



CONFIDENTIAL

***MULTI V* Hydro Kit** **(For Medium Temperature)** **SVC MANUAL(Exploded View)**

MODEL : ARNH10GK2A4 / ARNH04GK2A4

CAUTION

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

The appliance shall be disconnected from its power source during service and when replacing parts.

1. Specification

Type			Hydro Kit (Medium Temp)		
Model		Unit	ARNH10GK2A4	ARNH04GK2A4	
Power Supply			220-240 / 1 / 50		
			220 / 1 / 60		
Capacity (Rated)	Cooling	kW	28	12.3	
		kcal/h	24100	10580	
		Btu/h	95900	42000	
	Heating	kW	31.5	13.8	
		kcal/h	27100	11870	
Btu/h		107500	47000		
Input (Rated)	Cooling	kW	0.01		
	Heating	kW	0.01		
Casing			Painted Steel Plate		
Dimensions	Body	W x H x D	mm	520 X 631 X 330	
			inch	20-15/32 X 24-27/32 X 13	
Net Weight	Body	kg (lbs)	35.0 (77.2)	30.5 (67)	
Heat Exchanger	Refrigerant to Water	Type	Brazen Plate HEX		
		Quantity	EA	1	
		Number of Plate	EA	48	26
		Rated Water Flow	l/min	92	39.6
		Head Loss	kPa	69	41
Temperature Control			Microprocessor, Thermostat for cooling and heating		
Sound Absorbing Thermal Insulation Material			Foamed polystyrene		
Safety Device			Fuse		
Piping Connections	Water Side	Inlet	inch	Male PT 1	
		Outlet	inch	Male PT 1	
	Refrigerant Side	Liquid	mm(inch)	9.52(3/8)	9.52(3/8)
		Gas	mm(inch)	22.2(7/8)	15.88(5/8)
Drain Piping Connection			inch	Male PT 1	
Sound Press Level	Cooling		dB(A)	26	
	Heating		dB(A)	26	
Transmission Cable			No. x mm ²	2C x 1.0~1.5	
Refrigerant	Refrigerant to Water	Refrigerant name		R410A	
		Precharged Amount	kg (lbs)	-	
		Control		Electronic Expansion Valve	

Notes:

1. Capacities are based on the following conditions:

- Cooling Temperature Indoor 27°C(80.6°F) DB / 19°C(66.2°F) WB
Outdoor 35°C(95°F) DB / 24°C(75.2°F) WB
Water Inlet 23°C(73.4°F) / Outlet 18°C(64.4°F)
- Heating Temperature Indoor 20°C(68°F) DB / 15°C(59°F) WB
Outdoor 7°C(44.6°F) DB / 6°C(42.8°F) WB
Water Inlet 30°C(86°F) / Outlet 35°C(95°F)
- Piping Length : Interconnected Pipe Length = 7.5m
- Difference Limit of Elevation (Outdoor ~ Indoor Unit) is Zero.

2. Wiring cable size must comply with the applicable local and national code.

3. Due to our policy of innovation, some specifications may be changed without notification.

4. Sound Level Values are measured at Anechoic chamber.

Therefore, these values can be increased (maximum 3dB(A)) owing to ambient conditions during operation.

Conversion Formula

kcal/h= kW x 860
Btu/h = kW x 3412

2. List of Function

Category	Function	ARNH10GK2A4 / ARNH04GK2A4
Installation	Drain pump	X
	E.S.P. control	X
	Electric heater	X
	High ceiling operation	X
	Auto Elevation Grille	X
Reliability	Hot start	X
	Self diagnosis	O
	Soft dry operation	X
Convenience	Auto changeover	X
	Auto cleaning	X
	Auto operation(artificial intelligence)	X
	Auto Restart	O
	Child lock	O
	Forced operation	X
	Group control	O
	Sleep mode	X
	Timer(on/off)	O
	Timer(weekly)	O
	Two thermistor control	X
CAC network function	General central controller (Non LGAP)	X
	Network Solution(LGAP)	O
	Dry contact	PDRYCB000 / PDRYCB100
	PDI(power distribution indicator)	O
	PI 485(for Indoor Unit)	X
Special function kit	Zone controller	X
	CTI(Communication transfer interface)	X
	Electronic thermostat	X
Others	Remote temperature sensor	PQRSTA0
	Telecom shelter controller	X
Air to Water Heat Pump Functions	Anti-condensation on floor(cooling)	O
	Water pump on / off Control	O
	Flow switch control	O
	Thermostat interface (230V AC)	O
	Thermostat interface (24V AC)	O
	Sanitary tank heating	O
	Solar-thermal interface with sanitary tank	O
	PHEX anti-freezing control	O
	Water pump forced operation	O
	Autosetting according to ambient temperature	O
	Silent operation	X
	Anti-overheating of water pipe	O
	Emergency operation	O

