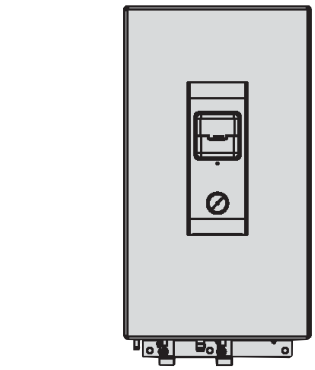
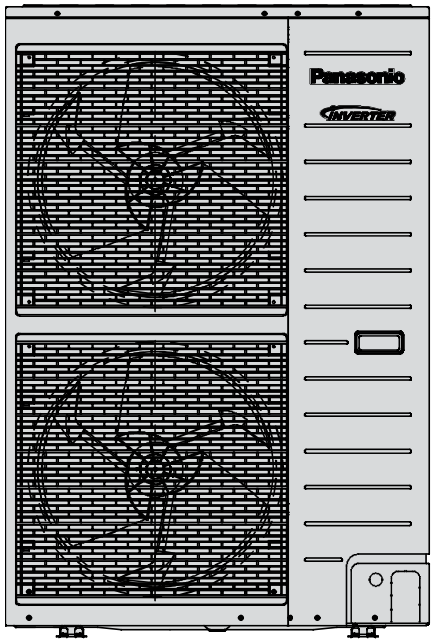
Order No: PAPAMY1312030CE

Service Manual

Air-to-Water Heatpump





Indoor Unit **Outdoor Unit**

WH-SXC12F6E5 **WH-UX12FE5**

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.

Panasonic®

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.

- 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
19. The unit is only for use in a closed portable water system. Utilization in an open water circuit or non-portable water circuit, may lead to excessive corrosion of the water piping and risk of incubating bacteria colonies, particularly Legionella, in water.
20. Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.
21. Do not dismantle refrigerant piping using pipe wrench. It might deform the piping and cause the unit to malfunction.
22. Select a location where in case of water leakage, the leakage will not cause damage to other properties.
23. Do not locally purchase electrical parts of the product for the purpose of installation, service, maintenance and etc. They might cause electrical shock or fire.
24. Do not branch the power from terminal block to heater tape. Overloaded terminal block will cause electrical shock or fire.
25. Installation or servicing work. It may need two people to carry out the installation or servicing work.
26. Do not use unspecified cord, modified cord, joint cord or extension cord for power supply cord. Do not share the single outlet with other electrical appliances. Poor contact, poor insulation or over current will cause electrical shock or fire.
27. Tighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigerant gas leakage.

⚠ CAUTION
1. Do not install the air-to-water heatpump indoor unit and outdoor unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.
2. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.
3. It may need two persons to carry out the installation work. The weight of indoor/outdoor unit might cause injury if carried by one person.
4. Do not touch outdoor unit air inlet and aluminium fin. It may cause injury.
5. Select an installation location which is easy for maintenance.
6. Pb free solder has a higher melting point than standard solder; typically the melting point is 50°F - 70°F (30°C - 40°C) higher. Please use a high temperature solder iron. In case of the soldering iron with temperature control, please set it to 700 ± 20°F (370 ± 10°C). Pb free solder will tend to splash when heated too high (about 1100°F/600°C).
7. Power supply connection to the indoor unit. 1. Power supply point should be in easily accessible place for power disconnection in case of emergency. 2. Must follow local national wiring standard, regulation and this installation instruction. 3. Strongly recommended to make permanent connection to a circuit breaker. - Power Supply 1: Use approved 15/16A 2-poles circuit breaker with a minimum contact gap of 3.0 mm. - Power Supply 2: Use approved 15/16A 2-poles circuit breaker with a minimum contact gap of 3.0 mm.
8. Do not release refrigerant during piping work for installation, servicing, re-installation and during repairing a refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.
9. Do not install this appliance in a laundry room or other high humidity location. This condition will cause rust and damage to the unit.
10. Make sure the insulation of power supply cord does not contact to hot part (i.e. refrigerant piping, water piping) to prevent from insulation failure (melt).
11. Do not sit, step or place anything on the unit, you may fall down accidentally.
12. Do not touch the sharp aluminum fins or edges of metal parts. If you are required to handle sharp parts during installation or servicing, please wear hand glove. Sharp parts may cause injury.
13. After installation, check the water leakage condition in connection area during test run. If leakage occur, it will cause damage to other properties.
14. The unit described in this manual is designed for use in a closed water system only. Utilization in an open water circuit may lead to excessive corrosion of the water piping.

2.2 WH-SXC12F6E5 WH-UX12FE5

Item		Unit	Outdoor Unit		
Performance Test Condition			EN 14511		
Cooling Capacity		Condition (Ambient/Water)	A35W7		
		kW	10.00		
		BTU/h	34100		
		kcal/h	8600		
Cooling EER		W/W	2.81		
		kcal/hW	2.42		
Heating Capacity		Condition (Ambient/Water)	A7W35	A2W35	
		kW	12.00	12.00	
		BTU/h	41000	41000	
		kcal/h	10320	10320	
Heating COP		W/W	4.74	3.44	
		kcal/hW	4.08	2.96	
Noise Level		Condition (Ambient/Water)	A35W7	A7W35	A2W35
		dB (A)	Cooling: 50	Heating: 50	—
		Power Level dB	Cooling: 68	Heating: 67	—
Air Flow		m^3/min (ft^3/min)	Cooling: 93.3 (3290) Heating: 80.0 (2830)		
Refrigeration Control Device			Expansion Valve		
Refrigeration Oil		cm^3	FV50S (1200)		
Refrigerant (R410A)		kg (oz)	2.85 (100.6)		
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)	101 (223)		
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	3.00		
Fan	Type		Propeller Fan		
	Material		PP		
	Motor Type		DC (8-poles)		
	Input Power	W	—		
	Output Power	W	60		
	Fan Speed	rpm	Cooling: 600 (Top), 640 (Bottom) Heating: 520 (Top), 560 (Bottom)		
Heat Exchanger	Fin material		Aluminium (Pre Coat)		
	Fin Type		Corrugated Fin		
	Row × Stage × FPI		2 × 51 × 18		
	Size (W × H × L)	mm	903.7 × 1295.4 × 38.1		

