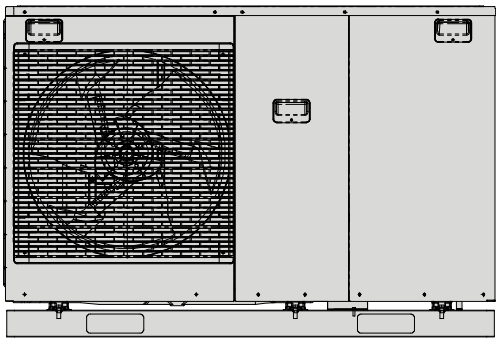
Service Manual

Air-to-Water Heatpump



Mono Bloc Unit
WH-MDC05H3E5

Destination
Europe
Turkey

⚠ 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.

⚠ PRECAUTION OF LOW TEMPERATURE

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

Panasonic®

Safety Precautions

- Read the following “SAFETY PRECAUTIONS” carefully before installation of (Mono bloc) Air-to-Water Heatpump system (hereafter referred to as “Mono bloc unit”).
- Electrical works and water installation works must be done by licensed electrician and licensed water system installer respectively. Be sure to use the correct rating and main circuit for the model to be 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 due to ignorance or negligence of the instructions 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 only.

The items to be followed are classified by the symbols:

⃠	Symbol with white background denotes item that is PROHIBITED from doing.
❗ ⏚	Symbol with dark background denotes item that must be carried out.

- Carry out test run to confirm that no abnormality occurs after the installation. 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.
- If there is any doubt about the installation procedure or operation, always contact the authorized dealer for advice and information.

	⚠ **WARNING**	
1.	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.	⃠
2.	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.	⃠
3.	Do not tie up the power supply cord into a bundle by band. Abnormal temperature rise on power supply cord may happen.	⃠
4.	Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.	⃠
5.	Do not sit or step on the unit, you may fall down accidentally.	⃠
6.	Keep plastic bag (packaging material) away from small children, it may cause suffocation.	⃠
7.	Do not use pipe wrench to install refrigerant pipe. It might deform the piping and cause the unit to malfunction.	⃠
8.	Do not purchase unauthorized electrical parts for installation, service, maintenance and etc.. They might cause electrical shock or fire.	⃠
9.	This unit is a multi supply appliances. All circuits must be disconnected before accessing to the unit terminals.	⃠
10.	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.	⃠
11.	Do not add or replace refrigerant other than specified type. It may cause product damage, burst and injury etc.	⃠
12.	For electrical work, follow the local national 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.	❗
13.	For water circuit installation work, follow to relevant European and national regulations (including EN61770) and local plumbing and building regulation codes.	❗
14.	Must engage an authorized dealer or specialist for installation. If installation is defective, it will cause water leakage, electrical shock or fire.	❗
15.	Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock or fire.	❗
16.	Only use the supplied or specified installation parts. Else, it may causes Mono bloc unit vibrate, fall, water leakage, electrical shock or fire.	❗
17.	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.	❗
18.	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.	❗
19.	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.	❗
20.	If there is any doubt about the installation procedure or operation, always contact the authorized dealer for advice and information.	❗
21.	Select a location where in case of water leakage, the leakage will not cause damage to other properties.	❗

⚠ WARNING	
22.	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.
23.	This installation may be subjected to building regulation approval applicable to respective country that may require to notify the local authority before installation.
24.	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.
25.	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.

⚠ 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 aluminium fin, 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. - Power supply 1: Use approved 30A circuit breaker - Power supply 2: Use approved 30A circuit breaker
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.

Specifications

WH-MDC05H3E5

Item			Unit	Refrigerant System		
Performance Test Condition				EN 14511		
Cooling Capacity			Condition (Ambient/Water)	A35W7		
			kW	4.50		
			BTU/h	15300		
			kcal/h	3870		
Cooling EER			W/W	3.28		
			kcal/hW	2.82		
Heating Capacity			Condition (Ambient/Water)	A7W35	A2W35	
			kW	5.00	4.80	
			BTU/h	17100	16400	
			kcal/h	4300	4130	
Heating COP			W/W	5.08	3.36	
			kcal/hW	4.37	2.89	
Heating ErP	Low Temperature Application (W35)			Warmer	Average	Colder
	Application		Climate			
	Pdesign		kW	5.0	4.0	6.0
	Tbivalent / TOL		°C	2 / 2	-10 / -10	-15 / -22
	SCOP / ns		(W/W) / %	6.00 / 237	5.05 / 199	4.08 / 160
	Annual Consumption		kWh	1113	1635	3625
	Class			A++	A++	A++
	Medium Temperature Application (W55)			Warmer	Average	Colder
	Application		Climate			
	Pdesign		kW	4.0	5.0	4.0
	Tbivalent / TOL		°C	2 / 2	-7 / -10	-15 / -22
	SCOP / ns		(W/W) / %	4.10 / 161	3.55 / 139	2.95 / 115
	Annual Consumption		kWh	1304	2914	3338
	Class			A++	A++	A+
Noise Level			Condition (Ambient/Water)	A35W7	A7W35	A2W35
			dB (A)	Cooling: 47	Heating: 49	-
			Power Level dB	Cooling: 65	Heating: 65	-
Air Flow			m^3/min (ft^3/min)	Cooling: 55.7 (1970) Heating: 39.3 (1390)		
Refrigeration Control Device				Expansion Valve		
Refrigeration Oil			cm^3	FV50S (450)		
Refrigerant (R410A)			kg (oz)	1.3 (45.9)		
F-GAS	GWP			2088		
	CO2eq (ton) (Precharged / Maximum)			2.714 / 2.714		
Compressor	Type			Hermetic Motor		
	Motor Type			Brushless (4-poles)		
	Rated Output		kW	0.90		
Fan	Type			Propeller Fan		
	Material			PP		
	Motor Type			DC (8-poles)		
	Input Power		W	-		
	Output Power		W	60		
	Fan Speed		rpm	Cooling: 700 Heating: 500		

Item		Unit	Refrigerant System		
Heat Exchanger	Fin material		Aluminium (Pre Coat)		
	Fin Type		Corrugated Fin		
	Row × Stage × FPI		2 × 36 × 18		
	Size (W × H × L)	mm	36.4 × 756 × 902 : 872		
Power Source (Phase, Voltage, Cycle)		ø	Single		
		V	230		
		Hz	50		
Input Power		Condition (Ambient/Water)	A35W7	A7W35	A2W35
		kW	Cooling: 1.37	Heating: 0.985	Heating: 1.43
Maximum Input Power For Heatpump System		kW	2.84		
Power Supply 1 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			1Ø / 13.0 / 2.84k		
Power Supply 2 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			1Ø / 13.0 / 3.00k		
Power Supply 3 : Phase (Ø) / Max. Current (A) / Max. Input Power (W)			- / - / -		

Item		Unit	Mono Bloc Unit		
Starting Current		A	4.7		
Running Current		Condition (Ambient/Water)	A35W7	A7W35	A2W35
		A	Cooling: 6.3	Heating: 4.7	Heating: 6.5
Maximum Current For Heatpump System		A	13.0		
Power Factor Power factor means total figure of compressor and outdoor fan motor.		%	Cooling: 94	Heating: 91	Heating: 95
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)	94 (207)		
Power Cord	Number of core		-		
	Length	m (ft)	-		
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: 20 ~ 55
Internal Pressure Differential			kPa	Cooling: 10.0 Heating: 12.0
Water Drain Hose Inner Diameter			mm (inch)	15.0 (19/32)
Pump	Motor Type			DC Motor
	Input Power		W	31
Hot Water Coil	Type			Brazed Plate
	No. of Plates			28
	Size (W × H × L)		mm	119 × 54 × 376
	Water Flow Rate		l/min (m^3/h)	Cooling: 12.9 (0.8) Heating: 14.3 (0.9)
Pressure Relief Valve Water Circuit			kPa	Open: 300, Close: 266 and below
Flow Switch				Electronic Sensor
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 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 =5°C

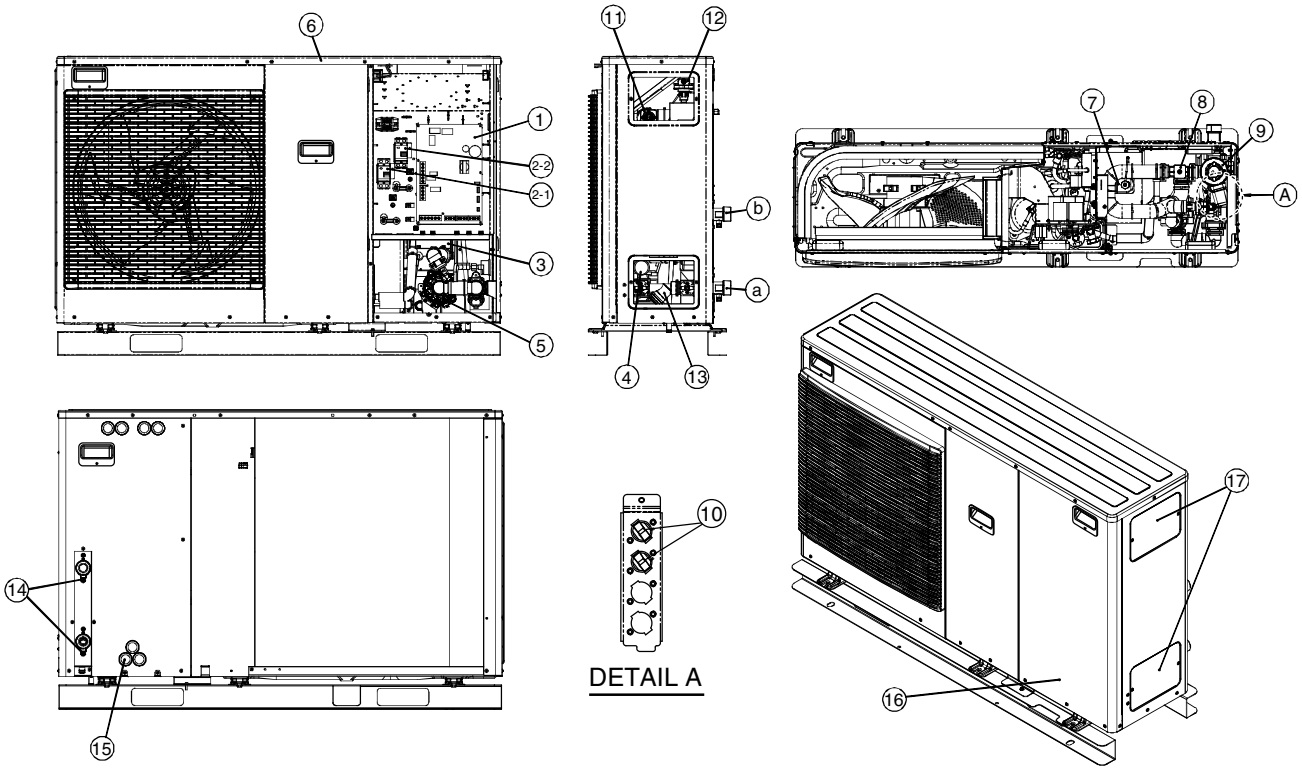
Features

- **Inverter Technology**
  - Energy saving
- **High Efficiency**
- **Compact Design**
- **Environment Protection**
  - Non-ozone depletion substances refrigerant (R410A)
- **Easy to use control panel**
- **Weekly Timer setting**
- **Quality Improvement**
  - Random auto restart after power failure for safety restart operation
  - Gas leakage protection
  - Prevent compressor reverse cycle
  - Inner protector to protect compressor
- **Serviceability Improvement**
  - Breakdown Self Diagnosis function
  - System Status Check Buttons for servicing purpose
  - System Pumpdown Button for servicing purpose
  - Front maintenance design for outdoor unit
- **Operation Condition**

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

NOTICE : When the outdoor temperature is out of the above temperature range, the heating capacity will drop significantly and outdoor unit might stop for protection control.

