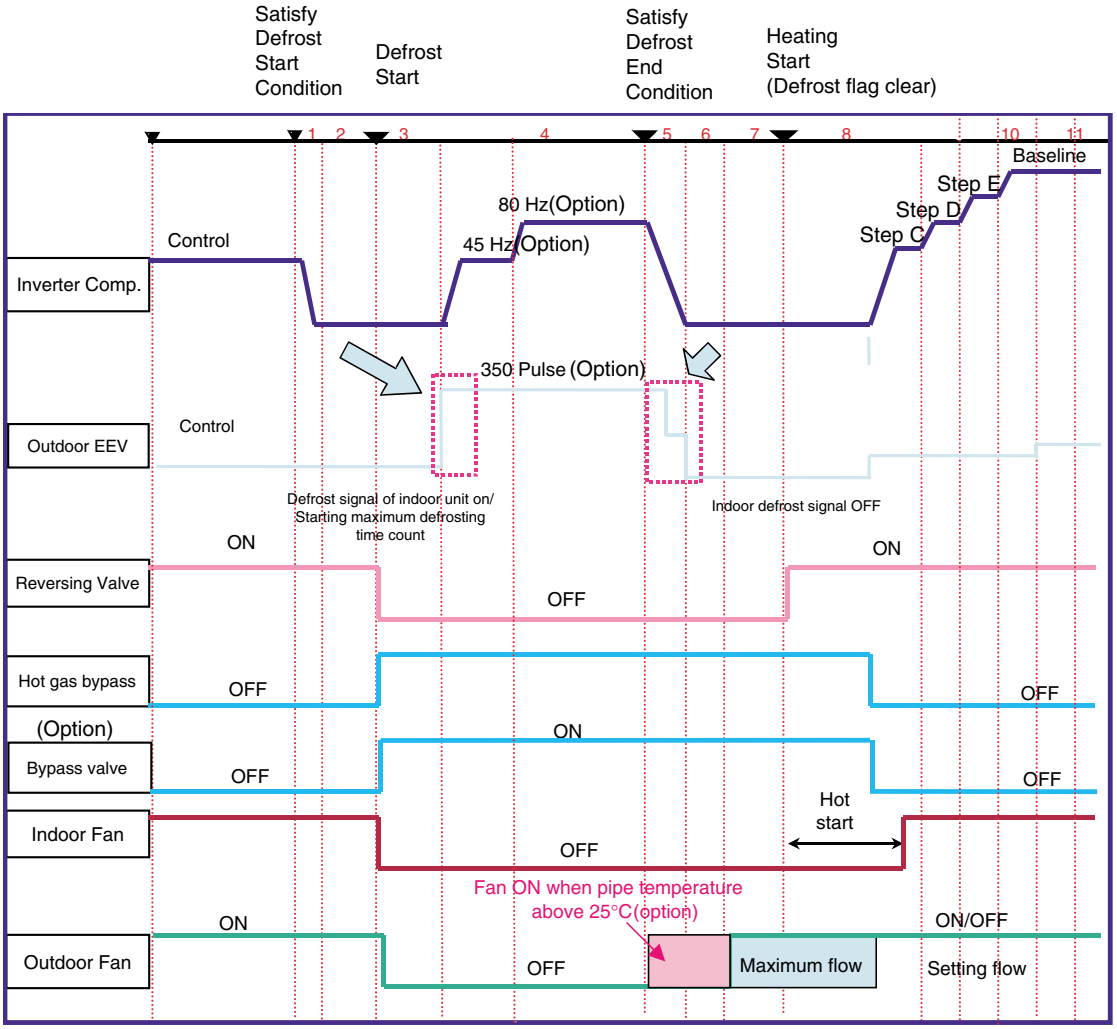
B) Outdoor piping temperature is below than –6 (Option)˚C for starting defrosting operation.

7.3 Completion of defrost operation

Send signal of defrost completion in case of meeting one of the condition as below.

1. Defrosting time ≥ 7 minutes
2. Piping temperature maintain 10 seconds (Option) in condition of more than 12˚C (Option).

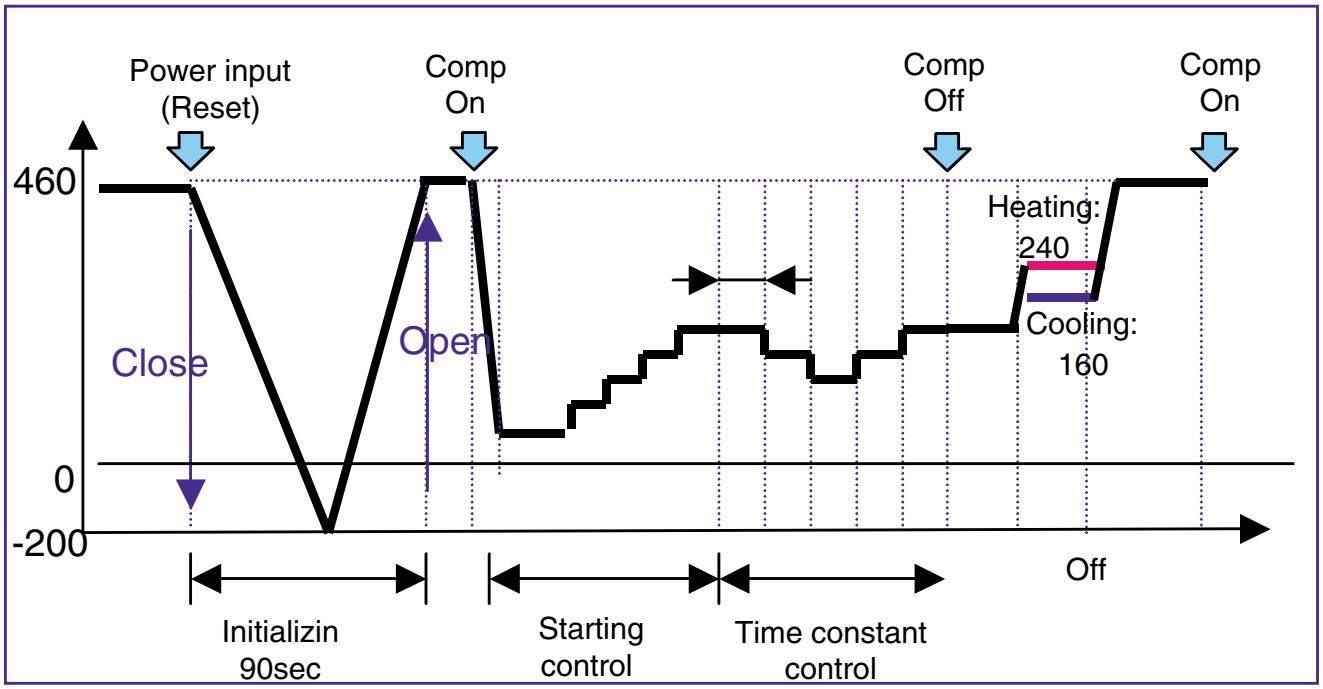
7.4 Defrosting Control Algorithm



8. EEV Control

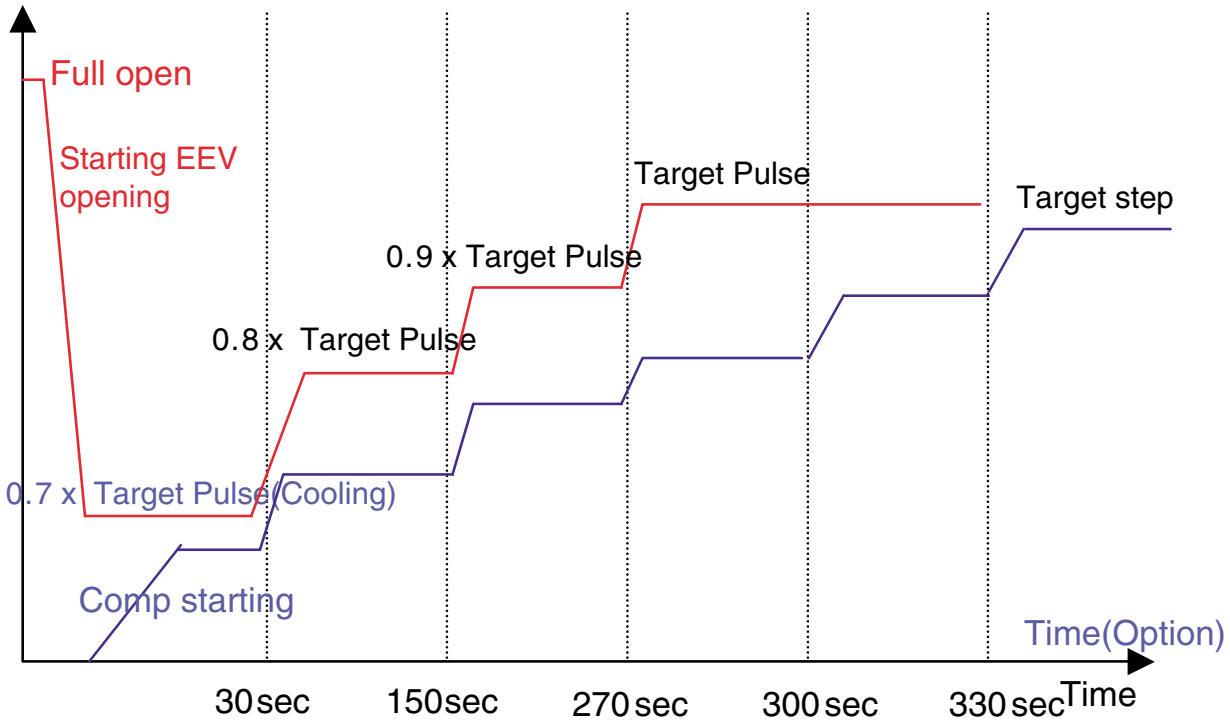
8.1 Control of EEV opening

1. EEV openings have a controllable ranges 70 (option) to 460 (option) pulse in both condition of cooling and heating.
2. Products do not be operated before initializing of EEV when starting.
3. Time constant control period of EEV is every 2 minutes except below conditions.
   - Control EEV every 1 minutes for 10 minutes after starting.
   - Control EEV every 1 minutes for 10 minutes after starting in case of the special situation such as defrost completion, oil supplying, current transformer limitation, limitation of discharge temperature, low ambient operation control.



8.2 Starting control (210 sec)

1) Only 1 EEV will be operate as below and others are closed fully.
2) Starting control does not use the time when the system operate with partial load after (example) after finishing starting control for 1 indoor unit, another indoor unit is ON additionally is operated with target opening of EEV.
3) The indoor units which are in the middle of starting control are continuing starting control with the opening of its opening.
4) Urgent control by indoor piping temperature
   1. EEV open 4 pulse with every 10 sec when the indoor piping temperature is below 2˚C
   2. When the temperature reaches 4˚C, system return to the starting control pulse value.



9. Heat sink control

9.1 Function

: Power module failure protection by checking the temperature of heat sink.
There is a temperature sensor for checking the heat sink temperature.

9.2 Heat sink sensor failure error

Short Check : if temperature ≥130˚C
Open Check : if temperature < - 30˚C
System will go in self diagnosis (error 65) is displayed and product stops.

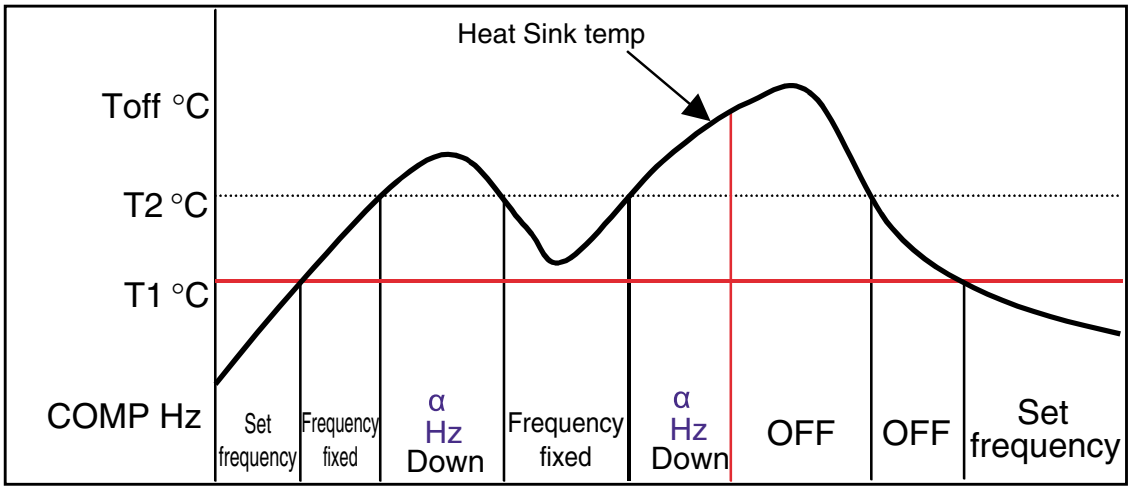
9.3 Heat sink temperature control

a)Heat sink temperature < T1 : No limitation on compressor frequency

b)Heat sink temperature < T2 : Compressor frequency fixed

c)T2 ≤ heat sink temperature < Toff : Compressor frequency down by a Hz in a minute

d) Heat sink temperature ≥ Toff : Compressor will be off.
System will stop if this situation occurs 5 times in 1 hour and error code will be generated also self diagnosis will start.
If high temperature situation occurs 5 times in 1 hr system counts 1 error and after that 4 times if this situation occurs system stops and give error code.
If the temperature reached Toff condition system will count 5 times after that and system will stop with error code.