Item		Unit	Outdoor Unit		
Power Source (Phase, Voltage, Cycle)		ø	Single		
		V	230		
		Hz	50		
Input Power		Condition (Ambient/Water)	A35W7	A7W35	A2W35
		kW	Cooling: 3.56	Heating: 2.53	Heating: 3.49
Maximum Input Power For Heatpump System		kW	6.27		
Power Supply 1 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			1Ø / 29.0 / 6.27k		
Power Supply 2 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			1Ø / 26.0 / 6.00k		
Power Supply 3 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			— / — / —		
Starting Current		A	16.5		
Running Current		Condition (Ambient/Water)	A35W7	A7W35	A2W35
		A	Cooling: 16.5	Heating: 11.7	Heating: 16.1
Maximum Current For Heatpump System		A	29.0		
Power Factor Power factor means total figure of compressor and outdoor fan motor.		%	Cooling: 94	Heating: 94	Heating: 94
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: 23.1 Heating: 33.0		
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)	45 (99)		
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	60		
Hot Water Coil	Type		Brazed Plate		
	No. of Plates		36		
	Size (H × W × L)	mm	65 × 120 × 376		
	Water Flow Rate	l/min (m^3/h)	Cooling: 28.7 (1.7) Heating: 34.4 (2.1)		
Pressure Relief Valve Water Circuit		kPa	Open: 300, Close: 265 and below		
Flow Switch			Magnetic Lead Switch		
Protection Device		A	Residual Current Circuit Breaker (30)		

Item		Unit	Indoor Unit
Expansion Vessel	Volume	l	10
	MWP	bar	3
Capacity of Integrated Electric Heater		kW	6.00

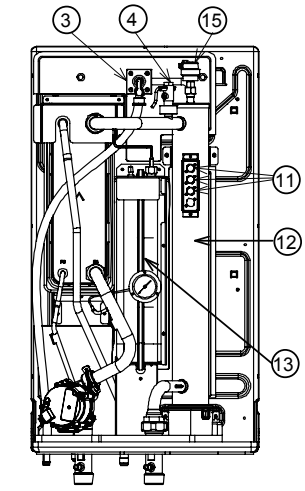
Note:

- 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.
- Flow rate indicated are based on nominal capacity adjustment of leaving water temperature (LWT) 35°C and ΔT = 5°C.

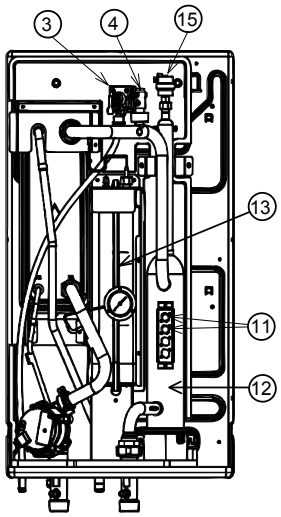
3. Features

- **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

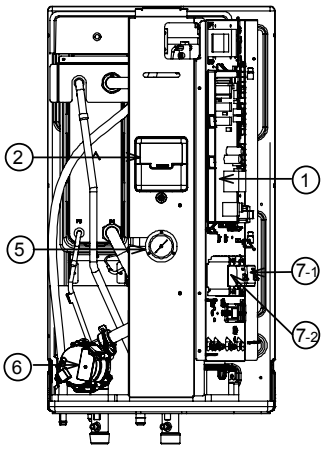
4.1.4 Main Components

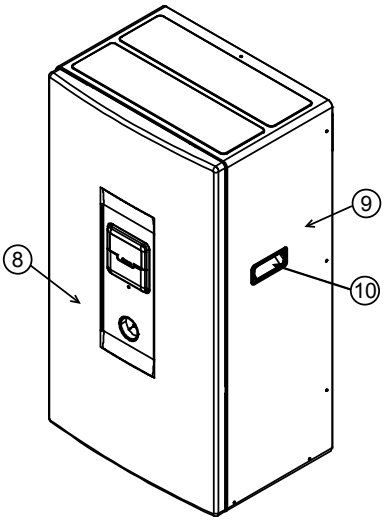


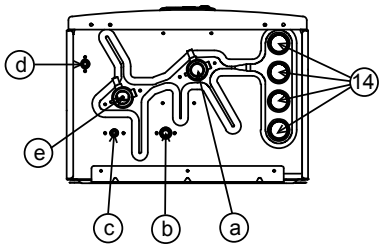
WH-S**12/14/16*6E5



WH-S**09*3E5



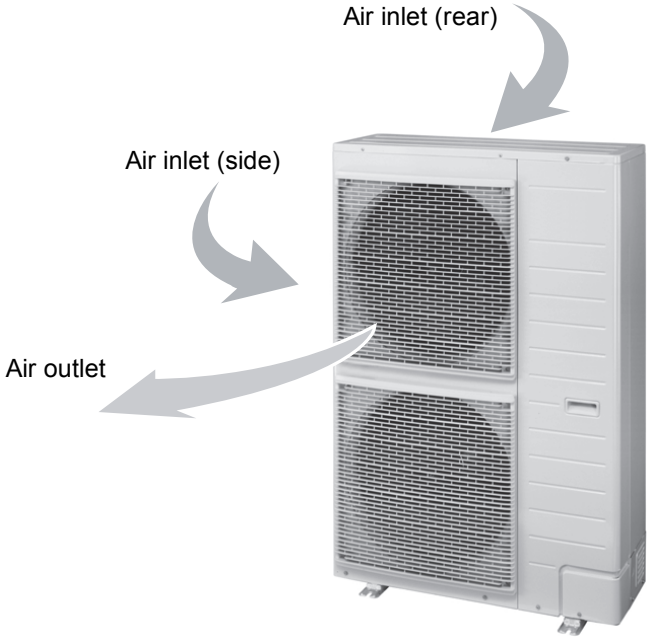




① PCB
② Control panel
③ Pressure relief valve
④ Flow switch
⑤ Pressure gauge
⑥ Water pump
⑦-1 1 phase RCCB/ELCB
⑦-2 1 phase RCCB/ELCB
⑧ Cabinet front plate
⑨ Cabinet
⑩ Handle (2 pieces)
⑪ Overload protector
(2 pieces for WH-S**09*3E5)
(3 pieces for WH-S**12/14/16*6E5)
⑫ Heater assembly
⑬ Expansion vessel
⑭ Bushing
⑮ Air purge valve

Connector name
ⓐ Water Outlet
ⓑ Gas Refrigerant
ⓒ Liquid Refrigerant
ⓓ Water drainage
ⓔ Water inlet

