

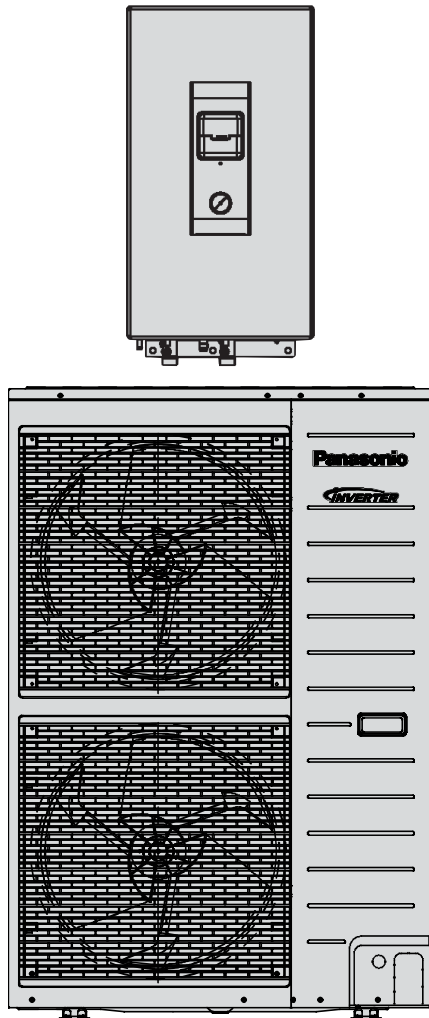
Service Manual

Air-to-Water Heatpump

Indoor Unit
WH-SXC16F9E8

Outdoor Unit
WH-UX16FE8

Destination
Europe



WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

PRECAUTION OF LOW TEMPERATURE

In order to avoid frostbite, be assured of no refrigerant leakage during the installation or repairing of refrigerant circuit.

1. Safety Precautions

- Read the following “SAFETY PRECAUTIONS” carefully before perform any servicing.
- Electrical work must be installed or serviced by a licensed electrician. Be sure to use the correct rating and main circuit for the model installed.
- The caution items stated here must be followed because these important contents are related to safety. The meaning of each indication used is as below. Incorrect installation or servicing due to ignoring of the instruction will cause harm or damage, and the seriousness is classified by the following indications.

 WARNING	This indication shows the possibility of causing death or serious injury.
 CAUTION	This indication shows the possibility of causing injury or damage to properties.

- The items to be followed are classified by the symbols:

	This symbol denotes item that is PROHIBITED from doing.
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- Carry out test run to confirm that no abnormality occurs after the servicing. Then, explain to user the operation, care and maintenance as stated in instructions. Please remind the customer to keep the operating instructions for future reference.

 WARNING	
1. Do not modify the machine, part, material during repairing service.	
2. If wiring unit is supplied as repairing part, do not repair or connect the wire even only partial wire break. Exchange the whole wiring unit.	
3. Do not wrench the fasten terminal. Pull it out or insert it straightly.	
4. Engage dealer or specialist for installation and servicing. If installation of servicing done by the user is defective, it will cause water leakage, electrical shock or fire.	
5. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electric shock or fire.	
6. Use the attached accessories parts and specified parts for installation and servicing. Otherwise, it will cause the set to fall, water leakage, refrigerant leakage, fire or electrical shock.	
7. Install at a strong and firm location which is able to withstand the set's weight. If the strength is not enough or installation is not properly done, the set will drop and cause injury.	
8. Do not install outdoor unit near handrail of veranda. When installing outdoor unit at veranda of high rise building, child may climb up to outdoor unit and cross over the handrail and causing accident.	
9. For electrical work, follow the local national wiring standard, regulation and the installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.	
10. This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, earth of lightning rod and telephone. Otherwise, it may cause electric shock in case equipment breakdown or insulation breakdown.	
11. Do not use joint cable for indoor/outdoor connection cable. Use specified indoor/outdoor connection cable, refer to Installation Instructions CONNECT THE CABLE TO THE INDOOR UNIT and connect tightly for indoor/outdoor connection. Clamp the cable so that no external force will be acted on the terminal. If connection or fixing is not perfect, it will cause heat up or fire at the connection.	
12. When install or relocate Air to Water Heatpump indoor/outdoor unit, do not let any substance other than the specified refrigerant, eg. air etc. mix into refrigerant cycle (piping). Mixing of air etc. will cause abnormal high pressure in refrigeration cycle and result in explosion, injury etc.	
13. This is a R410A model, when connecting the piping, do not use any existing (R22) pipes and flare nuts. Using such same may cause abnormally high pressure in the refrigeration cycle (piping), and possibly result in explosion and injury. Use only R410A refrigerant. Thickness of copper pipes used with R410A must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm. It is desirable that the amount of residual oil is less than 40 mg/10 m.	
14. During installation, install the refrigerant piping properly before run the compressor. Operation of compressor without fixing refrigeration piping and valves at opened condition will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc.	
15. During pump down operation, stop the compressor before remove the refrigeration piping. Removal of refrigeration piping while compressor is operating and valves are opened condition will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc.	
16. After completion of the installation servicing confirm there is no leakage of refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.	
17. Ventilate the room if there is refrigerant gas leakage during operation. Extinguish all fire sources if present. It may cause toxic gas when the refrigerant contacts with fire.	
18. Only use the supplied or specified installation parts, else, it may cause unit vibrate loose, water/refrigerant leakage, electrical shock or fire.	

WARNING

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CAUTION

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2. Specifications

2.1 WH-SXC16F9E8 WH-UX16FE8

Item		Unit	Outdoor Unit		
Performance Test Condition			EN 14511		
Cooling Capacity	Condition (Ambient/Water)		A35W7		
	kW		12.20		
	BTU/h		41600		
	kcal/h		10490		
Cooling EER	W/W		2.57		
	kcal/hW		2.20		
Heating Capacity	Condition (Ambient/Water)		A7W35	A2W35	
	kW		16.00	16.00	
	BTU/h		54600	54600	
	kcal/h		13760	13760	
Heating COP	W/W		4.28	3.07	
	kcal/hW		3.68	2.64	
Noise Level	Condition (Ambient/Water)		A35W7	A7W35	A2W35
	dB (A)		Cooling: 54	Heating: 53	—
	Power Level dB		Cooling: 71	Heating: 70	—
Air Flow		m ³ /min (ft ³ /min)	Cooling: 109.4 (3860) Heating: 76.0 (2860)		
Refrigeration Control Device			Expansion Valve		
Refrigeration Oil		cm ³	FV50S (1600)		
Refrigerant (R410A)		kg (oz)	2.90 (102.4)		
Dimension	Height	mm (inch)	1340 (52-3/4)		
	Width	mm (inch)	900 (35-7/16)		
	Depth	mm (inch)	320 (12-19/32)		
Net Weight		kg (lbs)	119 (262)		
Pipe Diameter	Liquid	mm (inch)	9.52 (3/8)		
	Gas	mm (inch)	15.88 (5/8)		
Standard Length		m (ft)	7 (23.0)		
Pipe Length Range		m (ft)	3 (9.8) ~ 30 (98.4)		
I/D & O/D Height Difference		m (ft)	20 (65.6)		
Additional Gas Amount		g/m (oz/ft)	50 (0.5)		
Refrigeration Charge Less		m (ft)	10 (32.8)		
Compressor	Type		Hermetic Motor		
	Motor Type		Brushless (4-poles)		
	Rated Output	kW	4.76		
Fan	Type		Propeller Fan		
	Material		PP		
	Motor Type		DC / Transistor (8-poles)		
	Input Power	W	—		
	Output Power	W	60		
	Fan Speed	rpm	Cooling: 680 (Top), 720 (Bottom) Heating: 500 (Top), 540 (Bottom)		
Heat Exchanger	Fin material		Aluminium (Pre Coat)		
	Fin Type		Corrugated Fin		
	Row × Stage × FPI		2 × 51 × 19		
	Size (W × H × L)	mm	898.8 × 1295.4 × 44		