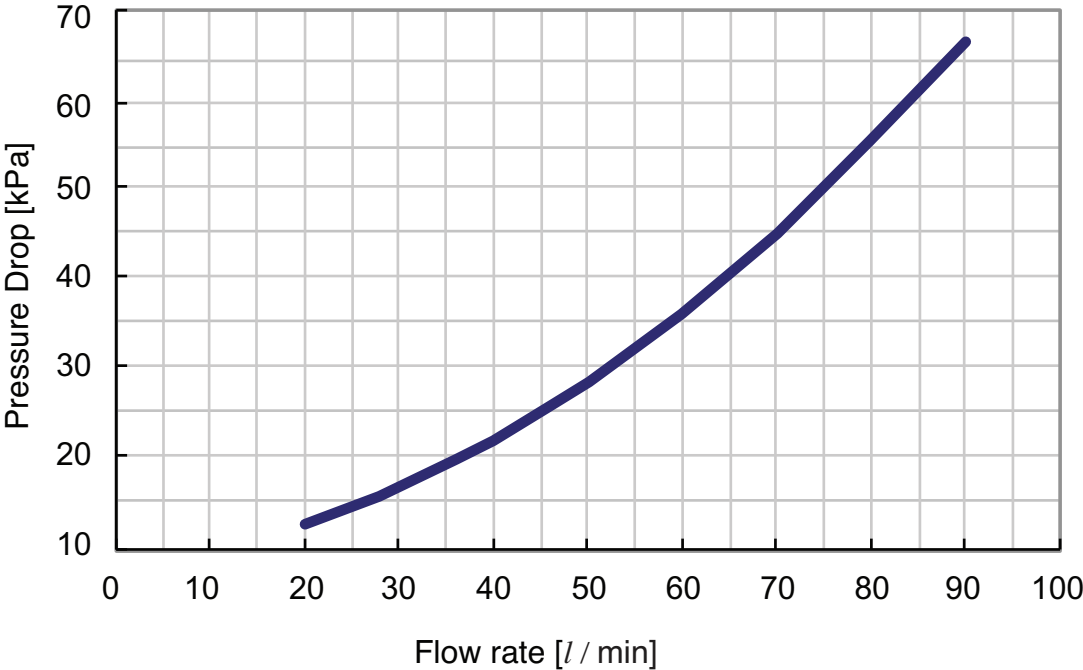
Notes

O : Applied, X : Not applied

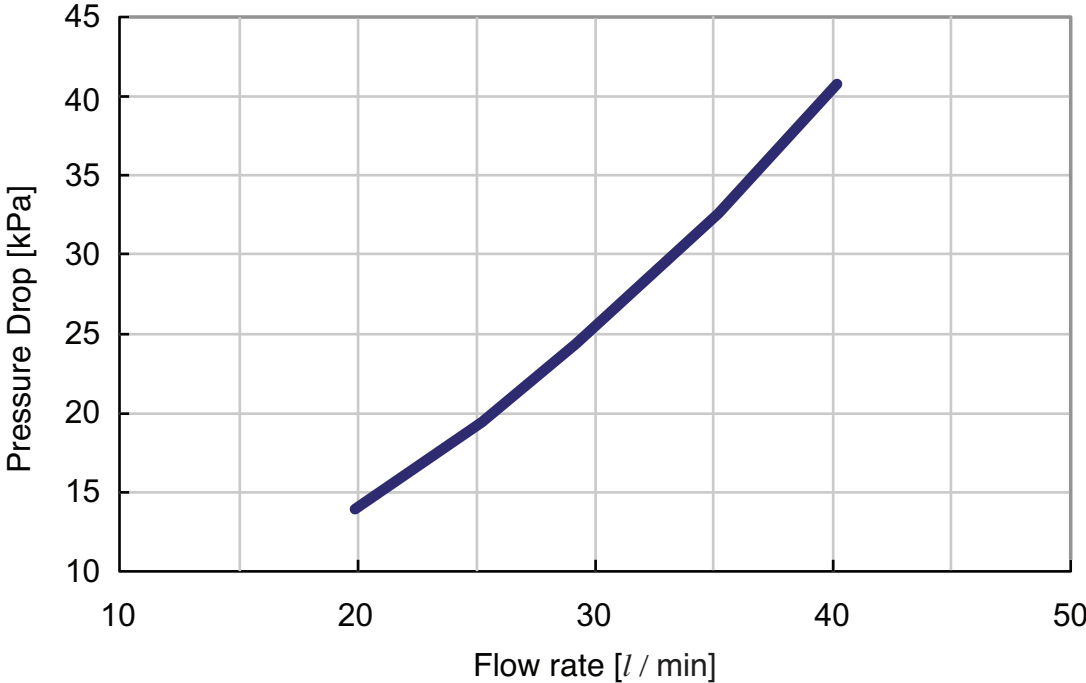
Accessory model name : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separate package.

