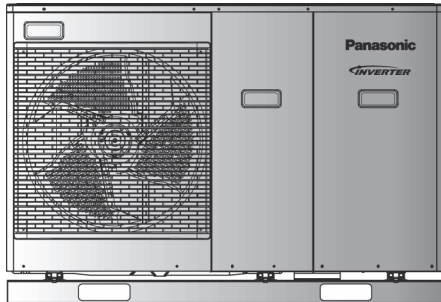


Service Manual

Mono Bloc Air-to-Water Heatpump System



**Mono bloc Unit
WH-MDC05F3E5**

**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 and water installation work must be installed or serviced by a licensed electrician and licensed water system installer respectively. 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 or material during repairing service.		
2. If wiring unit is supplied as repairing part, do not repair or connect the wire even partial wire break. Exchange the whole wiring unit.		
3. Do not wrench the fasten terminal. Pull it out or insert it straightly.		
4. Do not install Mono bloc unit near handrail of veranda. When installing Mono bloc unit at veranda of high rise building, child may climb up to Mono bloc unit and cross over the handrail and causing accident.		
5. Do not use unspecified cord, modified cord, join 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.		
6. Do not tie up the power supply cord into a bundle by band. Abnormal temperature rise on power supply cord may happen.		
7. Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.		
8. Do not sit or step on the unit, you may fall down accidentally.		
9. Keep plastic bag (packaging material) away from small children, it may cling to nose and mouth thus causing suffocation.		
10. Do not use pipe wrench to install refrigerant pipe. Using pipe wrench may deform the pipes and cause unit malfunction.		
11. Do not purchase unauthorized electrical parts for installation, service, maintenance and etc.. They might cause electrical shock or fire.		
12. Do not modify the wiring of Mono bloc unit for installation of other components (i.e. heater, etc). Overloaded wiring or wire connection points may cause electrical shock or fire.		
13. For electrical work, follow local wiring standard, regulation and this 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.		
14. For water circuit installation work, follow to relevant European and national regulations (including EN61770) and local plumbing and building regulation codes.		
15. Must engage an authorized dealer or specialist for installation. If installation is defective, it will cause water leakage, electrical shock or fire.		
16. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock or fire.		
17. Only use the supplied or specified installation parts. Else, it may causes Mono bloc unit vibrate, fall, water leakage, electrical shock or fire.		
18. Install at a flat, strong and firm location which is able to withstand the Mono bloc unit's weight. If the location is slanting, or strength is not enough the set will fall and cause injury.		

19. This equipment is strongly recommended to be installed with Residual Current Device (RCD) on-site according to the respective national wiring rules or country-specific safety measures in terms of residual current.
20. The unit is only for use in a closed water system. Utilization in an open water system may lead to excessive corrosion of the water piping and risk of incubating bacteria colonies, particularly Legionella, in water.
21. If there is any doubt about the installation procedure or operation, always contact the authorized dealer for advice and information.
22. Select a location where in case of water leakage, the leakage will not cause damage to other properties.
23. When installing electrical equipment at wooden building of metal lath or wire lath, in accordance with electrical facility standard, no electrical contact between equipment and building is allowed. Insulator must be installed in between.
24. This installation may be subjected to building regulation approval applicable to respective country that may require to notify the local authority before installation.
25. Any work carried out on the Mono bloc unit after removing the front panel which is secured by screws, must be carried out under the supervision of authorized dealer and licensed installation contractor.
26. This unit must be properly earthed, the electrical earth must not be connected to a gas pipe, water pipe, the earth of a lightning rod or a telephone. Otherwise there is a danger of electrical shock in the event of an insulation breakdown or electrical earth fault in the Mono bloc unit.
27. When replace refrigeration circuit components, confirm on usage of specified refrigerant type. Using of refrigerant other than the specified type may cause product damage, burst and injury etc.
28. Do not add or replace refrigerant other than the specified type. Equipment may damage or deteriorate in safety due to usage of other refrigerant.

 CAUTION

1. Do not install the Mono bloc unit in areas where there is a risk of flammable gas leakage. There is a risk of fire if flammable gas accumulates near or around the Mono bloc unit.	⊘
2. Do not release refrigerant during piping work for installation, re-installation and during repairing a refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.	⊘
3. Make sure the power supply cord does not contact with hot part (i.e. water piping). High temperature may cause insulator of power supply cord damage hence electrical shock or fire.	⊘
4. 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.	⊘
5. Do not apply excessive force to water pipes that may damage the pipes. If water leakage occurs, it will cause flooding and damage to other properties.	⊘
6. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water leakage may happen and may cause damage to properties of the user.	
7. The piping installation work must be flushed before the Mono bloc unit is connected to remove contaminants. Contaminants may damage the Mono bloc unit components.	
8. Select an installation location where it is accessible for maintenance.	
9. Power supply connection to Mono bloc unit. • Power supply point should be in easily accessible place for power disconnection in case of emergency. • Must follow local national wiring standard, regulation and this installation instruction. • Strongly recommended to make permanent connection to a circuit breaker. It must be a double pole switch with a minimum 3.0 mm gap. - Use approved 30A circuit breaker for power supply 1 - For electrical heater connection to main for power supply 2 (either ① or ②) ① Use approved 15A/16A circuit breaker (Backup Heater only) ② Use approved 30A circuit breaker (Backup Heater + Booster Heater)	
10. Ensure the correct polarity is maintained throughout all wiring. Otherwise, it will cause electrical shock or fire.	
11. After installation, the installer is obliged to verify correct operation of the Mono bloc unit. Check the connection point for water leakage during test run. If leakage occurs, it will cause damage to other properties.	
12. Installation work. Four or more people are required to carry out the installation work. The weight of Mono bloc unit might cause injury if carried by less than four people.	