Item		Unit	Outdoor Unit		
Power Source (Phase, Voltage, Cycle)		ø	Three		
		V	400		
		Hz	50		
Input Power		Condition (Ambient/Water)	A35W7	A7W35	A2W35
		kW	Cooling: 4.76	Heating: 3.74	Heating: 5.21
Maximum Input Power For Heatpump System		kW	10.27		
Power Supply 1 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			3Ø / 15.5 / 10.27k		
Power Supply 2 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			3Ø / 13.0 / 9.00k		
Power Supply 3 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			— / — / —		
Starting Current		A	7.2		
Running Current		Condition (Ambient/Water)	A35W7	A7W35	A2W35
		A	Cooling: 7.2	Heating: 5.7	Heating: 7.8
Maximum Current For Heatpump System		A	15.5		
Power Factor Power factor means total figure of compressor and outdoor fan motor.		%	Cooling: 96 Heating: 96		
Power Cord	Number of core		—		
	Length	m (ft)	—		
Thermostat			Electronic Control		
Protection Device			Electronic Control		

Item		Unit	Indoor Unit		
Performance Test Condition			EN 14511		
Operation Range	Outdoor Ambient	°C	Cooling: 16 ~ 43 Heating: -20 ~ 35		
	Water Outlet	°C	Cooling: 5 ~ 20 Heating: 25 ~ 55		
Internal Pressure Differential		kPa	Cooling: 9.7 Heating: 14.6		
Noise Level		Condition (Ambient/Water)	A35W7	A7W35	A2W35
		dB (A)	Cooling: 33	Cooling: 33	—
		Power Level dB	Cooling: 46	Cooling: 46	—
Dimension	Height	mm (inch)	892 (35-1/8)		
	Width	mm (inch)	502 (19-3/4)		
	Depth	mm (inch)	353 (13-29/32)		
Net Weight		kg (lbs)	47 (104)		
Refrigerant Pipe Diameter	Liquid	mm (inch)	9.52 (3/8)		
	Gas	mm (inch)	15.88 (5/8)		
Water Pipe Diameter	Inlet	mm (inch)	28 (1-3/32)		
	Outlet	mm (inch)	28 (1-3/32)		
Water Drain Hose Inner Diameter		mm (inch)	15 (19/32)		
Pump	Motor Type		DC Motor		
	No. of Speed		7 (Software Selection)		
	Input Power	W	82		
Hot Water Coil	Type		Brazen Plate		
	No. of Plates		52		
	Size (H × W × L)	mm	93 × 120 × 376		
	Water Flow Rate	l/min (m³/h)	Cooling: 35.0 (2.1) Heating: 45.9 (2.8)		
Pressure Relief Valve Water Circuit		kPa	Open: 300, Close: 265 and below		
Flow Switch			Magnetic Lead Switch		
Protection Device		A	Residual Current Circuit Breaker (40)		

Item		Unit	Indoor Unit
Expansion Vessel	Volume	l	10
	MWP	bar	3
Capacity of Integrated Electric Heater		kW	9.00

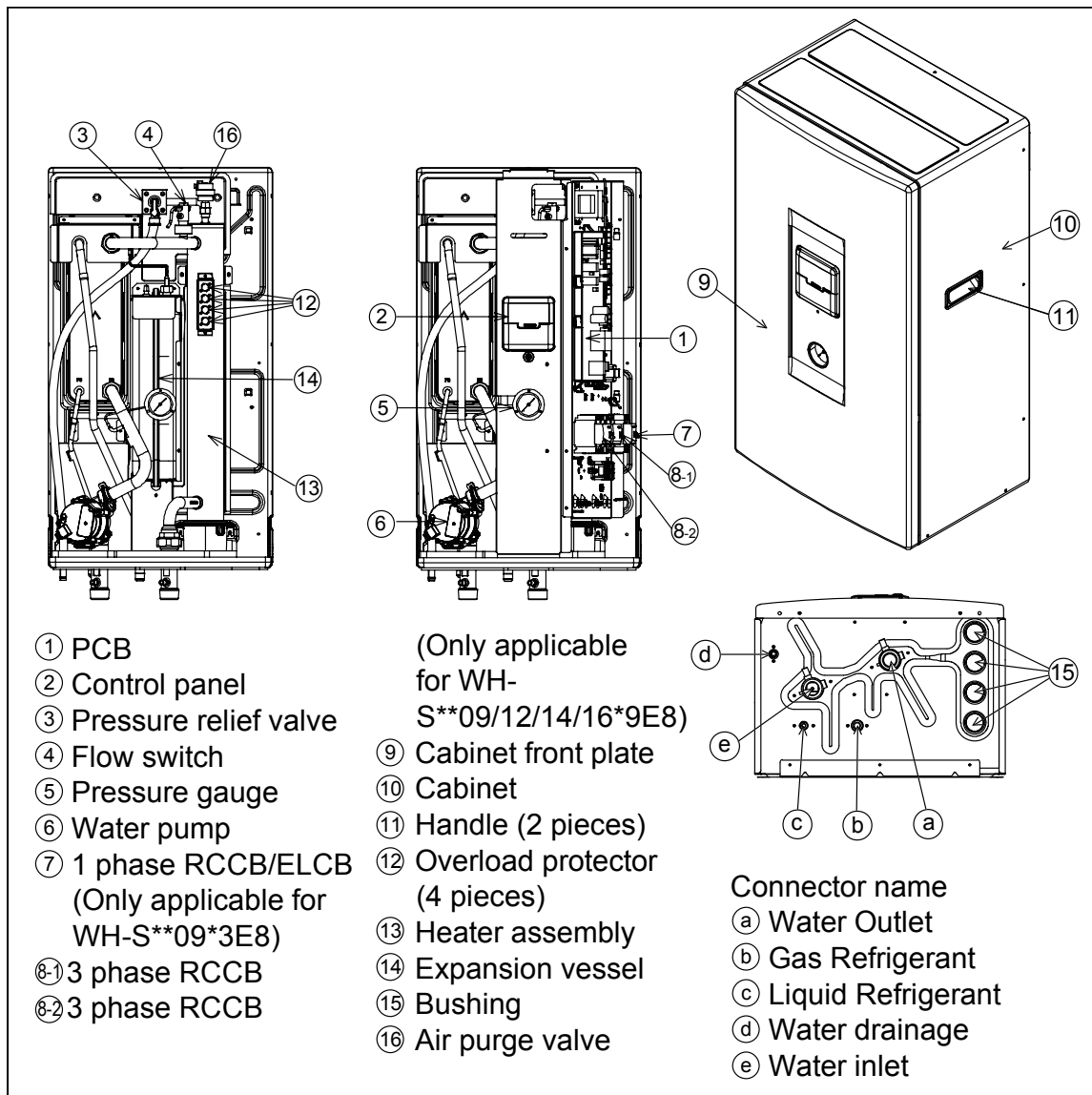
Note:

- Cooling capacities are based on outdoor air temperature of 35°C Dry Bulb with controlled indoor water inlet temperature of 12°C and water outlet temperature of 7°C.
- Heating capacities are based on outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb) with controlled indoor water inlet temperature of 30°C and water outlet temperature of 35°C.
- Specification are subjected to change without prior notice for further improvement.