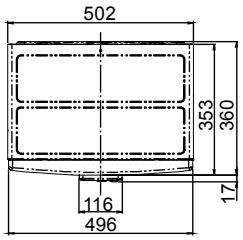
4.2 Outdoor Unit



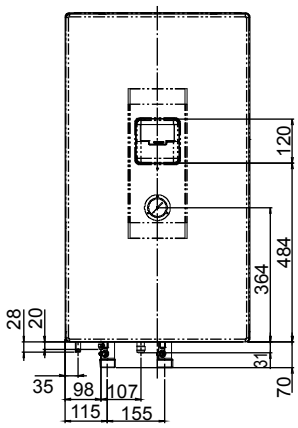
5. Dimensions

5.1 Indoor Unit

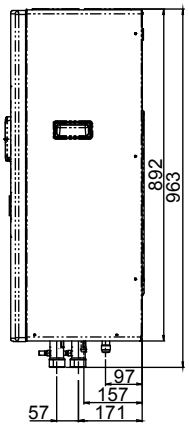
<Top View>



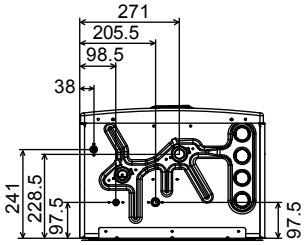
<Front View>



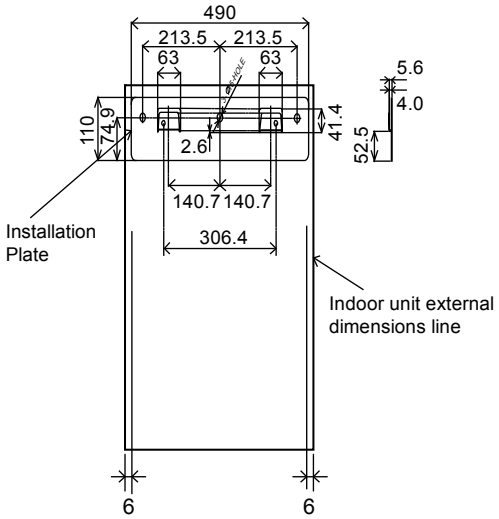
<Side View>



<Bottom View>



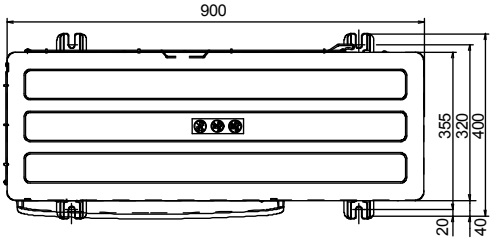
Relative position between the indoor unit and the installation plate <Front View>