3. Water Pressure Drop

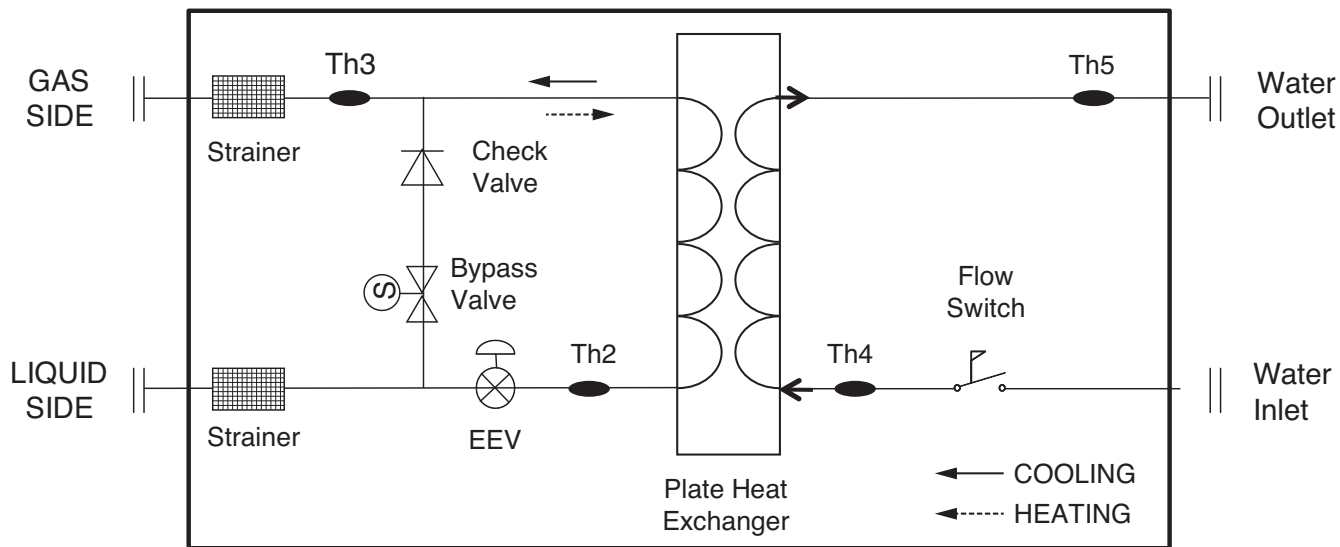
3.1 ARNH10GK2A4



3.2 ARNH04GK2A4

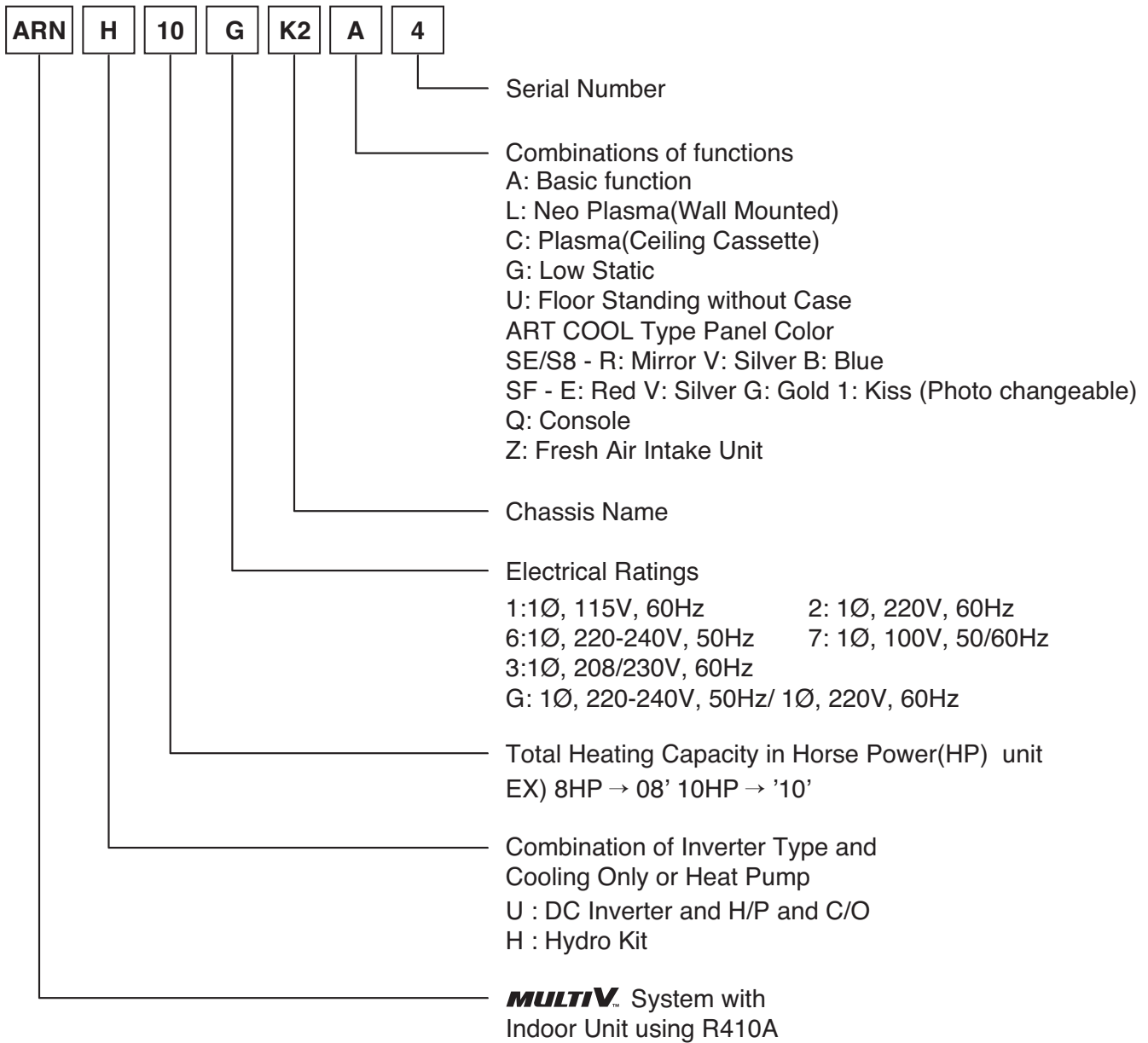


4. Cycle Diagram

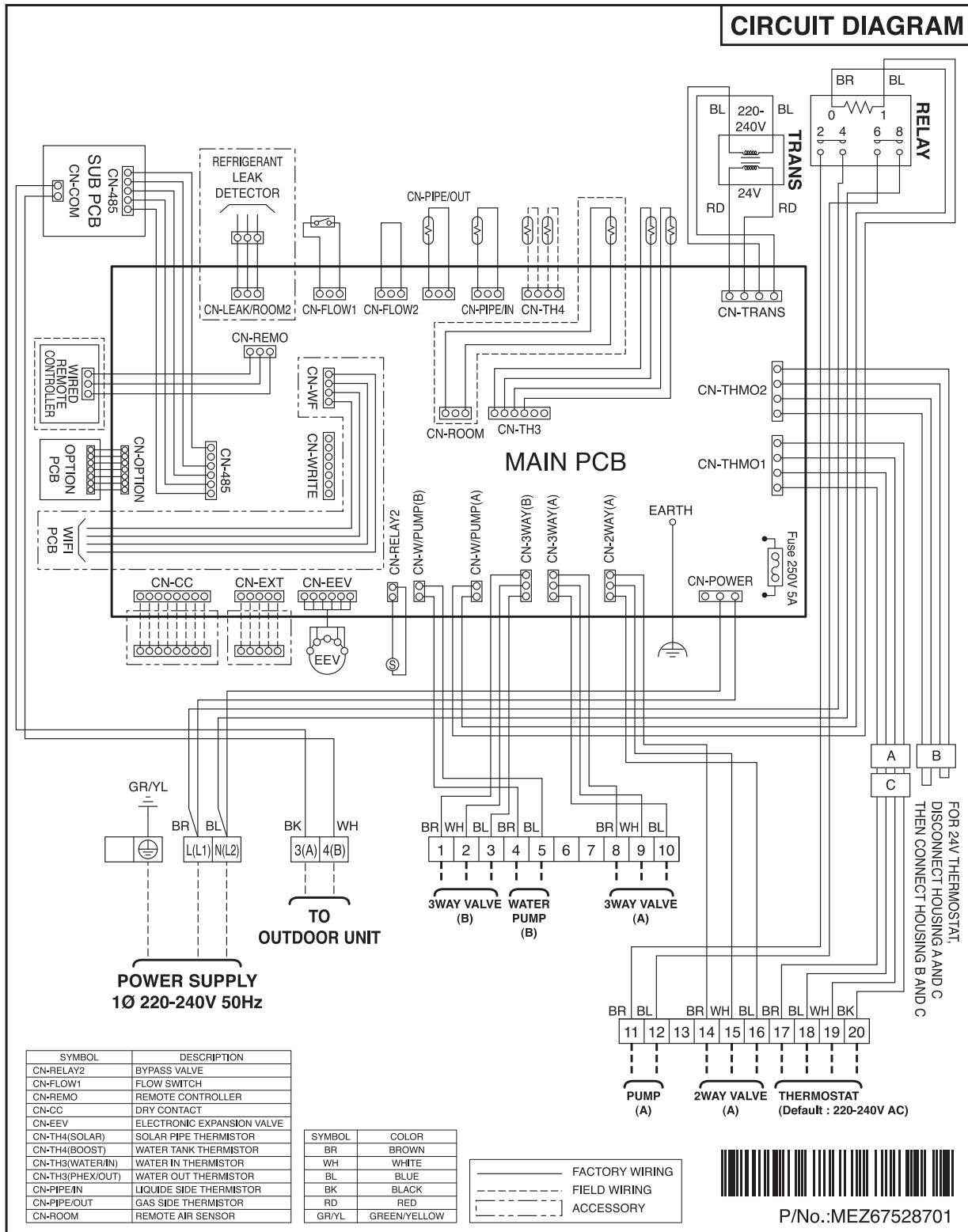


Symbol	Description	PCB Connector	Remarks
Th1	Air Temperature Sensor	CN-ROOM	*Optional accessory (being sold separately) *Not shown in diagram
Th2	Liquid Side Temperature Sensor	CN-PIPE/IN	
Th3	Gas Side Temperature Sensor	CN-PIPE/OUT	
Th4	Water Inlet Temperature Sensor	CN-TH3	*Th4 and Th5 are connected to 4 pin type connector CN-TH3
Th5	Water Outlet Temperature Sensor		