2. Specifications

2.1 WH-MDC05F3E5

Item		Unit	Refrigerant System	
Performance Test Condition			EN 14511	
Condition (Ambient/Water)			A35W7	-
Cooling Capacity		kW	4.50	-
		BTU/h	15300	-
		kcal/h	3870	-
EER		W/W	3.33	-
		kcal/hW	2.87	-
Condition (Ambient/Water)			A7W35	A2W35
Heating Capacity		kW	5.00	4.80
		BTU/h	17100	16400
		kcal/h	4300	4130
COP		W/W	5.08	3.75
		kcal/hW	4.37	3.23
Air Flow		m ³ /min (ft ³ /min)	Cooling: 57.1 (2016) Heating: 43.3 (1529)	
Refrigeration Control Device			Expansion Valve	
Refrigeration Oil		cm ³	FV50S (800)	
Refrigerant (R410A)		kg (oz)	1.42 (50.1)	
Compressor	Type		Hermetic Motor (Rotary)	
	Motor Type		Brushless (4-poles)	
	Rated Output	kW	1.70	
Fan	Type		Propeller Fan	
	Material		PP	
	Motor Type		DC (8-poles)	
	Input Power	W	—	
	Output Power	W	60	
	Fan Speed	rpm	Cooling: 700 Heating: 580	
Heat Exchanger	Fin material		Aluminium (Pre Coat)	
	Fin Type		Corrugated Fin	
	Row × Stage × FPI		2 × 30 × 17	
	Size (W × H × L)	mm	38.1 × 762 × 903.8:873.8	

Item		Unit	Mono Bloc Unit	
Dimension	Height	mm (inch)	865 (34-1/16)	
	Width	mm (inch)	1283 (50-17/32)	
	Depth	mm (inch)	320 (12-5/8)	
Net Weight		kg (lbs)	107 (236)	
Noise Level		dB-A	Cooling: 47 Heating: 47	Cooling: - Heating: -
		Power Level dB	Cooling: 65 Heating: 65	Cooling: - Heating: -
Power Source (Phase, Voltage, Cycle)		ø	Single	
		V	230	
		Hz	50	
Input Power		kW	Cooling: 1.35 Heating: 0.985	Cooling: - Heating: 1.28
Maximum Input Power For Mono Bloc Unit		kW	4.26	

Item	Unit	Mono Bloc Unit	
Power Supply 1: Phase (ø) / Max. Current (A) / Max. Input Power (W)		Single / 19.5 / 4.26k	
Power Supply 2: Phase (ø) / Max. Current (A) / Max. Input Power (W)		Single / 13.0 / 3.00k	
Power Supply 3: Phase (ø) / Max. Current (A) / Max. Input Power (W)		- / - / -	
Starting Current	A	6.1	
Running Current	A	Cooling: 6.10 Heating: 4.50	Cooling: - Heating: 5.90
Maximum Current For Mono Bloc Unit	A	19.5	
Power Factor	%	Cooling: 96 Heating: 95	Cooling: - Heating: 95
Power factor means total figure of compressor and outdoor fan motor.			
Thermostat		Electronic Control	
Protection Device		Electronic Control	

Item	Unit	Water System	
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: 16.0 Heating: 19.6	
Water Pipe Diameter	Inlet	mm (inch)	30 (1-3/16)
	Outlet	mm (inch)	30 (1-3/16)
Water Drain Hose Inner Diameter	mm (inch)	15.00 (19/32)	
Pump	Motor Type		Brushless DC Motor
	No. of Speed		7 (Software Selection)
	Input Power	W	47
Hot Water Coil	Type		Brazed Plate
	No. of Plates		48
	Size (H × W × L)	mm	81 × 93 × 325
	Water Flow Rate	l/min (m³/h)	Cooling: 12.9 (0.8) Heating: 14.3 (0.9)
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)	
Expansion Vessel	Volume	l	6
	MWP	bar	3
Capacity of Integrated Electric Heater	kW	3.00	

Note:

- Cooling capacities are based on outdoor air temperature of 35°C Dry Bulb with controlled 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 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 $\Delta T = 5^\circ\text{C}$.

3. Features

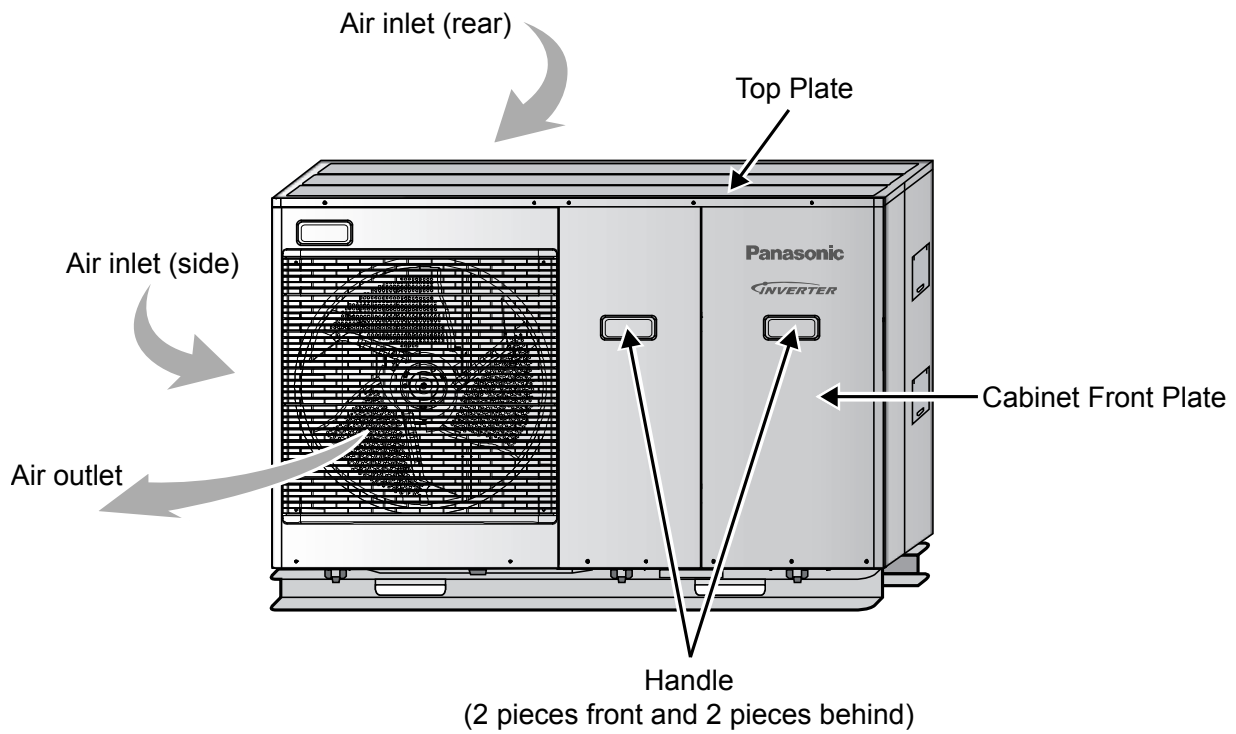
- **Inverter Technology**
 - Energy saving
- **High Efficiency**
- **Compact Design**
- **Environment Protection**
 - Non-ozone depletion substances refrigerant (R410A)
- **Easy to use control panel**
 - Auto mode
 - Holiday mode
 - Dry concrete function
 - Weekly timer setting
- **A-class energy efficiency pump**
 - Water pump speed can be set by selection at control panel
- **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 mono bloc unit
- **Operation Condition**