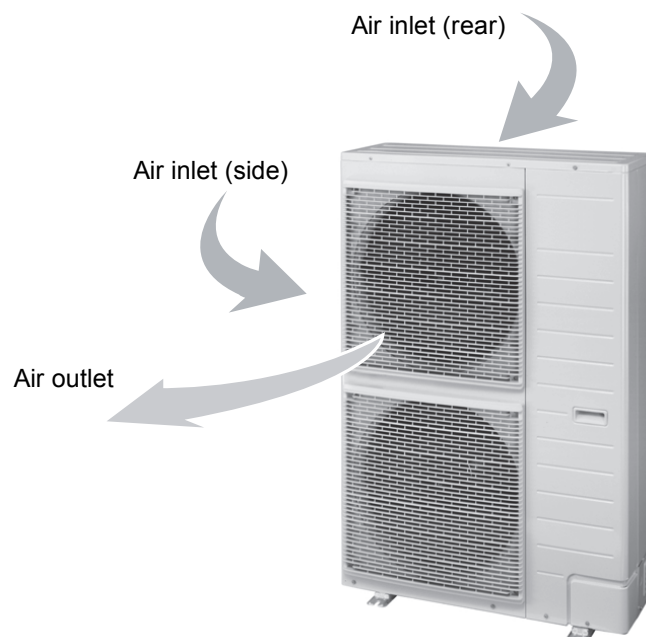
3. Features

- **Inverter Technology**
 - Energy saving
- **High Efficiency**
- **Environment Protection**
 - Non-ozone depletion substances refrigerant (R410A)
- **Long Installation Piping**
 - Long piping up to 30 meter with height difference 20 meter
 - Flexible 4-way piping for outdoor unit
- **Easy to use control panel**
 - Auto mode
 - Holiday mode
 - Dry concrete function
 - Weekly timer setting
- **A-class energy efficiency pump**
 - Water pump speed can be set by selection at control panel
- **Improved deice cycle**
- **Protection Feature**
 - Random auto restart after power failure for safety restart operation
 - Gas leakage protection
 - Prevent compressor reverse cycle
 - Inner protector to protect compressor
- **Serviceability Feature**
 - Breakdown Self Diagnosis function
 - System Status Check Buttons for servicing purpose
 - System Pumpdown Button for servicing purpose
 - Front maintenance design for outdoor unit