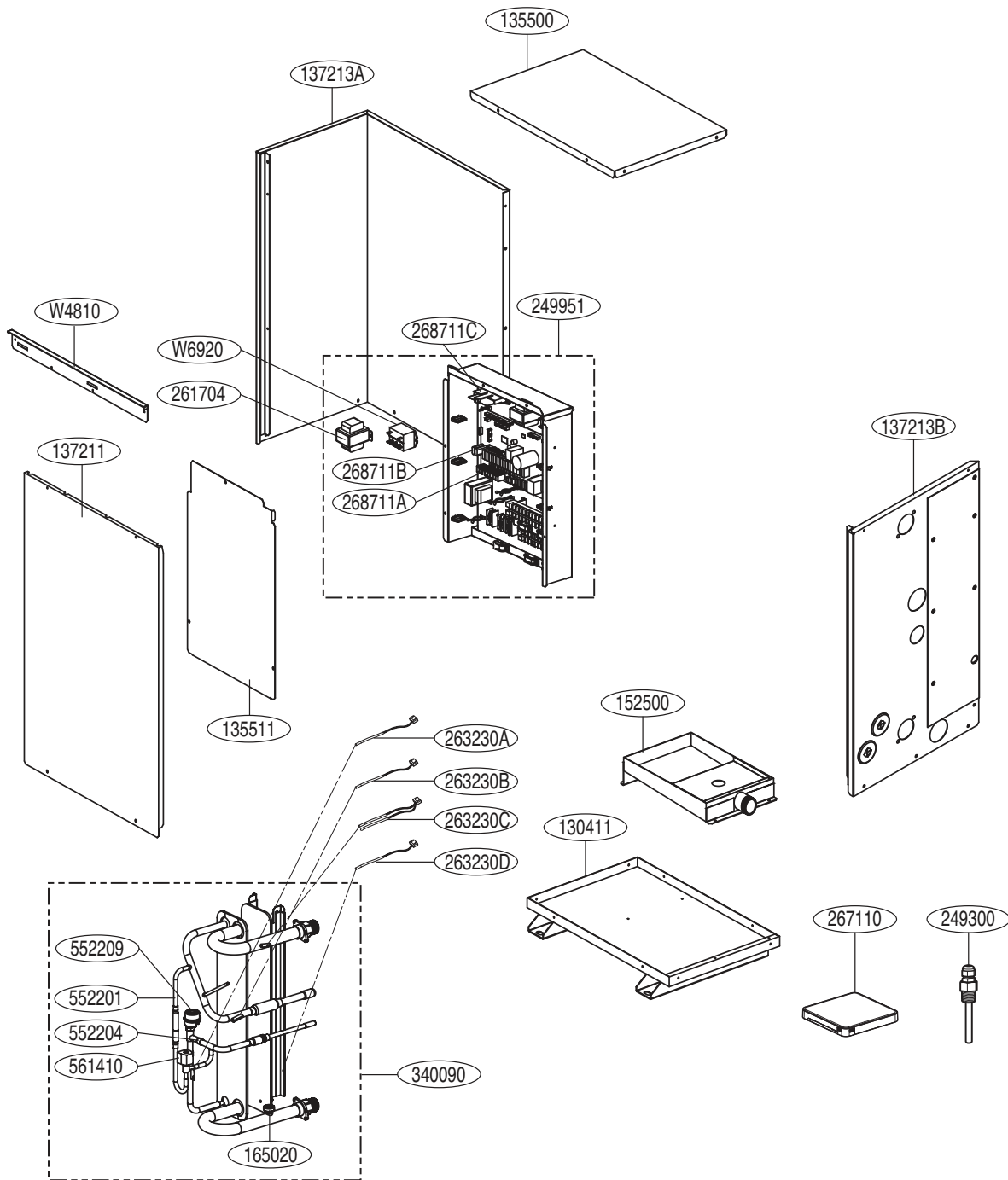
5. Nomenclature



6. Wiring Diagram



7. Exploded View



Location No.	Description	Housing Color
263230A	Liquid Side Temperature Sensor	White
263230B	Gas Side Temperature Sensor	Red
263230C	Water Inlet/Outlet Temperature Sensor	Black
263230D	Water Tank Temperature Sensor	Red

8. Self-diagnosis Function

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, Hydro Kit is generally operated 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 into 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 operated 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.
- 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.

Error Display

- This function performs the self diagnosis for the unit and displays the types of the error when a error occurs.
- Error displays the following codes on wired remote controller and red/green LED on out door unit control board.
- If two or more errors simultaneously occur, it displays in the order of error number.
- After an occurrence of a error, error code disappears once the error is corrected.

Error Code List

Error No.	Error Type	Classification			
		Slight Trouble	Heavy Trouble	Option Trouble	Error
01	Air temperature sensor error	○			
02	Gas side temperature sensor error	○			
03	No communication between wired remote controller & indoor unit				○
05	Indoor unit & outdoor unit communication error				○
06	Liquid side temperature sensor error	○			
08	Water tank temperature sensor error			○	
09	Indoor unit EEPROM error				○
13	Solar thermal temperature sensor error			○	
14	Flow switch error				○
15	Water pipe overheated				○
16	Water inlet & outlet temperature sensor error	○			
17	Water inlet temperature sensor error	○			
18	Water outlet temperature sensor error	○			
187	P.HEX bursting error				○

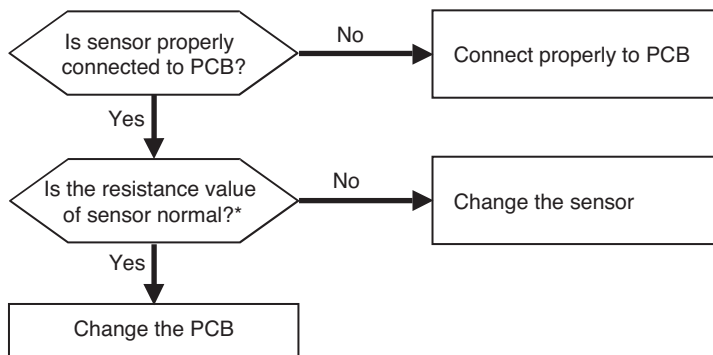
• Notice of error code

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

Major error Diagnosis Method

Error No.	Error Type	Error Point	Main Reasons
01	Air temperature sensor error	Sensor is open/short	1. Indoor unit PCB wrong connection! 2. Indoor unit PCB failure! 3. Sensor problem (main reason)
02	Gas side temperature sensor error		
06	Liquid side temperature sensor error		
08	Water tank temperature sensor error		
13	Solar thermal temperature sensor error		
16	Water inlet & outlet temperature sensor error		
17	Water inlet temperature sensor error		
18	Water outlet temperature sensor error		