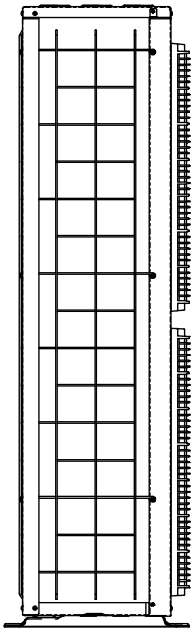
Unit: mm

5.2 Outdoor Unit

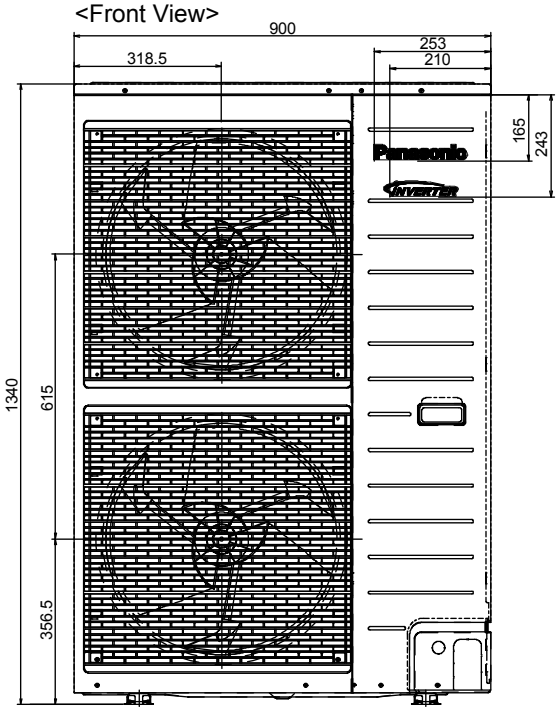
<Top View>



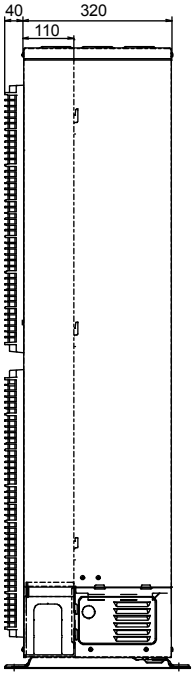
<Side view>



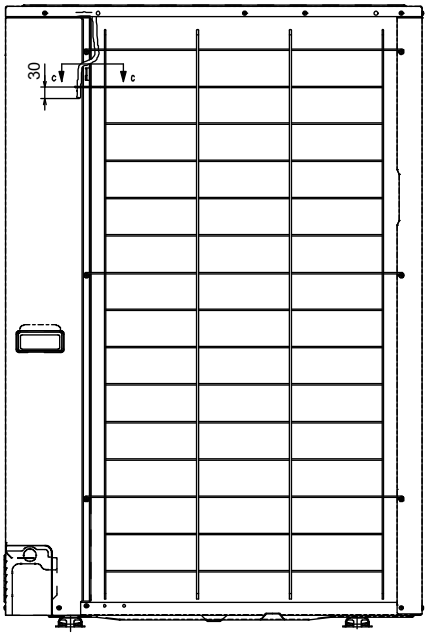
<Front View>



<Side View>

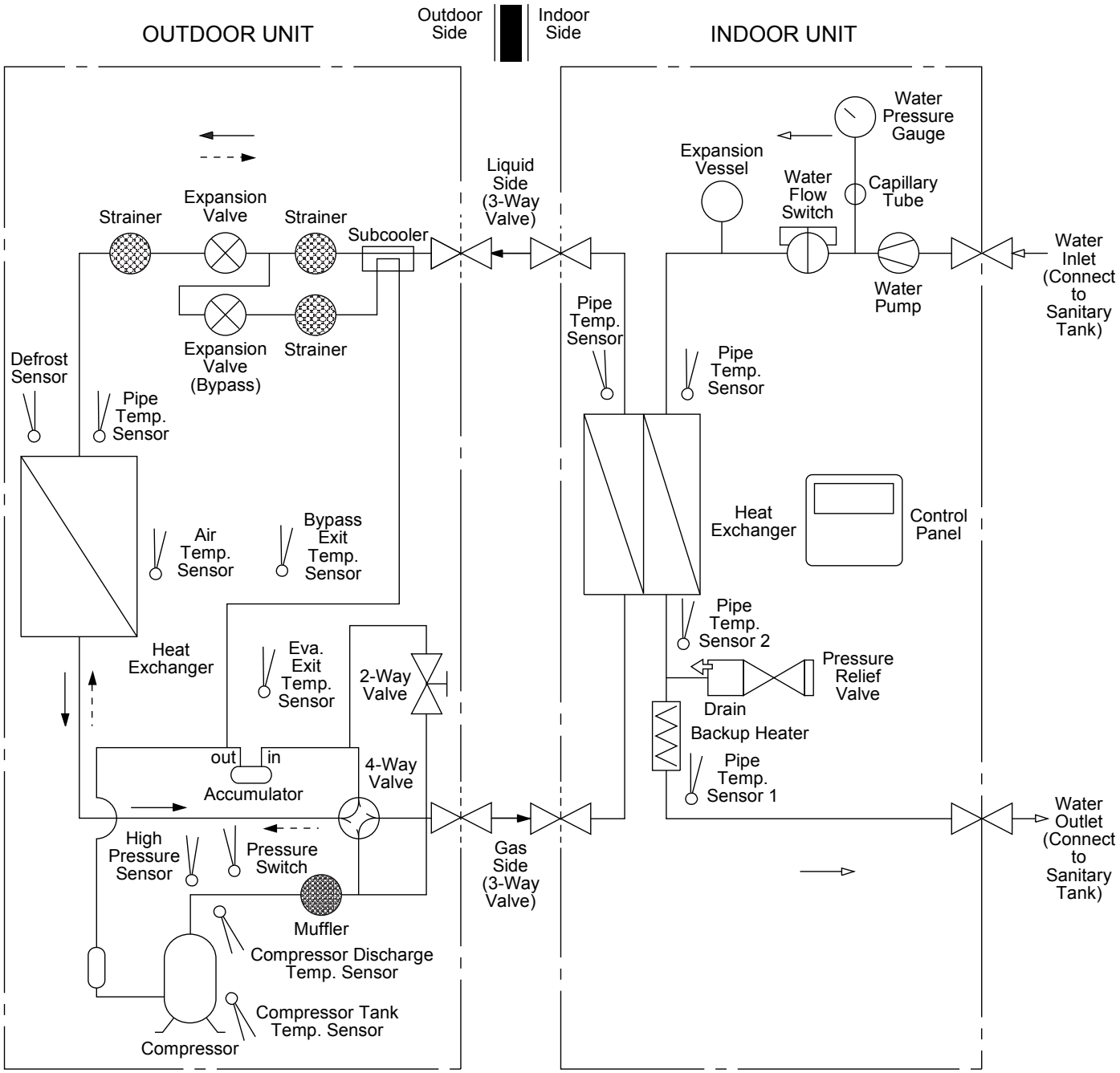


<Back view>



Unit: mm

6. Refrigeration and Water Cycle Diagram

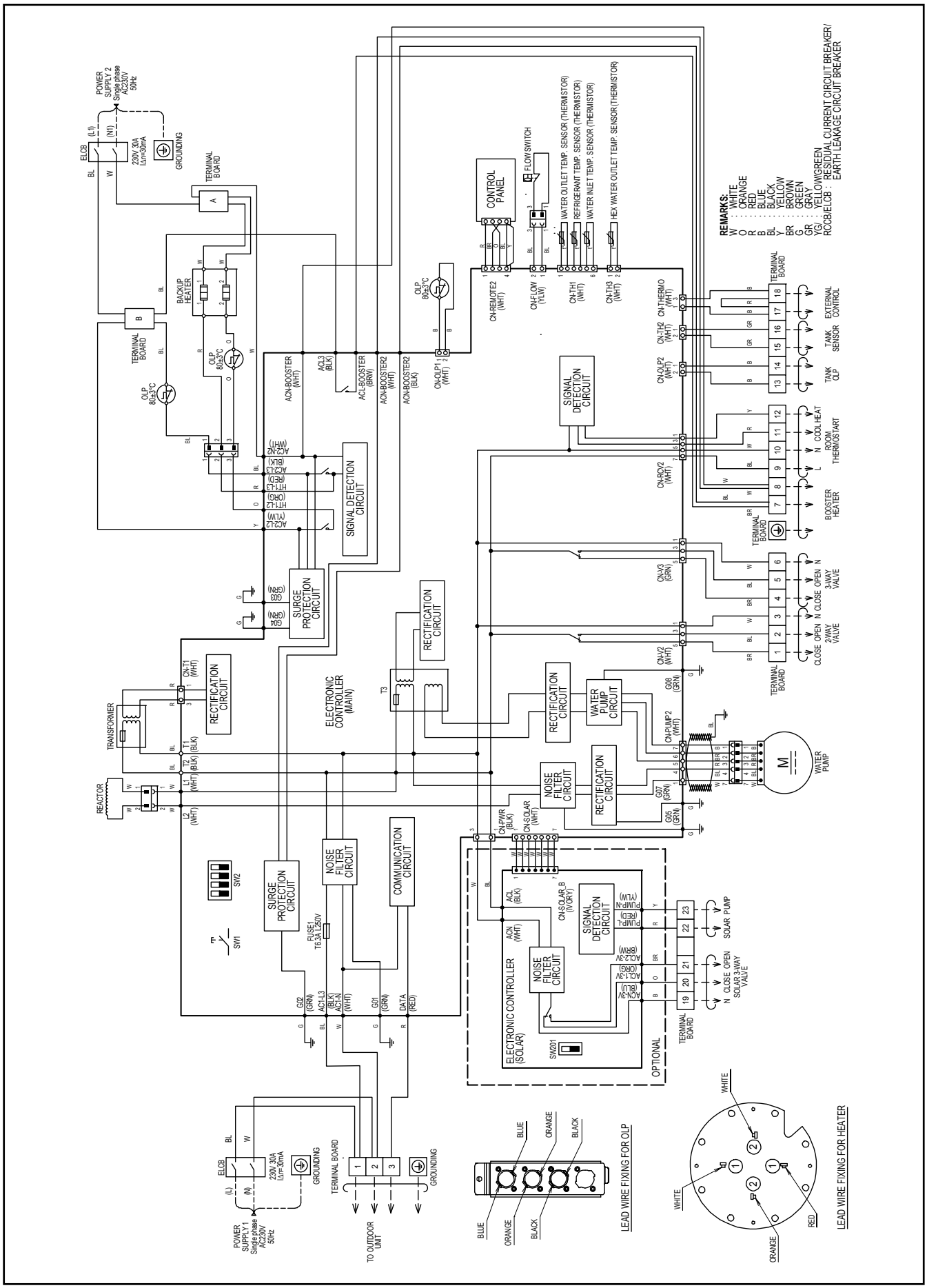


Refrigerant Cycle (Heating)
Water Cycle
Refrigerant Cycle (Cooling)

