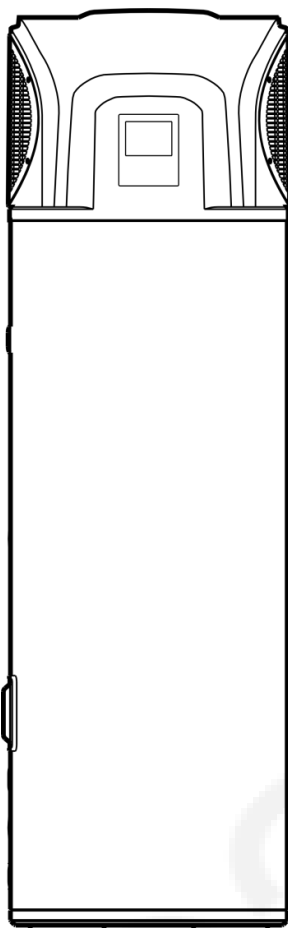


Service Manual

Heat Pump Water Heater

Model No. PHE-30ABR



Destination: <Australia>

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 product or 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.

 WARNING

This appliance must be installed in accordance with:

- Manufacturer's Installation Instructions
- Current AS/NZS 3500
- Plumbing Code of Australia (PCA)
- Local Regulations and Municipal Building Codes including local OH&S requirements

This system must be installed, commissioned, serviced, maintained and removed **ONLY** by an Authorised person.

NOT SUITABLE AS A POOL OR SPA HEATER

For continued safety of this appliance it must be installed and maintained in accordance with the manufacturer's instructions.



SGS-250527-EA



Lead Free

AS:3498
Lic No.:WMK27047



AS/NZS:2712
Lic No.:SMK41664

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WARNINGS AND IMPORTANT INFORMATION

SAFETY AND REGULATORY INFORMATION



WARNING

DO NOT operate this system before reading the manufacturers instructions.

This appliance must be installed, commissioned and serviced by an authorised person in accordance with all applicable local rules and regulations.

Access covers of water heating system components will expose 240V wiring and **MUST** only be removed by an authorised person.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

For continued safety of this appliance it must be installed, operated and maintained in accordance with the manufacturer's instructions.

Children should be supervised to ensure they **DO NOT** play with the appliance.

The unit is rated at 15 amps (2 core and earth) so the power mains supplying the unit must have a 15 amp minimum double pole circuit breaker fitted. If the power supply cord is damaged, it **MUST** be replaced by an authorised person in order to avoid a hazard. Take care not to touch the power connections or plugs with wet hands.

Care should be taken not to touch the pipe work as it may be **HOT!**

DO NOT place articles on or against this appliance.

DO NOT store chemicals or flammable materials near this appliance.

DO NOT operate with collectors or covers removed from this appliance.

DO NOT activate heat pump unless cylinder is full of water.

NEVER use a flammable spray such as hair spray, paint, etc near this unit as this may cause a fire.

MANDATORY INSPECTION PRIOR TO INSTALLATION



WARNING

Immediately report any damage or discrepancies to the Supplier of the appliance. This appliance was inspected and tested at the time of manufacture and packaging, and released for transportation without known damage. Upon receipt, inspect the exterior for evidence of rough handling in shipment. Ensure that the appliance is labelled correctly for the gas and electrical supply, and/or other services it is intended to be connected to.

For safety and warranty purposes, appliances that may be damaged or incorrect must not be installed or operated under any circumstances. Installation of damaged or incorrect appliances may contravene local government regulations. We disclaims any liability or responsibility whatsoever in relation to the installation or operation of damaged or incorrect appliances.

NOTICE TO VICTORIAN CONSUMERS

This appliance must be installed by a person licensed with the Victorian Building Authority.

Only a licensed person will have insurance protecting their workmanship.

So make sure you use a licensed person to install this appliance and ask for your Compliance Certificate.

For further information contact the Victorian Building Authority on 1300 815 127.