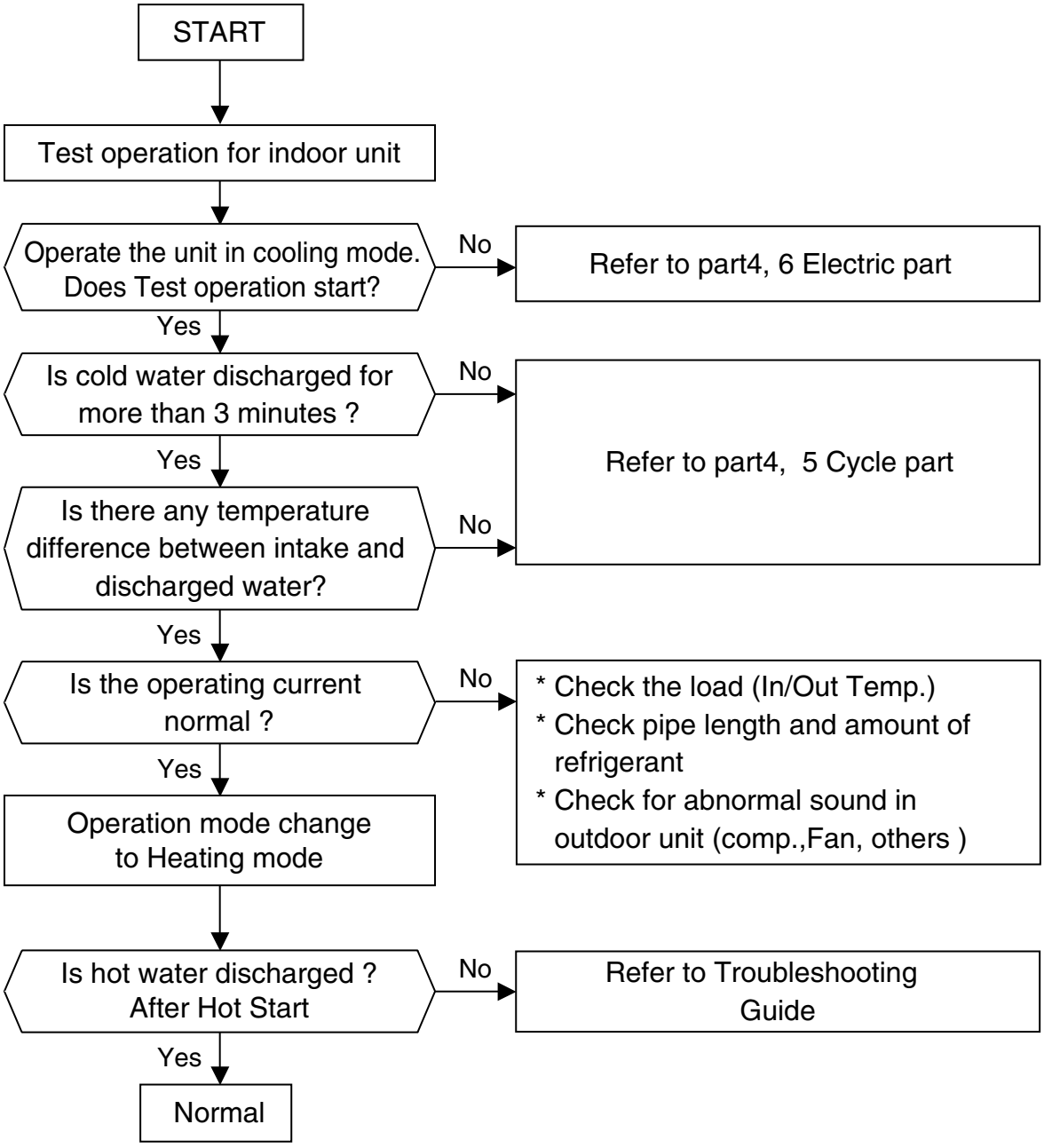


4. Test Run

1. Check before Test Run

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

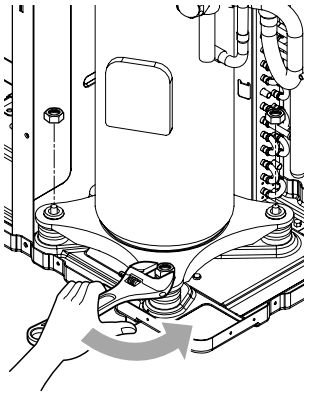
2. Test Run Flow chart



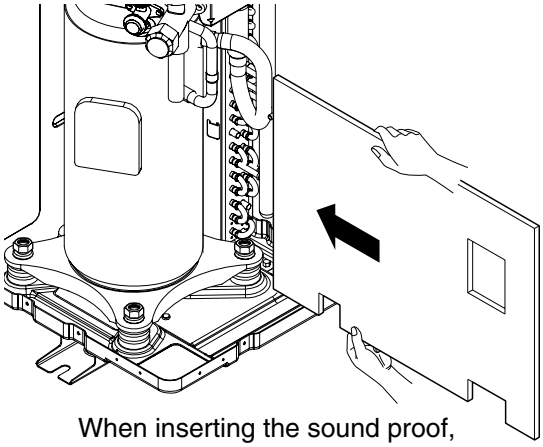
Part 3
Replacement

1. Replacement Procedure for Compressor

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

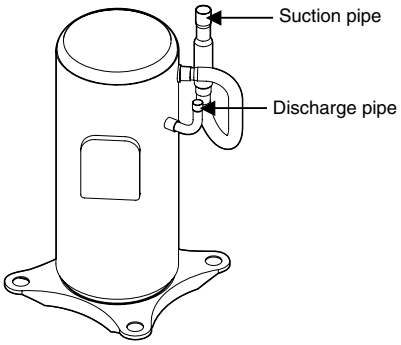


<Figure 1>



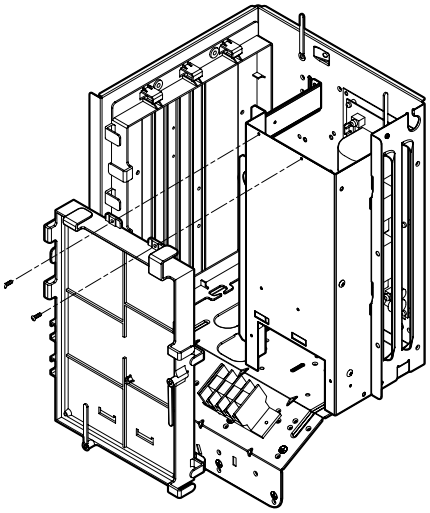
When inserting the sound proof,
be sure to insert counter-clockwise.

<Figure 2>

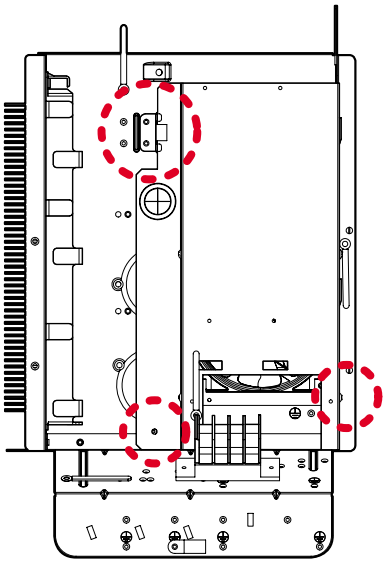


2. Replacement Procedure for INV PCB

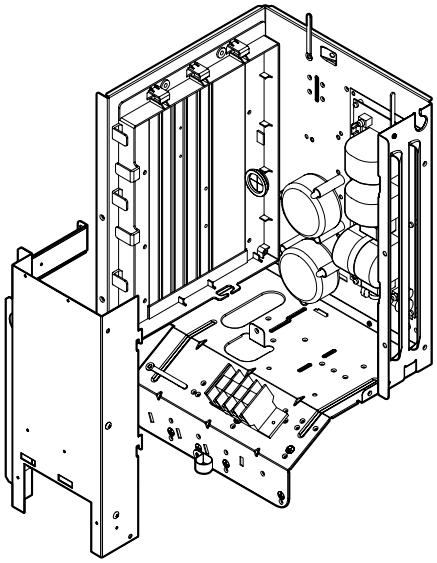
1. Disassemble main PCB by unscrewing 2 screws. (Figure 1.)
2. Disassemble panel assembly (with cooling fan) by unscrewing 4 screws. (Figure 2.)
3. Replace INV PCB assembly. (Figure 3.)
   When assemble INV PCB assembly with control case, make sure that PCB case is inserted surely in the slit of control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



< Figure 1. >



< Figure 2-1. >



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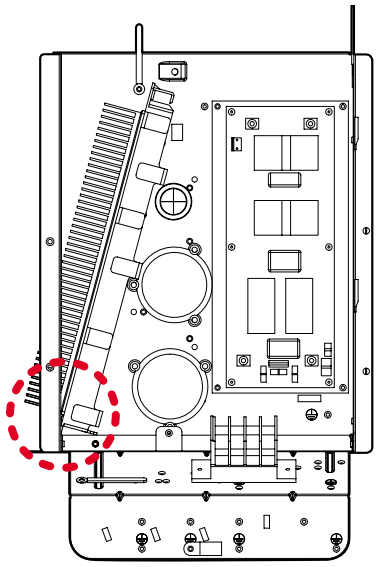
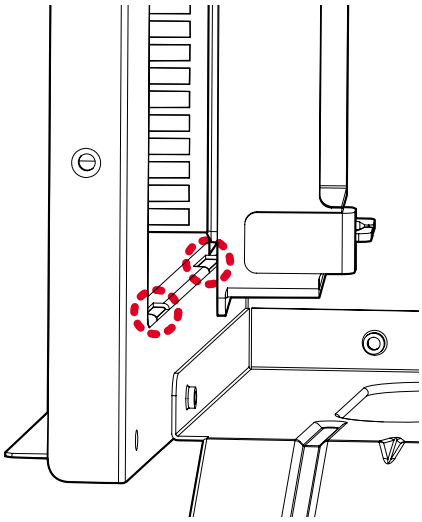
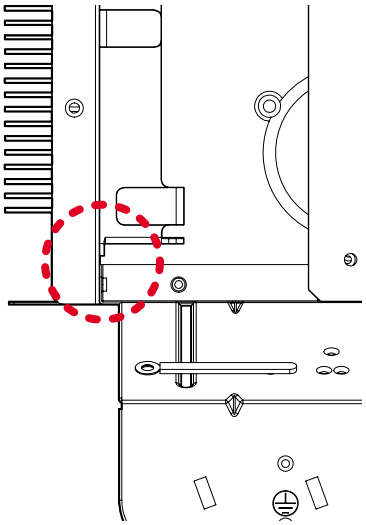


< Figure 3-1. >



< Figure 3-2. >



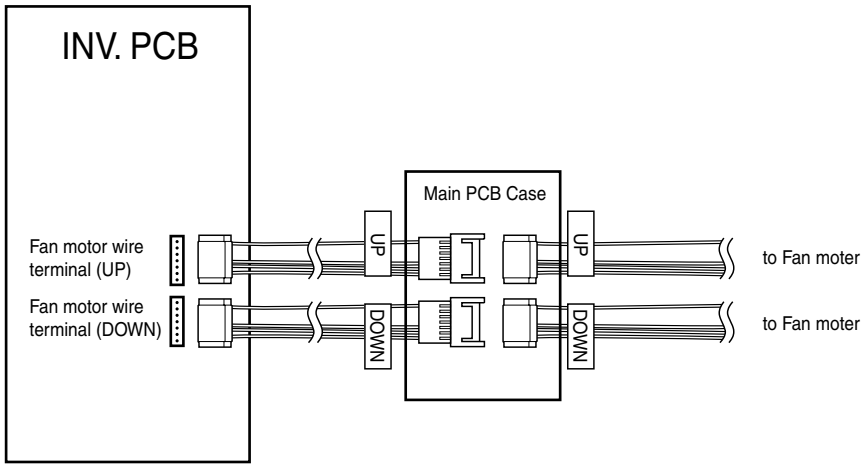
< Figure 4. >

CAUTION

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

CAUTION

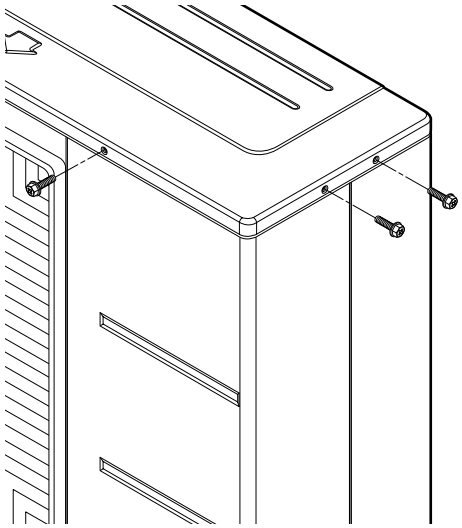
After replace the INV PCB assembly, make sure that connection of fan motor wires is correct.