■ Error diagnosis and countermeasure flow chart

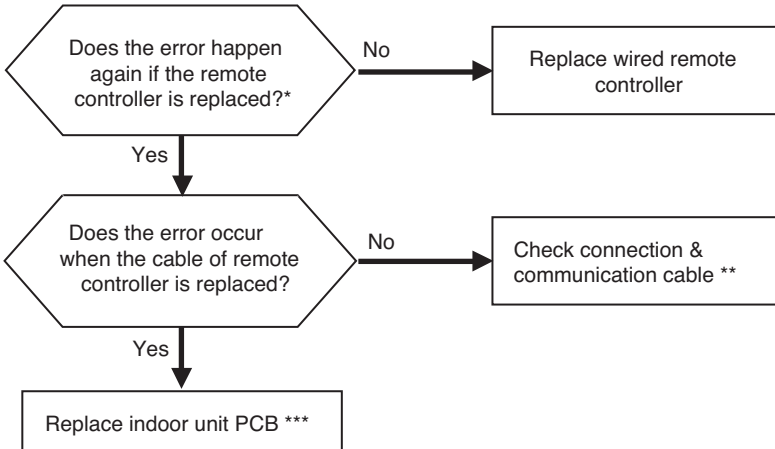


*If the resistance value of the temperature sensor changes according to temperature, and the following resistance values are displayed based on the current temperature, it is normal. ($\pm 5\%$ error)

- Air temperature sensor : $10^{\circ}\text{C}(50^{\circ}\text{F})=20.7\text{k}\Omega$: $25^{\circ}\text{C}(77^{\circ}\text{F})=10\text{k}\Omega$: $50^{\circ}\text{C}(122^{\circ}\text{F})=3.4\text{k}\Omega$
- Gas/Liquid side temperature sensor : $10^{\circ}\text{C}(50^{\circ}\text{F})=10\text{k}\Omega$: $25^{\circ}\text{C}(77^{\circ}\text{F})=5\text{k}\Omega$: $50^{\circ}\text{C}(122^{\circ}\text{F})=1.8\text{k}\Omega$
- Water inlet/outlet temperature sensor : $10^{\circ}\text{C}(50^{\circ}\text{F})=10\text{k}\Omega$: $25^{\circ}\text{C}(77^{\circ}\text{F})=5\text{k}\Omega$: $50^{\circ}\text{C}(122^{\circ}\text{F})=1.8\text{k}\Omega$
- Water tank temperature sensor : $10^{\circ}\text{C}(50^{\circ}\text{F})=10\text{k}\Omega$: $25^{\circ}\text{C}(77^{\circ}\text{F})=5\text{k}\Omega$: $50^{\circ}\text{C}(122^{\circ}\text{F})=1.8\text{k}\Omega$
- Solar thermal temperature sensor : $10^{\circ}\text{C}(50^{\circ}\text{F})=362\text{k}\Omega$: $25^{\circ}\text{C}(77^{\circ}\text{F})=200\text{k}\Omega$: $50^{\circ}\text{C}(122^{\circ}\text{F})=82\text{k}\Omega$: $100^{\circ}\text{C}(212^{\circ}\text{F})=18.5\text{k}\Omega$

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

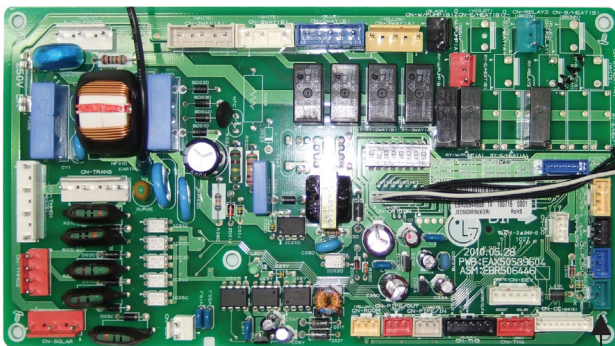
■ Error diagnosis and countermeasure flow chart