WARNINGS AND IMPORTANT INFORMATION

TRANSPORT AND STORAGE OF APPLIANCE



RISK OF FIRE

The appliance(s) shall be stored and transported in an area without ignition sources (for example, open flames, an operating gas appliance or an operating electric heater)

DO NOT pierce or burn the appliance.

Be aware that refrigerants may not contain an odour.

Compliance with AS/NZS 5149 **MUST** be observed while storing the appliance.



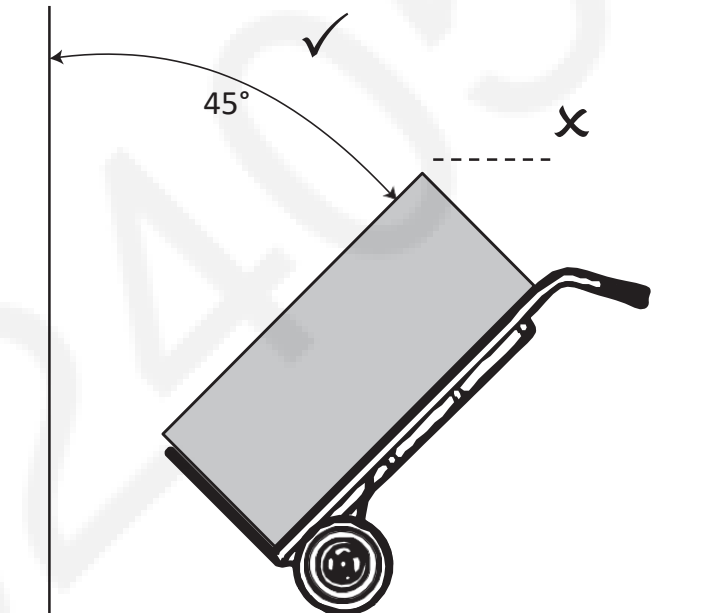
IMPORTANT

National and state regulations exist for storage, handling and transport of hazardous goods including flammable gasses. The maximum number of pieces of equipment or the configuration of the equipment, permitted to be transported or stored together will be determined by the applicable regulations.



IMPORTANT

**DO NOT TILT
MORE THAN 45°
FROM VERTICAL**



The PANASONIC Electric Heat Pump must be transported at an angle no greater than 45° from vertical. As the compressor unit is located at the top of the electric heat pump, should the heat pump be tilted at a greater angle than 45° from vertical, the lubrication oil within the compressor can run down into the mufflers. This will leave the compressor motor without sufficient lubrication and lead to premature failure of the compressor unit.

As a general good practice it is better to keep the compressor upright as much as possible to avoid any risks. Returning the PANASONIC Electric Heat Pump to a vertical position will allow the oil to properly flow back into the compressor motor.

Tilting beyond 45° from vertical will also place undue strain on compressor motor mounts and associated piping.



WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources. For example, open flames, an operating gas appliance or an operating electric heater.

Do not pierce or burn.

Be aware that refrigerants may not contain an odour.

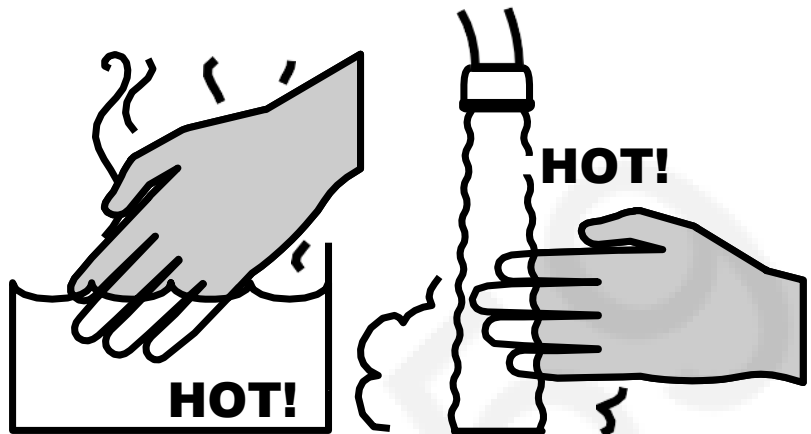
WARNINGS AND IMPORTANT INFORMATION

SCALD HAZARDS



DANGER

**BEWARE OF
SCALDING
HAZARDS**



HOT WATER CAN CAUSE SCALDS.