Main Components



Component name

① PCB
②-1 Single phase RCCB (Main Power)
②-2 Single phase RCCB (Backup Heater)
③ Heat Exchanger
④ Water Pressure gauge
⑤ Water pump
⑥ Cabinet top plate
⑦ Expansion vessel
⑧ Flow sensor
⑨ Heater assembly
⑩ Overload protector (2 pieces)
⑪ Pressure relief valve
⑫ Air purge valve
⑬ Water Filter Set
⑭ Plug (2 pieces)
⑮ Bushing (7 pieces)
⑯ Cabinet front plate
⑰ Cover (2 pieces)

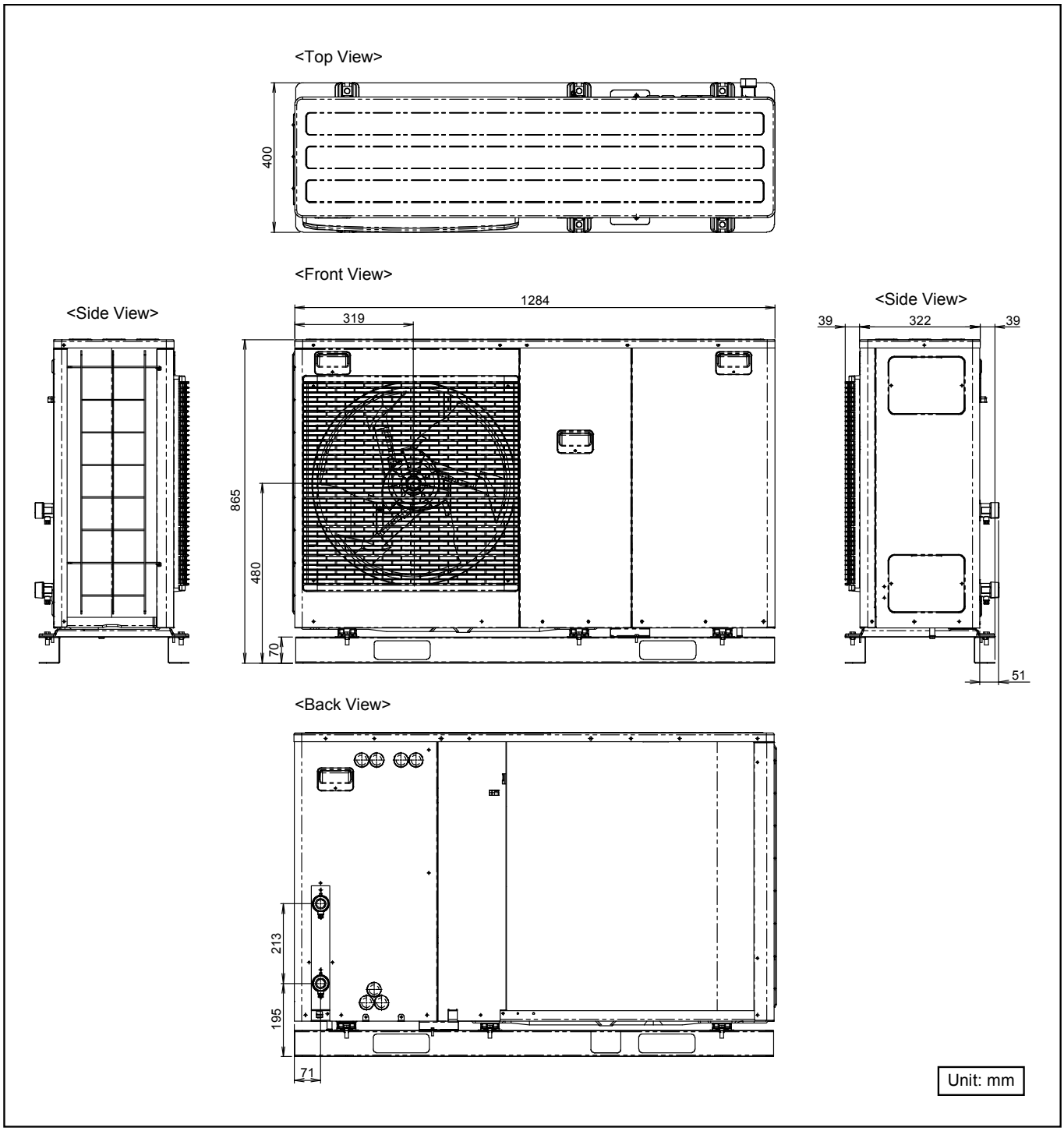
Connector name

ⓐ Water inlet
ⓑ Water outlet

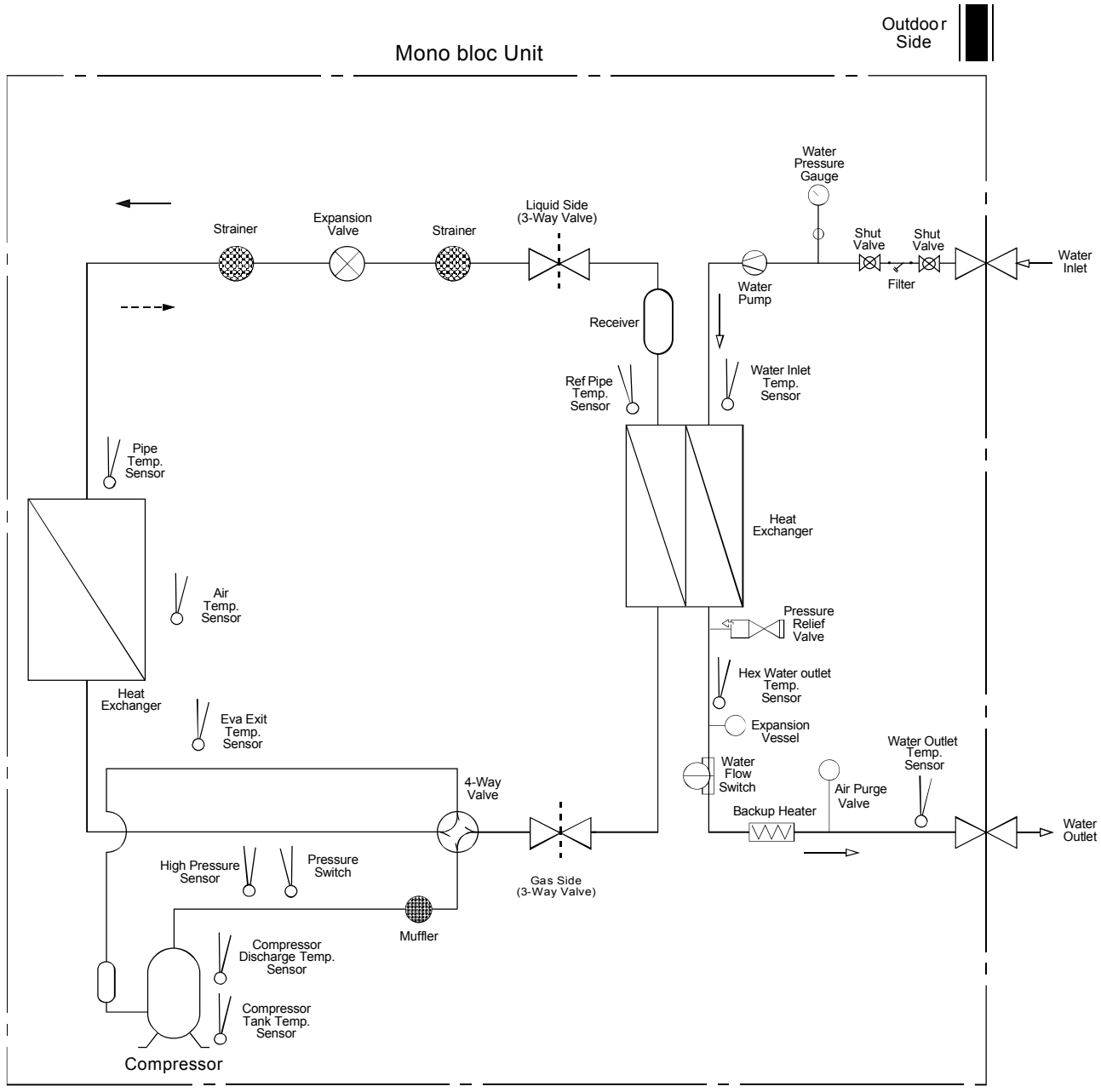
It is advisable to avoid more than 2 blockage directions. For better ventilation & multiple-outdoor installation, please consult authorized dealer/specialist.