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

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

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



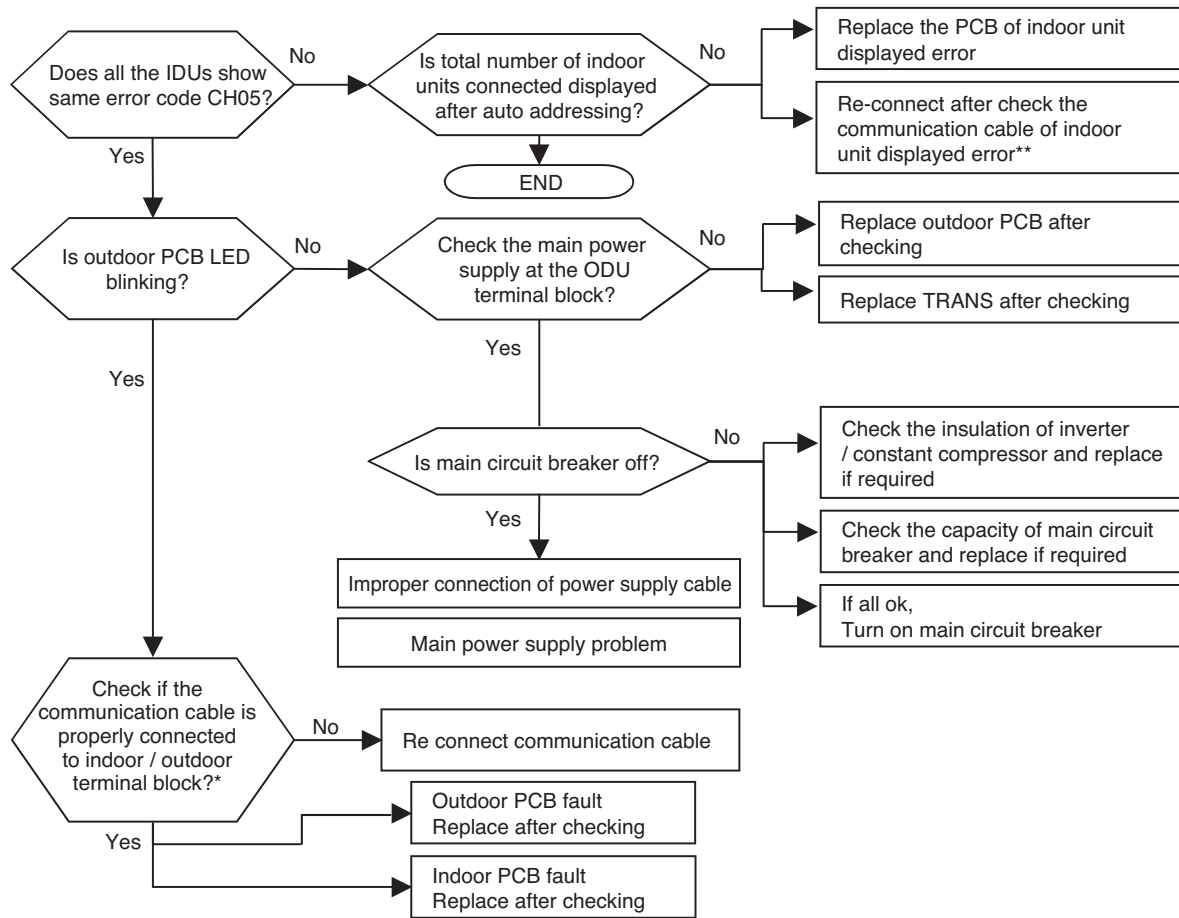
CN-REMO : Remote controller connection

※ The PCB can differ from model to model.
 Check from the right source.

! 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.

Error No.	Error Type	Error Point	Main Reasons
05	Indoor & Outdoor unit communication error	No signal communication between indoor & outdoor units.	1. Auto addressing is not done 2. Communication cable is not connected 3. Short circuit of communication cable 4. Indoor unit communication circuit fault 5. Outdoor unit communication circuit fault 6. Not enough distance between power and communication cable?

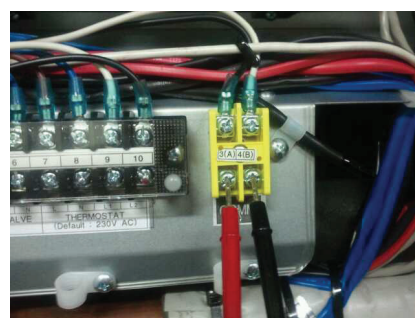
■ Error diagnosis and countermeasure flow chart



* (Note1) communication from IDU is normal if voltage fluctuation(-9V ~ +9V) exists when checking DC voltage of communication terminal between IDU and ODU



* If the DC voltage between communication terminal A, B of indoor unit fluctuates within (-9V~+9V) then communication from outdoor unit is normal



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

■ **Error diagnosis and countermeasure flow chart**

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

Error No.	Error Type	Error Point	Main Reasons
14	Flow Switch error	Abnormal working of flow switch	1. Strainer blocking by dust / mist 2. Low water flow 3. Flow switch fault (*) 4. Pump fault

(*) Flow switch status test

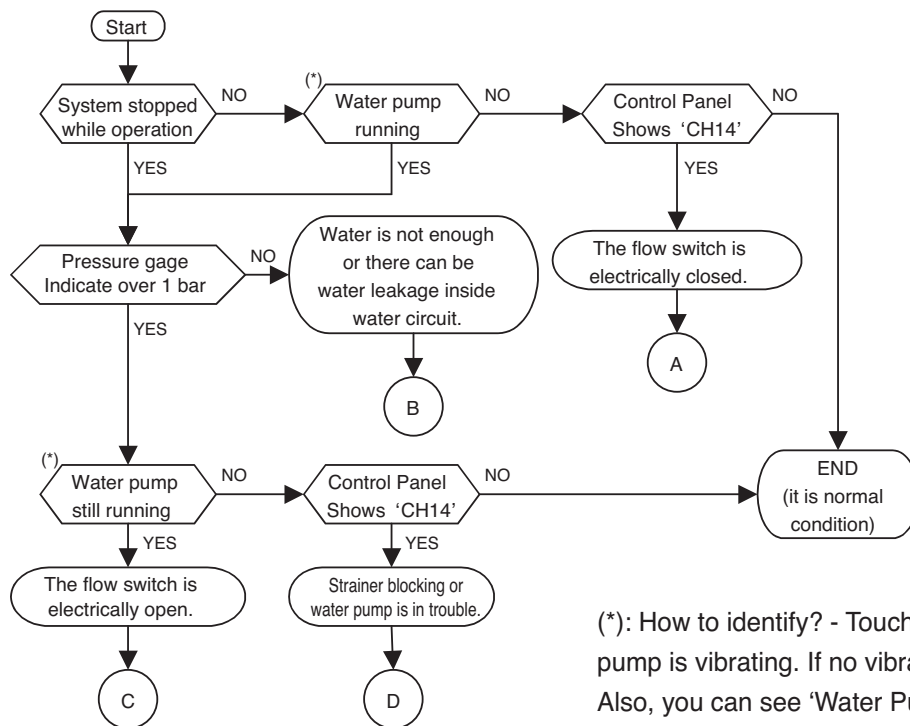



Flow switch open.
Multi meter will display
0.FMΩ(∞Ω)