CHILDREN, DISABLED, ELDERLY AND THE INFIRM ARE AT THE HIGHEST RISK OF BEING SCALDED.

FEEL WATER TEMPERATURE BEFORE BATHING OR SHOWERING.

SCALDS FROM HOT WATER TAPS CAN RESULT IN SEVERE INJURIES TO YOUNG CHILDREN.

SCALDS OCCUR WHEN CHILDREN ARE EXPOSED DIRECTLY TO HOT WATER WHEN THEY ARE PLACED INTO A BATH WHICH IS TOO HOT.

ALWAYS –

Test the temperature of the water with your elbow before placing your child in the bath, also carefully feel water before bathing or showering yourself.

Supervise children whenever they are in the bathroom.

Make sure that the hot water tap is turned off tightly.

CONSIDER –

Installing child proof tap covers or child resistant taps (both approaches will prevent a small hand being able to turn on the tap).

Installing tempering valves or thermostatic mixing valves which reduce the hot water temperature delivered to the taps. Your local plumbing authority may already require that these be fitted. Contact your installer or local plumbing authority if in doubt.

NEVER –

Leave a toddler in the care of another child. They may not understand the need to have the water temperature set at a safe level.

WARNINGS AND IMPORTANT INFORMATION

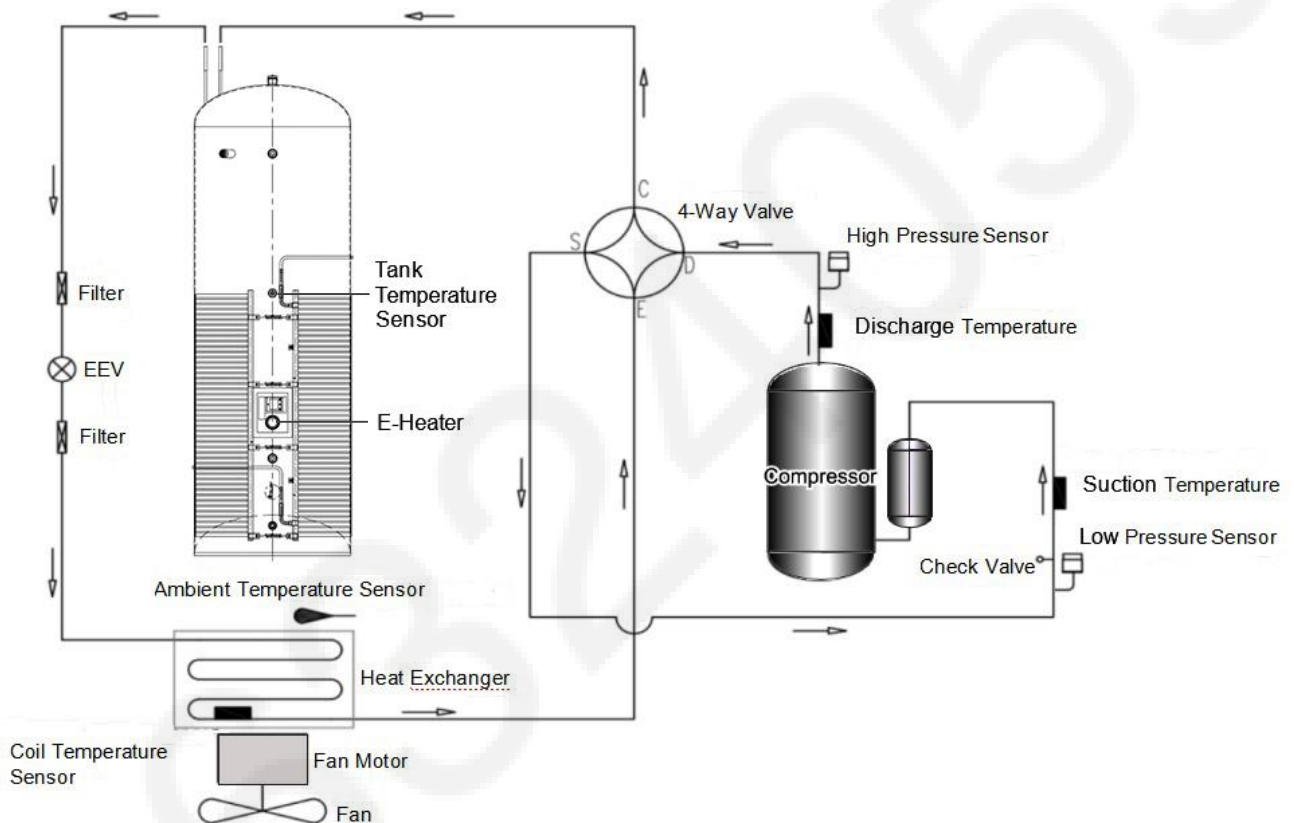
OPERATING PRINCIPLE

The operation of an electric heat pump is very similar to a refrigerator, but in reverse. A heat pump operates by transferring heat from the ambient outside air into the water. Electricity is just used to operate the system, but not to directly heat the water. Because of this energy consumption is significantly reduced as compared to an electric element hot water system. The warmer the climate in which the heat pump is installed, the more efficient the heat pump system will be at heating water.

The heat pump unit includes highly efficient copper tube heat exchanger wrapped around the inner cylinder for thermal conductivity. A temperature sensor in the tank is used to control the heat pump operation to achieve suitable tank temperature.