Dimensions

Mono Bloc Unit

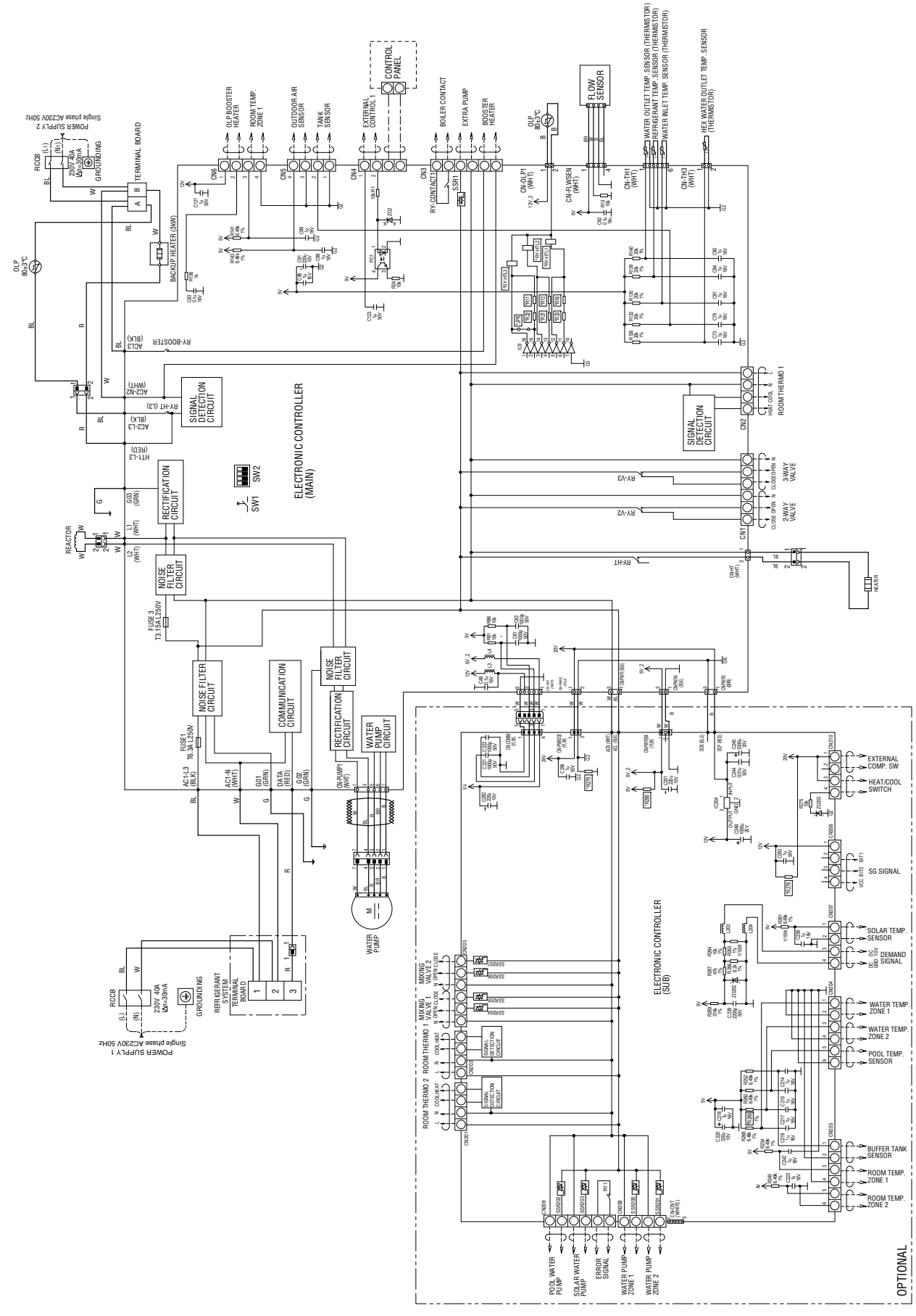


Refrigeration and Water Cycle Diagram



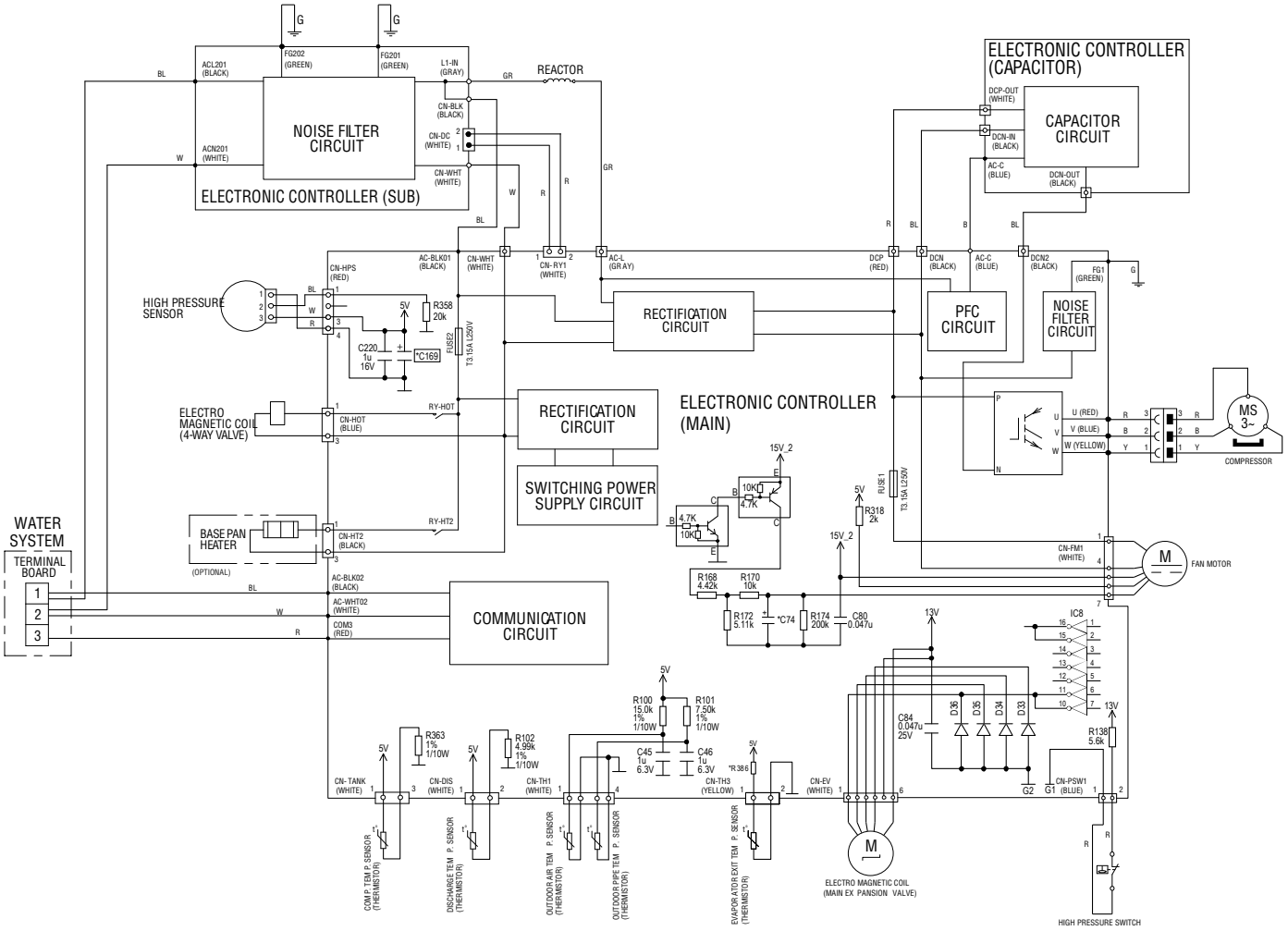
Electronic Circuit Diagram

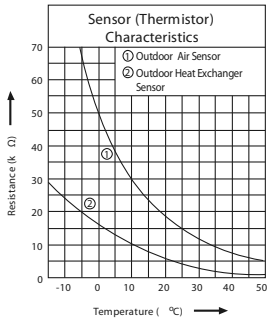
Water System

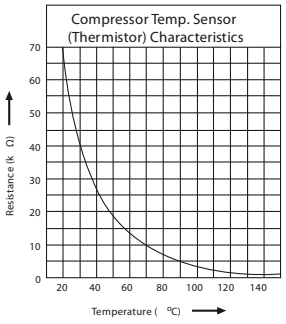


Refrigerant System

WH-MDC05H3E5





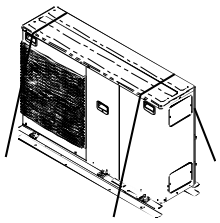


Installation Instruction

Mono Bloc Unit

Select the Best Location

- Install the Mono bloc unit in outdoor locations only.
- Avoid installations in areas where the ambient temperature may drop below -20°C.
- The Mono bloc unit must be installed on a flat, solid surface.
- A place removed from any heat source or steam which may effect the operation of the Mono bloc unit.
- A place where air circulation is good.
- A place where drainage can be easily done.
- A place where Mono bloc unit's operation noise will not cause discomfort to the user.
- A place which is accessible for maintenance.
- Ensure to keep minimum distance of spaces as illustrated above from wall, ceiling, or other obstacles.
- A place where flammable gas leaking might not occur.
- A place where the Mono bloc unit's piping and wiring lengths come within reasonable ranges.
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- Avoid installing the Mono bloc unit at a location where suction side may be exposed directly to wind.
- If Mono bloc unit installed near sea, region with high content of sulphur or oily location (e.g. machinery oil, etc.), it lifespan maybe shorten.
- When installing the product in a place where it will be affected by typhoon or strong wind such as wind blowing between buildings, including the rooftop of a building and a place where there is no building in surroundings, fix the product with an overturn prevention wire, etc. (Overturn prevention fitting model number: K-KYZP15C)



Mono Bloc Unit Installation

Mono bloc unit will become heavy when filled with water. Please install the unit on a strong concrete floor and consider the weight of the unit and water.

- Fix Mono bloc unit on the concrete floor with M12 anchor bolt at 4 locations.
- Pull-out strength of these anchor bolts must be above 15000N.

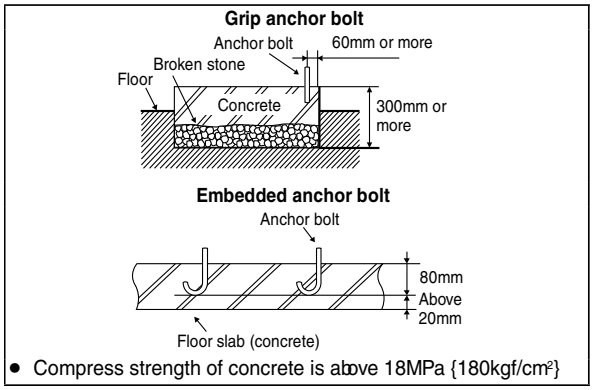
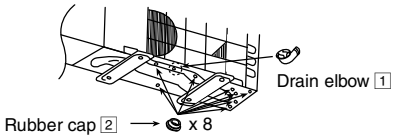


Illustration of grip type and embedded type anchor bolt

Disposal of Mono Bloc Unit Drain Water

- When a Drain elbow is used, please ensure to follow below:
  - The unit should be placed on a stand which is taller than 50mm.
  - Cover the 8 holes (ø20mm) with Rubber cap (refer to illustration below)
  - Use a tray (field supply) when necessary to dispose the Mono bloc unit drain water.



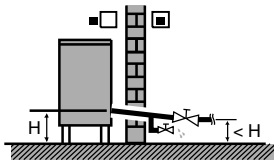
- If the unit is used in an area where temperature falls below 0°C for 2 or 3 consecutive days, it is recommended not to use the Drain elbow and Rubber cap, for the drain water freezes and the fan will not rotate.

Piping Installation

⚠ WARNING
This section is for authorized and licensed electrician / water system installer only. Work behind the front plate secured by screws must only be carried out under supervision of qualified contractor, installation engineer or service person.

Please engage a licensed water circuit installer to install this water circuit.

- This water circuit must comply with relevant European and national regulations (including EN61770), and local building regulation codes.
- Ensure the components installed in the water circuit could withstand water pressure during operation.
- Do not apply excessive force to piping that may damage the pipes.
- Use Rp 1¼" nut for both water inlet and water outlet connection and clean all piping with tap water before connecting to the Mono bloc unit.
- Cover the pipe end to prevent dirt and dust when inserting it through a wall. If an existing tank is to be connected to this Mono bloc unit, ensure the pipes are clean before water pipe installation is carried out.
- Choose proper sealer which can withstand the pressures and temperatures of the system.
- Make sure to use two spanners to tighten the connection. Tighten the nuts with torque wrench: 117.6 N•m.
- If non-brass metallic piping is used for installation, make sure to insulate the piping to prevent galvanic corrosion.
- Do not use pipes that are crushed or deformed. If these inferior pipes are used, it may cause unit malfunction.
- Make sure to insulate the water circuit piping (insulator thickness : 20mm or more) to prevent condensation during cooling operation and reduction of heating capacity, as well as avoid freezing of the outdoor water circuit piping during winter season.
- After installation, check the water leakage condition in connection area during test run.
- In case of a power supply failure or pump operating failure, drain the system (as suggested in the figure below).



When water is idle inside the system, freezing up is very likely to happen which could damage the system.