		Water outlet temperature (°C)	Ambient temperature (°C)
HEATING	Maximum	55	35
	Minimum	25	-20
COOLING	Maximum	20	43
	Minimum	5	16

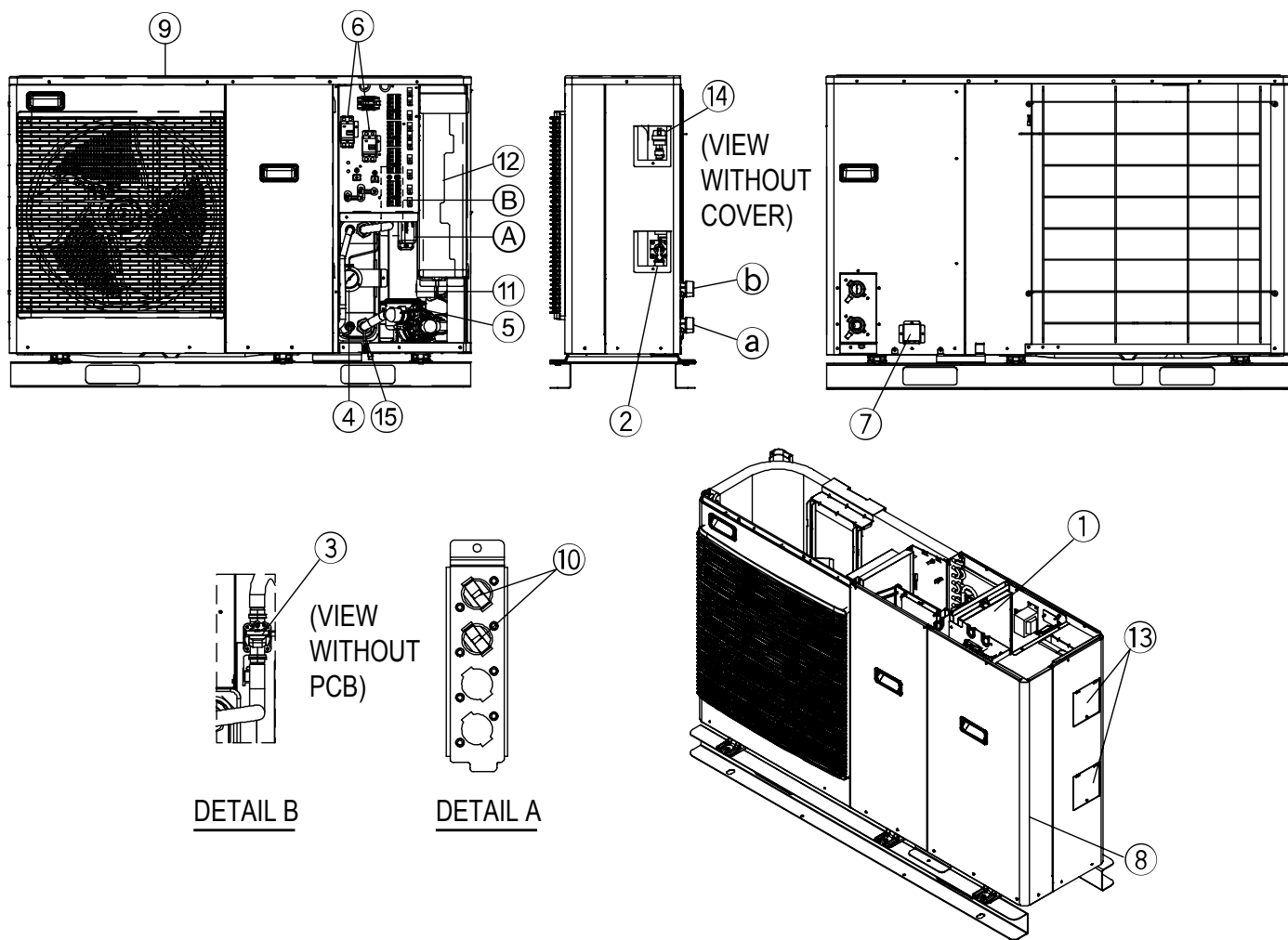
NOTICE : When the outdoor temperature is out of the above temperature range, the heating capacity will drop significantly and mono bloc unit might stop for protection control. The unit will restart automatically after the outdoor temperature returns to the specified range.