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

3. Caution for Assembling Outdoor Panels after Test Run

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

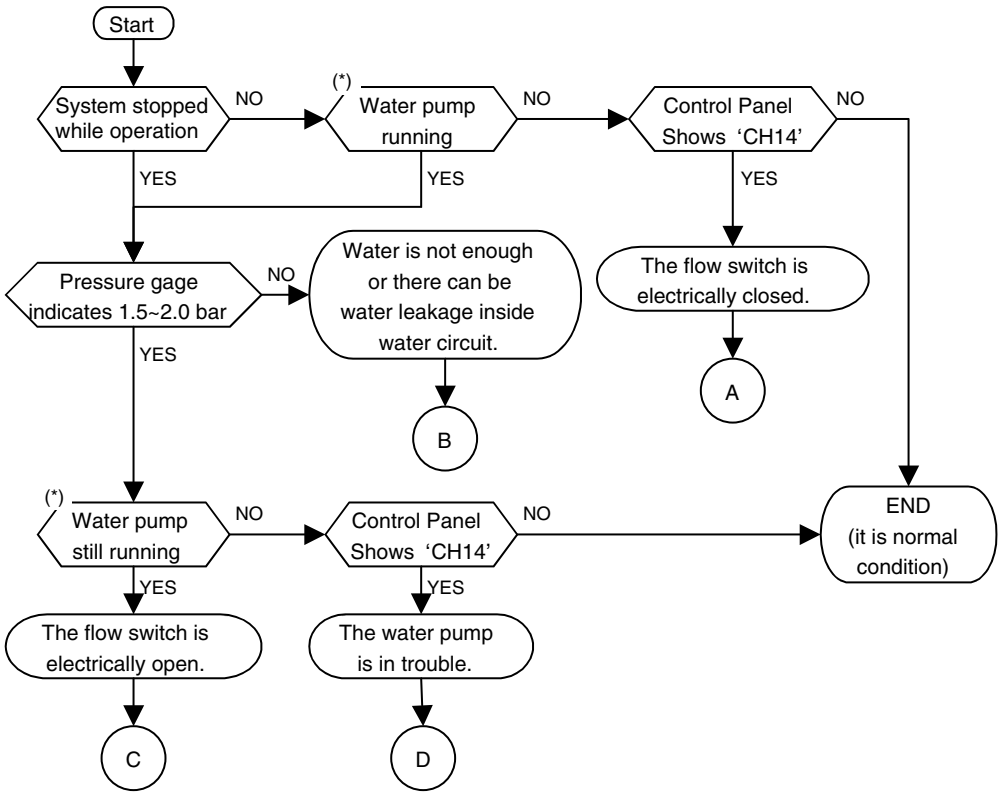


Part 4
Trouble Shooting

Trouble Shooting

1. Checking Key Components of Indoor Unit

1.1 Flow Switch



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

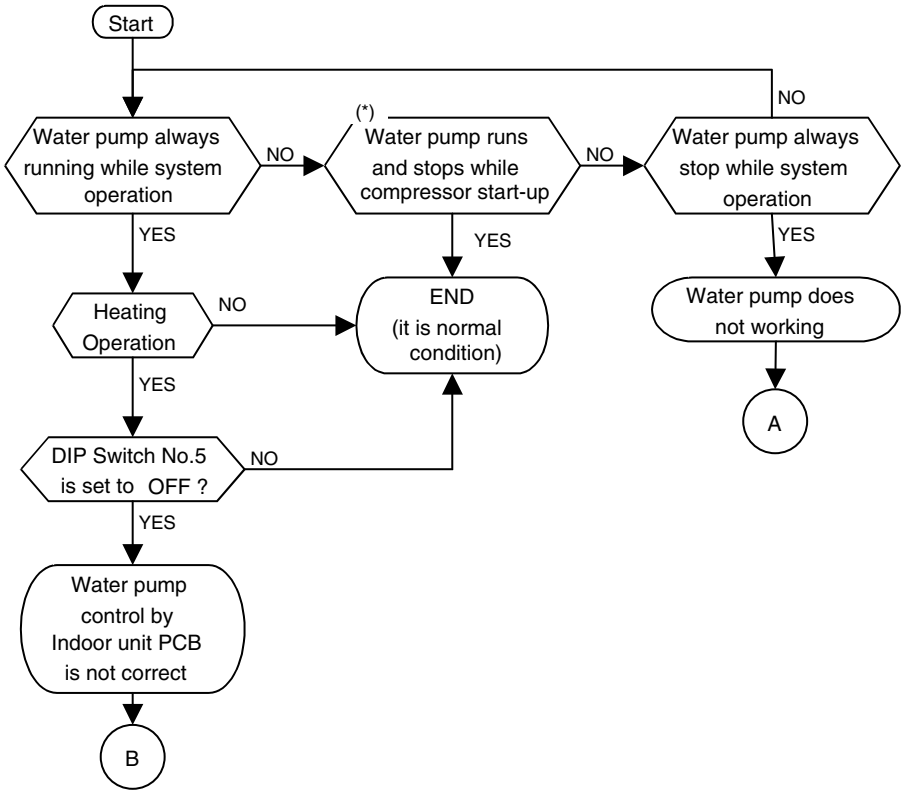
A
- Although there is not water flow inside water circuit, the flow switch detects as if water is flowing. It is due to electrically closed (or short) of flow switch or the contact of flow switch is mechanically stuck.
- Contact official After Service Center and replace the flow switch.

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

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

D
- Read 'Checking Key Components of Indoor Unit – Water Pump' carefully to get more detail information.
- Contact official After Service Center and replace the water pump.
- Also, check the water quality if there are particles that can yield locking at the shaft of the water pump.

1.2 Water Pump



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

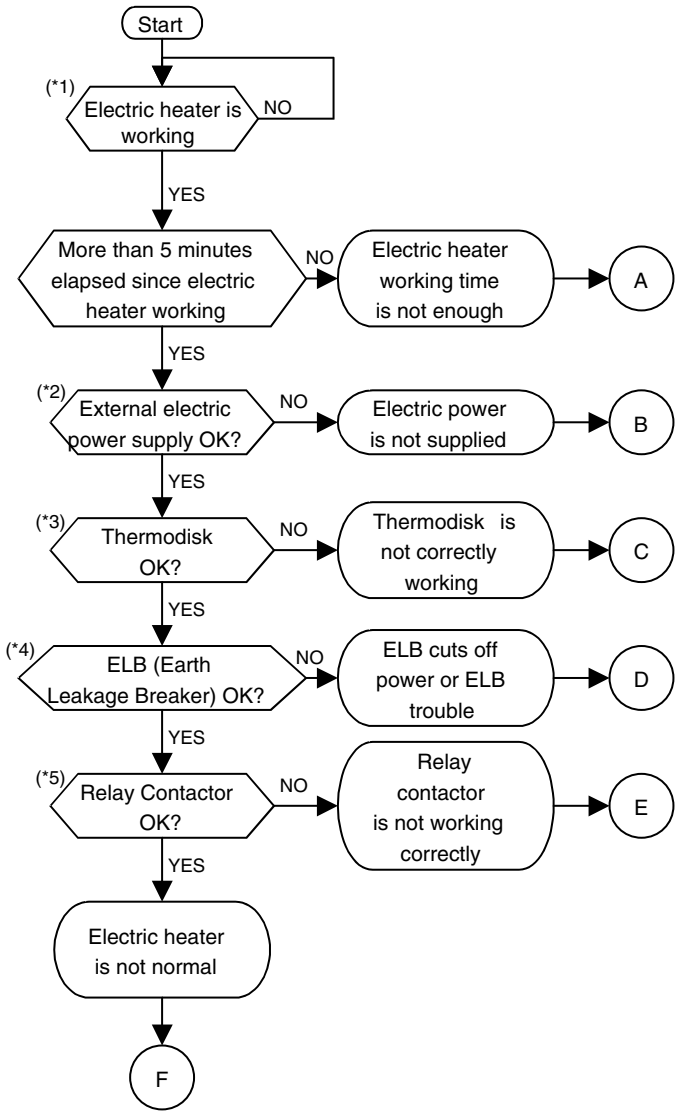
A

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

B

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

1.3 Electric Heater



(*1): When electric heater is working, 'Electric Heater Operating Icon(W_1 or W_2) ' is displayed at control panel.

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

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

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

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

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

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

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

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

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

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

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

1.4 Control Panel

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

No	Topic	Question	Answer
1	Power button does not bright	System installation is finished. Also, all wirings including power connection is all right. But when the power button in front of the control panel is pushed, it does not bright.	• There can be a problem in wiring between PCB and control panel. Open control box and find 'CN_REMO' connector at the PCB. If the connector is empty or nothing is connected, please connect it with end of wire which is from control panel then restart the system. • Check if external controller is connected like thermostat. If thermostat is connected to the system and it is configured exactly, you can see 'Thermostat Icon ( )' at the display of the control panel. It is normal condition that power button of control panel does not work when thermostat is installed.
2	Some icons are displayed automatically	Although nobody touched control panel, someties it displays specific icons and the system operates automatically.	• It is normal condition. Basically, two features can be operated without user's decision – one is system protective operation, the other is 'background water tank heating operation', which is heating inside the water tank while space heating is not used or the system is not working. System protective operation is, as letter says, for the purpose of securing the system from worse condition. Anti-freezing operation, for example, is one of the protective operation. It is essential to start protective operation to prevent potential malfunction and to keep possible accidents. On the other hand, background water tank heating operation is not protective operation but to supply warm water to end-user. The background water tank heating operation is only started when the water tank temperature is under the specific temperature.
3	Water tank heating or related features are not permitted	Setting water tank temperature is not permitted although the water tank is installed.	Following two conditions should be satisfied. • Check if 'Water tank enable/disable' button is correctly pushed or not. To use water tank, end-user must push button and highlight icon. Otherwise, water tank heating is disabled. • Also, check if DIP switch setting is correct or not. To identify the DIP switch setting, open the control box inside the indoor unit. Unless 2nd and 3rd pin of DIP switch setting is 01(OFF-ON) or 10(ON-OFF), the water tank heating will not be configured.
4			

2. Checking Key Components of Outdoor Unit

2.1 Compressor

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

<table>
<tr><th>No.</th><th>Checking Item</th><th>Symptom</th><th>Countermeasure</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">How long is power on during operation?</td><td>1) Power on for 12 hours or more</td><td>• Go to No.2.</td></tr>
<tr><td>2) Power on for 12 hours or less</td><td>• Go to No.2 after applying power for designated time (12 hours).</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Does failure appears again when starting operation?

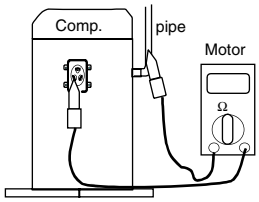
Method to measure insulation resistance
 

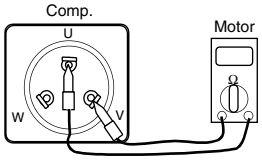
Figure 1.
Method to measure coil resistance
 

Figure 2.</td><td>1) The compressor stops and same error appears again.</td><td>• Check if IPM failure is occurred.</td></tr>
<tr><td>2) If output voltage of the inverter is stably.</td><td>• Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor.
• Insulation resistor: 2㏁ or more
• Coil resistor:
at 20°C
<table><tr><th></th><th>Inverter (ANB42FBDMT)</th></tr><tr><td>U-V</td><td>0.188±7%</td></tr><tr><td>V-W</td><td>0.188±7%</td></tr><tr><td>W-U</td><td>0.188±7%</td></tr></table></td></tr>
<tr><td>3) If output voltage of the inverter is unstable or it is 0V.
(When incapable of using a digital tester)</td><td>• Check the IPM.
If the IPM is normal, replace the inverter board.
• Check coil resistor and insulation resistor.</td></tr>
</table>

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

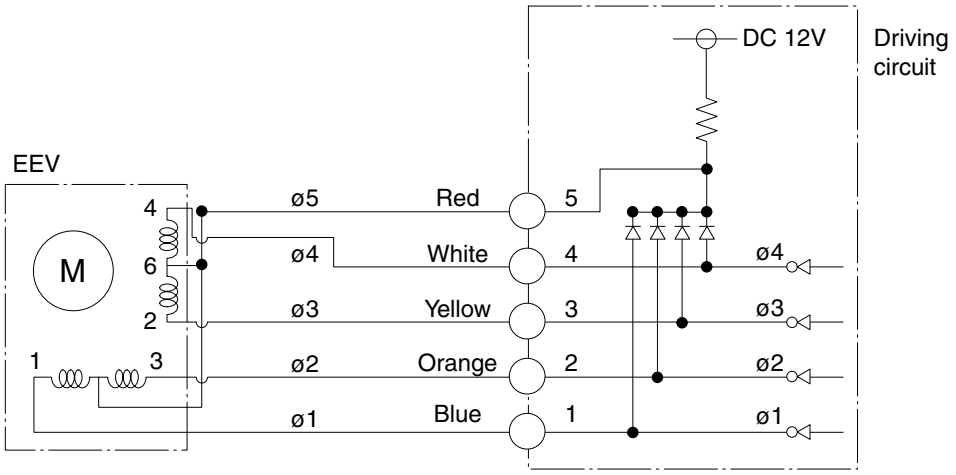
Measuring values may be different depending on measuring tools and measuring circuits since voltage, current in the power supply or output side of the inverter has no same waveform.
Especially, output voltage changes when output voltage of the inverter has a pattern of pulse wave.
In addition, measuring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

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

2.2 Fan Motor

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

2.3 Electronic Expansion Valve



• Pulse signal output value and valve operation

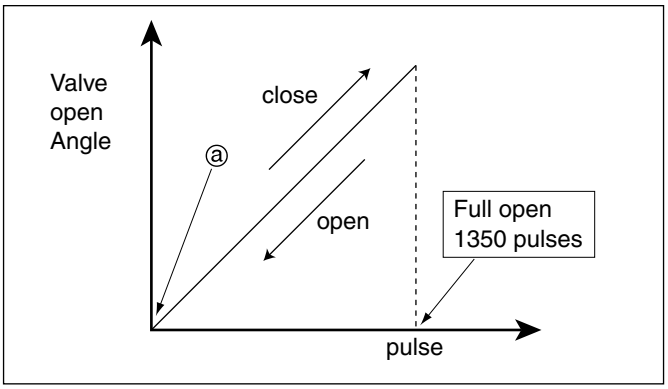
Output(ø) No.	Output state							
	1	2	3	4	5	6	7	8
ø1	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
ø2	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
ø3	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
ø4	OFF	OFF	OFF	OFF	ON	ON	ON	OFF

• Output pulse sequence

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

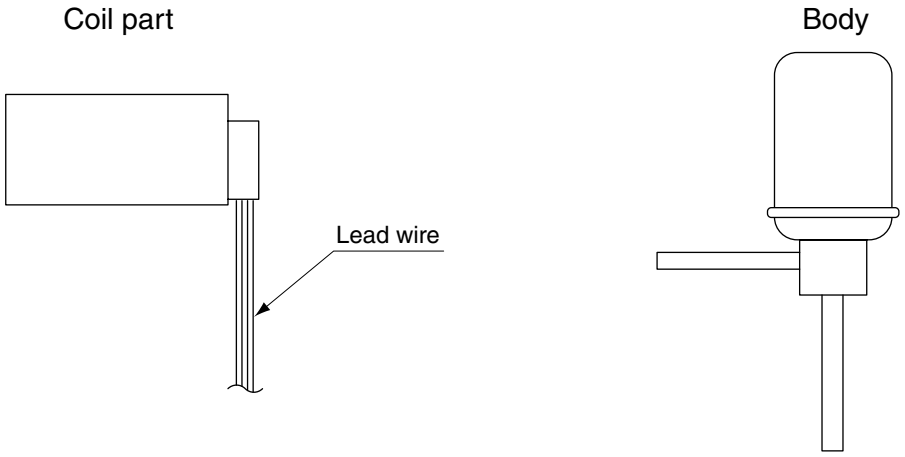
1. If EEV open angle does not change, all of output phase will be OFF
2. If output phase is different or continuously in the ON state, motor will not operate smoothly and start vibrating.