⚠ CAUTION
Do not over tighten, over tightening cause water leakage.

Drainage piping installation

- Use a drain hose with inner diameter of 15 mm.
- The hose must be installed in a continuously downward direction and left open to the frost-free atmosphere.
- If drain hose is long, use a metal support fixture along the way to eliminate the wavy pattern of drain tube.
- Water will drip from this hose, therefore the outlet of this hose must be installed in an area where the outlet cannot become blocked.
- Do not insert this hose into sewage or drain pipe that may generate ammonia gas, sulfuric gas, etc.
- If necessary, use a hose clamp to tighten the hose at drain hose connector to prevent it from leaking.

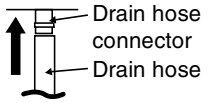


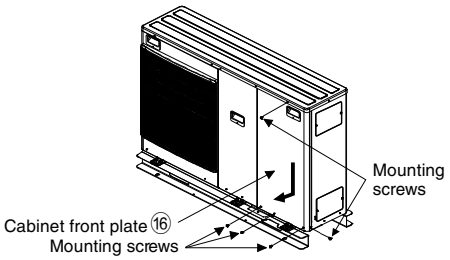
Illustration of how to fix drain hose to Mono bloc unit

Connect the Cable to Mono Bloc Unit

⚠ WARNING
This section is for authorised and licensed electrician only. Work behind the cabinet front plate secured by screws must only be carried out under supervision of qualified contractor, installation engineer or service person.

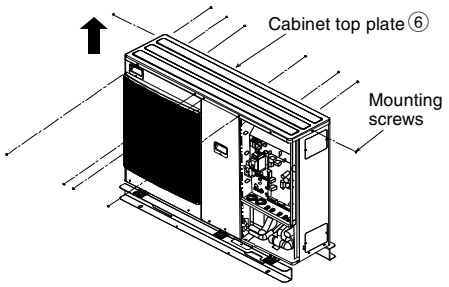
Remove The Cabinet Front Plate

1. Remove the 5 mounting screws as shown in the illustration.
2. Slide the cabinet front plate downward to release the pawls.
   Then, pull it toward front to remove it.



Remove The Cabinet Top Plate

1. Remove the 12 mounting screws as shown in the illustration.
2. Lift the cabinet top plate upward to remove it.



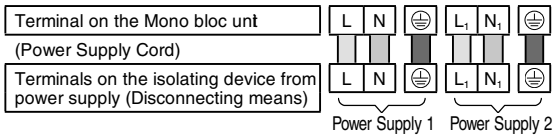
Fixing of Power Supply Cord

(REFER TO WIRING DIAGRAM AT UNIT FOR DETAIL)

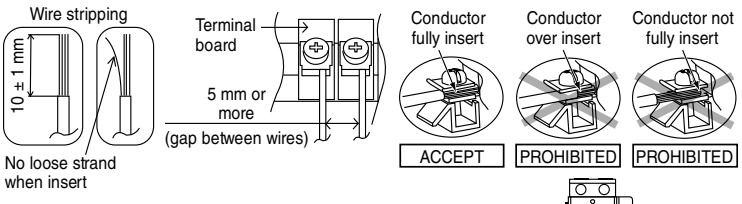
1. An isolating device must be connected to the power supply cable.
   - Isolating device (Disconnecting means) should have minimum 3.0 mm contact gap.
   - Connect the approved polychloroprene sheathed power supply 1 cord and power supply 2 cord and type designation 60245 IEC 57 or heavier cord to the terminal board, and to the other end of the cord to isolating device (Disconnecting means). See below table for cable size requirement.

Model	Power Supply Cord	Cable Size	Isolating Devices	Recommended RCD
WH-MDC05H3E5	1	3 x min 1.5 mm^2	15/16A	30mA, 2P, type A
	2	3 x min 1.5 mm^2	15/16A	30mA, 2P, type AC
WH-MDC07H3E5 and WH-MDC09H3E5	1	3 x min 2.5 mm^2	25A	30mA, 2P, type A
	2	3 x min 1.5 mm^2	15/16A	30mA, 2P, type AC

2. To avoid the cable and cord being damaged by sharp edges, the cable and cord must be passed through the designated holes before being connected to the terminal block.
3. Secure the cable onto the control board with the holder (clamper).

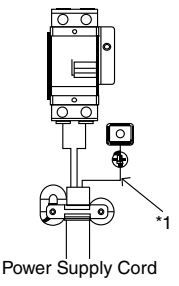


Wire Stripping and Connecting Requirement



Terminal screw	Tightening torque cN•m {kgf•cm}
M4	157~196 {16~20}
M5	196~245 {20~25}

*1 - Earth wire must be longer than other cables for safety reasons.



Connecting Requirement

For WH-MDC05H3E5

- The equipment's Power Supply 1 complies with IEC/EN 61000-3-2.
- The equipment's Power Supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.
- The equipment's Power Supply 2 complies with IEC/EN 61000-3-2.
- The equipment's Power Supply 2 complies with IEC/EN 61000-3-11 and shall be connected to suitable supply network, with the following maximum permissible system impedance Z_{max} = 0.257 ohm (Ω) at the interface. Please liaise with supply authority to ensure that the Power Supply 2 is connected only to a supply of that impedance or less.

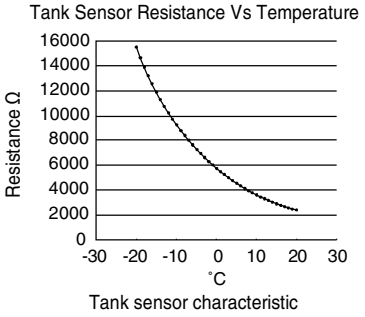
For WH-MDC07H3E5 and WH-MDC09H3E5

- This equipment's Power Supply 1 complies with IEC61000-3-12 provided that the short circuit power S_{sc} is greater than or equal to 750.00kW at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short circuit power S_{sc} greater than or equal to 750.00kW.
- The equipment's Power Supply 1 complies with IEC/EN 61000-3-11 and shall be connected to a suitable supply network, having services current capacity ≥ 100A per phase. Please liaise with supply authority that the service current capacity at the interface point is sufficient for the installation of the equipment.
- The equipment's Power Supply 2 complies with IEC/EN 61000-3-2.
- The equipment's Power Supply 2 complies with IEC/EN 61000-3-11 and shall be connected to suitable supply network, with the following maximum permissible system impedance Z_{max} = 0.257 ohm (Ω) at the interface. Please liaise with supply authority to ensure that the Power Supply 2 is connected only to a supply of that impedance or less.

Connecting with external device (optional)

- **All connections shall** follow to the local national wiring standard.
- It is strongly recommended to use manufacturer-recommended parts and accessories for installation.
- For connection to main PCB
  1 Two-way valve shall be spring and electronic type, refer to "Field Supply Accessories" table for details. Valve cable shall be (3 x min 1.5 mm^2), of type designation 60245 IEC 57 or heavier, or similarly double insulation sheathed cable.
    * note: - Two-way Valve shall be CE marking compliance component.
    - Maximum load for the valve is 9.8VA.
  2 Three-way valve shall be spring and electronic type. Valve cable shall be (3 x min 1.5 mm^2), of type designation 60245 IEC 57 or heavier, or similarly double insulation sheathed cable.
    * note: - Shall be CE marking compliance component.
    - It shall be directed to heating mode when it is OFF.
    - Maximum load for the valve is 9.8VA.
  3 Room thermostat cable must be (4 or 3 x min 0.5 mm^2), of type designation 60245 IEC 57 or heavier cord, or similarly double insulation sheathed cable.
  4 Maximum output power of booster heater shall be ≤ 3 kW. Booster heater cable must be (3 x min 1.5 mm^2), of type designation 60245 IEC 57 or heavier.
  5 Extra pump cable shall be (2 x min 1.5 mm^2), of type designation 60245 IEC 57 or heavier.
  6 Boiler contact cable shall be (2 x min 0.5 mm^2), of type designation 60245 IEC 57 or heavier.
  7 External control shall be connected to 1-pole switch with min 3.0 mm contact gap. Its cable must be (2 x min 0.5 mm^2), double insulation layer of PVC-sheathed or rubber-sheathed cable.
    * note: - Switch used shall be CE compliance component.
    - Maximum operating current shall be less than $3A_{rms}$.

8 Tank sensor shall be resistance type, please refer to graph below for the characteristic and details of sensor. Its cable shall be (2 x min 0.3 mm^2), double insulation layer (with insulation strength of min 30V) of PVC-sheathed or rubber-sheathed cable.

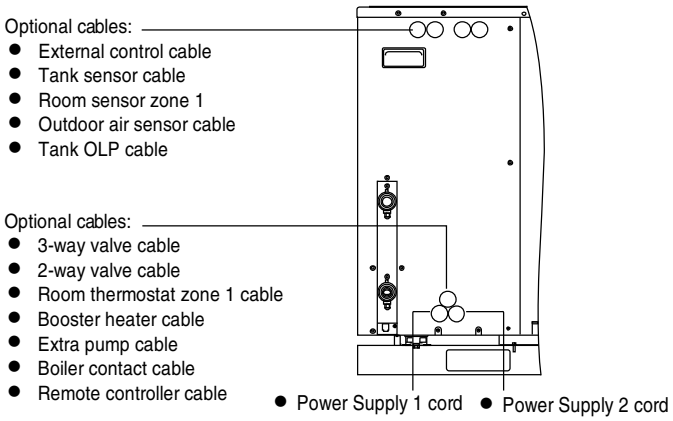


Tank sensor characteristic

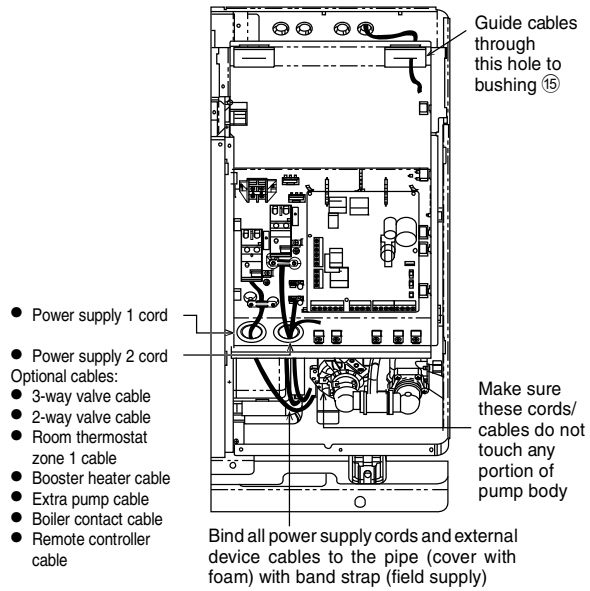
9 Room sensor zone 1 cable shall be (2 x min 0.3 mm^2) double insulation layer of PVC-sheathed or rubber-sheathed.