Flow switch off.
→ Multi meter will display
0.4Ω

■ Error diagnosis and countermeasure flow chart

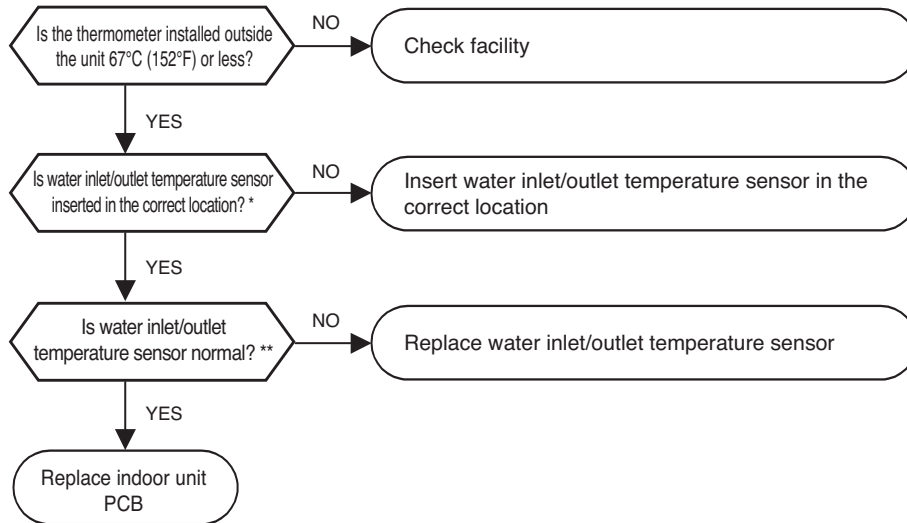


(*): How to identify? - Touch the water pump and feel if the water pump is vibrating. If no vibration, the water pump is not operating. Also, you can see 'Water Pump Operating Icon()' at control panel.

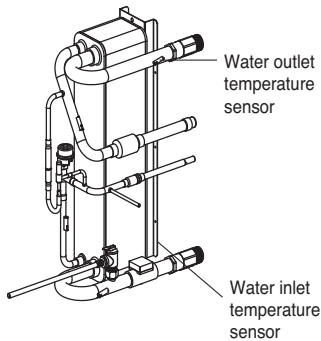
- (A) • Although there is not water flow inside water circuit, the flow switch detects as if water is flowing. It is due to electrically closed (or short) of flow switch or the contact of flow switch is mechanically stuck.
• Replace the flow switch.
- (B) • Check if water inside water circuit is fully 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.
• Replace the flow switch.
• Clean the strainer filter
- (D) • Replace the water pump.
• Also, check the water quality if there are particles that can yield locking at the shaft of the water pump.

Error No.	Error Type	Error Point	Main Reasons
15	Water pipe overheated	Water outlet temperature is above 90°C (176°F)	1. High temperature of water inflow 2. Temperature sensor defect 3. Indoor unit PCB fault

■ Error diagnosis and countermeasure flow chart

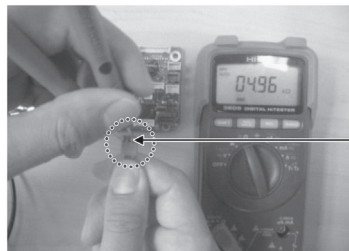


*Water inlet/outlet temperature sensor location



**If the resistance value of the temperature sensor changes according to temperature, and the following resistance values are displayed based on the current temperature, it is normal. (±5% error)

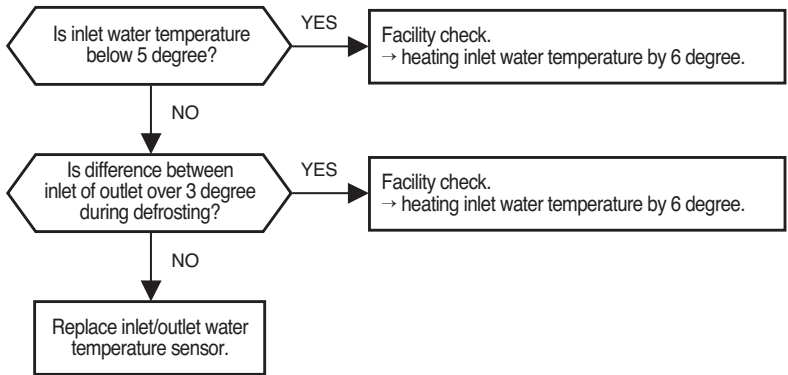
- Air temperature sensor : 10°C(50°F)=20.7kΩ : 25°C(77°F)=10kΩ : 50°C(122°F)=3.4kΩ
- Gas/Liquid side temperature sensor : 10°C(50°F)=10kΩ : 25°C(77°F)=5kΩ : 50°C(122°F)=1.8kΩ
- Water inlet/outlet temperature sensor : 10°C(50°F)=10kΩ : 25°C(77°F)=5kΩ : 50°C(122°F)=1.8kΩ
- Water tank temperature sensor : 10°C(50°F)=10kΩ : 25°C(77°F)=5kΩ : 50°C(122°F)=1.8kΩ



Measuring the resistance value of the temperature sensor

Error No.	Error Type	Error Point	Main Reasons
CH187	Hydro-Kit P.HEX bursting error	Inlet water temperature is below 5 degree or water temperature error during defrosting operation.	1. below water temp. 5°C 2. EEV fault of Hydro-Kit 3. inlet/outlet sensor afault

■ Error diagnosis and countermeasure flow chart





P/NO : MFL67086905