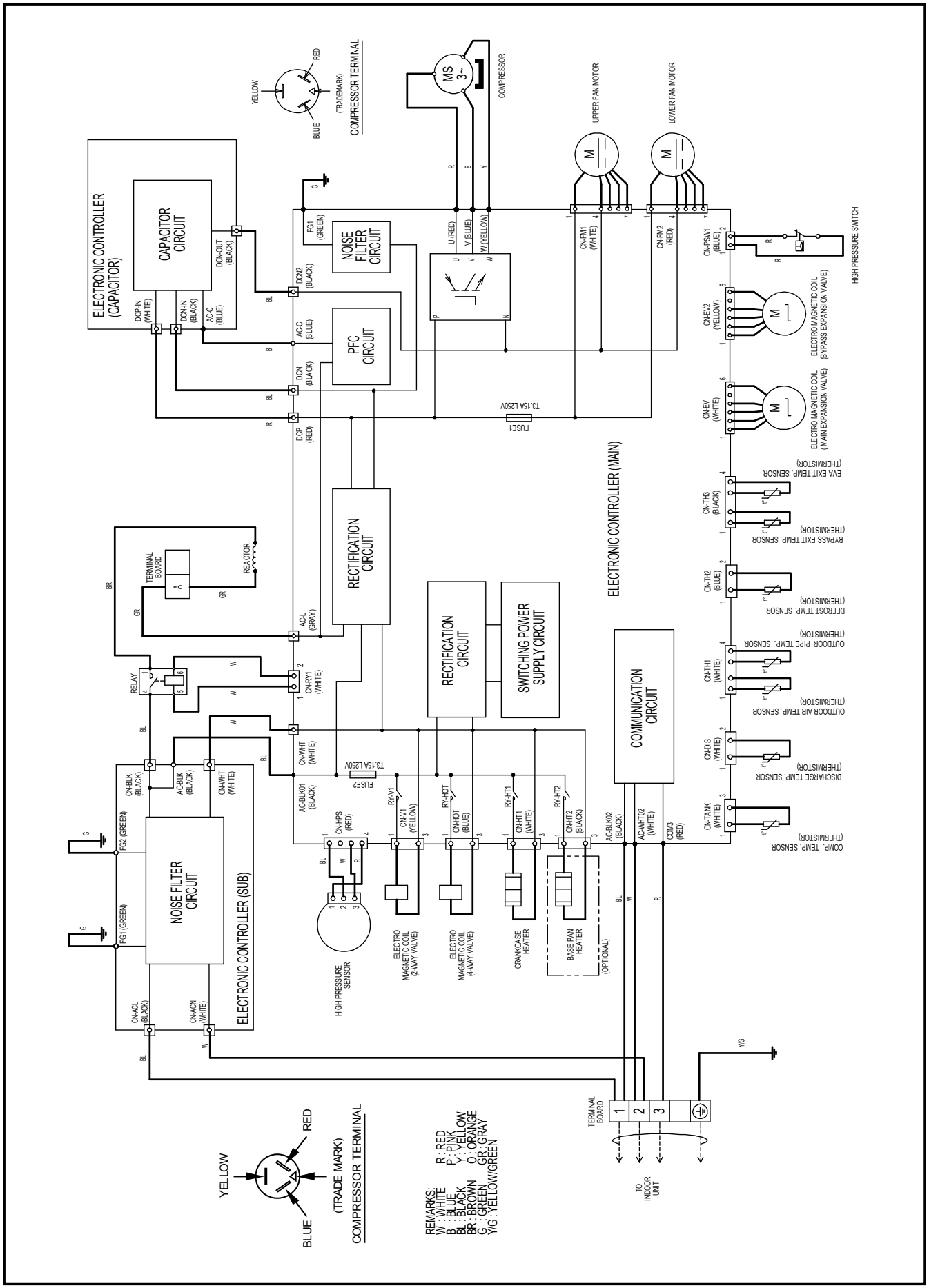
Model		Piping size		Rated Length (m)	Max Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)
		Gas	Liquid					
Cooling	WH-S*C09*3E5 WH-U*09*E5	Ø15.88 mm (5/8")	Ø9.52 mm (3/8")	5 ~ 7.5	20	3	30	50
	WH-S*C12/14/16*6E5 WH-U*12/14/16*E5							
Heating	WH-S*F09*3E5 WH-U*09*E5							
	WH-S*F12/14/16*6E5 WH-U*12/14/16*E5							

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

8.1.2 WH-SXC12F6E5



8.2 Outdoor Unit

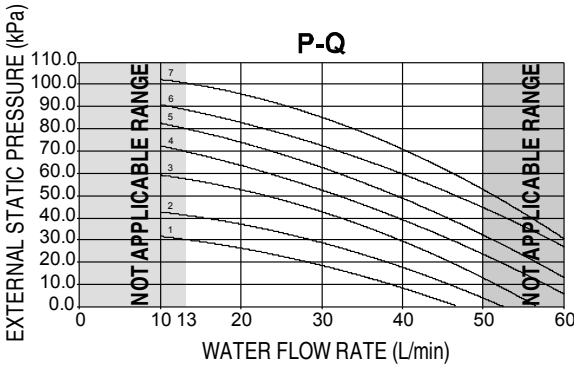


How to Adjust Water Flow Rate [SERVICE MODE: 02]

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*3E5 and WH-S**12*6E5) and SPEED 4 for WH-S**14/16*6E5. 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 select menu S02 (PUMP SPEED ADJUST MODE) and press SET button to confirm the menu.
3. Press SELECT button then press ▲/▼ button to change SPEED and press SET to confirm.
4. Press OFF/ON button to exit PUMP SPEED ADJUST MODE.

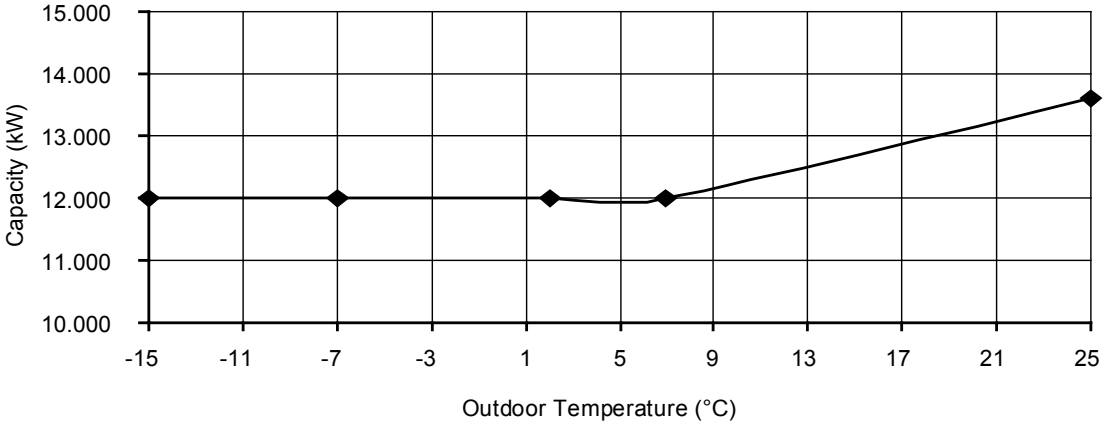
During PUMP SPEED ADJUST MODE, we can select AIR PURGE function by pressing FORCE button.
In AIR PURGE function, the pump will operate ON and OFF for 10 minutes to purge the air in the hydraulic system.
Press again the FORCE button to exit AIR PURGE function. PUMP SPEED ADJUST MODE will stop operation.