During the occasional times when the ambient weather conditions aren't suitable for the heat pump to operate, the electric element will provide heating to ensure a supply of hot water.

SYSTEM SCHEMATIC



SAFETY DEVICES

The water heating system is supplied with various safety devices including temperature sensors, overheat sensors and switches and a Pressure & Temperature Relief (PTR) valve. These devices must not be tampered with or removed. The water heating system must not be operated unless each of these devices is fitted and is in working order.



WARNING

DO NOT tamper with or remove safety devices.

DO NOT operate the water heater unless all safety devices are fitted and in working order.

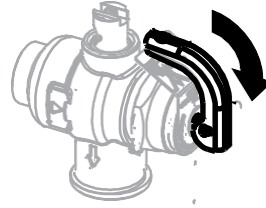
DO NOT block or seal the PTR Valve and drain pipe.

WARNINGS AND IMPORTANT INFORMATION

Pressure & Temperature Relief (PTR) Valve

This valve is located near the top of the water heater and is essential for safe operation. It is normal for the valve to release a small quantity of water through the drain line during heating.

However, continuous leakage of water from the valve and its drain line may indicate a problem with the water heater.



Lift lever until water flows from drain line
(Lower lever gently!)



WARNING

NEVER block the outlet of the PTR valve or its drain line for any reason. The easing gear **MUST** be operated at least every 6 months to remove lime deposits and verify that it is not blocked.

Failure to do this may result in the water heater failing.

If the valve does not discharge water when the easing gear lever is opened, or does not seal again when the easing gear is closed, attendance by an authorised person **MUST** be arranged without delay. The PTR valve is not serviceable.

EXCESSIVE DISCHARGE FROM SAFETY DEVICES

Pressure & Temperature Relief (PTR) Valve

It is normal and desirable that this valve allows a small quantity of water to be discharged during the heating cycle. If it discharges more than a bucket of water during a 24 hour period or discharges continuously there may be another problem.