4.1.4 Main Components

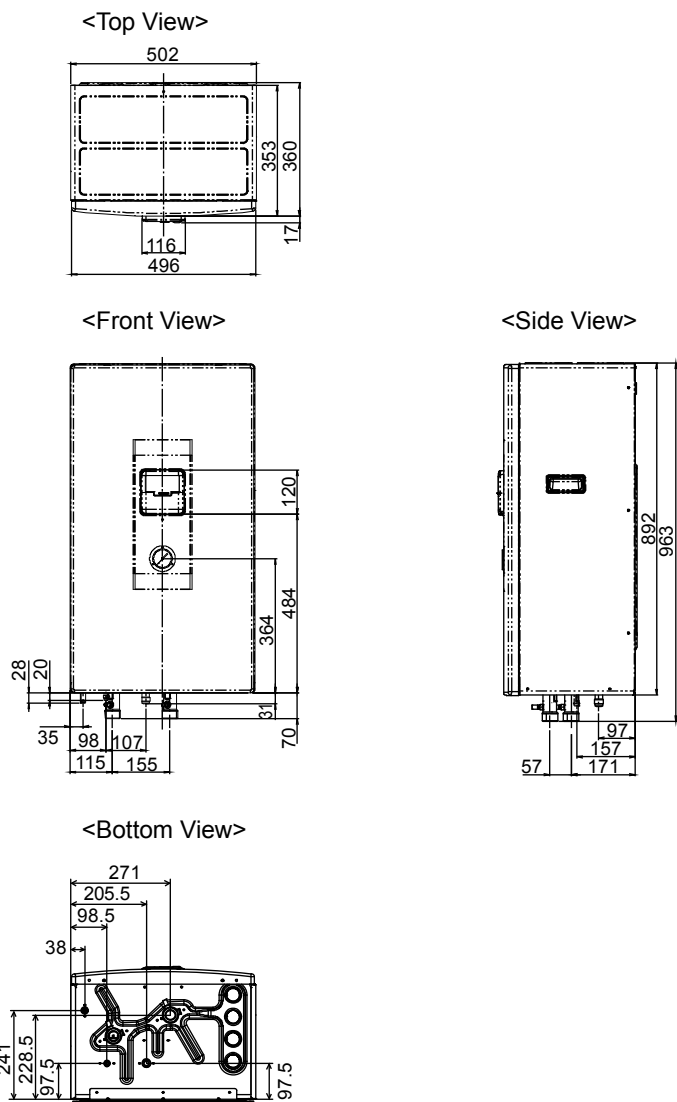


4.2 Outdoor Unit

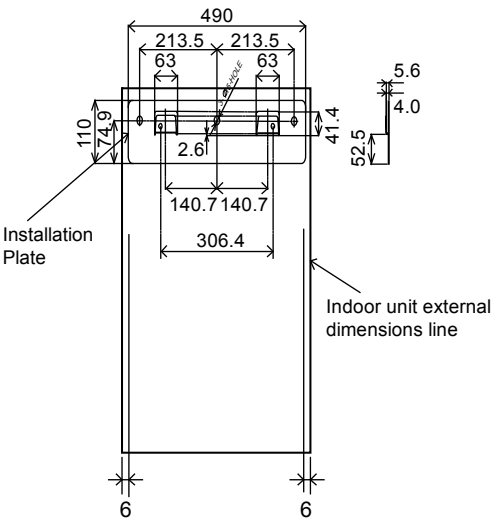


5. Dimensions

5.1 Indoor Unit

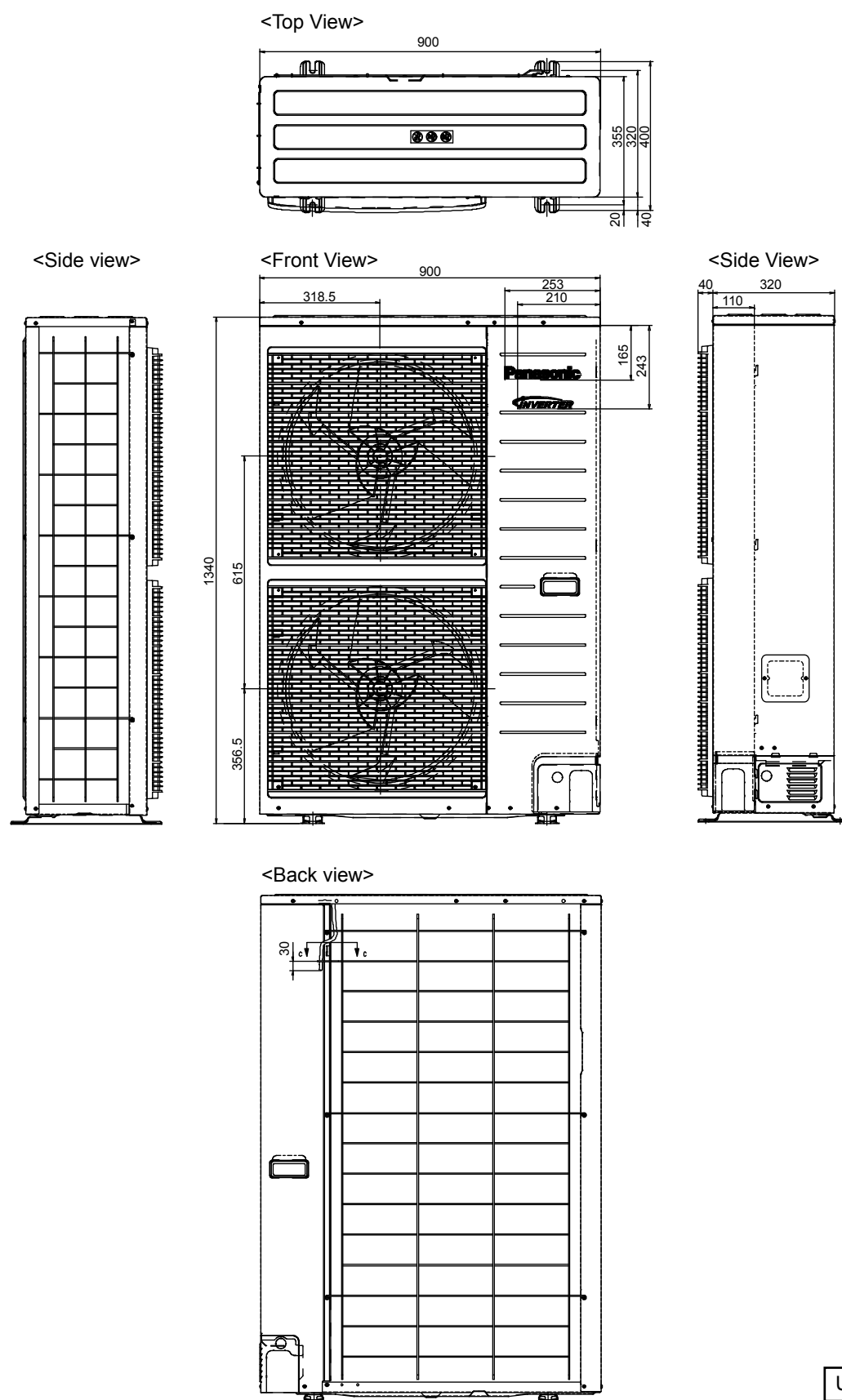


Relative position between the indoor unit and the installation plate <Front View>