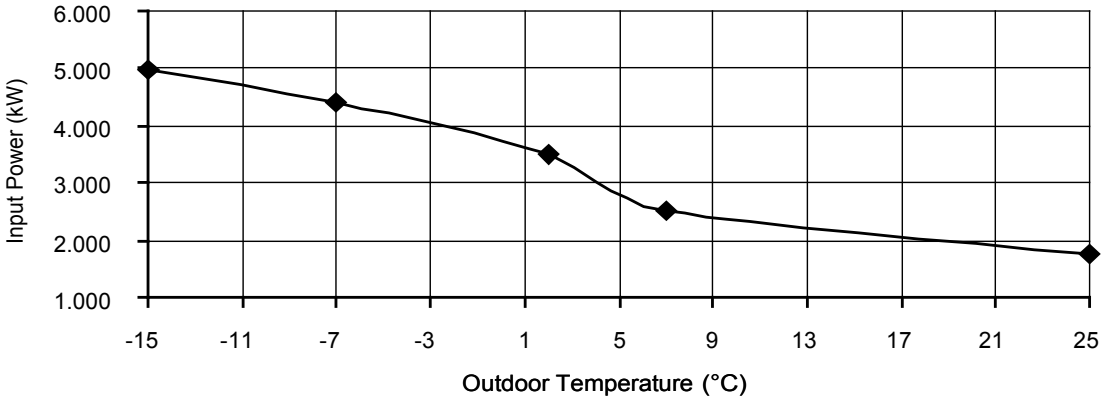


18.1.2 WH-SXC12F6E5 WH-UX12FE5

Heating Characteristics at Different Outdoor Air Temperature

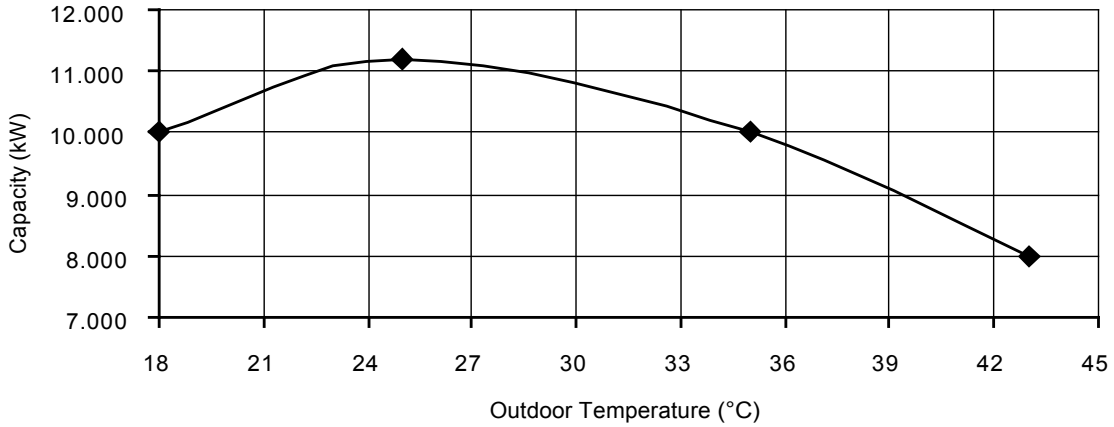
Condition
Outdoor air temperature : 7°C (DBT), 6°C (WBT)
Indoor water inlet temperature : 30°C
Indoor water outlet temperature : 35°C
Piping length : 7 m