• EEV valve operation

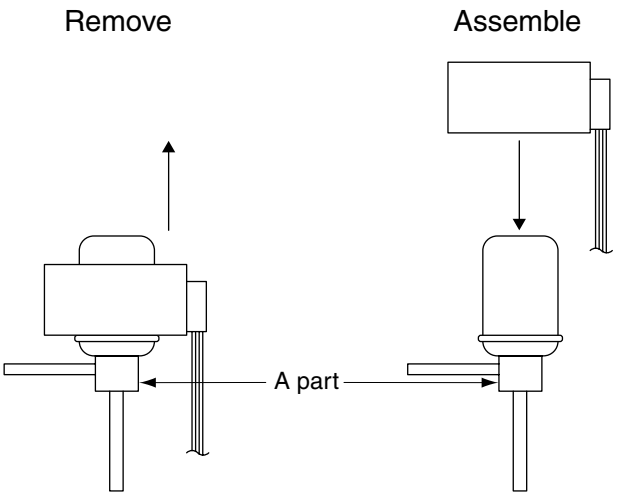


- At power ON, open angle signal of 1400 pulses output and valve position is set to ⓐ
  If valve operates smoothly, no noise and vibration occurs and if valve is closed. noise occurs.
- Noise from EEV can be confirmed by touching the EEV surface with a screw driver and listening the EEV noise.
- If liquid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

• EEV Coil and body(Outdoor unit)



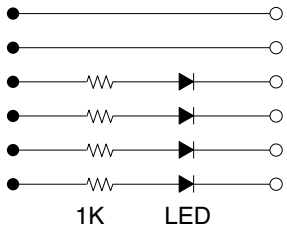
• Remove and assemble the coil



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

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

- **EEV failure check method**

Failure mode	Diagnosis	Repair process	Unit
Microcomputer Driving circuit failure	1.Disconnect the EEV connector form control board and connect testing LED  2. Main power ON, pulse signal is out from EEV for 17 sec. If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal	Check and replace Indoor unit control board	Indoor unit
EEV locking	1.If EEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace EEV	Indoor / Outdoor unit
EEV Motor coil short or misconnection	1. Check the resistance between coil terminal (red-white, red-yellow, red-orange, red-blue) 2. If the estimated resistance value is in 52 ± 3Ω then the EEV is normal	Replace EEV	Outdoor unit
	1. Check the resistance between coil terminal (brown-white, brown-yellow, brown-orange, brown-blue) 2. If the estimated resistance value is in 150 ± 10Ω then the EEV is normal	Replace EEV	Indoor unit
Full closing (valve leakage)	1. Operate indoor unit with FAN mode and operate another indoor unit with COOLING mode 2. Check indoor unit(FAN mode) liquid pipe temperature (from operation monitor of outdoor unit control board) 3. When fan rotate and EEV is fully closed, if there is any leakage, then the temperature is down If estimated temperature is very low in comparison with suction temperature which is displayed at remote controller then the valve is not fully closed	If the amount of leakage is much, Replace EEV	Indoor unit

3. Self-Diagnosis Feature

3.1 Concept of 'Classified Trouble'

• Definition of terms

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

• Objective of introducing 'Trouble'

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

• Classified Trouble

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

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

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

3.2 Error Code List

Code No.	Description	Classification				Unit
		Slight Trouble	Heavy Trouble	Option Trouble	Error	
01	Problem in Remote Room Air sensor	O				Indoor
02	Problem in Refrigerant (Inlet side) sensor		O			Indoor
03	Bad communication between control panel and indoor unit				O	Indoor
05	Bad communication between Indoor unit and Outdoor unit				O	Indoor / Outdoor
06	Problem in Refrigerant (Outlet side) sensor		O			Indoor
08	Problem in Water Tank sensor			O		Water Tank
09	PCB Program (EEPROM) Fault				O	Indoor
13	Problem in Solar-thermal sensor			O		Indoor
14	Problem in Flow Switch				O	Indoor
15	Water pipe overheated				O	Indoor
16	Problems in sensors				O	Indoor
17	Problem in Water-inlet sensor	O				Indoor
18	Problem in Water-outlet sensor	O				Indoor
19	Problem in Water-interlim sensor	O				Indoor

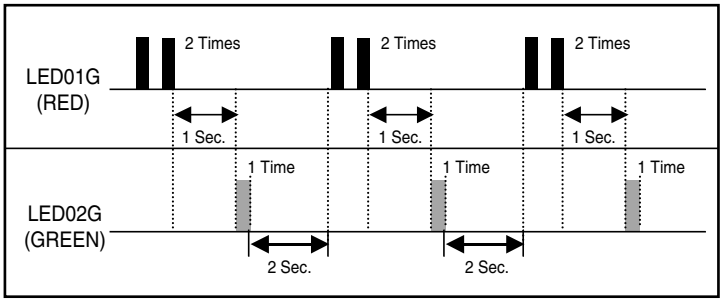
• Notice of error code

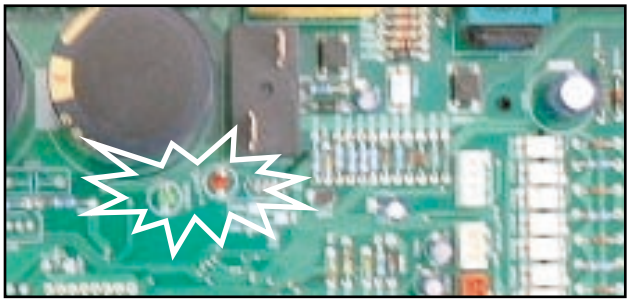
- Slight / Heavy / Option Troubles : lowercases ‘ch’ + code no.
- Errors : capital letters ‘CH’ + code no.

Code No.	Description	Classification				Unit	LED Blinking	
		Slight Trouble	Heavy Trouble	Option Trouble	Error		LED1 (Red)	LED2 Green)
21	DC Peak (IPM Fault)		O			Outdoor	2 times	1 time
22	CT 2 (Max CT)		O			Outdoor		2 times
23	DC Link Voltage is low		O			Outdoor		3 times
24	High Pressure / Low Pressure switch activated		O			Outdoor		4 times
25	Voltage is too low or too high		O			Outdoor		5 times
26	Problem in DC Compressor positioning		O			Outdoor		6 times
27	PSC Fault		O			Outdoor		7 times
28	DC Link Voltage is high		O			Outdoor		8 times
29	High current at Compressor phases		O			Outdoor		9 times
32	Temperature at discharge-pipe is too high		O			Outdoor	3 times	2 times
40	Problem in CT sensor		O			Outdoor	4 times	none
41	Problem in discharge-pipe temperature sensor		O			Outdoor		1 time
44	Problem in ambient temperature sensor		O			Outdoor		4 times
45	Problem in condenser-pipe temperature sensor		O			Outdoor		5 times
46	Problem in suction-pipe temperature sensor		O			Outdoor		6 times
52	Bad communication between internal PCBs		O			Outdoor	5 times	2 times
53	Bad communication between Indoor unit and Outdoor unit		O			Outdoor		3 times
60	EEPROM Checksum mismatched		O			Outdoor	6 times	none
61	Temperature at condenser-pipe is too high		O			Outdoor		1 time
62	Temperature at heatsink is too high		O			Outdoor		2 times
63	Temperature at condenser-pipe is too low		O			Outdoor		3 times
65	Problem in heatsink temperature sensor		O			Outdoor		5 times
73	Instant over current input		O			Outdoor	6 times	3 times

Error Indicator (Outdoor PCB)

Outdoor Error
Ex) Error 21 (DC Peack)





CAUTION

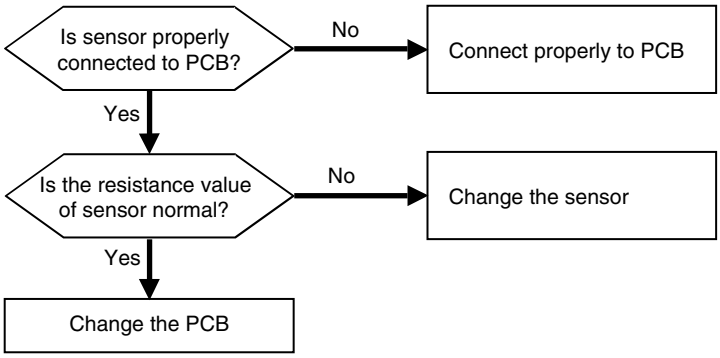
Precaution in Service or Check

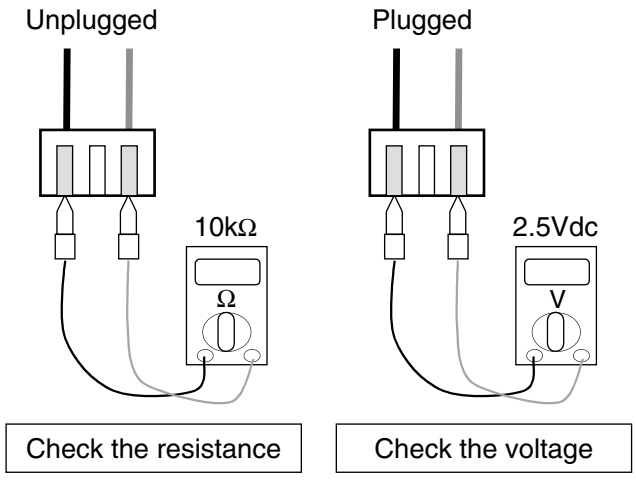
Even after stopping the operation of product, it takes some time to discharge the remaining electricity of the electrolytic capacitor that was charged early. Before conducting a checking or repairing job, pull out the plug out of the outlet and make sure that the lamp on the control board outdoor unit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

4. Trouble Shooting Guide

Code No.	Description	Cause	Normal Condition
01	Problem in Remote Room Air sensor	• Incorrect connection between sensor and PCB • PCB fault • Sensor fault	• Resistance: 10k ohm at 25 centigrade (unplugged) → for Remote Room Air sensor • Resistance: 5k ohm at 25 centigrade (unplugged) → for all sensors EXCEPT Remote Room Air sensor • Voltage: 2.5Vdc at 25 centigrade (plugged) (for all sensors) • Refer resistance-temperature table to check in different temperature
02	Problem in Refrigerant (Inlet side) sensor		
06	Problem in Refrigerant (Outlet side) sensor		
08	Problem in Water Tank sensor		
13	Problem in Solar-thermal sensor		
16	Problems in sensors		
17	Problem in Water-inlet sensor		
18	Problem in Water-outlet sensor		
19	Problem in Water-interlim sensor		

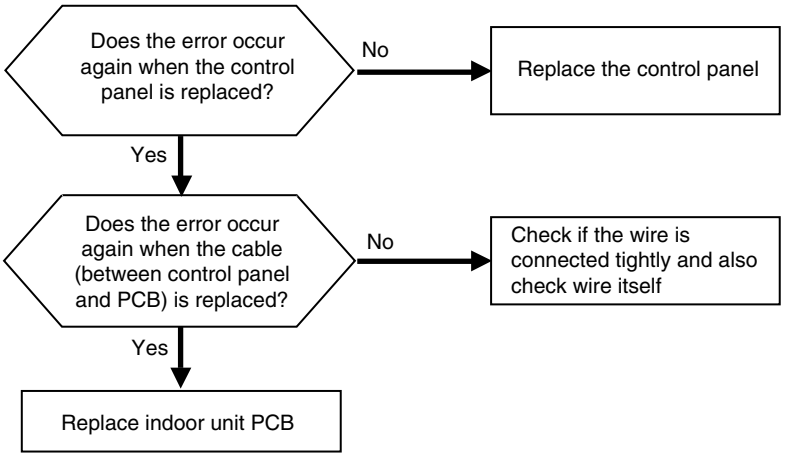
■ Error diagnosis and countermeasure flow chart

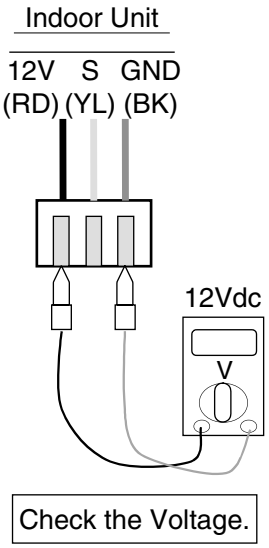




Code No.	Description	Cause	Normal Condition
03	Bad communication between control panel and indoor uni	• Incorrect connection between sensor and PCB • PCB fault • Sensor fault	• Wire connection between control panel and indoor unit PCB should be tight • Output voltage of PCB should be 12Vdc

■ Error diagnosis and countermeasure flow chart

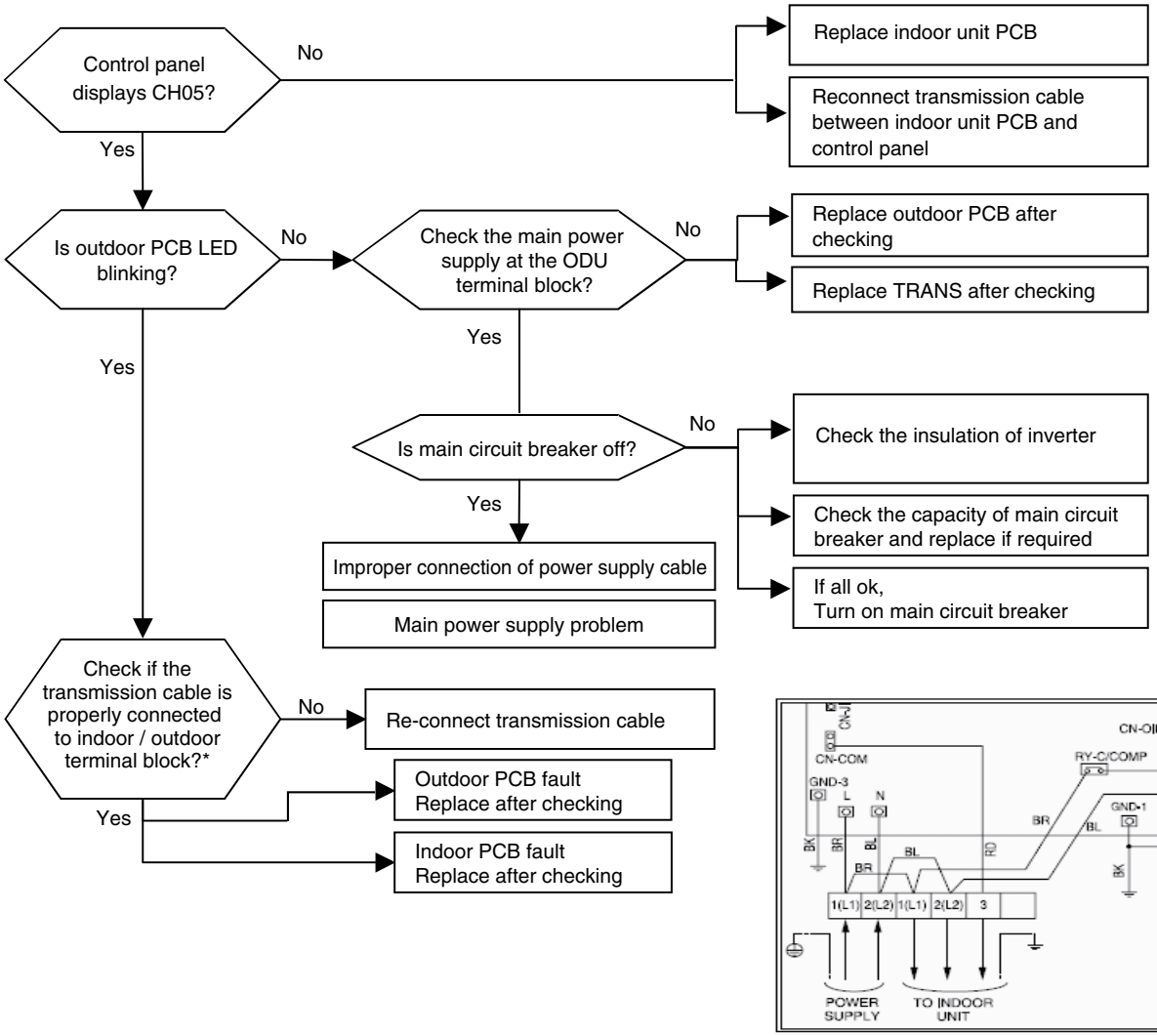




After replacing the control panel or indoor unit PCB, it is very important to perform parameter setting by 'entering Installer Setting Mode' at the control panel.
If not, system will NOT be operated correctly. It is STRONGLY recommended to keep above instruction.