10 Outdoor air sensor cable shall be (2 x min 0.3 mm^2) double insulation layer of PVC-sheathed or rubber-sheathed.

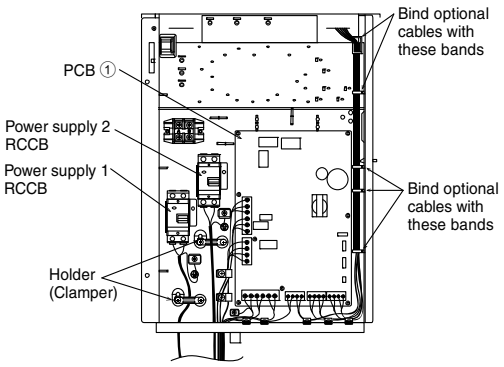
11 Tank OLP cable must be (2 x min 0.5 mm^2), double insulation layer of PVC-sheathed or rubber-sheathed cable.



How to guide optional cables and power supply cords to Bushing ⑮

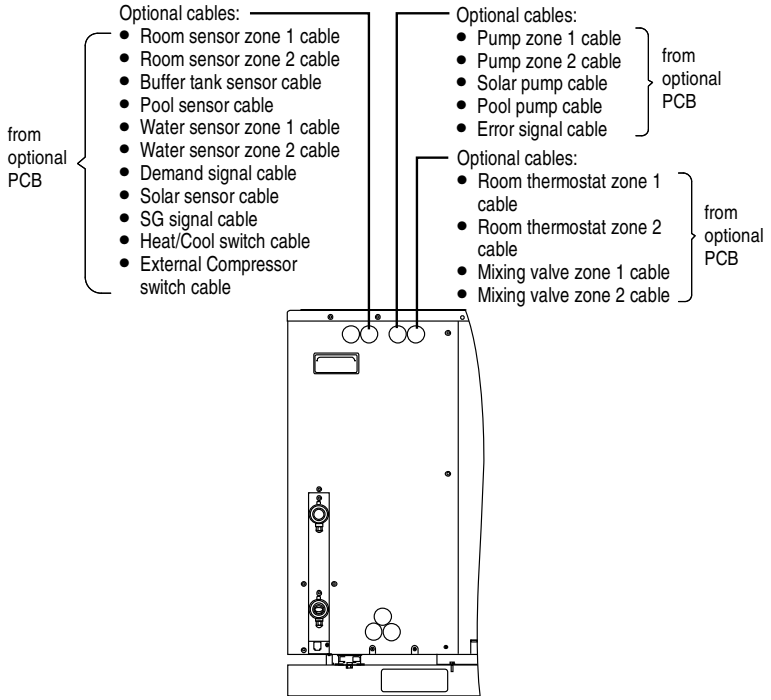


How to guide optional cables and power supply cords to control board

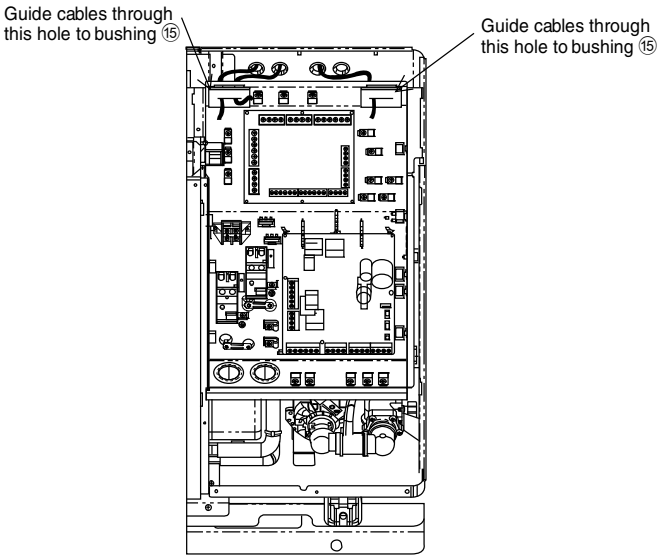


How to guide optional cables and power supply cords
(view without internal wiring)

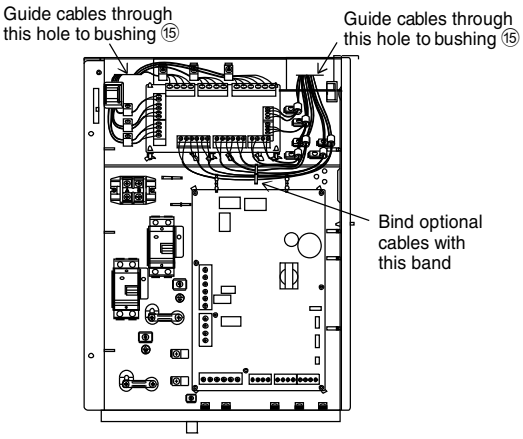
- For connection to optional PCB
  1 By connecting optional PCB, 2 Zone temperature control can be achieved. Please connect mixing valves, water pumps and thermistors in zone 1 and zone 2 to each terminals in optional PCB. Temperature of each zone can be controlled independently by remote controller.
  2 Pump zone 1 and zone 2 cable shall be (2 x min 1.5 mm^2), of type designation 60245 IEC 57 or heavier.
  3 Solar pump cable shall be (2 x min 1.5 mm^2), of type designation 60245 IEC 57 or heavier.
  4 Pool pump cable shall be (2 x min 1.5 mm^2), of type designation 60245 IEC 57 or heavier.
  5 Room thermostat zone 1 and zone 2 cable shall be (4 x min 0.5 mm^2), of type designation 60245 IEC 57 or heavier.
  6 Mixing valve zone 1 and zone 2 cable shall be (3 x min 1.5 mm^2), of type designation 60245 IEC 57 or heavier.
  7 Room sensor zone 1 and zone 2 cable shall be (2 x min 0.3 mm^2), double insulation layer (with insulation strength of minimum 30V) of PVC-sheathed or rubber-sheathed cable.
  8 Buffer tank sensor, pool water sensor and solar sensor cable shall be (2 x min 0.3 mm^2), double insulation layer (with insulation strength of minimum 30V) of PVC-sheathed or rubber-sheathed cable.
  9 Water sensor zone 1 and zone 2 cable shall be (2 x min 0.3 mm^2), double insulation layer of PVC-sheathed or rubber-sheathed cable.
  10 Demand signal cable shall be (2 x min 0.3 mm^2), double insulation layer of PVC-sheathed or rubber-sheathed cable.
  11 SG signal cable shall be (3 x min 0.3 mm^2), double insulation layer of PVC-sheathed or rubber-sheathed cable.
  12 Heat/Cool switch cable shall be (2 x min 0.3 mm^2), double insulation layer of PVC-sheathed or rubber-sheathed cable.
  13 External compressor switch cable shall be (2 x min 0.3 mm^2), double insulation layer of PVC-sheathed or rubber-sheathed cable.



How to guide optional cables to bushing ⑮



How to guide optional cables to control board



How to guide optional cables (view without internal wiring)

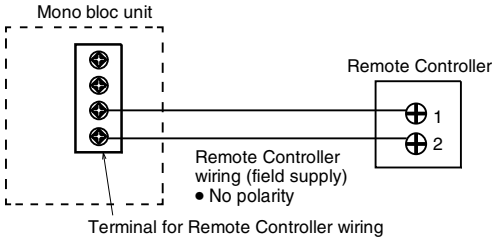
Terminal screw on PCB	Maximum tightening torque cN•m {kgf•cm}
M3	50 {5.1}
M4	120 {12.24}

Installation of Remote Controller

Installation Location

- Install at the height of 1 to 1.5 m from the floor (Location where average room temperature can be detected).
- Install vertically against the wall.
- Avoid the following locations for installation.
  1 By the window, etc. exposed to direct sunlight or direct air.
  2 In the shadow or backside of objects deviated from the room airflow.
  3 Location where condensation occurs (The Remote Controller is not moisture proof or drip proof.)
  4 Location near heat source.
  5 Uneven surface.
- Keep distance of 1 m or more from the TV, radio and PC. (Cause of fuzzy image or noise)

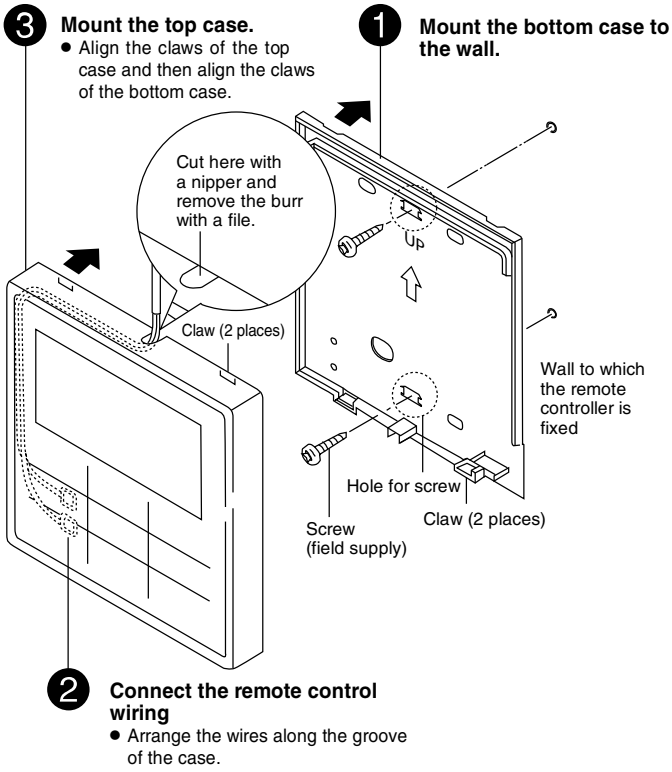
Remote Controller Wiring



- Remote Controller cable shall be (2 x min 0.3 mm^2), of double insulation PVC-sheathed or rubber sheathed cable. Total cable length shall be 50 m or less.
- Be careful not to connect cables to other terminals (e.g. power source wiring terminal). Malfunction may occur.
- Do not bundle together with the power source wiring or store in the same metal tube. Operation error may occur.

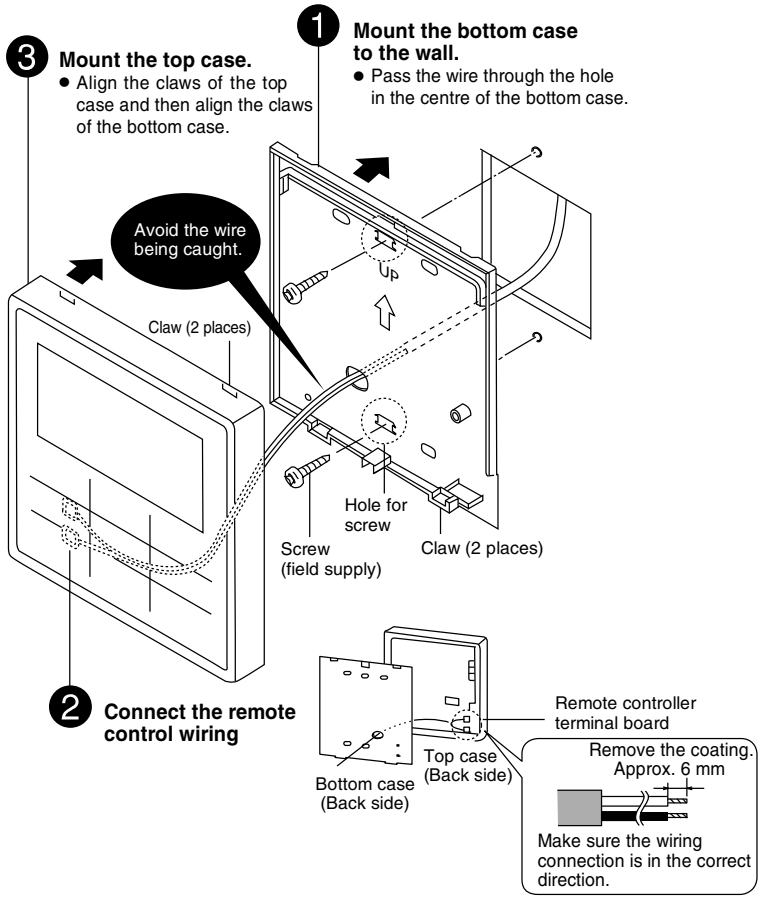
Mounting The Remote Controller

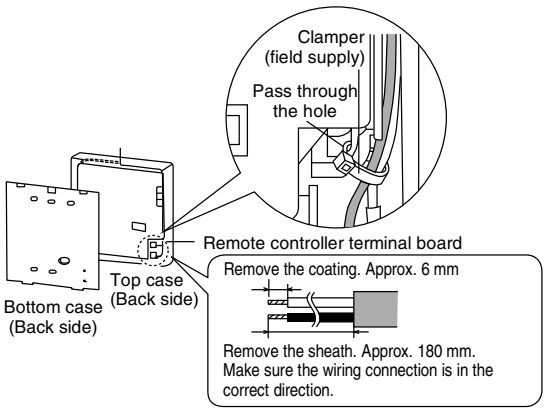
For exposed type
Preparation: Make 2 holes for screws using a driver.