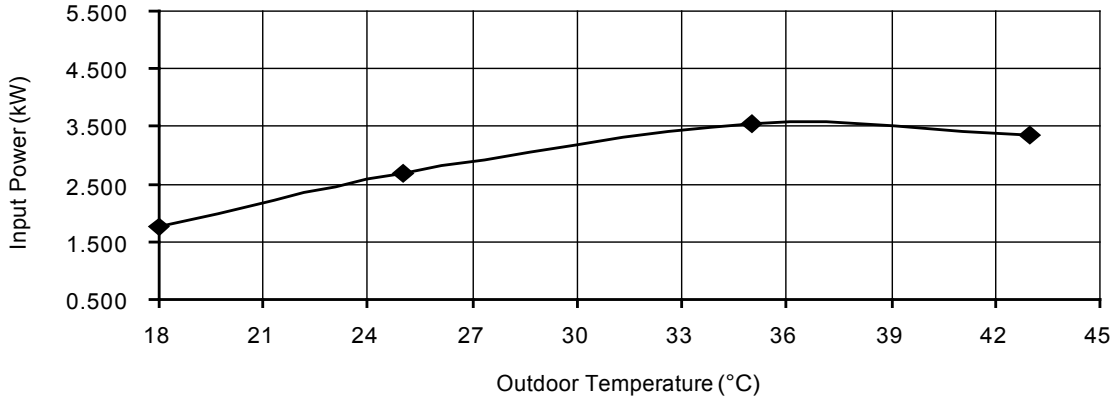




Cooling Characteristics at Different Outdoor Air Temperature

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

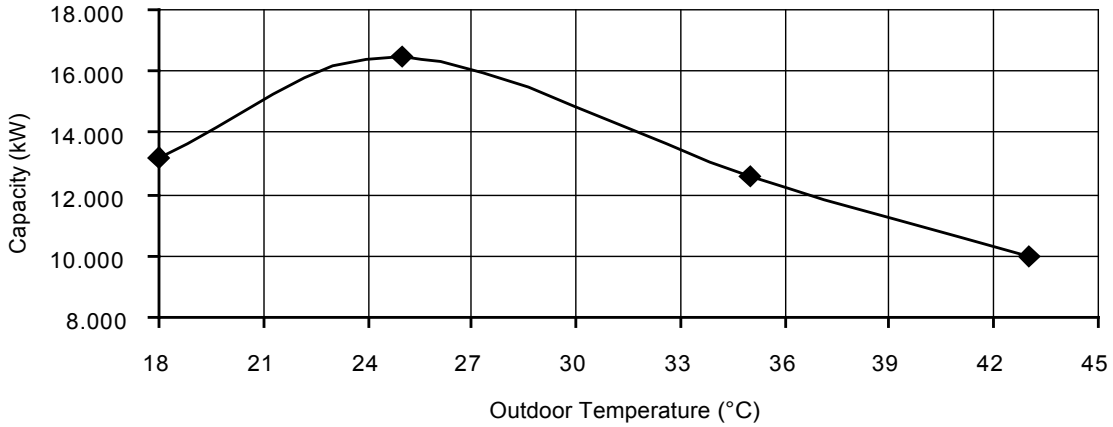
Condition

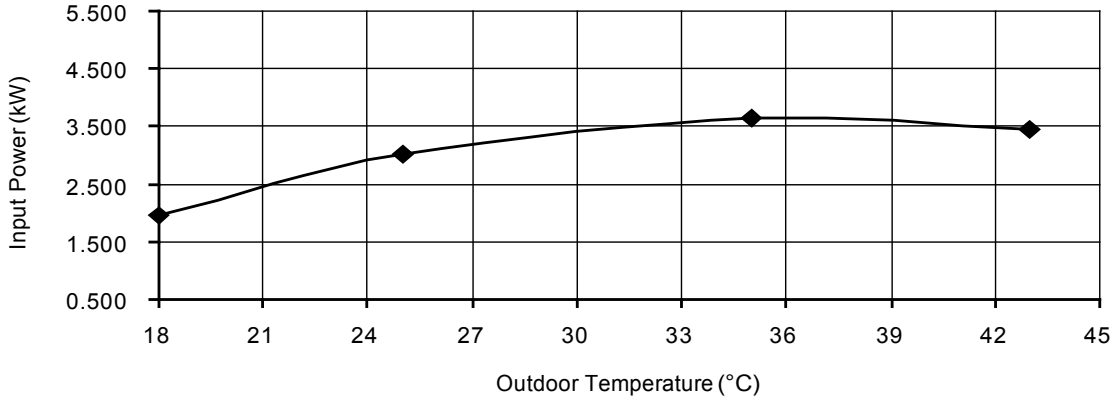
Outdoor air temperature : 35°C (DBT), -°C (WBT)

Indoor water inlet temperature : 19°C

Indoor water outlet temperature : 14°C

Piping length : 7 m





Cooling Characteristics at Different Outdoor Air Temperature

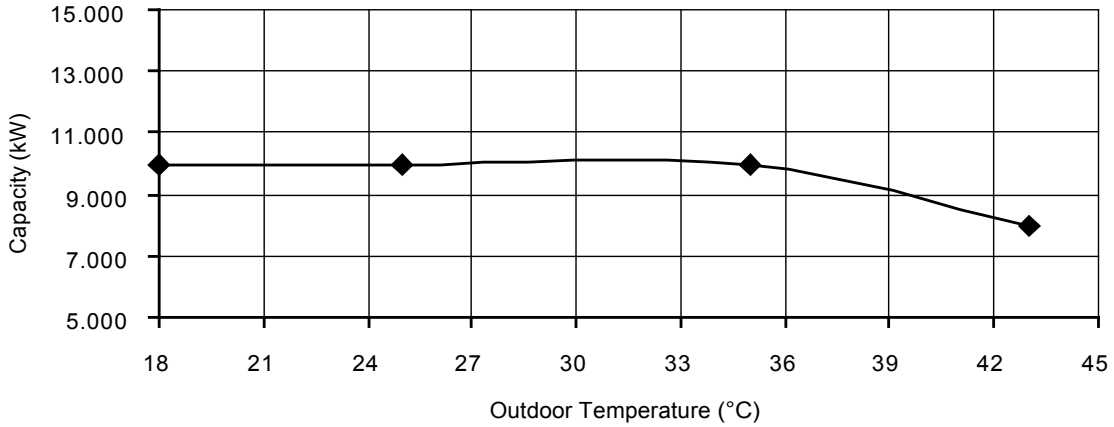
Condition

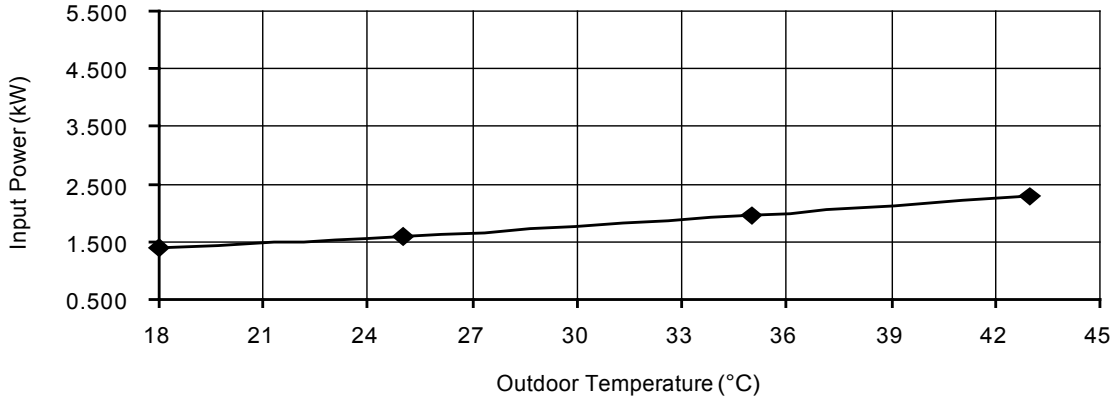
Outdoor air temperature : 35°C (DBT), -°C (WBT)