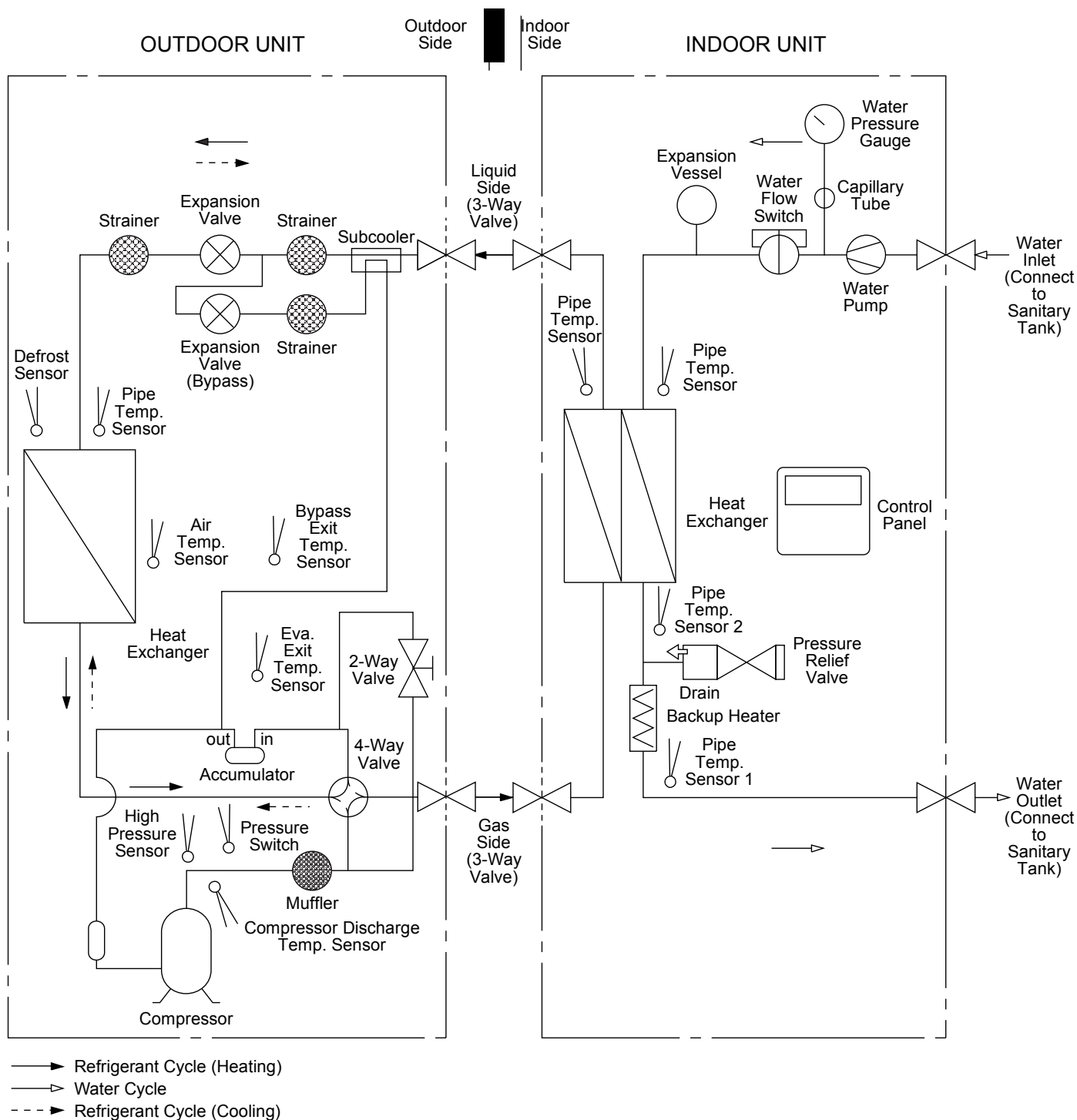


Unit: mm

5.2 Outdoor Unit



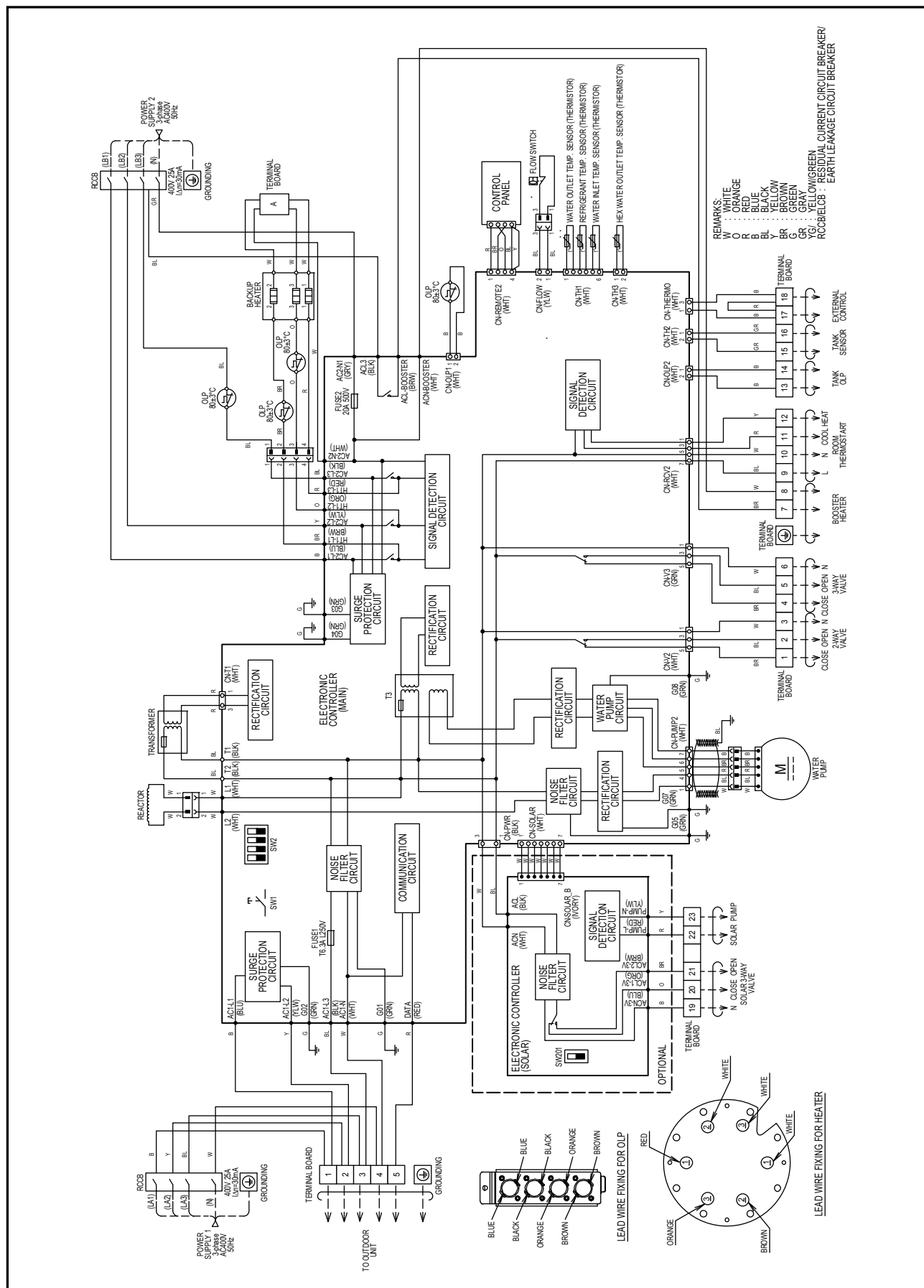
6. Refrigeration and Water Cycle Diagram



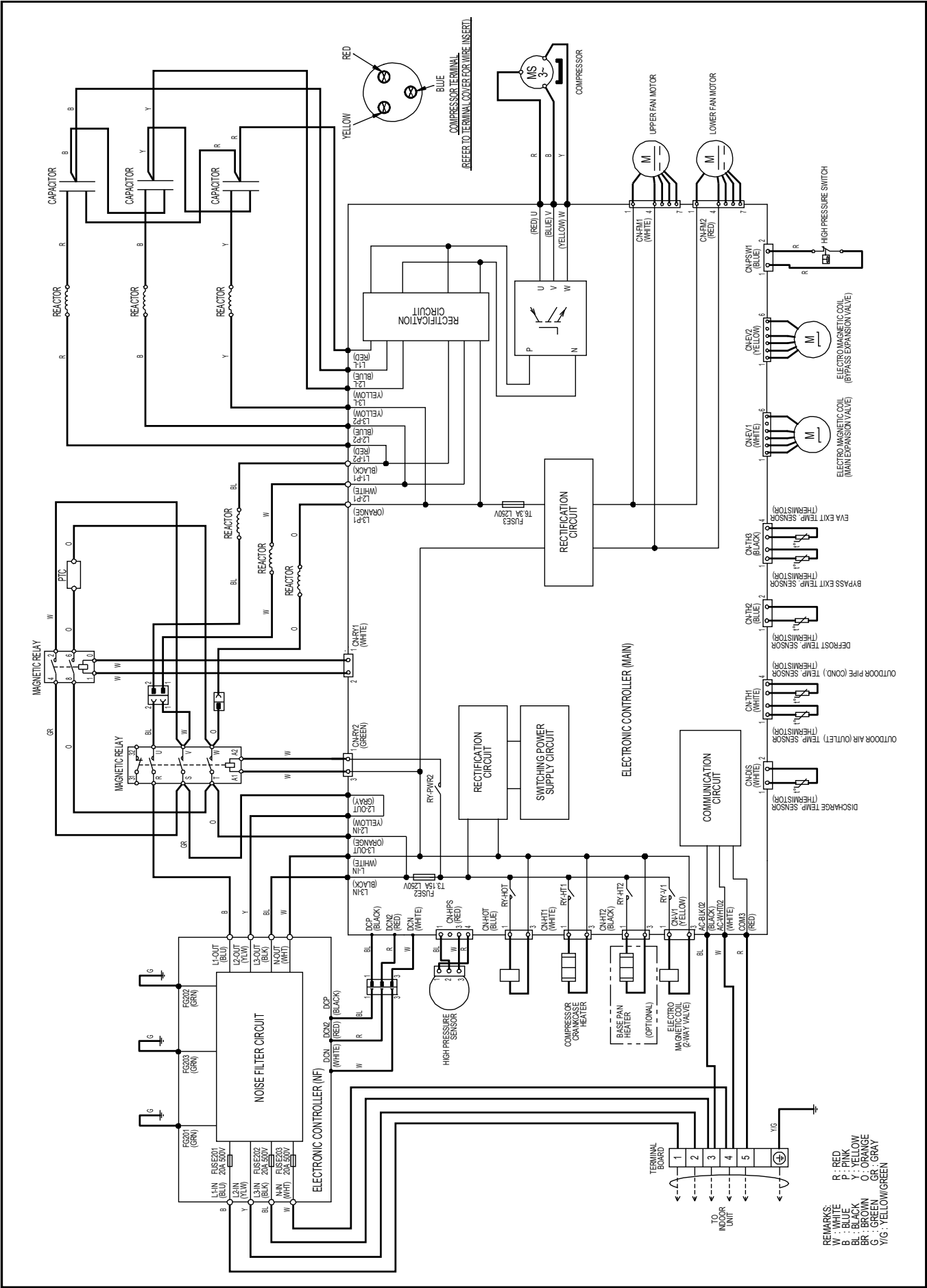
Model		Piping size		Rated Length (m)	Max Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)
		Gas	Liquid					
Cooling	WH-S*C09*3E8 WH-U*09*E8	Ø15.88 mm (5/8")	Ø9.52 mm (3/8")	5 ~ 7.5	20	3	30	50
	WH-S*C09/12/14/16*9E8 WH-U*09/12/14/16*E8							
Heating	WH-S*F09*3E8 WH-U*09*E8							
	WH-S*F09/12/14/16*9E8 WH-U*09/12/14/16*E8							