For embedded type

Preparation: Make 2 holes for screws using a driver.





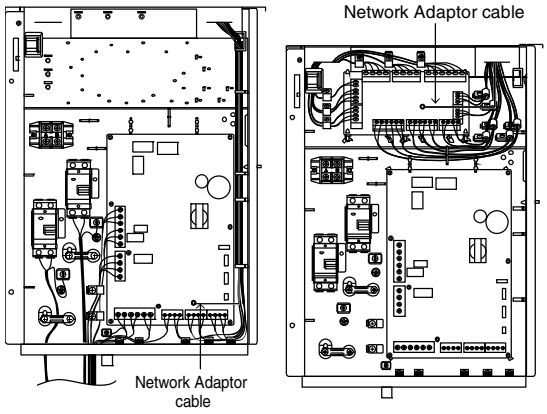
⚠ WARNING

This section is for authorized and licensed electrician/water system installer only. Work behind the front plate secured by screws must only be carried out under supervision of qualified contractor, installation engineer or service person.

Installation of Network Adaptor and Base Pan Heater

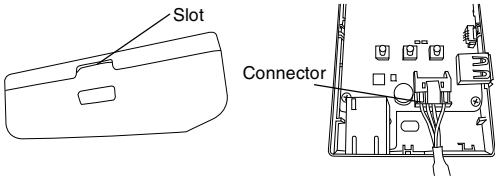
Network Adaptor and Installation (Optional)

1. **Open the Cabinet front plate and Cabinet top plate, then connect the Network Adaptor Cable to the CN-CNT connector on the printed circuit board.**
   - Pull the cable out of the Mono bloc unit so that there is no pinching.
   - If an optional PCB has been install in the Mono bloc unit, connect the CN-CNT connector to Optional PCB.

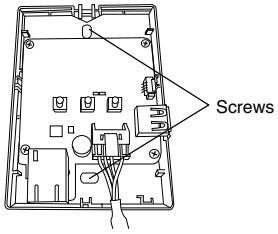


Without Optional PCB With Optional PCB

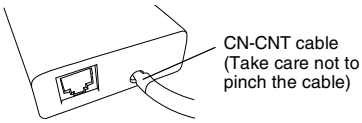
2. **Insert a flat head screwdriver into the slot on the top of the adaptor and remove the cover. Connect the other end of the CN-CNT cable connector to the connector inside the adaptor.**



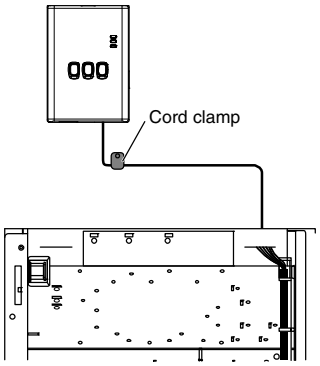
3. **On the wall near the Mono bloc unit, attach the adaptor by screwing screws through the holes in the back cover.**



4. **Pull the CN-CNT cable through the hole in the bottom of the adaptor and re-attach the front cover to the back cover.**



5. **Use the included cord clamp to fix the CN-CNT cable to the wall.**
   Pull the cable around as shown in the diagram so that external forces cannot act on the connector in the adaptor.



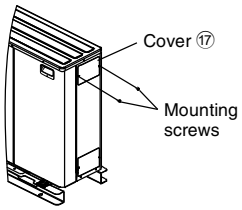
Base Pan Heater (Optional)

- It is strongly recommended to install a Base Pan Heater (optional) if the Mono bloc unit is installed in cold climate area. Refer the Base Pan Heater (optional) installation instruction for details of installation.

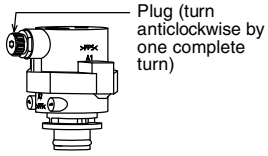
Charging the Water

- Make sure all the piping installations are properly done before carry out below steps.

1 Take out the Cover by removing the 2 mounting screws to access to the Pressure Relief Valve and Air Purge Valve.

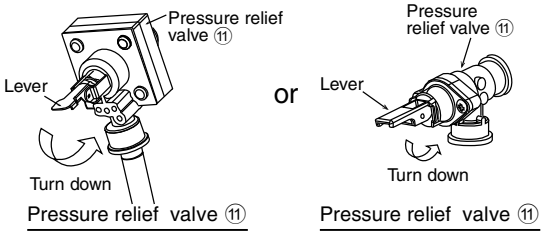


2 Turn the plug on the Air Purge Valve outlet anticlockwise by one complete turn from fully closed position.



Air purge valve ⑫

3 Set the Pressure Relief Valve level “DOWN”.



Pressure relief valve ⑪ Pressure relief valve ⑪

4 Start filling water (with pressure more than 0.1 MPa (1 bar)) to the Mono bloc unit via water inlet. Stop filling water if the free water flow through Pressure Relief Valve drain hose.
5 Turn ON the power supply and make sure Water Pump is running.
6 Check and make sure no water leaking at the tube connecting points.
7 Reinstall the Cover by tightening the 2 mounting screws.

Reconfirmation

⚠ WARNING
Be sure to switch off all power supply before performing each of the below checkings. Before obtaining access to terminals, all supply circuits must be disconnected.

*Check Water Pressure *(0.1 MPa = 1 bar)*

Water pressure should not lower than 0.05 MPa (with inspects the Water Pressure Gauge). If necessary add tap water into the water circuit.

Check Pressure Relief Valve

- Check for correct operation of Pressure Relief Valve by turning on the lever to become horizontal.
- If you do not hear a clacking sound (due to water drainage), contact your local authorized dealer.
- Push down the lever after finish checking.
- In case the water keeps drained out from the unit, switch off the system, and then contact your local authorized dealer.

Expansion Vessel Pre Pressure Checking

[Upper limit water volume of the system]
The Mono bloc unit has a build-in Expansion Vessel with 6 L air capacity and initial pressure of 1 bar.

- Without antifreeze agent condition

Total amount of water in the system should be below 150 L.
If the total amount of water is more than 150 L, please add expansion vessel (field supply).

- With antifreeze agent condition

In the case of using antifreeze agent, expansion rate ε is different depending on its maker.
Please refer to the antifreeze agent maker for the expansion rate ε before calculate the upper limit water volume of the system.
The expansion vessel capacity required for the system can be calculated from the formula below.

$$V = \frac{\varepsilon \times Vo}{1 - \frac{98 + P_1}{98 + P_2}}$$

V : Required gas volume <expansion vessel volume L>
Vo : System total water volume <L>
ε : Expansion rate 5→60˚C = (depends on antifreeze agent used)
P_1 : Expansion tank filling pressure = (100) kPa
P_2 : System maximum pressure = 300 kPa
- ( ) Please confirm at actual place
- The gas volume of the sealed type expansion vessel is presented by <V>

❍ It’s advised to add 10% margin for required gas volume of calculation.

[Adjustment of the initial pressure of the expansion vessel when there is a difference in installation height]
If the height difference between the Mono bloc unit and the highest point of the system water circuit (H) is more than 7m, please adjust the initial pressure of the expansion vessel (Pg) according to the following formula.

Pg= (H*10+30) kPa

Check RCCB

Ensure the RCCB set to “ON” condition before check RCCB 2.
Turn on the power supply to the Mono bloc unit.
This testing could only be done when power is supplied to the Mono bloc unit.

⚠ WARNING
Be careful not to touch parts other than RCCB test button when the power is supplied to Mono bloc unit. Else, electrical shock may happen.

- Push the “TEST” button on the RCCB. The lever would turn down and indicate “0”, if it functions normal.
- Contact authorized dealer if the RCCB malfunction.
- Turn off the power supply to the Mono bloc unit.
- If RCCB functions normal, set the lever to “ON” again after testing finish.

This product contains fluorinated greenhouse gasses.
Refrigerant type : R410A (GWP=2088)
For WH-MDC05H3E5
Amount : 1.30 kg (2.7144 ton CO_2 equivalent)
For WH-MDC07H3E5 & WH-MDC09H3E5
Amount : 1.35 kg (2.8188 ton CO_2 equivalent)

Test Run

1. Before test run, make sure below items have been checked:-
   - Pipework are properly done.
   - Electric cable connecting work are properly done.
   - Mono bloc unit is filled up with water and trapped air is released.
2. Antifreeze agent must be added into water circuit to prevent freezing of water when outdoor ambient temperatures is low. Recommended antifreeze: Propylene glycol: 40% (equivalent to -20°C)
3. Set ON to the Mono bloc unit and RCCB. Then, for remote control operation please refers to (Mono bloc) Air-to-Water Heatpump’s operation instruction.
4. For normal operation, pressure gauge reading should be in between 0.05 MPa and 0.3 MPa.
5. After test run, please clean the Water filter. Reinstall it after finish cleaning.

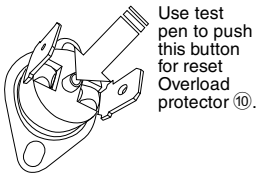
Check Water Flow of Water Circuit

Confirm the maximum water flow during main pump operation not less than 15 l/min.
*Water flow can be check through service setup (Pump Max Speed)
[Heating operation at low water temperature with lower water flow may trigger “H75” during defrost process.]

Reset Overload Protector

Overload Protector serves the safety purpose to prevent the water over heating. When the Overload Protector trip at high water temperature, take below steps to reset it.

1. Take out the cover.
2. Use a test pen to push the centre button gently in order to reset the Overload Protector.
3. Fix the cover to the original fixing condition.



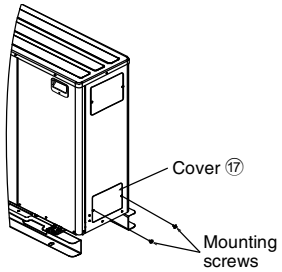
Maintenance

- In order to ensure optimal performance of the unit, seasonal inspections on the unit, functional check of RCCB, field wiring and piping have to be carried out at regular intervals. This maintenance should be carried out by authorized dealer.