Code No.	Description	Cause	Normal Condition
05	Bad communication between Indoor unit and Outdoor unit	• The connector for transmission is disconnected • The connecting wires are misconnected • The communication line is broken • Outdoor PCB is abnormal • Indoor PCB is abnormal	• Wire connection between control panel and indoor unit PCB should be tight
53			

■ Error diagnosis and countermeasure flow chart



※ CH05 is displayed at indoor unit,
CH53 is displayed at outdoor unit.

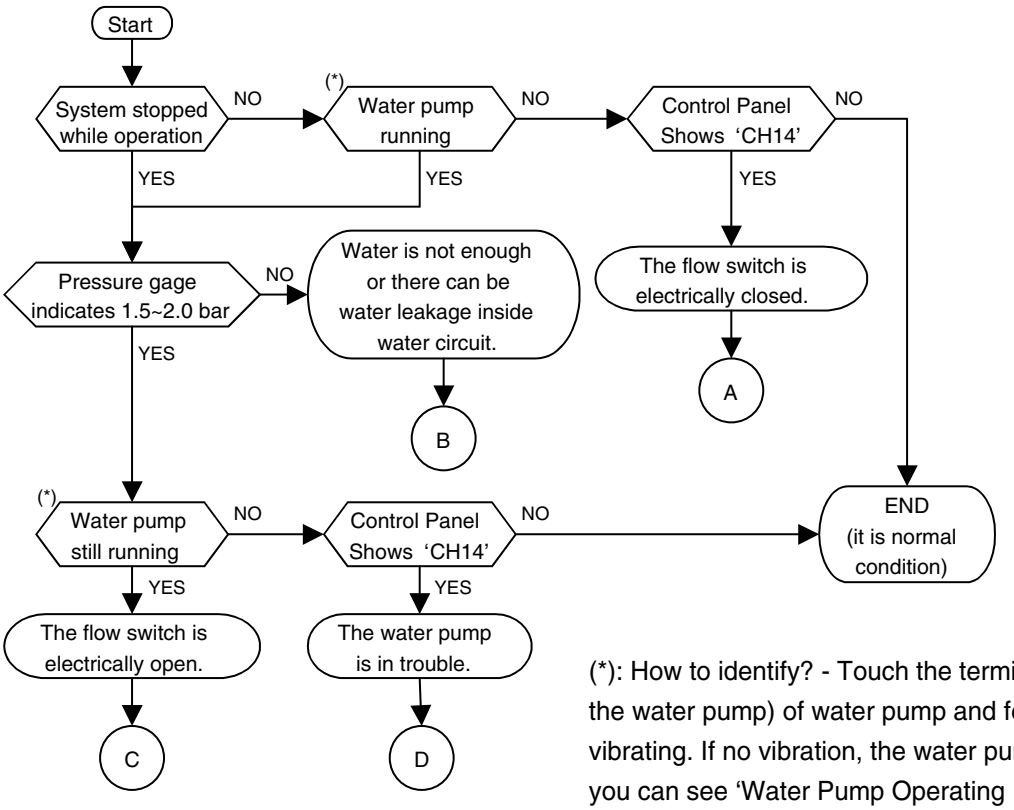
Code No.	Description	Cause	Normal Condition
09	PCB Program (EEPROM) Fault	• Electrical or mechanical damage a the EEPROM	• This error can not be permitted

■ Error diagnosis and countermeasure flow chart

- Replace the indoor unit PCB

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

■ Error diagnosis and countermeasure flow chart



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

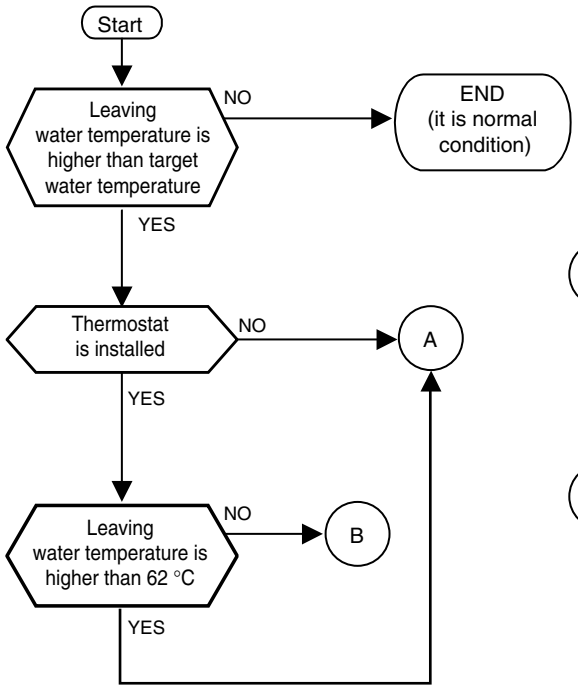
A
- Although there is not water flow inside water circuit, the flow switch detects as if water is flowing. It is due to electrically closed (or short) of flow switch or the contact of flow switch is mechanically stuck.
- Contact official After Service Center and replace the flow switch.

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

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

D
- Read 'Checking Key Components of Indoor Unit – Water Pump' carefully to get more detail information.
- Contact official After Service Center and replace the water pump.
- Also, check the water quality if there are particles that can yield locking at the shaft of the water pump.

Code No.	Description	Cause	Normal Condition
15	Water pipe overheated	• Abnormal operation of electric heater • Leaving water temperature is above 72°C	• If there is no problem in electric heater control, possible maximum leaving water temperature is 62°C.

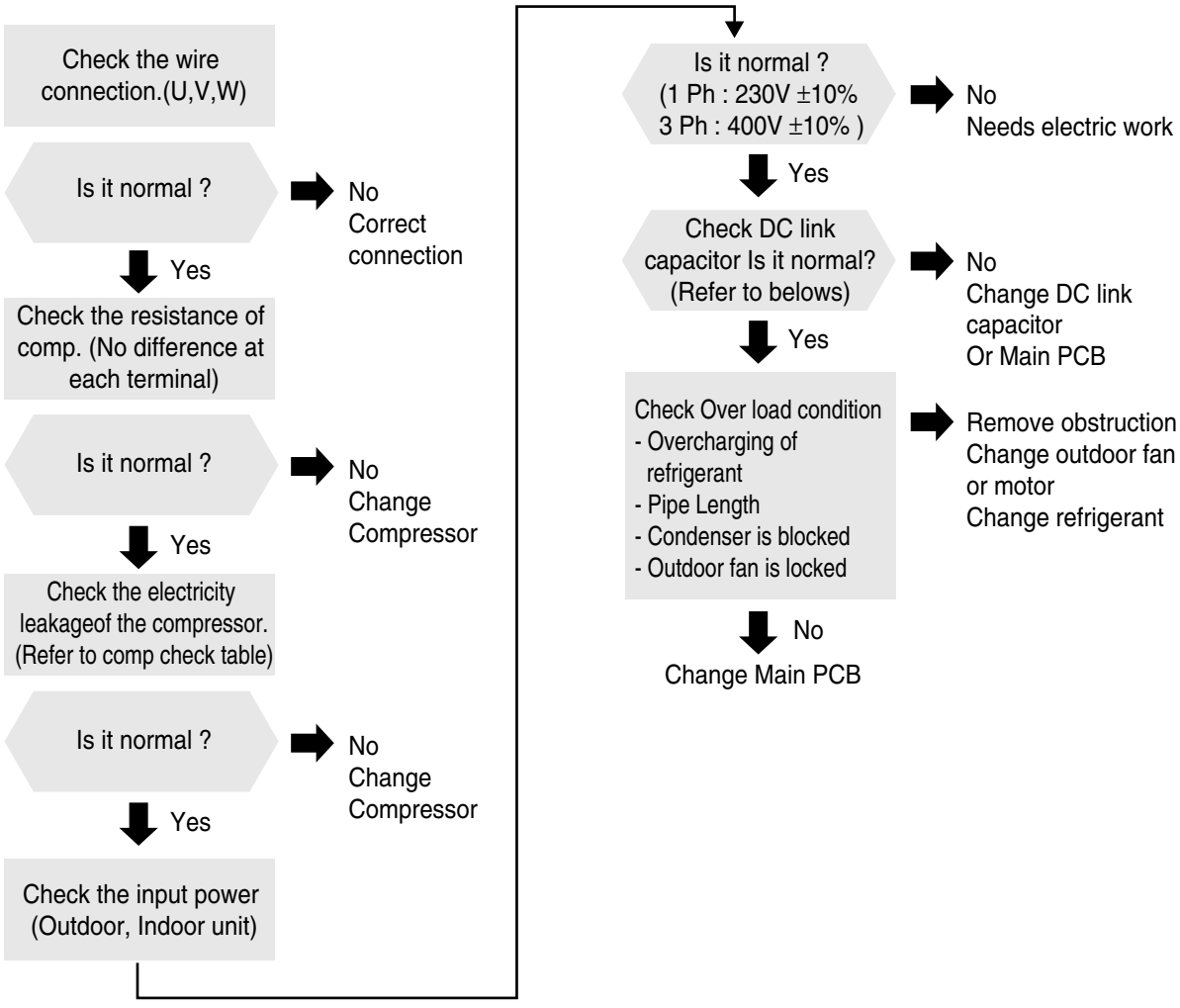


A
- This is unexpected case.
- Turn off the system and call service center.
- If the system is not turned off before it yields error code (CH15), very hot leaving water will be generated and it is harmful to human.

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

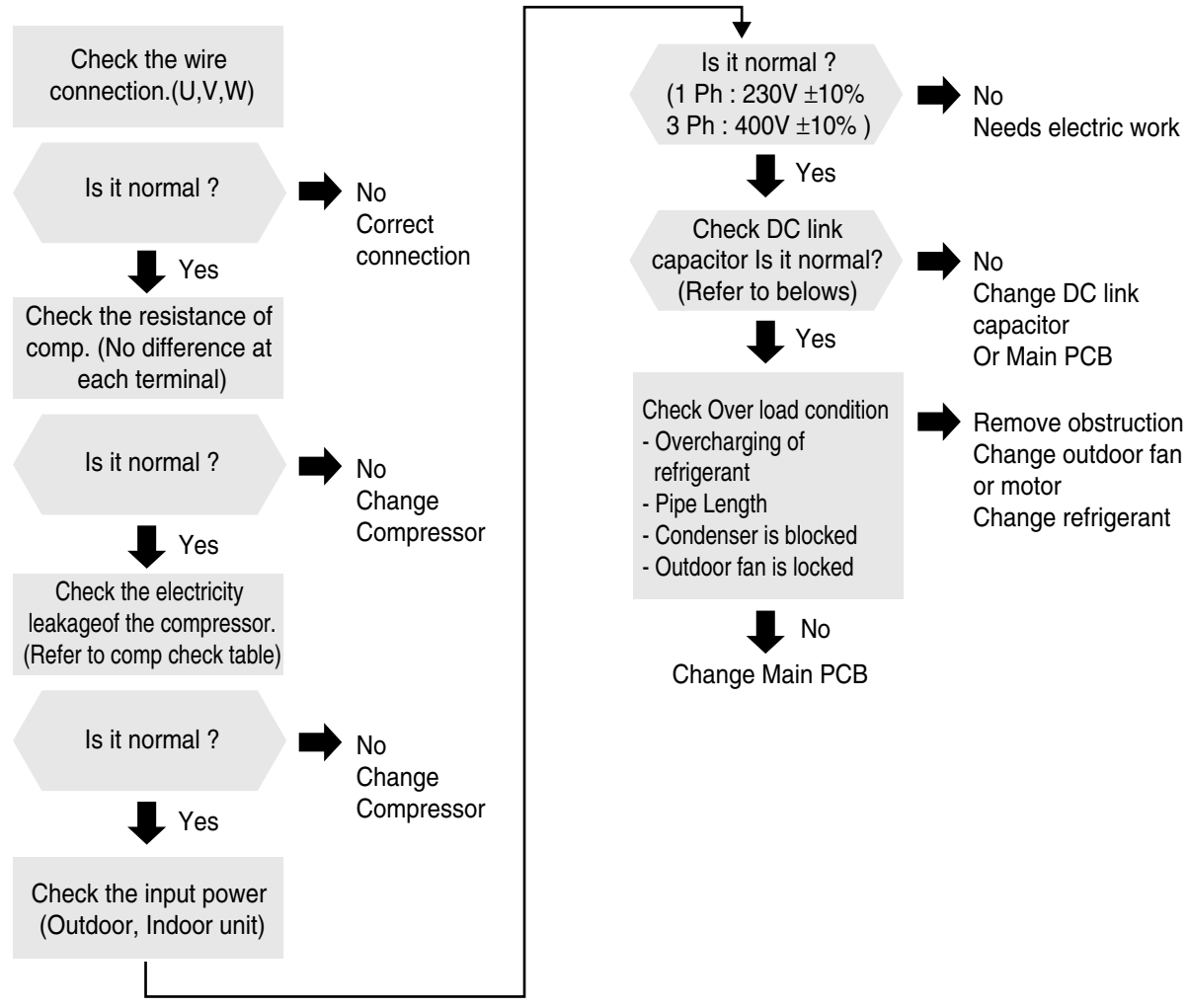
Display code	Title	Cause of error	Check point & Normal condition
21	DC Peak	• Instant over current • Over Rated current • Poor insulation of IPM	• An instant over current in the U,V,W phase - Comp lock - The abnormal connection of U,V,W • Over load condition - Overcharging of refrigerant - Pipe length.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

Check Flow Chart



Display code	Title	Cause of error	Check point & Normal condition
22	Max. C/T	• Over current	• Malfunction of compressor • Blocking of pipe • Low voltage input • Refrigerant, pipe length, blocked, …

Check Flow Chart



Display code	Title	Cause of error	Check point & Normal condition
23	DC Link Low voltage.	• 1ph : DC link volt. is 140Vdc ↓ • 3ph : DC link volt. is 250Vdc ↓	• Check the power source. • Check the components.
28	DC Link High voltage	• 1ph : DC link volt. is 140Vdc ↑ • 3ph : DC link volt. is 250Vdc ↑	• Check the power source. • Check the components.