* If piping length is over common length, additional refrigerant should be added as shown in the table.

8.1 Indoor Unit



8.2 Outdoor Unit



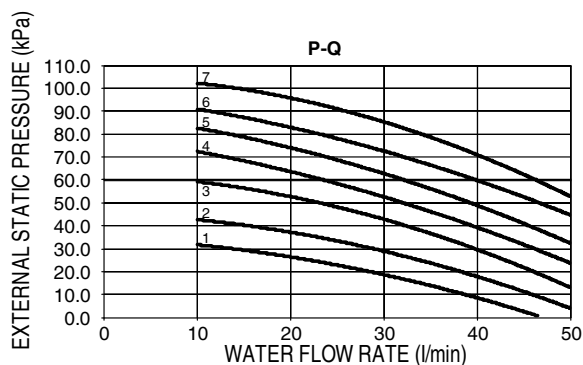
How to Adjust Water Flow Rate [SERVICE MODE: 02]

Before adjust the water flow rate, make sure that the total water volume in the installation is 50 litres minimum for heating side. The default setting is SPEED 3 (Only for WH-S**09*3E8 and WH-S**09/12*9E8) and SPEED 4 for WH-S**14/16*9E8. Please ensure the minimum flow rate is not less than 13 l/min and not more than 50 l/min.

The available external static pressure (kPa) in function of the water flow rate (l/min) is shown in the P-Q graph.

Depend on the hydraulic system pressure loss and type, the water flow rate can be adjusted by control panel.

1. Press SERVICE button for 5 seconds.
2. Press ▲ button to enter menu S02 and press SET button.
3. Press SELECT button then press ▲/▼ button to change SPEED and press SET to confirm.
4. Press OFF/ON button to quit setting.



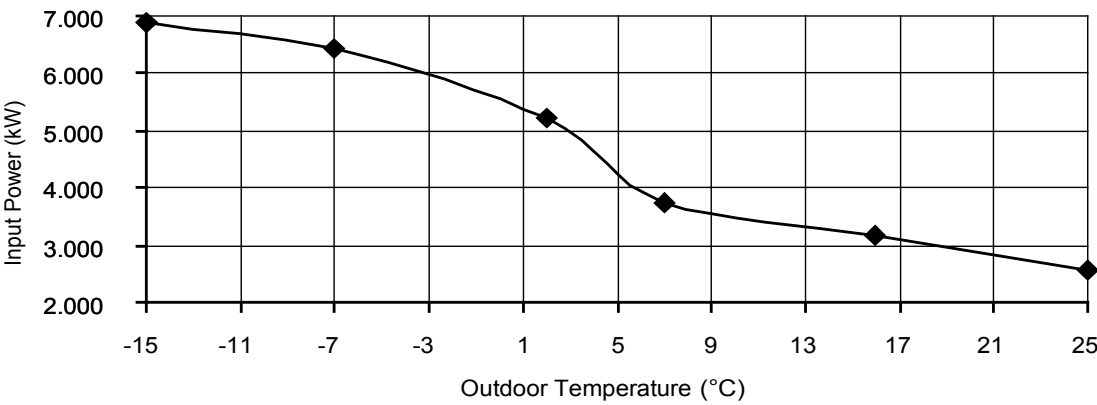
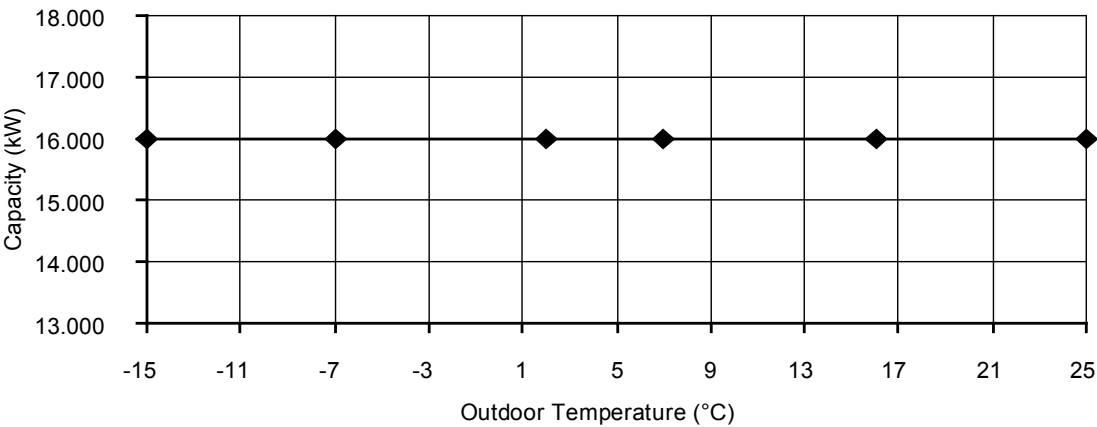
18. Technical Data

18.1 Operation Characteristics

18.1.1 WH-SXC16F9E8 WH-UX16FE8

Heating Characteristics at Different Outdoor Air Temperature

Condition
Outdoor air temperature : 7°C (DBT), 6°C (WBT)
Indoor water inlet temperature : 30°C
Indoor water outlet temperature : 35°C
Piping length : 7 m