Indoor water inlet temperature : 23°C

Indoor water outlet temperature : 18°C

Piping length : 7 m





Heating Characteristics at Different Piping Length

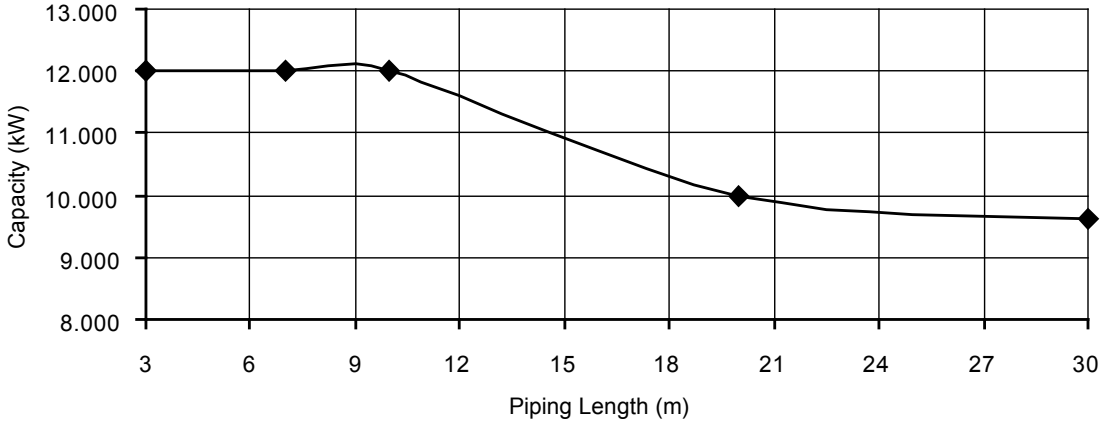
Condition

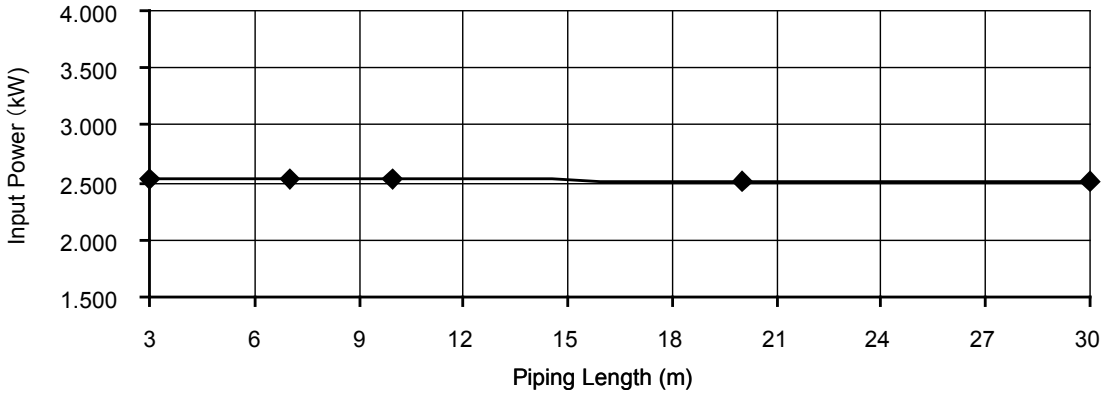
Outdoor air temperature : 7°C (DBT), 6°C (WBT)

Indoor water inlet temperature : 30°C

Indoor water outlet temperature : 35°C

Piping length : 7 m





Cooling Characteristics at Different Piping Length

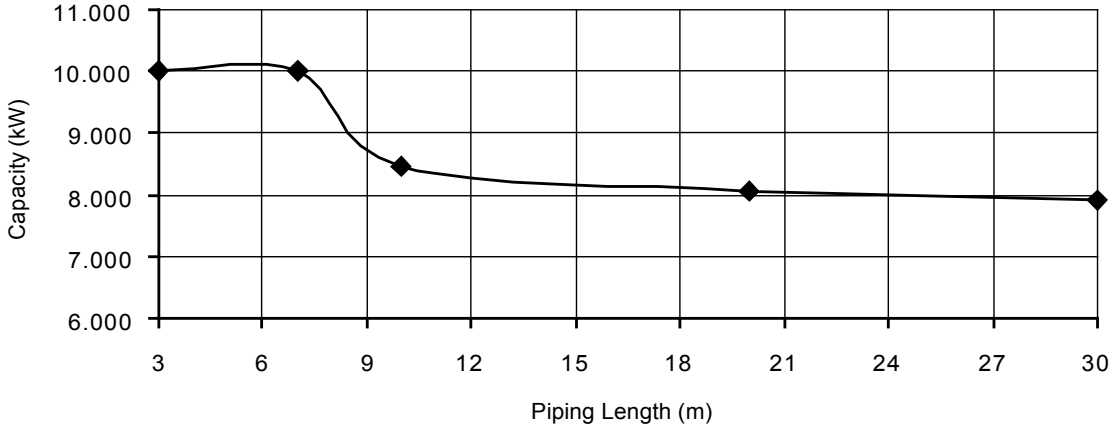
Condition

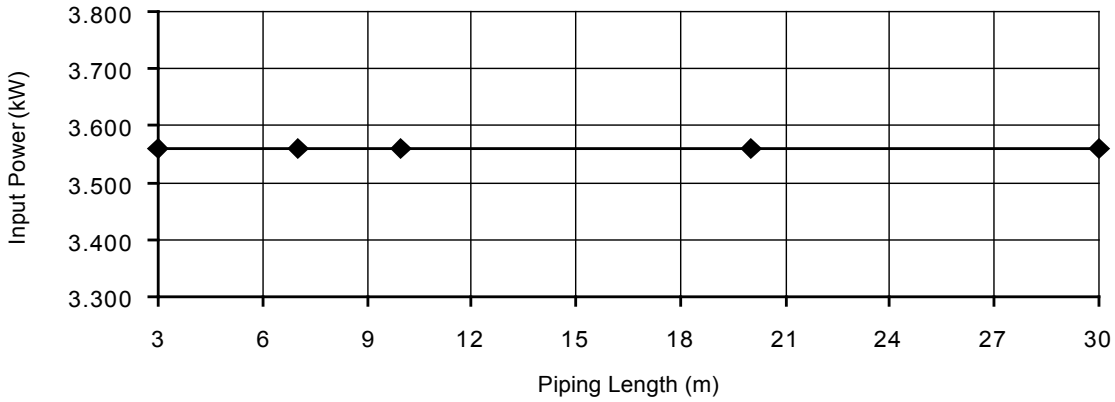
Outdoor air temperature : 35°C (DBT), -°C (WBT)

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-UX09FE5

Water Out (°C)	30		35		40		45		50		55	
Outdoor Air (°C)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)
-15	9000	3240	9000	3510	9000	3910	9000	4300	9000	4730	9000	5160
-7	9000	2710	9000	3160	9000	3620	9000	4070	9000	4270	9000	4460
2	9000	2360	9000	2510	9000	2780	9000	3050	9000	3560	9000	4070
7	9000	1640	9000	1860	9000	2160	9000	2460	9000	2760	9000	3060
25	13600	1500	13600	1710	13200	1930	12800	2140	12000	2410	11200	2670

18.2.2 WH-UX12FE5

Water Out (°C)	30		35		40		45		50		55	
Outdoor Air (°C)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)
-15	12000	4750	12000	4960	12000	5410	11000	5380	10800	5820	10500	6260
-7	12000	3850	12000	4410	12000	4980	12000	5540	12000	5900	12000	6260
2	12000	3190	12000	3490	12000	3870	12000	4250	12000	4860	12000	5470
7	12000	2180	12000	2530	12000	2960	12000	3390	12000	3780	12000	4160
25	13600	1550	13600	1760	13400	2100	13200	2430	12600	2660	12000	2890

18.3 Cooling Capacity Table

18.3.1 WH-SXC09F9E5 WH-UX09FE5

Water In (°C)	12		19		23	
Water Out (°C)	7		14		18	
Outdoor Air (°C)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)
18	7000	1360	8550	1410	7000	1000
25	7650	1910	11100	1980	7000	1100
35	7000	2210	9230	2370	7000	1350
43	6250	2660	8550	2710	5600	1600

18.3.2 WH-SXC12F6E5 WH-UX12FE5

Water In (°C)	12		19		23	
Water Out (°C)	7		14		18	
Outdoor Air (°C)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)	Capacity (W)	Input Power (W)
18	10000	1750	13200	1960	10000	1400
25	11200	2670	16500	3010	10000	1600
35	10000	3560	12550	3630	10000	1950
43	8000	3350	10000	3460	8000	2300