If the valve dribbles continuously, try easing the valve gear for a few seconds as described above. This may dislodge any foreign matter and alleviate the problem.

If the valve discharges at high flows, especially at night, it may be as a result of the water pressure exceeding the design pressure of the water heater. Ask your installer to fit a Pressure Limiting Valve (PLV).



WARNING

NEVER replace the PTR valve with one which has a higher pressure rating than is specified for your water heater.

Expansion Control Valve (ECV) - if required

It is normal that this valve allows a small quantity of water to be discharged during the heating cycle. If it discharges more than a bucket of water during a 24 hour period or discharges continuously there may be another problem.

If the valve leaks continuously, try easing the valve gear for a few seconds. This may dislodge any foreign matter and alleviate the problem. If it does not, please contact PANASONIC.

Operate the easing gear regularly to remove any lime deposits and to verify that it is not blocked.

WARNINGS AND IMPORTANT INFORMATION

HYDROGEN GAS

If the hot water unit is not used for two weeks or more, a quantity of hydrogen gas, which is highly flammable, may accumulate in the water heater. To dissipate this safely, it is recommended that a non-electrically operated hot tap be turned on for two minutes at a sink, basin, or bath, but not a dishwasher or other appliance. During this procedure there **MUST** be no smoking, open flame or any electrical appliance operating nearby. If hydrogen is discharged through the tap, it will probably make a sound like air escaping.

TURNING ON THE WATER HEATING SYSTEM

Switch on the electric supply to the heat pump unit. Water heating will now occur as required. It may take a number of hours before hot water is available.

TURNING OFF THE WATER HEATING SYSTEM

If you plan to be away for only a few nights, we suggest you leave the water heating system switched on. If it is necessary to switch off the water heater, do so as outlined below:



DO NOT turn power off to the heat pump unit if snow or frost conditions are expected as components in the system may be damaged by freezing. If power needs to be turned off or power failure occurs and freezing conditions are expected, the water needs to be drained from the heat pump unit. Follow the procedure described below in the section 'Draining and Filling'.

DRAINING AND FILLING

Draining or filling of the complete system normally only occurs during installation or servicing and must be carried out by an authorised person.

Draining water from the heat pump unit is necessary if the power will be shut off to the unit and snow or frost conditions are expected. **Arrange for an authorised person to carry out this task.**

To drain the heat pump:

1. Turn off power to the heat pump.
2. Close the cold water mains supply stop cock.
3. Open a hot tap to relieve pressure.
4. Disconnect the hot outlet near the top of the storage cylinder.
5. Disconnect the cold inlet near the bottom of the storage cylinder.
6. The system will now drain completely.

MAINTENANCE AND REGULAR CARE

Operate the easing gear of the PTR and the ECV if fitted as described in the section 'Safety Devices' on page 5.

The overflow tray (supplied by installer) and drain underneath the storage cylinder (if fitted) should be periodically checked to ensure there are no blockages.

Glossary of Terms & Symbols

Term or Symbol	Description
AC	Alternating Current
dB(A)	Sound Pressure Level (SPL) in decibels, "A" range
φ	Diameter
Hz	Hertz
kW	Kilowatts
kPa	Kilo-pascals
LED	Light Emitting Diode
L/min	Liters per minute
μF	Micro farad
mm	Millimetre
PCB	Printed Circuit Board
rpm	Revolutions per minute
$\Delta^{\circ}\text{C}$	Temperature rise above ambient in degrees Celsius
EEV	Electronic Expansion Valve

SAVE A SERVICE CALL

PANASONIC's servicing network personnel are fully trained and equipped to give the best service on your PANASONIC appliance. If your appliance needs service, ring one of the service contact numbers on the back of this booklet.

The pressure and temperature relief valve and expansion control valve (if fitted) must be replaced by an authorised person at intervals not exceeding 5 years or more frequently in areas where the water is classified as scaling water.

If the power supply cord to the heat pump unit is damaged, they must be replaced by an authorised person in order to avoid a hazard.