4. Location of Controls and Components

4.1 Mono Bloc Unit



4.1.1 Main Components



DETAIL B

DETAIL A

View without cabinet top plate

Component name

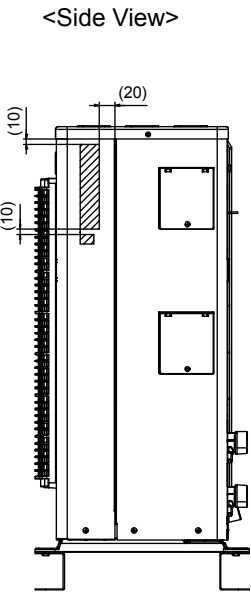
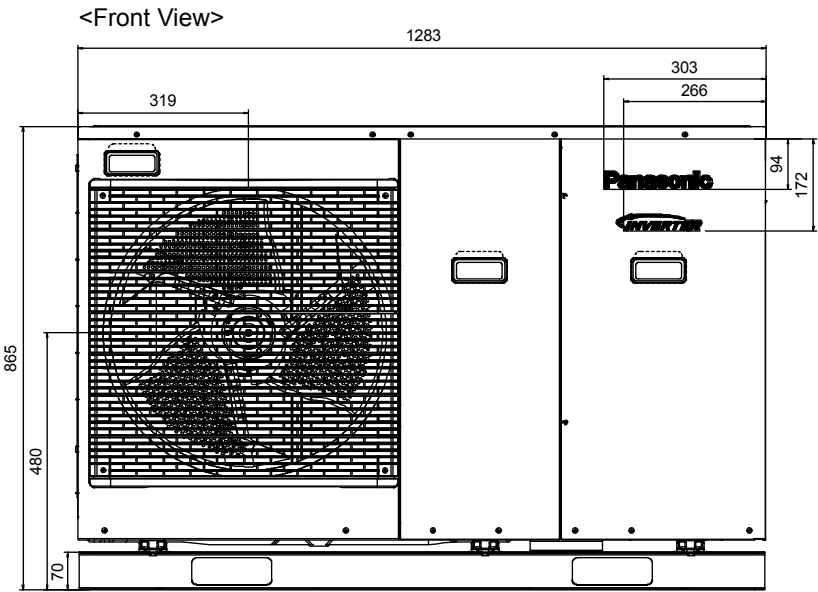
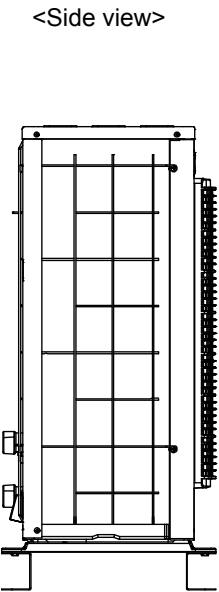
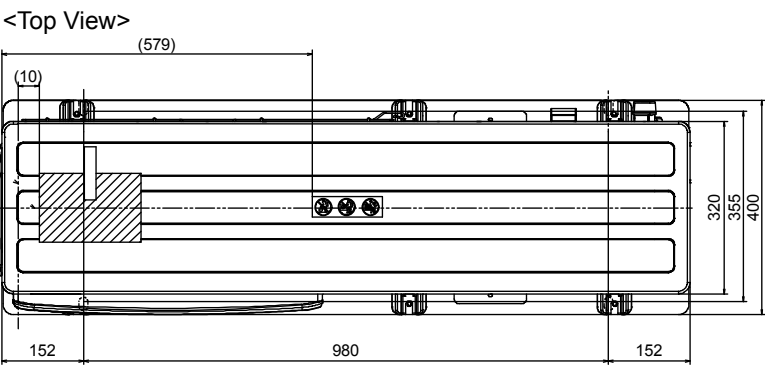
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|-------------------------|----------------------|
| ① PCB | ⑨ Cabinet top plate |
| ② Pressure relief valve | ⑩ Overload protector |
| ③ Flow switch | ⑪ Heater assembly |
| ④ Pressure gauge | ⑫ Expansion vessel |
| ⑤ Water pump | ⑬ Cover |
| ⑥ RCCB | ⑭ Air purge valve |
| ⑦ Cable cover | ⑮ Plug |
| ⑧ Cabinet front plate | |