Check Flow Chart

Check the wire connection.(U,V,W)

↓

Is it normal ? → No → Correct connection

↓ Yes

Is it normal ? → No → Change Compressor

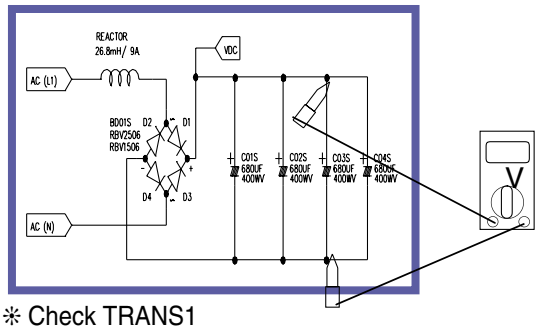
↓ Yes

Is it normal ? → No → Change Compressor

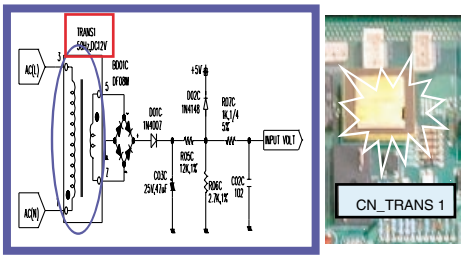
↓ Yes

Check the input power

※ Check DC link voltage



※ Check TRANS1



Display code	Title	Cause of error	Check point & Normal condition
24	Press S/W Open	• Low / High press S/W open.	• Check the connection of “CN_PRESS” • Check the SVC V/V open. • Check the leakage of refrigerant.

Check Flow Chart

Is the wire connection normal ?
→ No: Correct connection
↓ Yes

Is the soldering state of connector is normal?
→ No: Re-soldering component
↓ Yes

Is the SVC Valve opened ?
→ No: Open SVC Valve
↓ Yes

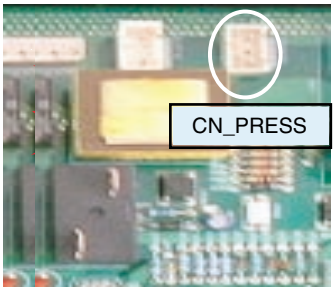
Check the leakage of refrigerant.
Check Pressure of suction pipe
Check Pressure of discharge pipe

Is it normal ?
→ No: Re-vaccuming system & Re-charging
↓ Yes

Change main PCB

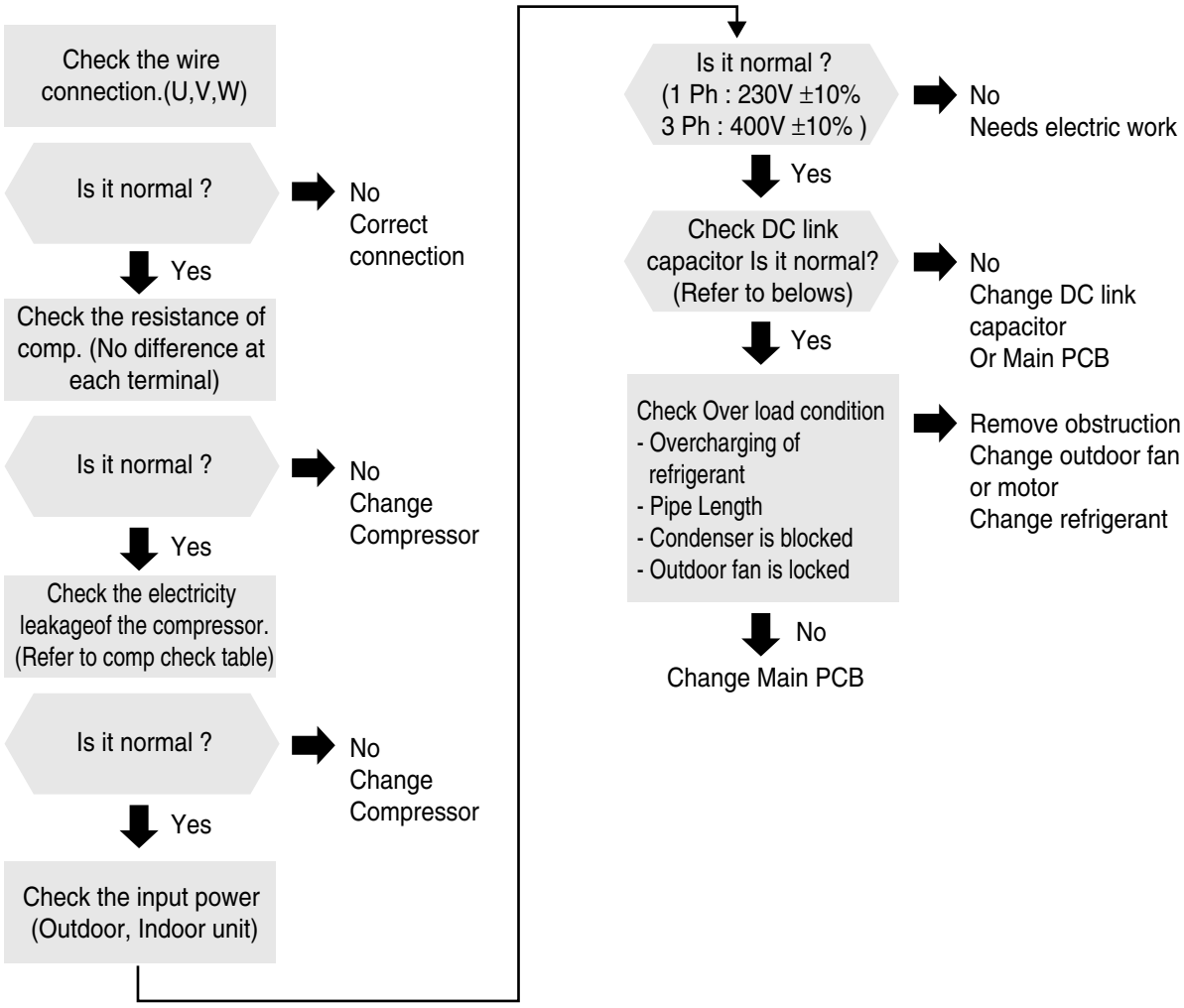
※ Pressure switch table

Switch	Low pressure switch	High pressure switch
Spec	0.03 Mpa	4.3 Mpa
Model	AUUW126C AUUW186C	AUUW246D AUUW306D AUUW366D AUUW426D AUUW486D AUUW606D AUUW368D AUUW428D AUUW488D AUUW608D



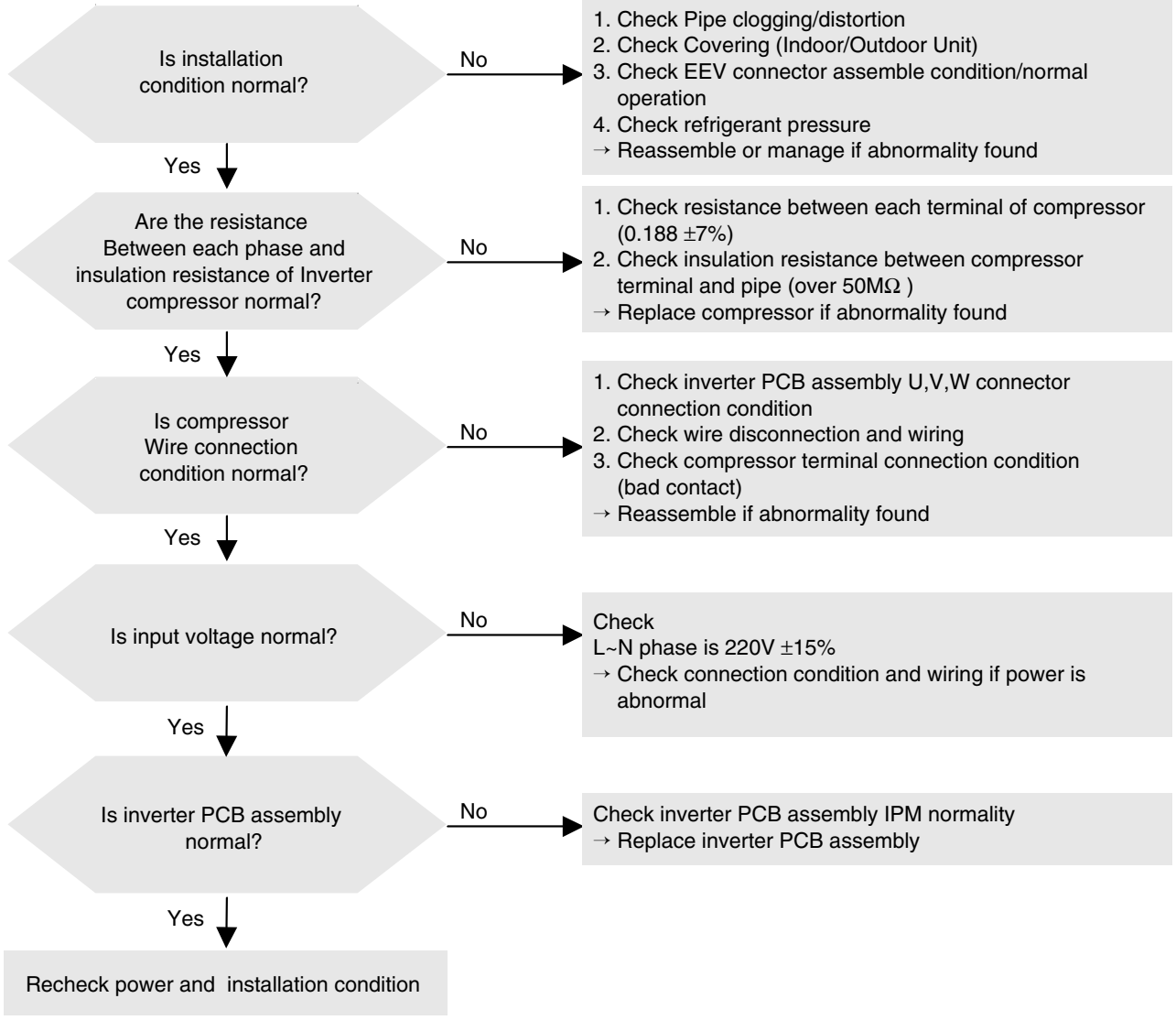
Display code	Title	Cause of error	Check point & Normal condition
26	DC Compressor Position	• Compressor position detect error	• Check the connection of comp wire “U,V,W” • Malfunction of compressor • Check the component of “IPM”, detection parts.
27	PSC Fault PFC Fault	• Over current at “IGBT”/PFC module	• Check the component of “IGBT” /PFC module. • Check the components.

Check Flow Chart



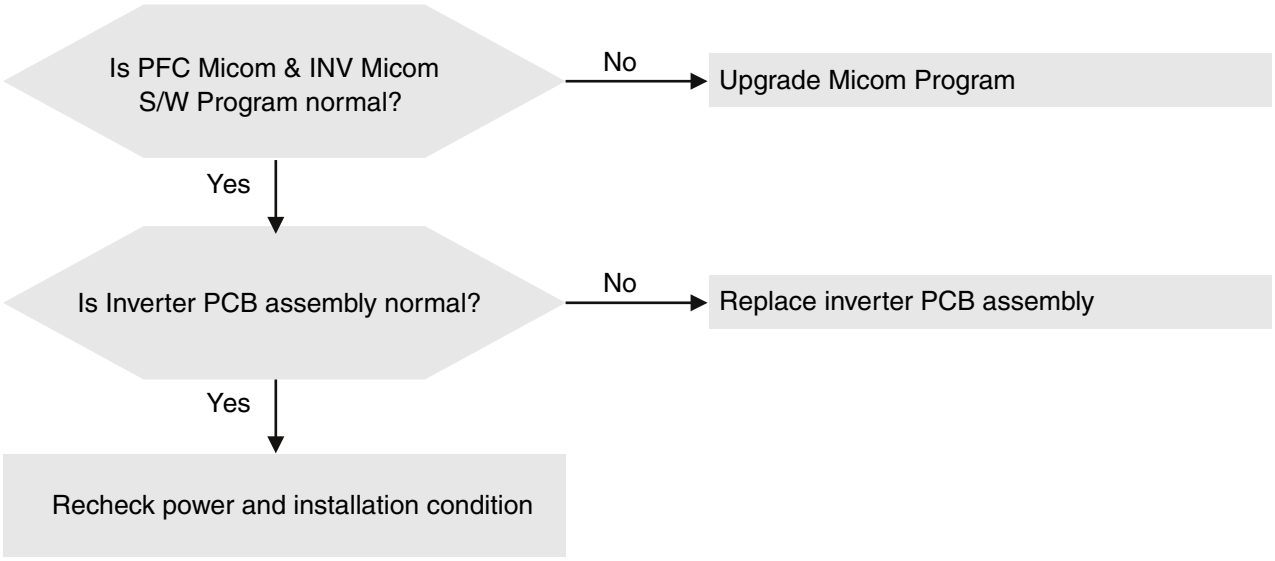
Display code	Title	Cause of error	Check point & Normal condition
29	Inverter compressor over current	Inverter compressor input current is over 30A	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. over-charge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU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

Check Flow Chart



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

Check Flow Chart



Display code	Title	Cause of error	Check point & Normal condition
40	C/T Internal circuit	• Initial current error	• Malfunction of current detection circuit. (Open / Short) • The voltage of “C01N” Is 4.0Vdc (25A) ↑.

Check Flow Chart

Check the input power
AC230V
(Outdoor, Indoor unit)

↓

Is it normal ?
(230V±10%)

➡ No
Correct connection

↓ Yes

Check “C01N”
Is it normal (4.0Vdc↓)?