Cooling Characteristics at Different Outdoor Air Temperature

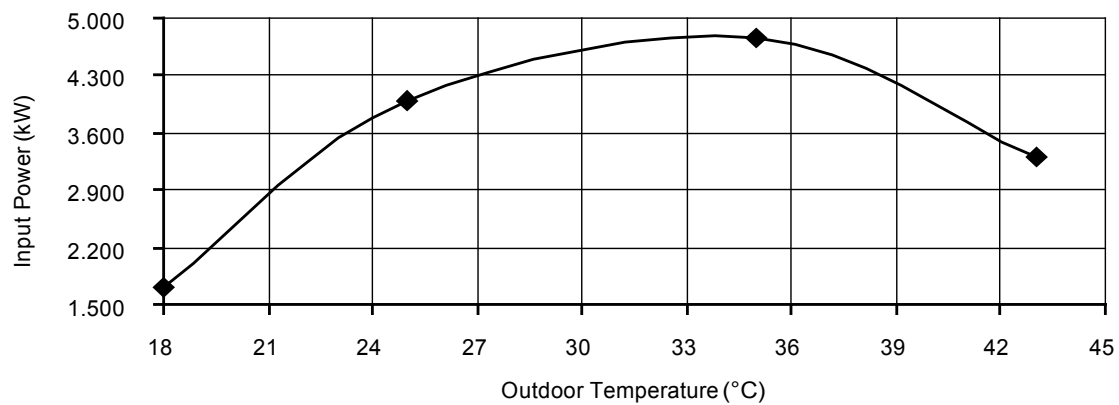
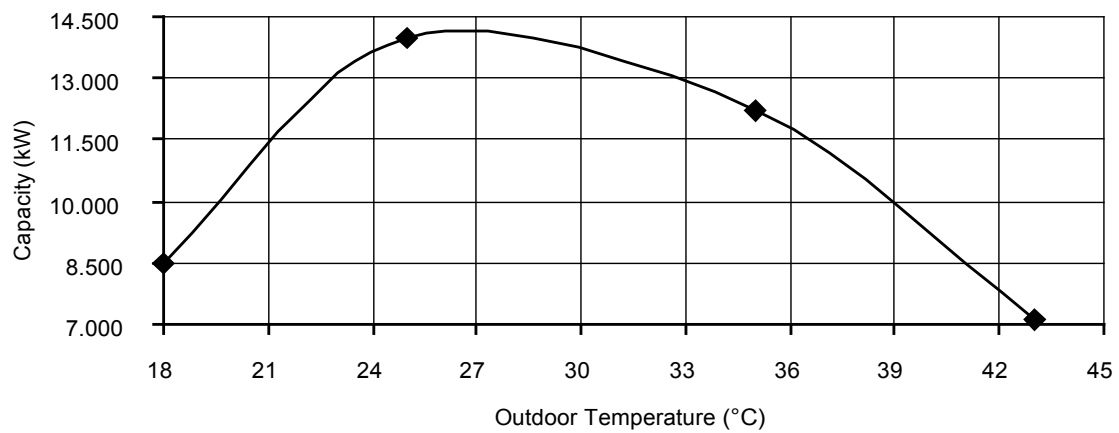
Condition

Outdoor air temperature : 35°C (DBT), -°C (WBT)

Indoor water inlet temperature : 12°C

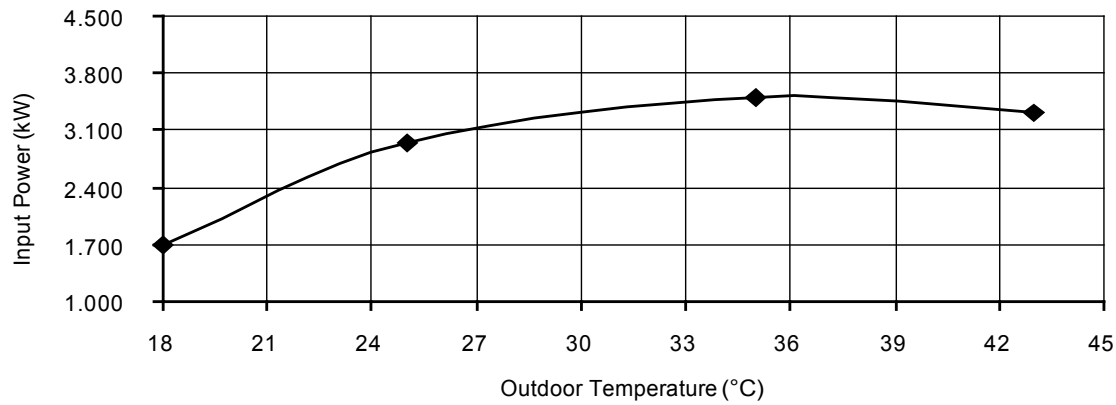
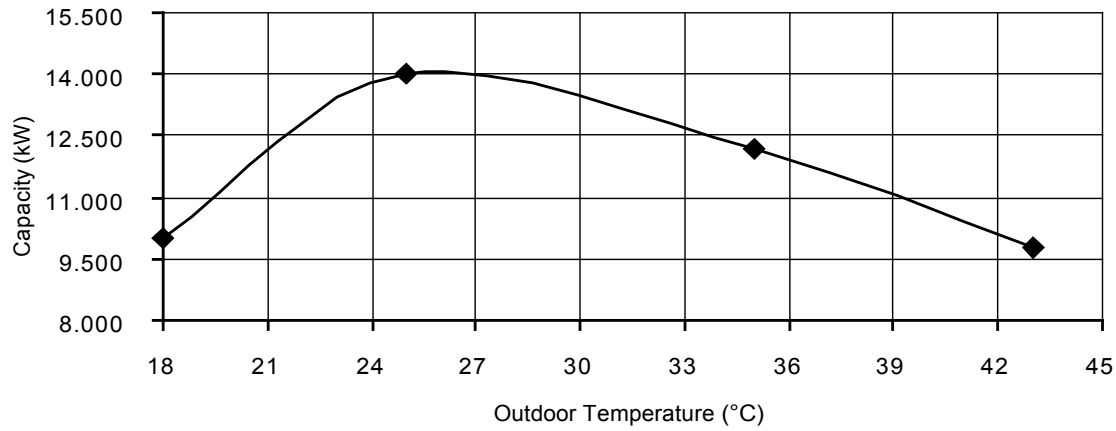
Indoor water outlet temperature : 7°C

Piping length : 7 m



Cooling Characteristics at Different Outdoor Air Temperature

Condition
Outdoor air temperature : 35°C (DBT), -°C (WBT)
Indoor water inlet temperature : 12°C
Indoor water outlet temperature : 18°C
Piping length : 7 m