Maintenance for Water Filter Set

1. Remove the Cover by loosening the mounting screws to access to the Water Filter Set.
2. Turn OFF power supply.
3. Set the two valves for the Water Filter Set to “CLOSE”.
4. Take off the clip, then gently pull out the mesh. Beware of small amount water drain out from it.
5. Clean the mesh with warm water to remove all the stain. Use soft brush if necessary.
6. Reinstall the mesh to the Water Filter Set and set back the clip on it.
7. Set the two valves for the Water Filter Set to “OPEN”.
8. Turn ON power supply.
9. After cleaning, reinstall the Cover by tightening the mounting screws properly.

⚠ WARNING
Do not add or replace other than R410A type. It may cause product damage, burst, injury and etc. Use compatible R410A tools for refrigerant piping work and refrigerant charging during installation or servicing.



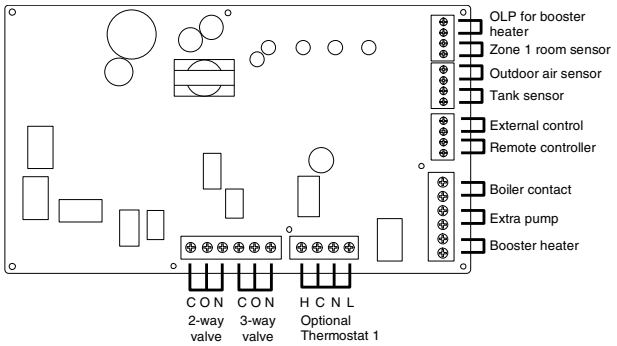
How to Fix External Device

Connecting Cables Length

When connecting cables between Mono bloc and external devices, the length of the said cables must not exceed the maximum length as shown in the table.

External device	Maximum cables length (m)
Two-way valve	50
Three-way valve	50
Mixing valve	50
Room thermostat	50
Booster heater	50
Extra pump	50
Solar pump	50
Pool pump	50
Pump	50
Boiler contact	50
External control	50
Tank sensor	30
Room sensor	30
Outdoor air sensor	30
Tank OLP	30
Buffer tank sensor	30
Pool water sensor	30
Solar sensor	30
Water sensor	30
Demand signal	50
SG signal	50
Heat/Cool switch	50
External compressor switch	50

Connection of the main PCB



■ Signal inputs

Optional Thermostat	L N =AC230V, Heat, Cool=Thermostat heat, Cool terminal ❊It does not function when using the optional PCB
OLP for booster heater	Dry contact Vcc-Bit1, Vcc-Bit2 open/short (System setup necessary) It is connected to the safety device (OLP) of DHW tank.
External control	Dry contact Open=not operate, Short=operate (System setup necessary) Able to turn ON/OFF the operation by external switch
Remote controller	Connected (Please use 2 cores wire for relocation and extension. Total cable length shall be 50m or less.)

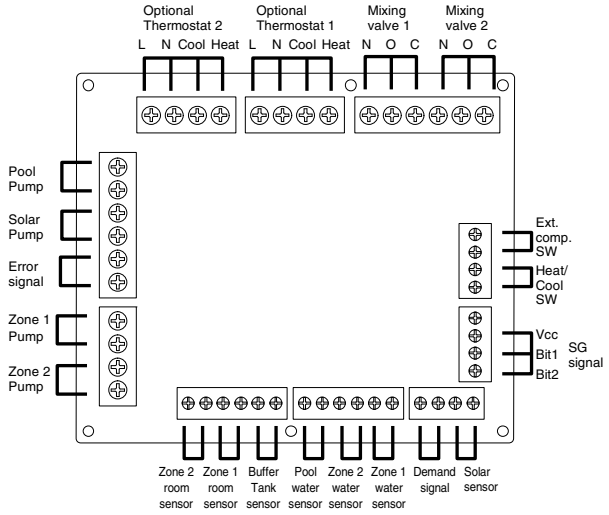
■ Outputs

3-way valve	AC230V N=Neutral Open, Close=direction (For circuit switching when connected to DHW tank)
2-way valve	AC230V N=Neutral Open, Close (Prevent water circuit pass through during cooling mode)
Extra pump	AC230V (Used when Mono bloc pump capacity is insufficient)
Booster heater	AC230V (Used when using booster heater in DHW tank)
Boiler contact	Dry contact (System setup necessary)

■ Thermistor inputs

Zone 1 room sensor	PAW-A2W-TSRT ❊It does not work when using the optional PCB
Outdoor air sensor	AW-A2W-TSOD (Total cable length shall be 30m or less)
Tank sensor	Please use Panasonic specified part

Connection of Optional PCB (CZ-NS4P)



■ Signal inputs

Optional Thermostat	L N =AC230V, Heat, Cool=Thermostat heat, Cool terminal
SG signal	Dry contact Vcc-Bit1, Vcc-Bit2 open/short (System setup necessary) Switching SW (Please connect to the 2 contacts controller)
Heat/Cool SW	Dry contact Open=Heat, Short=Cool (System setup necessary)
External comp.SW	Dry contact Open=Comp.ON, Short=Comp.OFF (System setup necessary)
Demand signal	DC 0~10V (System setup necessary) Please connect to the DC 0~10V controller.

■ Outputs

Mixing valve	AC230V N=Neutral Open, Close=mixture direction Operating time: 30s~120s
Pool pump	AC230V
Solar pump	AC230V
Zone pump heater	AC230V

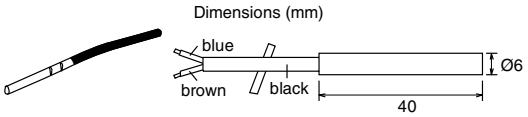
■ Thermistor inputs

Zone room sensor	PAW-A2W-TSRT
Buffer tank sensor	PAW-A2W-TSBU
Pool water sensor	PAW-A2W-TSHC
Zone water sensor	PAW-A2W-TSHC
Solar sensor	PAW-A2W-TSSO

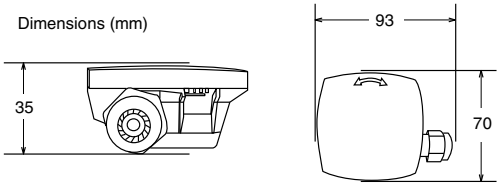
Recommended External Device Specification

- This section explains about the external devices (optional) recommended by Panasonic. Please always ensure to use the correct external device during system installation.
- For optional sensor.

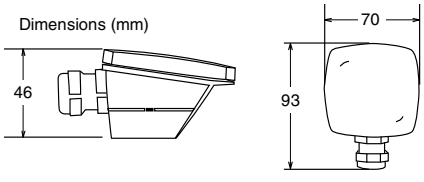
1 Buffer tank sensor: PAW-A2W-TSBU
Use for measurement of the buffer tank temperature.
Insert the sensor into the sensor pocket and paste it on the buffer tank surface.



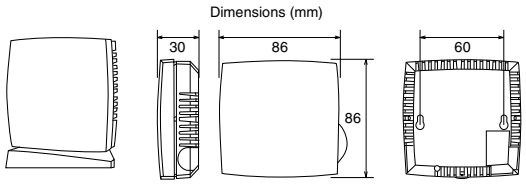
2 Zone water sensor: PAW-A2W-TSHC
Use to detect the water temperature of the control zone.
Mount it on the water piping by using the stainless steel metal strap and contact paste (both are included).



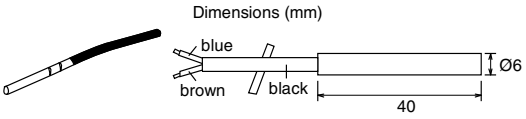
3 Outdoor sensor: PAW-A2W-TSOD
If the installation location of the outdoor unit is exposed to direct sunlight, the outdoor air temperature sensor will be unable to measure the actual outdoor ambient temperature correctly.
In this case, optional outdoor temperature sensor can be fixed at a suitable location to more accurately measure ambient temperature.



4 Room sensor: PAW-A2W-TSRT
Install the room temperature sensor to the room which requires room temperature control.



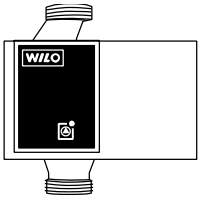
5 Solar sensor: PAW-A2W-TSSO
Use for measurement of the solar panel temperature.
Insert the sensor into the sensor pocket and paste it on the solar panel surface.



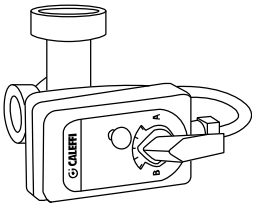
6 Please refer to the table below for sensor characteristic of the sensors mentioned above.

Temperature (°C)	Resistance (kΩ)
150	0.147
140	0.186
130	0.236
120	0.302
110	0.390
100	0.511
90	0.686
80	0.932
70	1.279
65	1.504
60	1.777
55	2.106
50	2.508
45	3.003
40	3.615
35	4.375
30	5.326
25	6.523
20	8.044
15	9.980
10	12.443
5	15.604
0	19.70
-5	25.05
-10	32.10
-15	41.45
-20	53.92
-25	70.53
-30	93.05
-35	124.24
-40	167.82

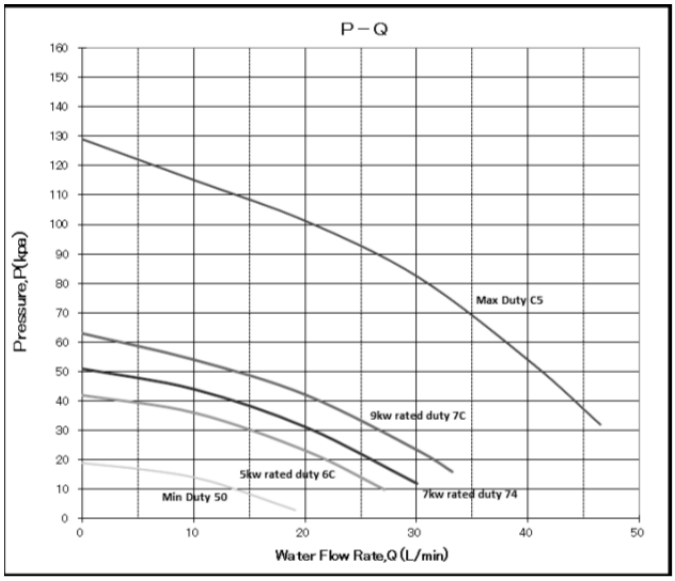
- For optional pump.
  Power supply: AC230V/50Hz, <500W
  Recommended part: Yonos 25/6: made by Wilo



- For optional mixing valve.
  Power supply: AC230V/50Hz (input open/output close)
  Operating time: 30s~120s
  Recommended part: 167032: made by Caleffi