Connector name

- | |
|----------------|
| ① Water inlet |
| ② Water outlet |

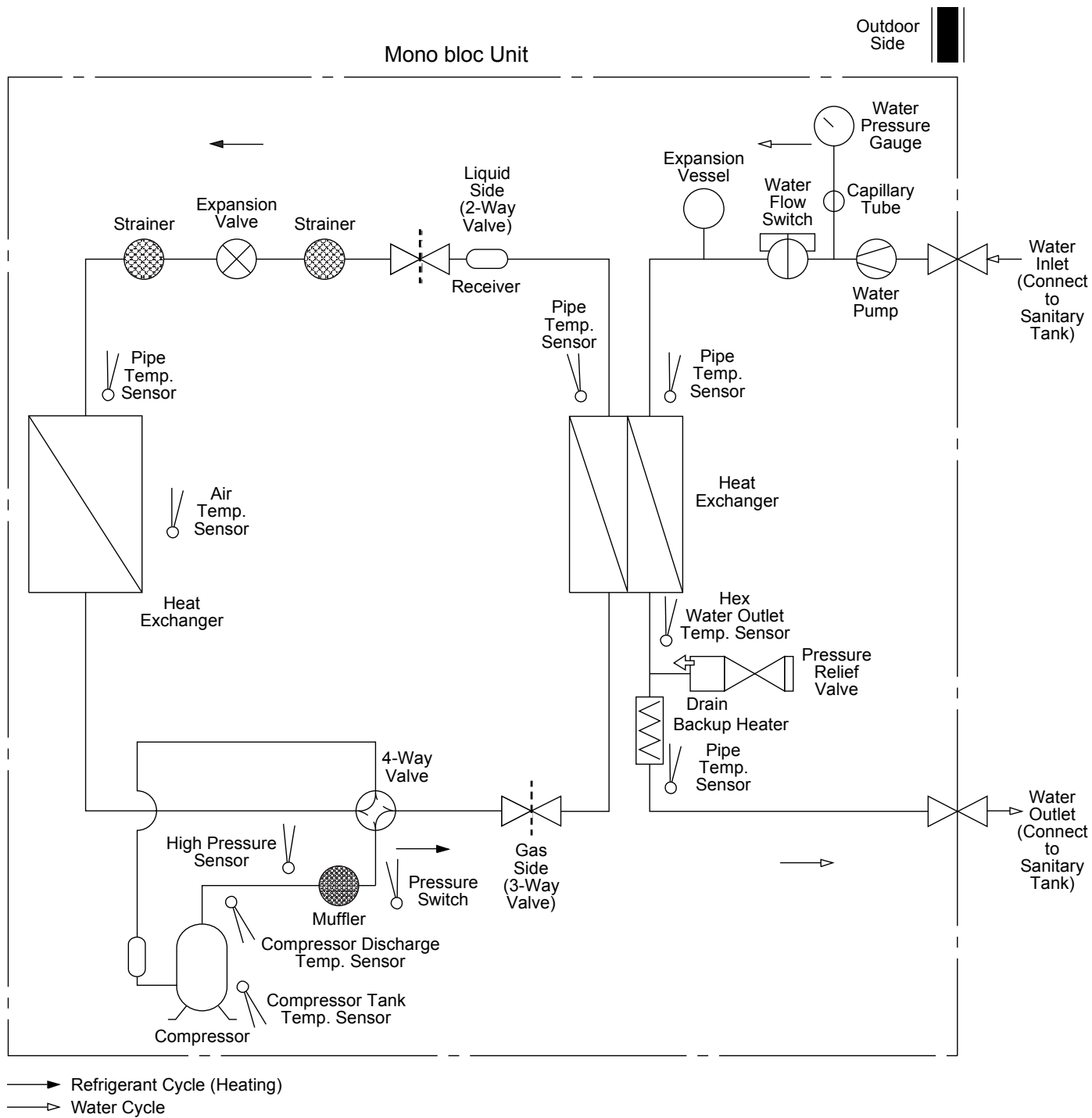
5. Dimensions

5.1 Mono bloc Unit

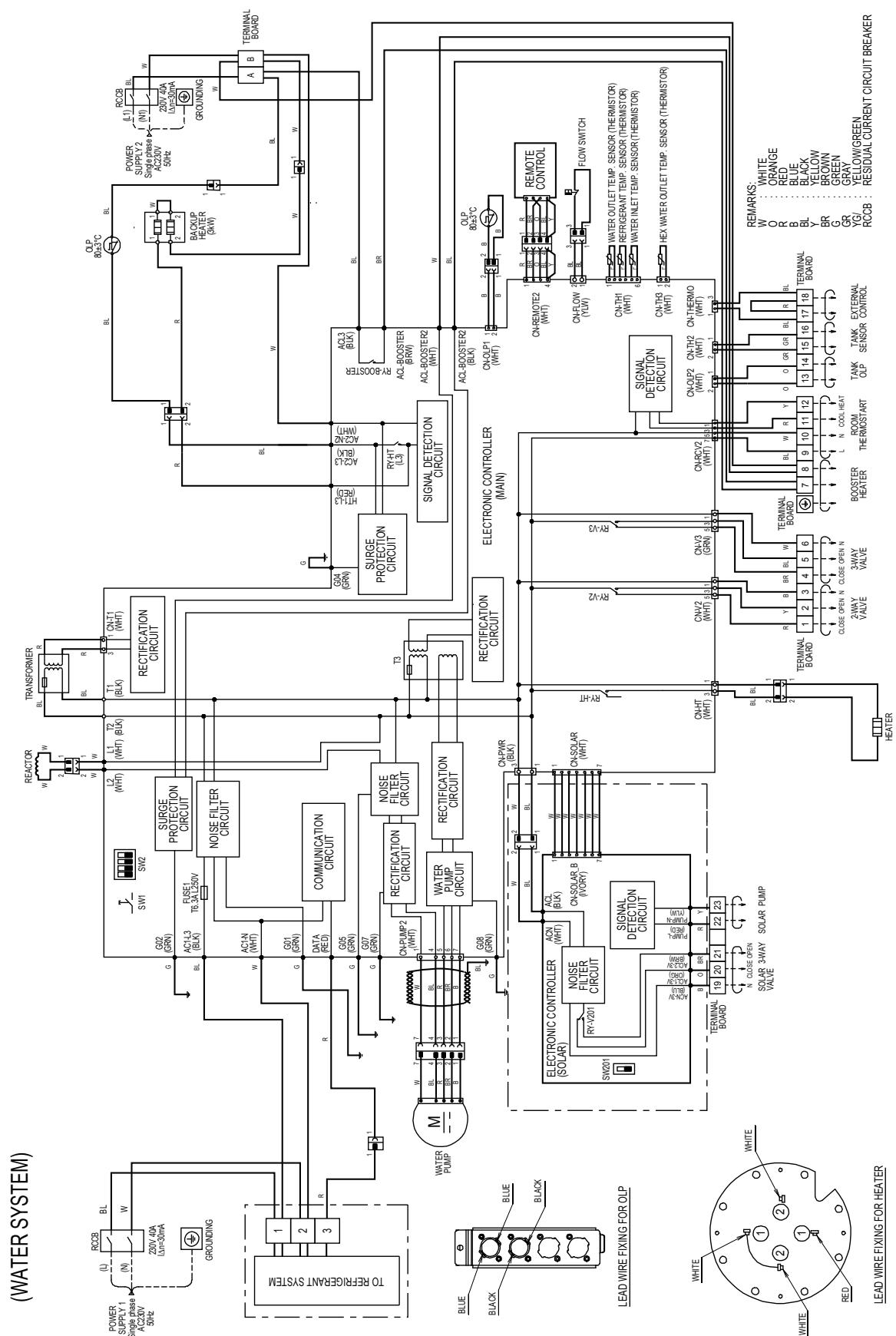


Unit: mm

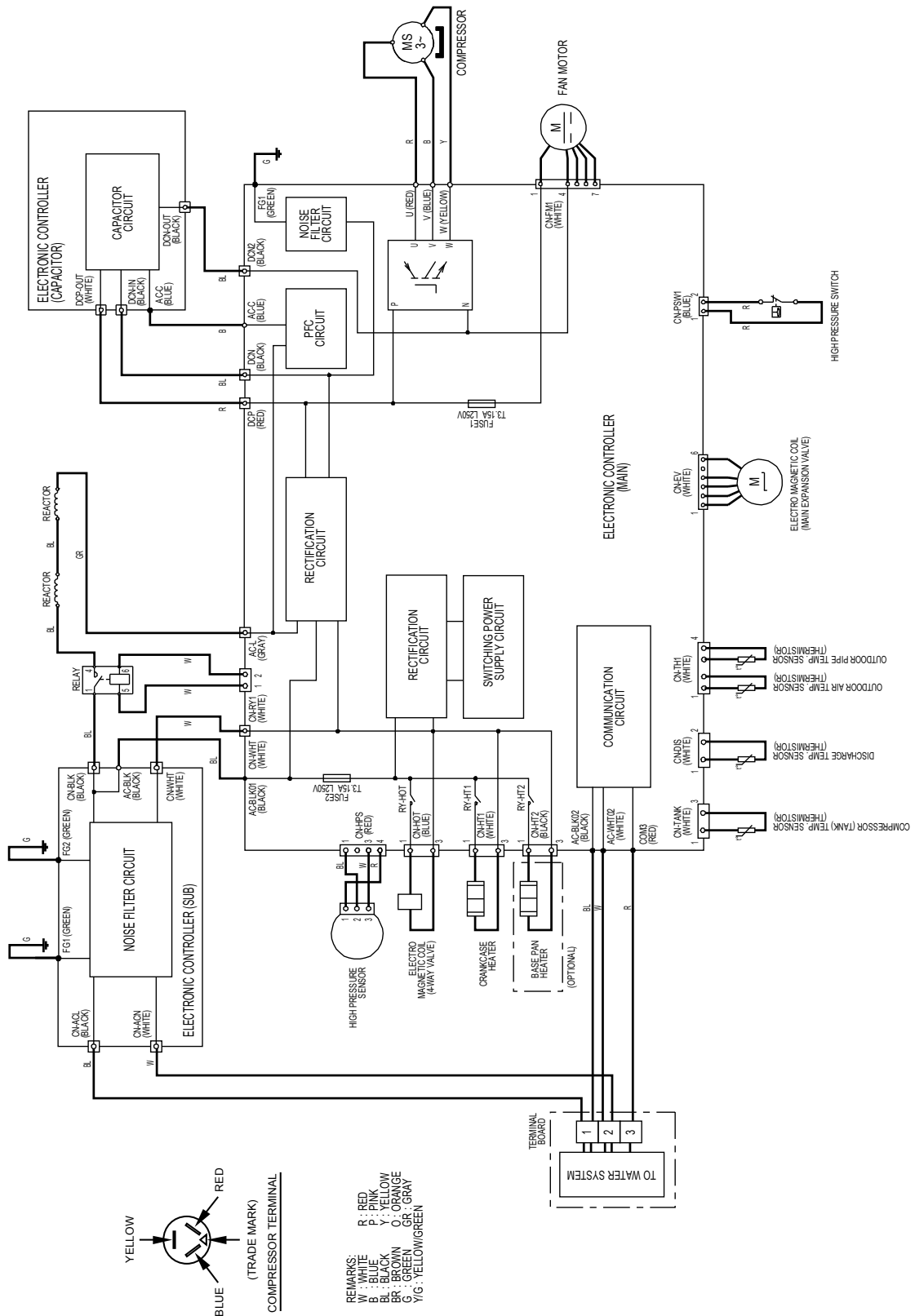
6. Refrigeration and Water Cycle Diagram



8. Wiring Connection Diagram

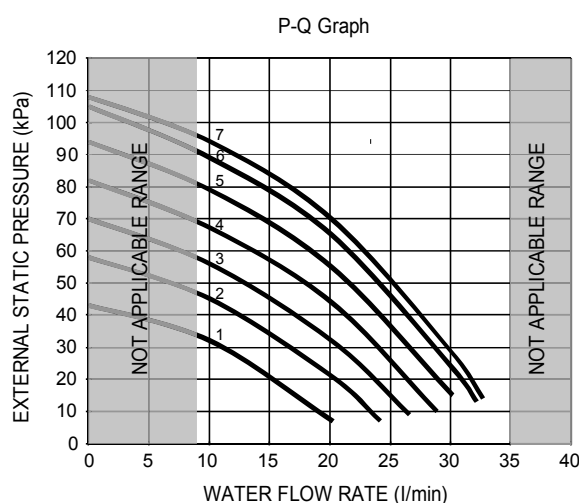


(REFRIGERANT SYSTEM)



How To Adjust Water Flow Rate

- Before adjust the water flow rate, make sure that the total water volume in the installation is 30 litres minimum for heating side. The default setting is SPEED 2. Please ensure the minimum flow rate is not less than 9 l/min and not more than 35 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 remote control.
1. When the Air-to-Water Heatpump is in stop operation, 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 pump speed and press SET button to confirm the pump speed.
 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. Technical Data