Heating Characteristics at Different Piping Length

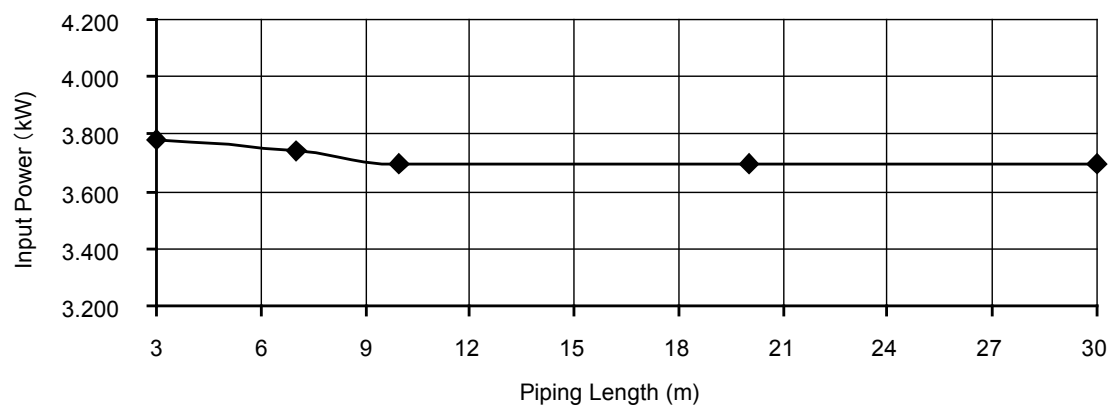
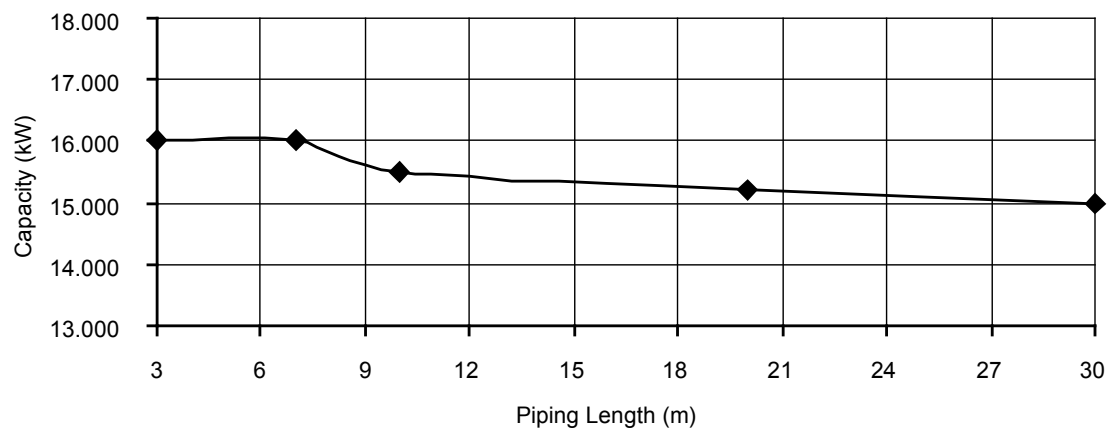
Condition

Outdoor air temperature : 7°C (DBT), 6°C (WBT)

Indoor water inlet temperature : 30°C

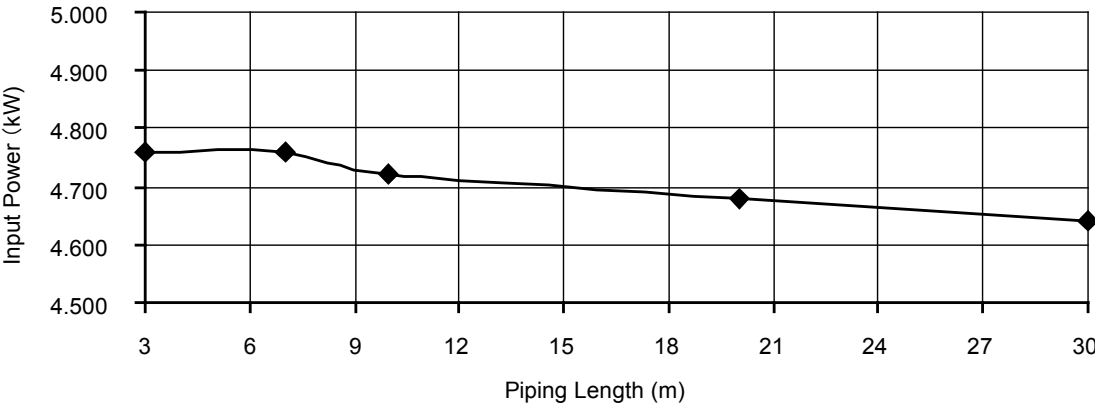
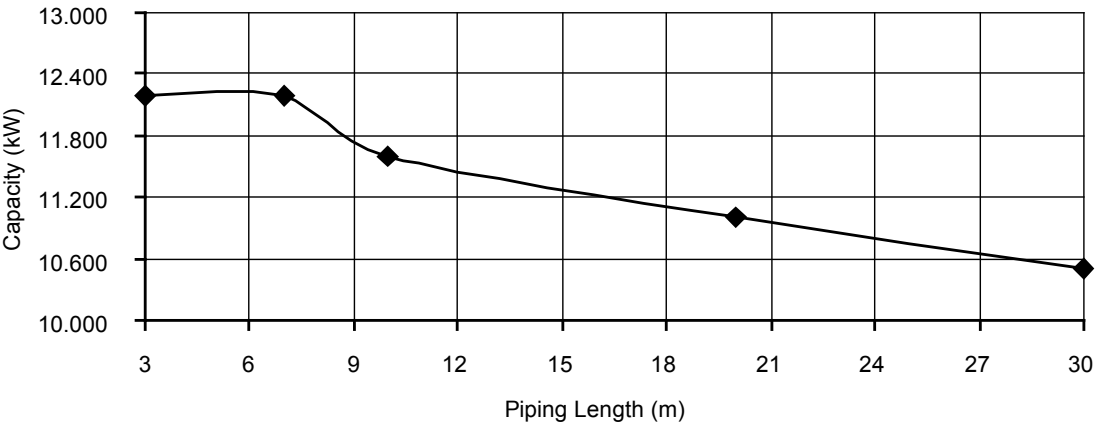
Indoor water outlet temperature : 35°C

Piping length : 7 m



Cooling Characteristics at Different Piping Length

Condition
Outdoor air temperature : 35°C (DBT), -°C (WBT)
Indoor water inlet temperature : 12°C
Indoor water outlet temperature : 7°C
Piping length : 7 m



18.2 Heating Capacity Table

18.2.1 WH-SXC16F9E8 WH-UX16FE8

Water Out (°C)	30		35		40		45		50		55	
Outdoor Air (°C)	Capacity	Input Power	Capacity	Input Power	Capacity	Input Power	Capacity	Input Power	Capacity	Input Power	Capacity	Input Power
-15	16000	6300	16000	6890	16000	7450	16000	8100	16000	8480	15200	8960
-7	16000	5850	16000	6420	16000	7000	16000	7570	16000	8100	16000	8620
2	16000	4670	16000	5210	16000	5740	16000	6310	16000	6900	16000	7500
7	16000	3350	16000	3740	16000	4300	16000	4800	16000	5430	16000	5910
16	16000	2590	16000	3180	16000	3710	16000	4270	16000	4860	16000	5220
25	16000	2020	16000	2580	16000	2910	16000	3360	16000	3740	16000	4000

18.3 Cooling Capacity Table

18.3.1 WH-SXC16F9E8 WH-UX16FE8

Water Out (°C)	7		18	
Outdoor Air (°C)	Capacity	Input Power	Capacity	Input Power
18	8500	1700	10000	1700
25	14000	4000	14000	2940
35	12200	4760	12200	3500
43	7100	3310	9800	3310