1) P-Q graph for different pump HEX duty



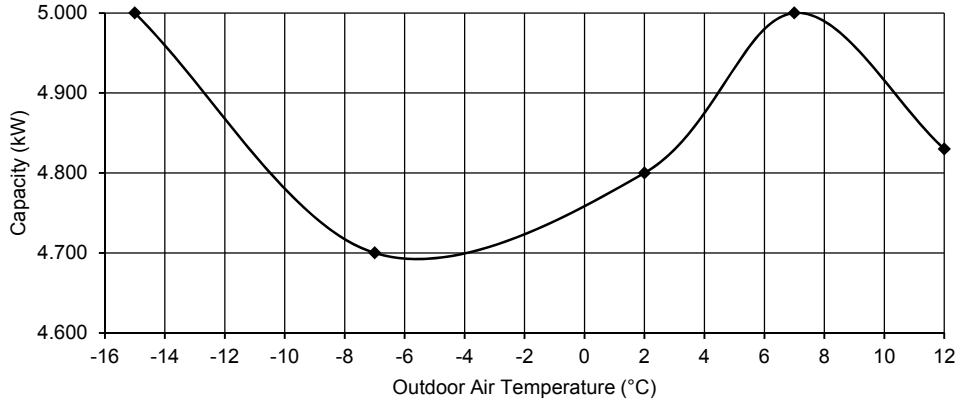
Technical Data

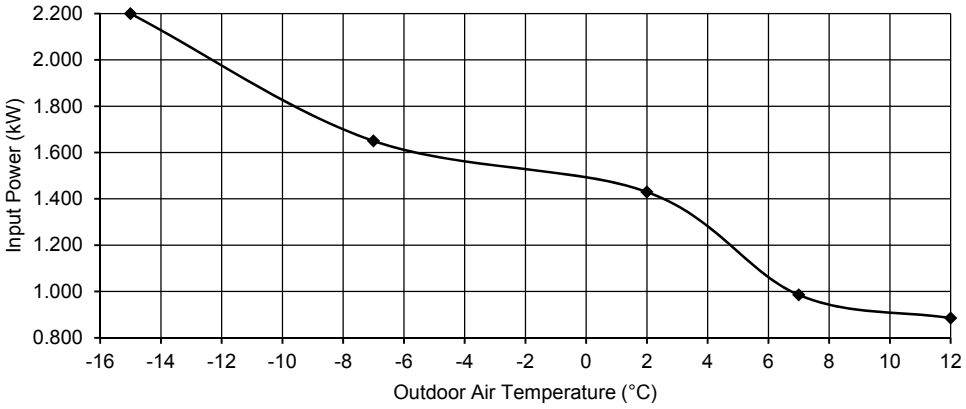
Operation Characteristics

WH-MDC05H3E5

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





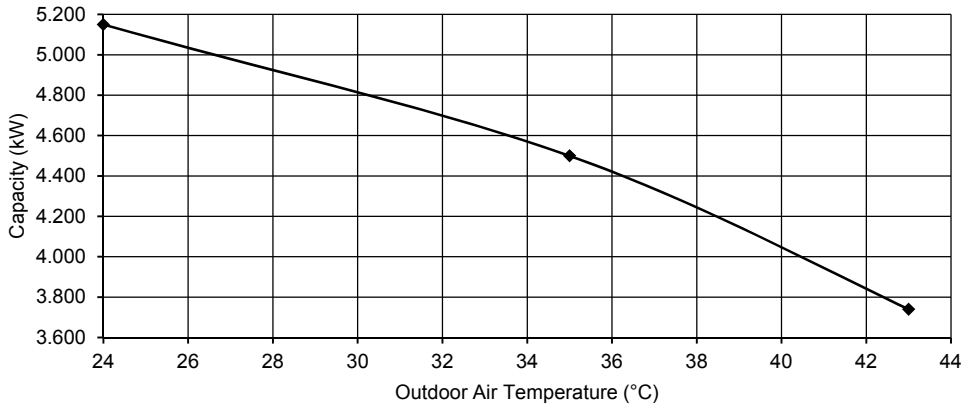
Cooling Characteristics at Different Outdoor Air Temperature

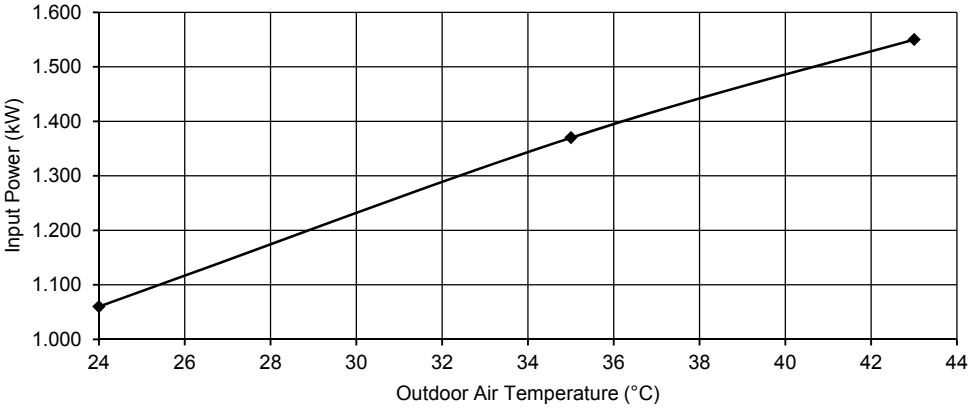
Condition

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

Indoor water inlet temperature : 12°C

Indoor water outlet temperature : 7°C





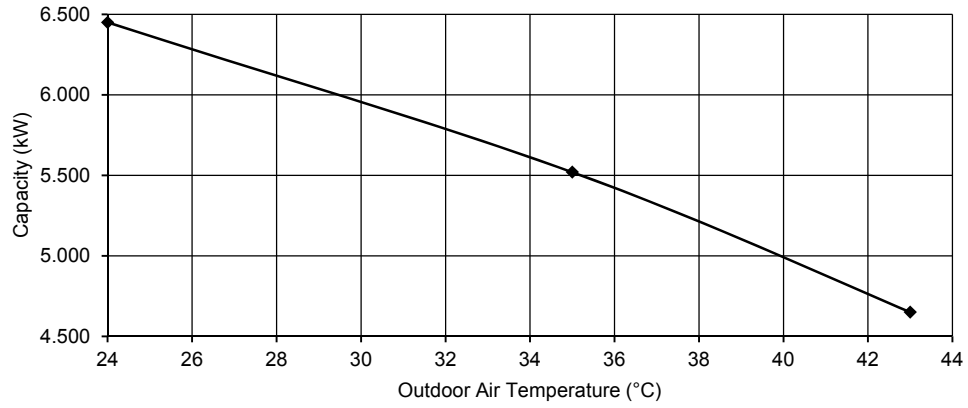
Cooling Characteristics at Different Outdoor Air Temperature

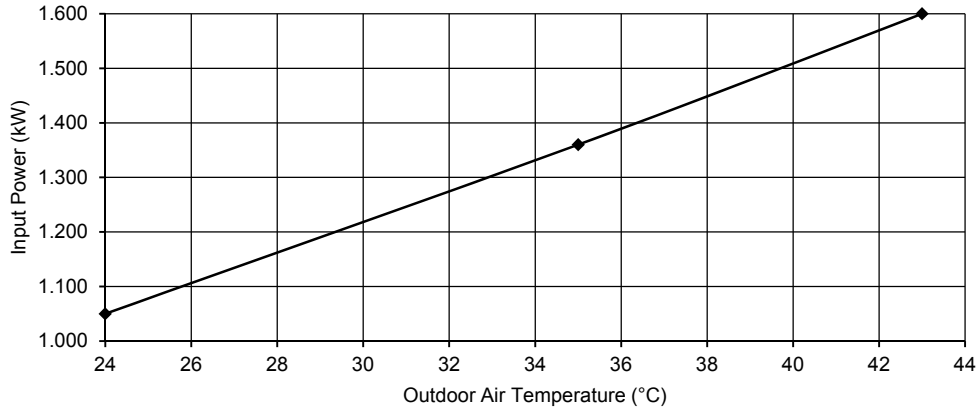
Condition

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

Indoor water inlet temperature : 19°C

Indoor water outlet temperature : 14°C





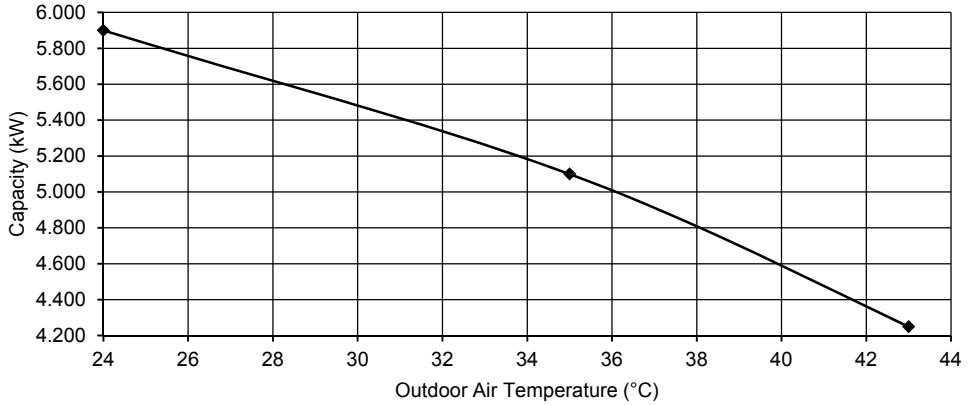
Cooling Characteristics at Different Outdoor Air Temperature

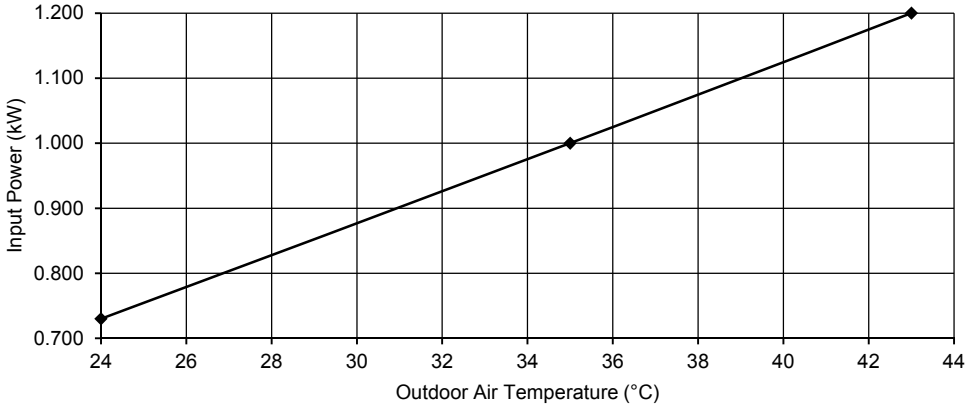
Condition

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

Indoor water inlet temperature : 23°C

Indoor water outlet temperature : 18°C





Heating Capacity Table

WH-MDC05H3E5

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	5125	2015	5000	2200	4875	2385	4750	2570	4075	2285	3400	2000
-7	4800	1485	4700	1650	4600	1815	4500	1980	4400	2130	4300	2280
2	5100	1340	4800	1430	4500	1520	4200	1610	4100	1665	4000	1720
7	5000	790	5000	985	5000	1180	5000	1370	5000	1565	5000	1760
12	4845	770	4830	885	4815	1000	4800	1120	4740	1245	4680	1370

Cooling Capacity Table

WH-MDC05H3E5

OD	WO 7		WO 14		WO 18	
	Q	IP	Q	IP	Q	IP
24	5150	1060	6450	1050	5900	730
35	4500	1370	5520	1360	5100	1000
43	3740	1550	4650	1600	4250	1200