18.1 Operation Characteristics

18.1.1 WH-MDC05F3E5

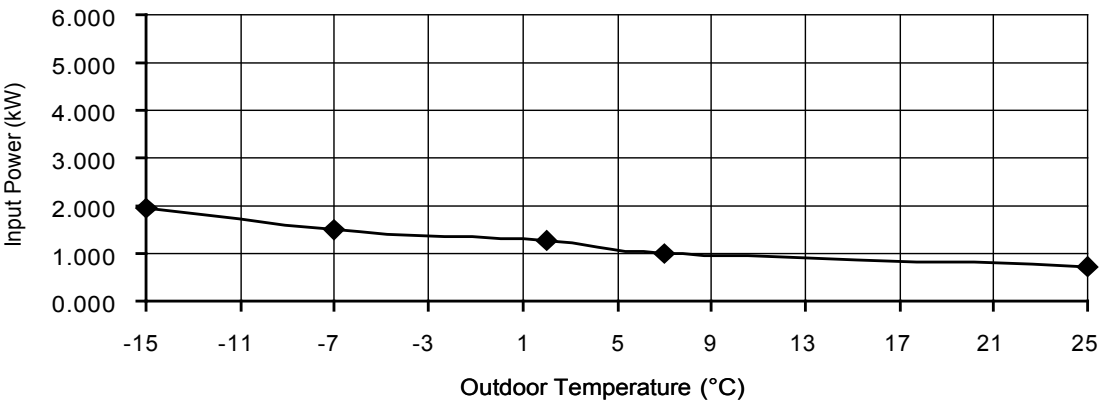
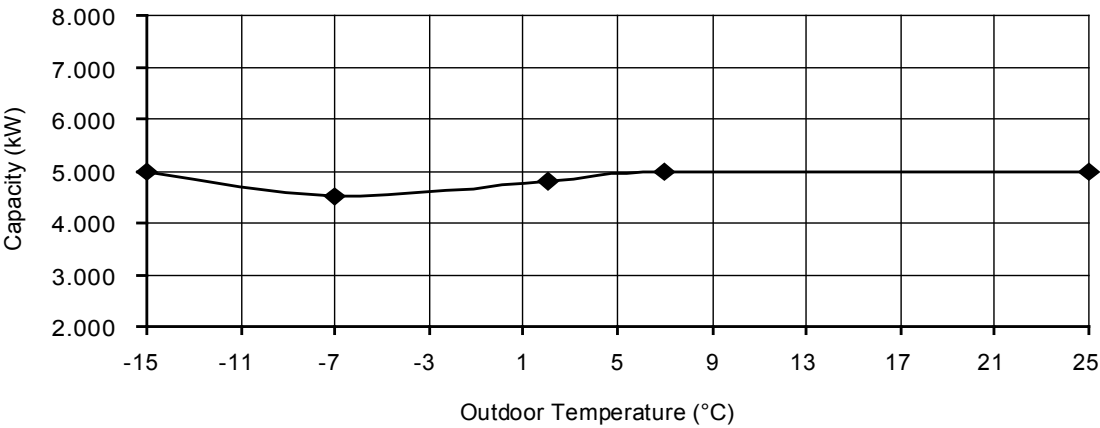
Heating Characteristics at Different Outdoor Air Temperature

Condition

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

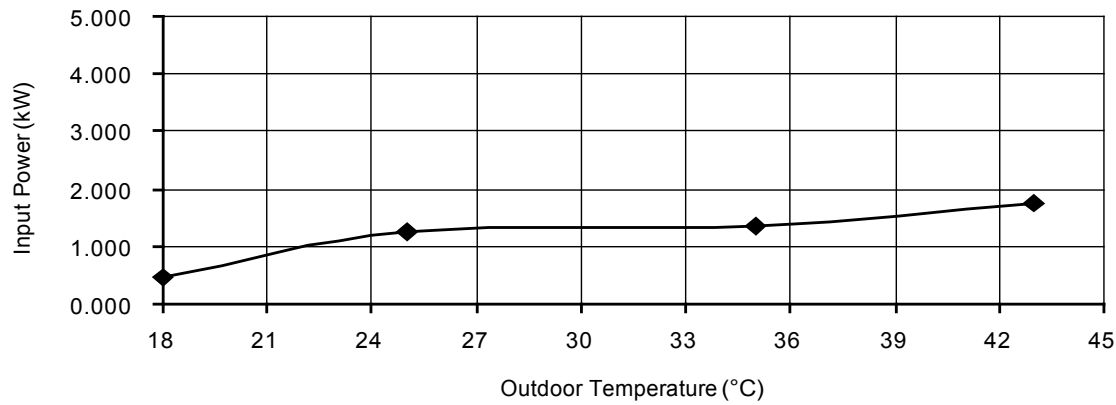
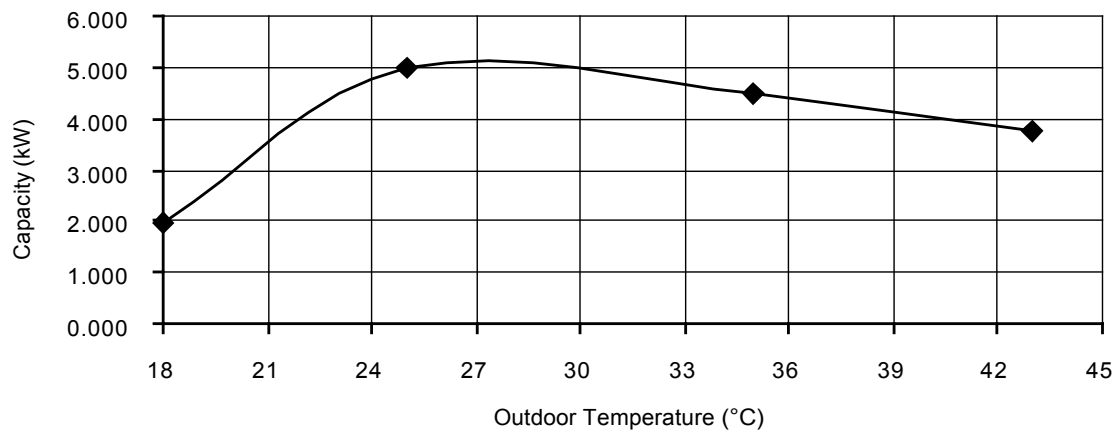
Indoor water inlet temperature : 30°C