➡ No
Change Main PCB

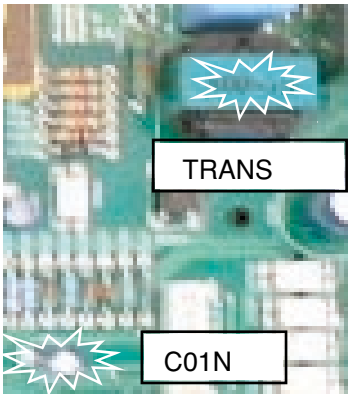
↓ Yes

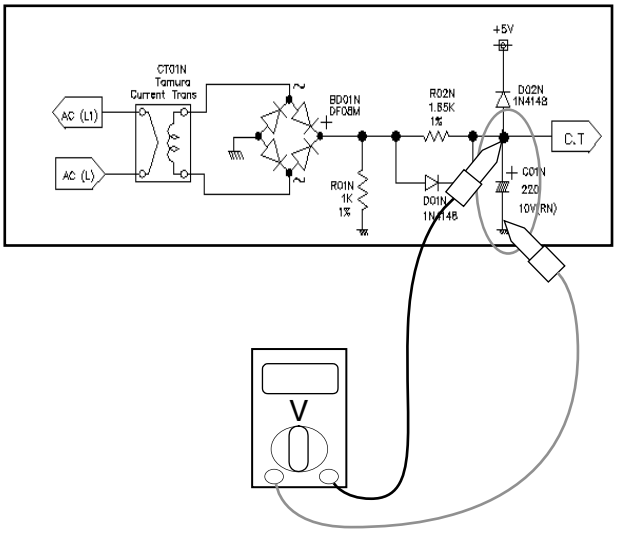
Check Check TRANS
Is it normal?

➡ No
Change TRANS

↓ Yes

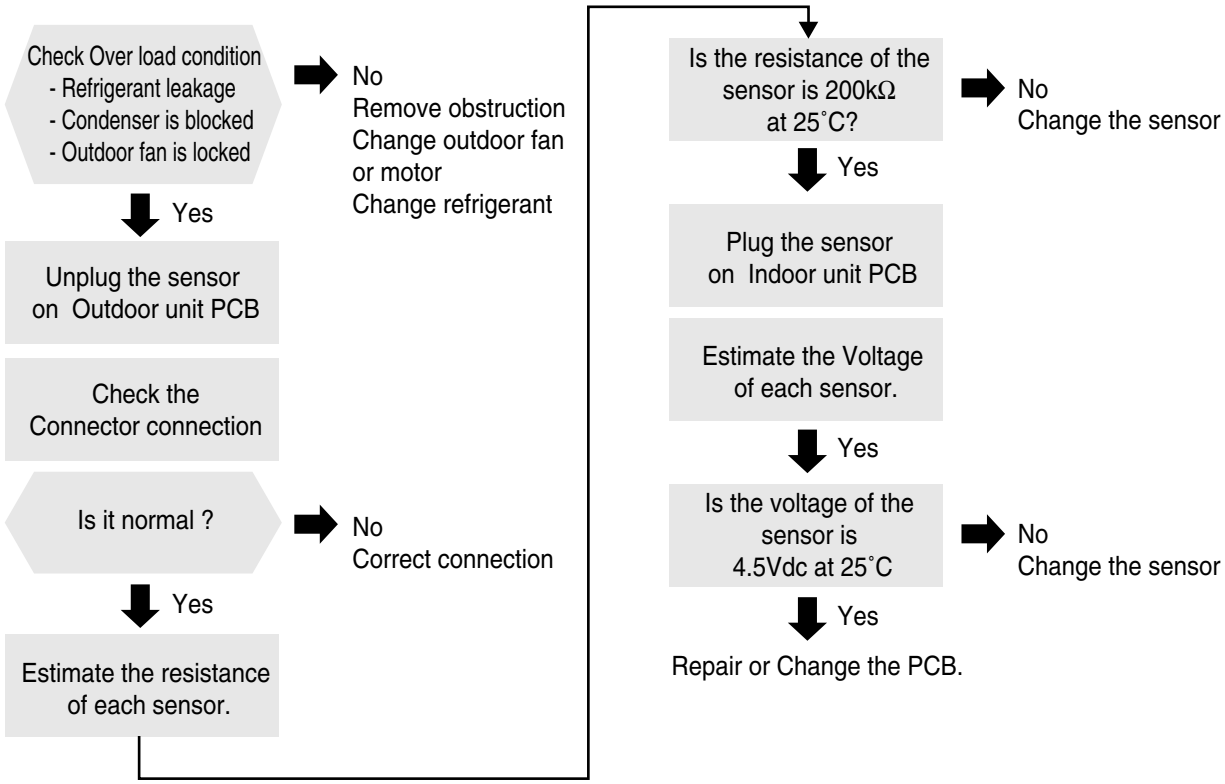
Change main PCB





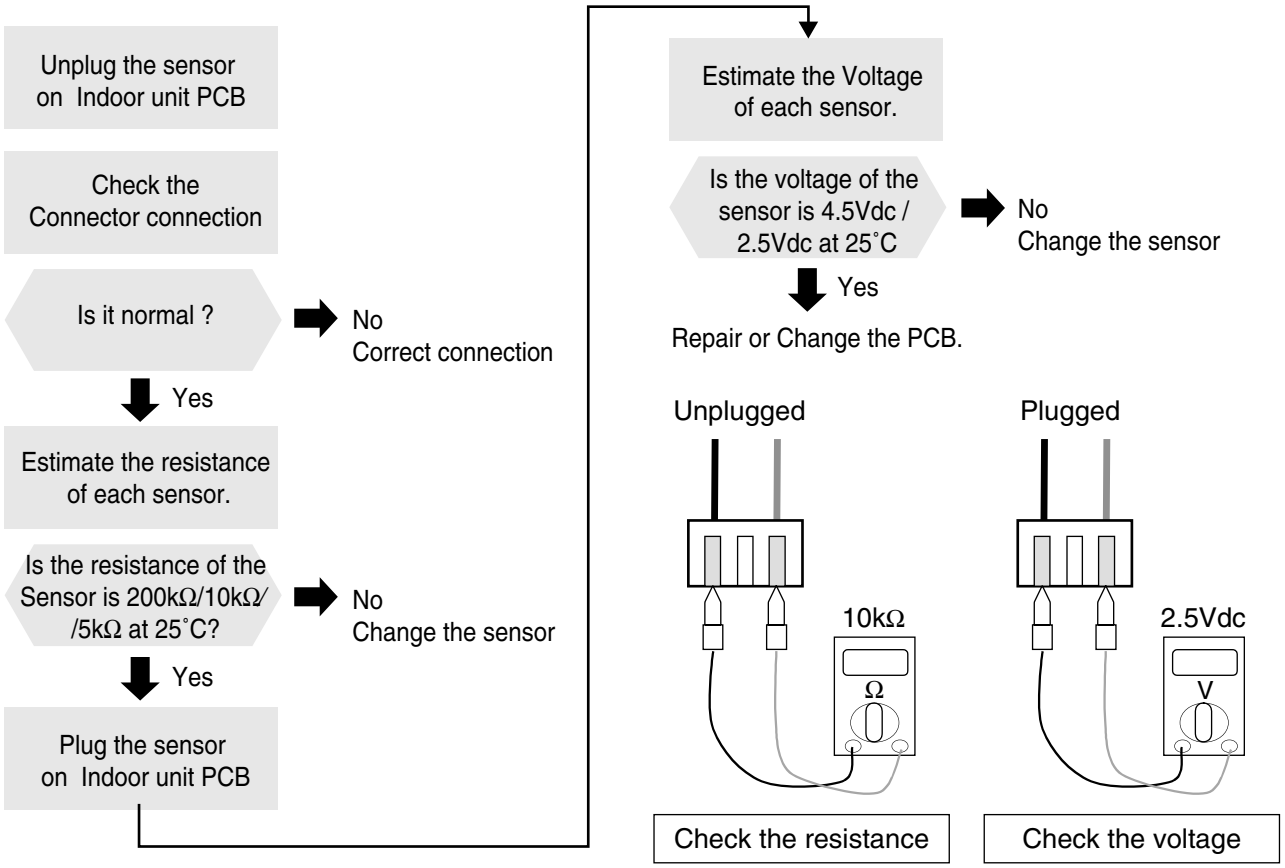
Display code	Title	Cause of error	Check point & Normal condition
32	D-pipe (Inverter) temp. high (105˚C↑)	• Discharge sensor (Inverter) temp. high	• Check the discharge pipe sensor for INV. • Check the install condition for over load. • Check the leakage of refrigerant. • Check the SVC V/V open. • Refer to sensor resistance table.
33	D-pipe (Constant) temp. high (105˚C↑)	• Discharge sensor (Cons.) temp. high	• Check the discharge pipe sensor for Cons. • Check the install condition for over load. • Check the leakage of refrigerant. • Check the SVC V/V open. • Refer to sensor resistance table.

Check Flow Chart



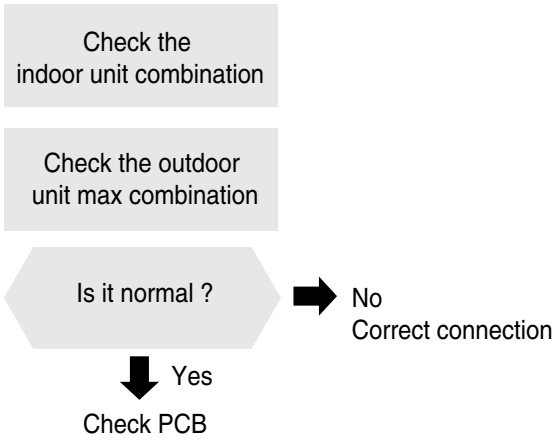
Display code	Title	Cause of error	Check point & Normal condition
41 **47**	D-pipe sensor(Inv) D-pipe sensor(Cons)	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	• Normal resistor : 200KΩ/ at 25˚C (Unplugged) • Normal voltage : 4.5Vdc / at 25˚C (plugged) • Refer to sensor resistance table.
44	Air sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	• Normal resistor : 10KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (plugged) • Refer to sensor resistance table.
45 **46**	Condenser Pipe sensor Suction Pipe sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	• Normal resistor : 5KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (plugged) • Refer to sensor resistance table.
65	Heat sink sensor	• Connector connection error • Faulty PCB • Faulty sensor (Open / Short)	• Normal resistor : 5KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (plugged) • Refer to sensor resistance table.

Check Flow Chart

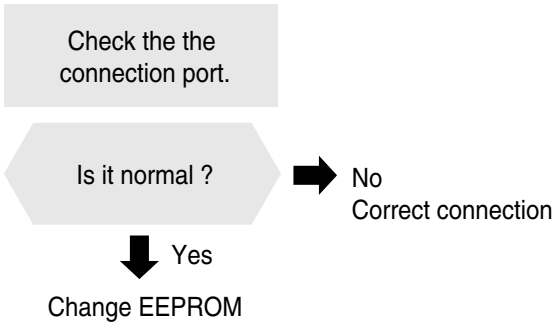


Display code	Title	Cause of error	Check point & Normal condition
51	Over capacity	• Over capacity Combination	• Check the indoor unit capacity. • Check the combination table.
60	EEPROM Check sum	• Check sum error	• Check the connection port. • Check the poor soldering.

Check Flow Chart (CH51)

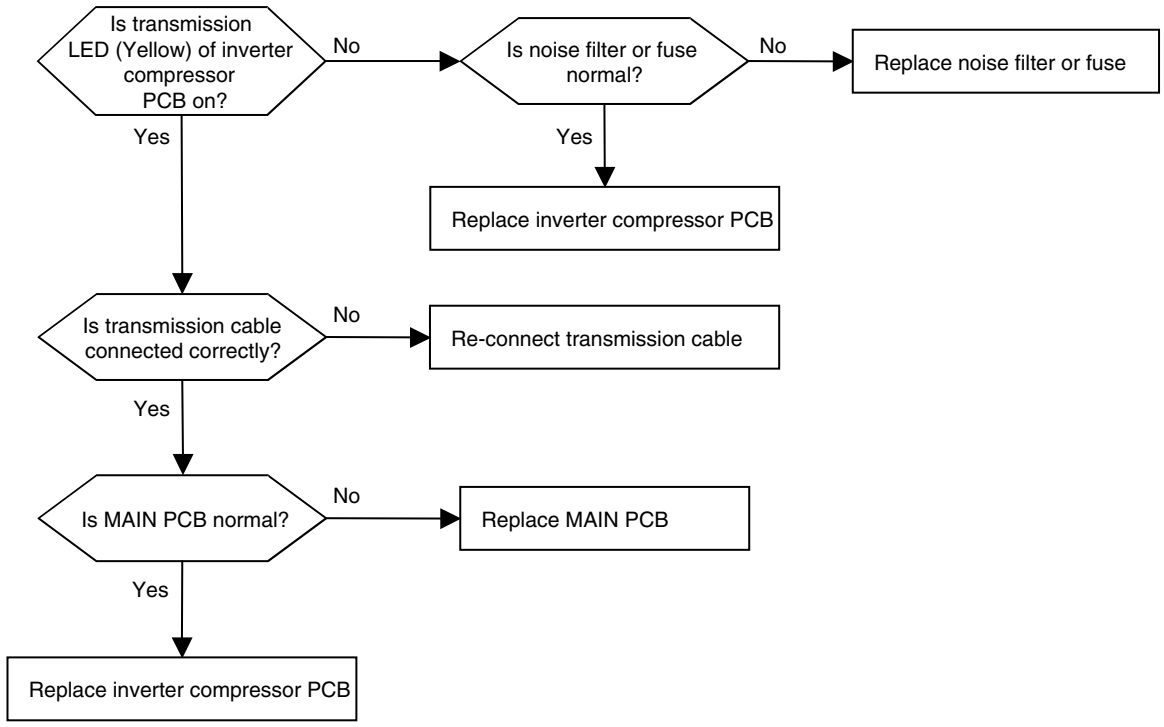


Check Flow Chart (CH60)



Display code	Title	Cause of error	Check point & Normal condition
52	Transmission error between (Inverter PCB ➔ Main PCB)	Main controller of Master unit of Master unit can't receive signal from inverter controller	1. Power cable or transmission cable is not connected 2. Defect of outdoor Main fuse/Noise Filter 3. Defect of outdoor Main / inverter PCB

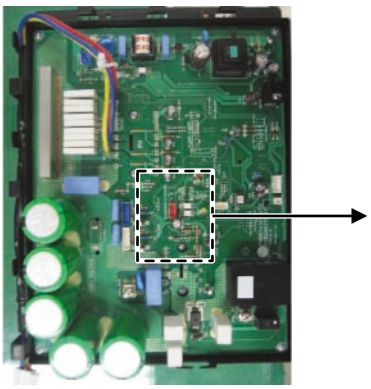
■ Error diagnosis and countermeasure flow chart

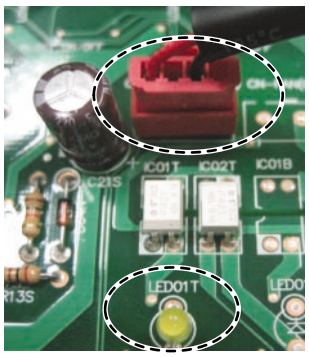


Check Point

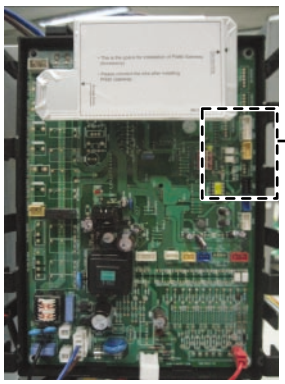
- Check the Transmission connector and LED (Main & Inverter)

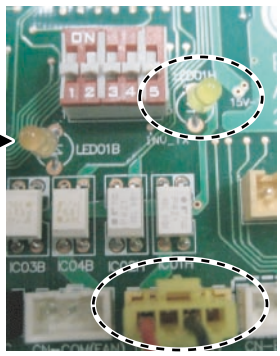
▸ 42/48/60k





<Inverter PCB>

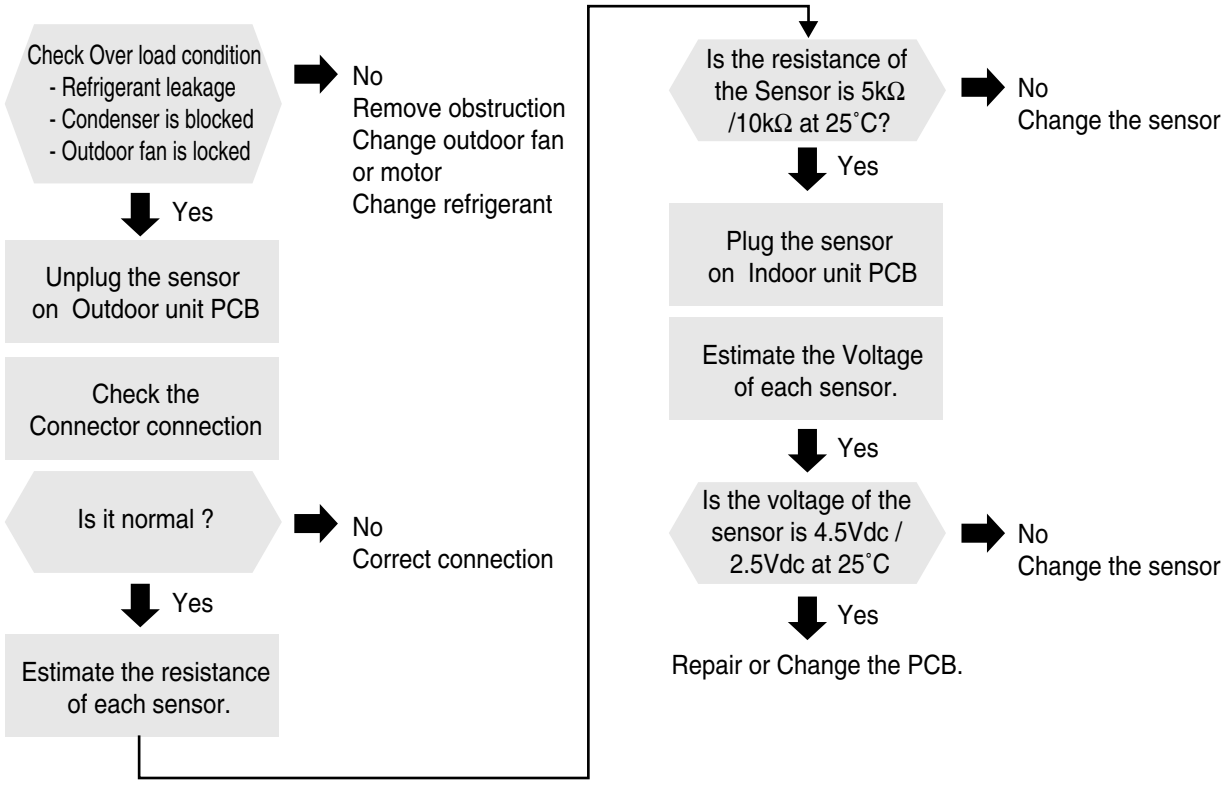




<MAIN PCB>

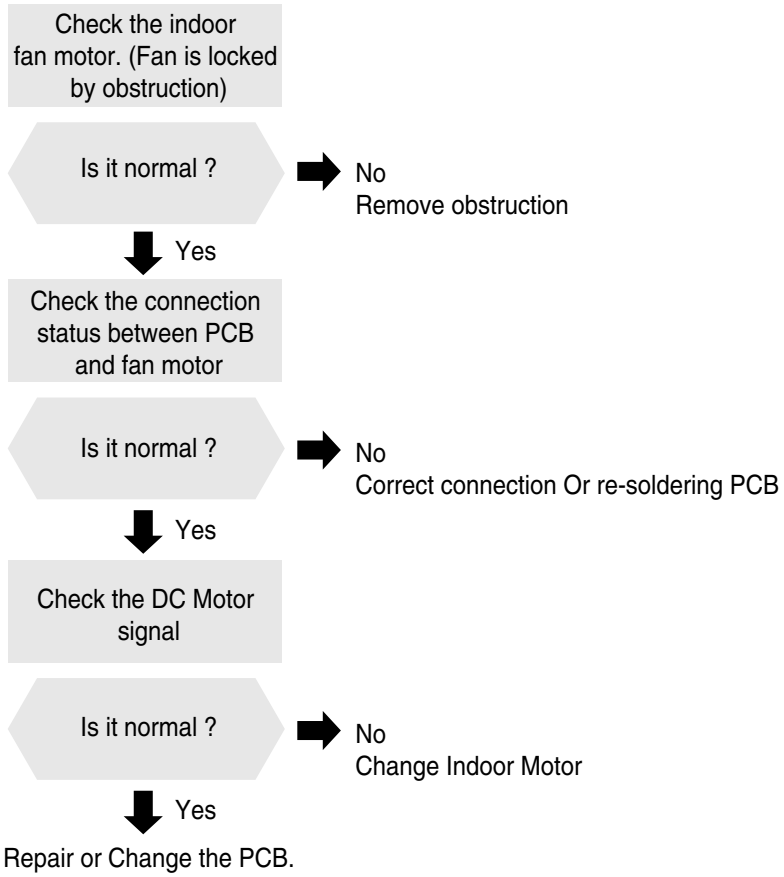
Display code	Title	Cause of error	Check point & Normal condition
61	Condenser pipe sensor temp. high	• condenser pipe sensordetected high temp.(65˚C)	• Check the load condition. • Check the sensor of Condenser pipe sensor. • Normal resistor : 5KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (Plugged)
62	Heat sink sensor temp. high	• heat sink sensor detected high temp. (85˚C)	• Check the load condition. • Check the sensor of heat sink. • Normal resistor : 10KΩ/ at 25˚C (Unplugged) • Normal voltage : 2.5Vdc / at 25˚C (Plugged)

Check Flow Chart



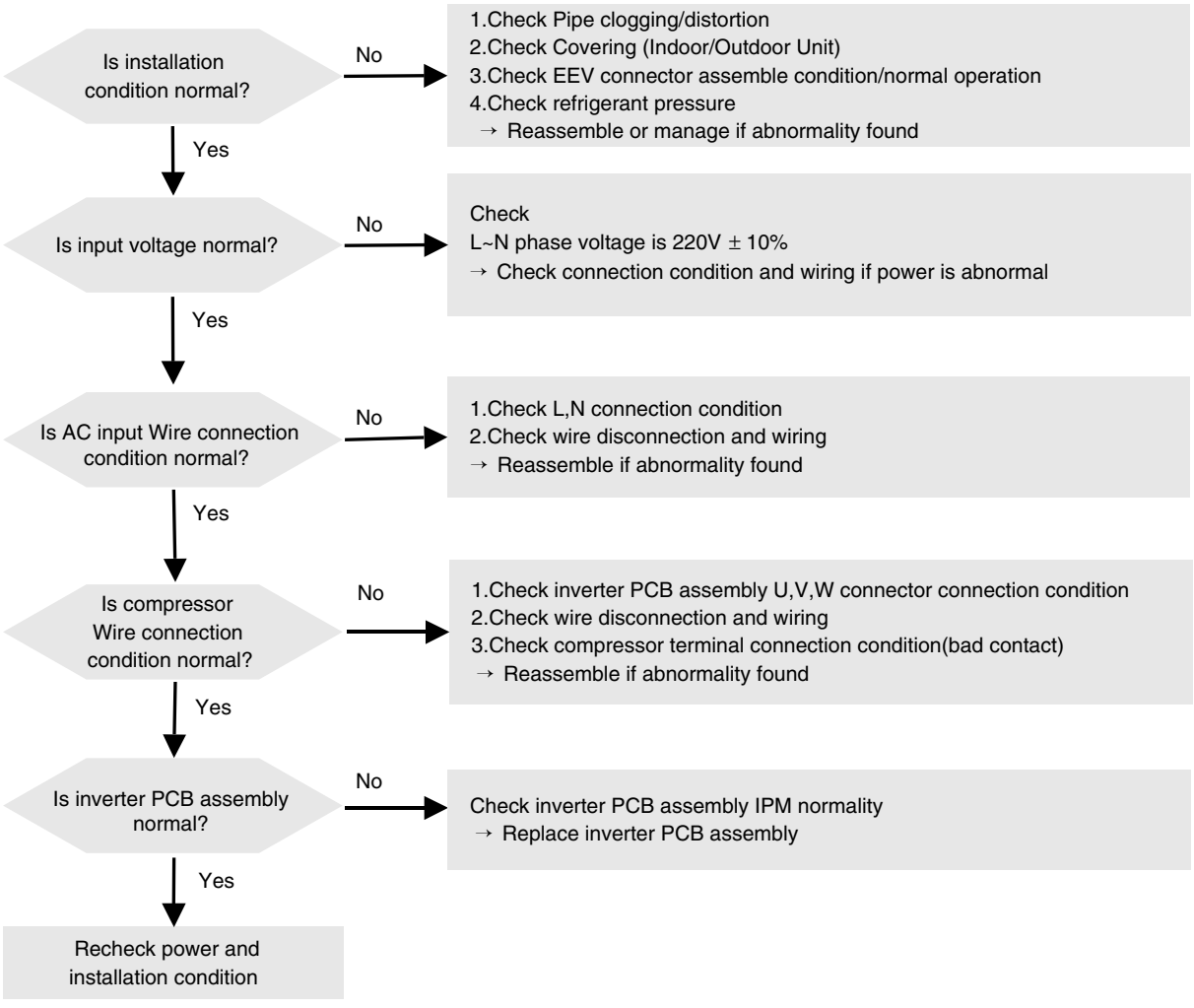
Display code	Title	Cause of error	Check point & Normal condition
67	BLDC motor fan lock (Outdoor)	• Fan motor break down • Fan motor & PCB poor contact • Obstruction to the fan	• Check the indoor fan motor. • Check the connection status between • PCB and fan motor.

Check Flow Chart



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

Check Flow Chart



Sensor resistance table

Pipe Temp

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

Air Temp

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

Heatsink Temp

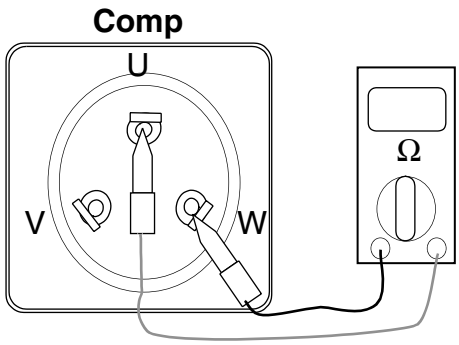
B Constant	3970	
Std Temp	25	
Resistance	10	
Temp	Resistance	Volt
-30	102.17	4.71
-25	73.49	4.61
-20	53.55	4.48
-15	39.5	4.32
-10	29.48	4.13
-5	22.24	3.91
0	16.95	3.66
5	26.05	4.73
10	20.25	4.66
15	15.87	4.57
20	12.55	4.47
25	10	4.35
30	8.03	4.21
35	6.49	4.06
40	5.28	3.89
45	4.33	3.71
50	3.57	3.52
55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

D-Pipe Temp

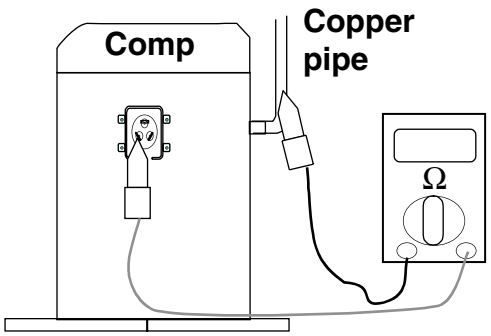
B Constant	3500	
Std Temp	25	
Resistance	200	
Temp	Resistance	Volt
-30	2845.99	4.969
0	585.66	4.851
5	465.17	4.814
10	372.49	4.77
15	300.58	4.717
20	244.33	4.657
25	200	4.587
30	164.79	4.508
35	136.64	4.418
40	113.98	4.318
45	95.62	4.208
50	80.65	4.088
55	68.38	3.958
60	58.27	3.82
65	49.88	3.674
70	42.9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

Check of compressor

■ Check resistance of the compressor



■ Check Insulation resistance of the compressor



Model		Resistance(Ω at 20℃)		
		U	V	W
1 Phase	AUUW126C	0.65	0.65	0.65
	AUUW186C	0.65	0.65	0.65
	AUUW246D	0.75	0.75	0.75
	AUUW306D	0.75	0.75	0.75
	AUUW366D	0.44	0.44	0.44
	AUUW426D	0.44	0.44	0.44
	AUUW486D	0.44	0.44	0.44
	AUUW606D	0.44	0.44	0.44
3 Phase	AUUW368D	1.84	1.84	1.84
	AUUW428D	1.08	1.08	1.08
	AUUW488D	1.08	1.08	1.08
	AUUW608D	1.08	1.08	1.08

Resistance(Ω) at 20°C	
Terminal	All models
U-GND	More than 2MΩ
V-GND	More than 2MΩ
W-GND	More than 2MΩ

P/NO : MFL58346401

September, 2008