Indoor water outlet temperature : 35°C



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



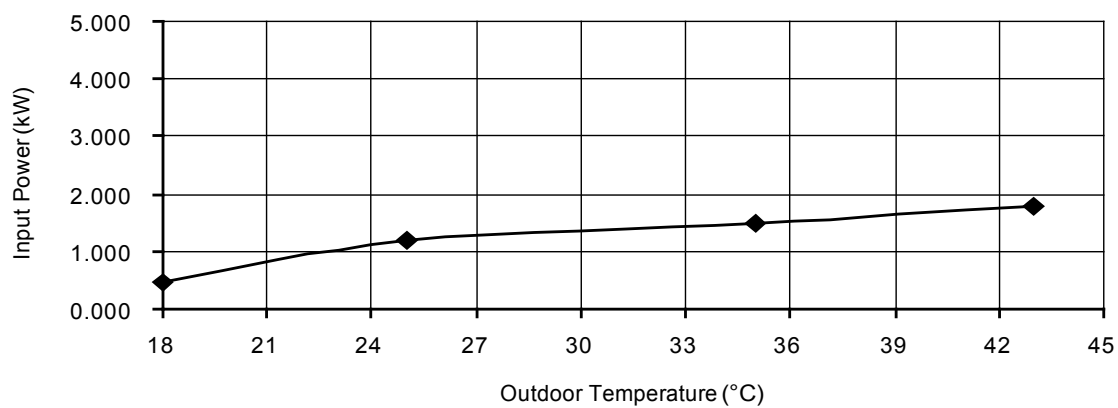
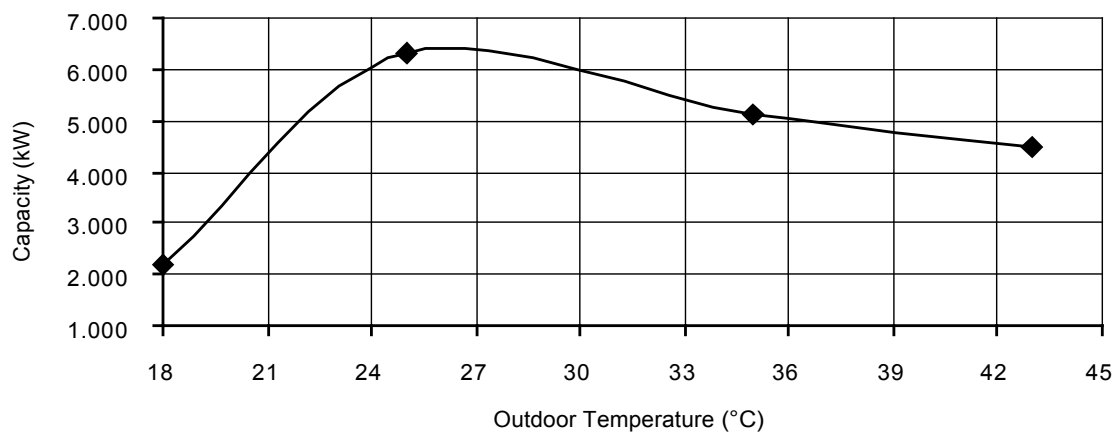
Cooling Characteristics at Different Outdoor Air Temperature

Condition

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

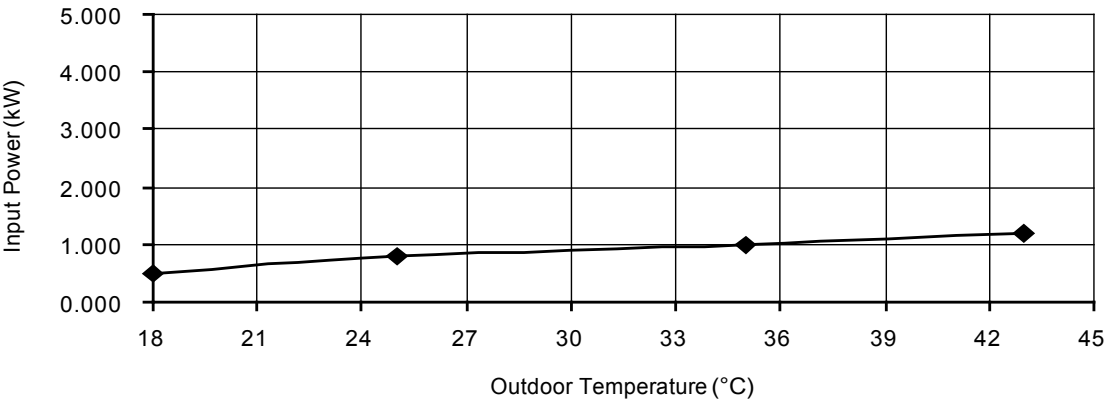
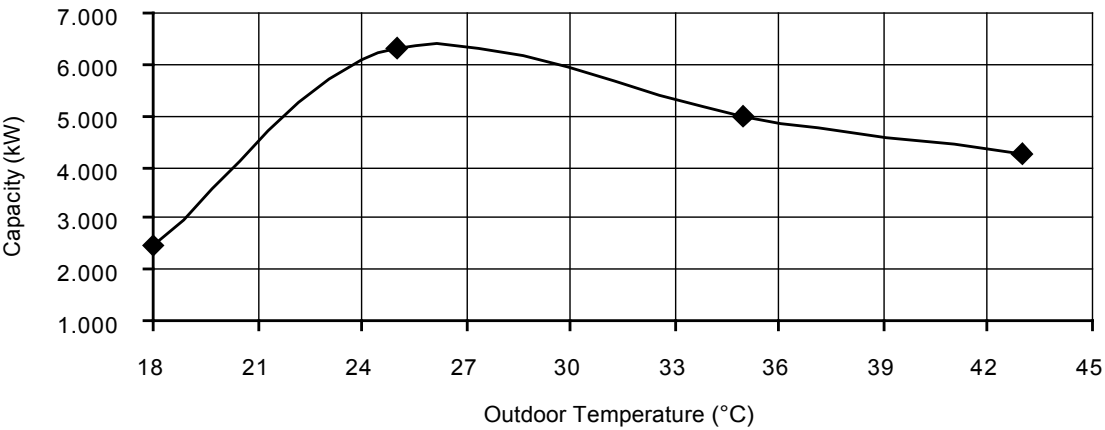
Indoor water inlet temperature : 19°C

Indoor water outlet temperature : 14°C



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



18.2 Heating Capacity Table

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	5000	1820	5000	1950	5000	2200	5000	2450	5000	1675	5000	2900
-7	4500	1440	4500	1510	4500	1645	4500	1780	4400	1940	4300	2100
2	4800	1220	4800	1280	4650	1400	4500	1520	4250	1620	4000	1720
7	5000	910	5000	985	5000	1130	5000	1260	5000	1445	5000	1630
25	5000	670	5000	710	5000	785	5000	860	5000	980	5000	1100

18.3 Cooling Capacity Table

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	1950	450	2200	450	2450	500
25	5000	1250	6300	1200	6300	800
35	4500	1350	5100	1500	5000	1000
43	3750	1750	4500	1800	4250	1200