Use the following guide to avoid the need for an unnecessary service call.

INSUFFICIENT OR NO HOT WATER	
Heat Pump Unit Not Powered	Check to ensure the electric isolating switch at the switchboard (usually marked "Hot water" or "Water heater") is turned on. (note that the compressor may not start up for 2 minutes after power is turned on).
Excessive hot water consumption	Often, end users are surprised at the amount of hot water used, especially when showering. If the amount of hot water used during the day exceeds the storage capacity of the cylinder, it is likely there will be insufficient hot water.
Pressure & Temperature Relief (PTR) Valve continually discharging water	It is normal and desirable that this valve allows a small quantity of water to be discharged during the heating cycle. If it discharges more than a bucket of water during a 24 hour period or discharges continuously there may be another problem. If the valve dribbles continuously, try easing the valve gear for a few seconds as described in the section 'Excessive Discharge from Safety Devices' on page 8. This may dislodge any foreign matter and alleviate the problem. If the valve discharges at high flows, especially at night, it may be as a result of the water pressure exceeding the design pressure of the water heater. Ask your installer to fit a Pressure Limiting Valve (PLV).
Expansion Control Valve (ECV) continually discharging water	It is normal and desirable that this valve allows a small quantity of water to be discharged during the heating cycle. If it discharges more than a bucket of water during a 24 hour period or discharges continuously there may be another problem. If the valve leaks continuously, try easing the valve gear for a few seconds as described in the section 'Excessive Discharge from Safety Devices' on page 8. This may dislodge any foreign matter and alleviate the problem. If this does not alleviate the problem contact PANASONIC.
Ambient conditions too hot	To protect the components of the heat pump unit it may not operate when the ambient temperature is higher than 45°C. The heating element will operate if water heating is required, but may take longer to heat the water.
Ambient conditions too cold	To protect the components of the heat pump unit it may not operate when the ambient temperature is less than -1°C. The heating element will operate if water heating is required, but may take longer to heat the water.
NO WATER FROM THE TAP	
Restriction in the hot tap or failure of the cold water supply to the water heater	Check for water flow at the other taps and that the cold water isolation valve is fully open.

SAVE A SERVICE CALL

HIGH ELECTRICITY BILLS	
Excessive hot water consumption	See entry under the heading 'Insufficient or no hot water'
High Electricity Tariffs	The electricity tariff will determine the running costs of the system. It is important the end user is aware of the applicable tariffs. Contact your electricity supplier to confirm what these tariffs are.
Higher Element Usage	In extremely cold conditions the element may be operating more than normal.
WATER FLOW FLUCTUATIONS	
One or more hot taps opened at the same time	More than one or two hot taps in use at the same time may cause a decrease in the hot water flow from the taps. Is there more than one or two hot taps open, or are appliances such as a dishwasher or washing machine, in use at the same time ? Ensure only one or two hot taps are on at one time.
WATER HAMMER	
Hot and cold water plumbing in the premises	Have a plumber check clipping of hot and cold water pipe work and install a pressure limiting valve and water hammer arrestor as required.
HEAT PUMP ICES UP	
Defrosting function	The heat pump has a built in hot bypass defrosting function which may operate and remove any ice.
HEAT PUMP ERROR INDICATOR	
When an Error is detected with the Heat Pump, the "Fault" icon on the display screen will illuminate, and the setting temperature window displays the current fault code:	

FAULT CODES

Fault Code	Description	Fault Code	Description
P01	Medium water temperature sensor error	P07	Discharge temperature sensor error
P02	Bottom water temperature sensor error	E01	High pressure protection
P03	Coil temperature sensor error	E02	Low pressure protection
P04	Suction temperature sensor error	E03	DC motor failure
P05	Outdoor ambient temperature sensor error	E04	Over-high protection of discharge temperature
P06	Anti-freezing protection	E08	Communication error
PA	The ambient temperature is not in the operating range of the heat pump		

SPECIFICATIONS

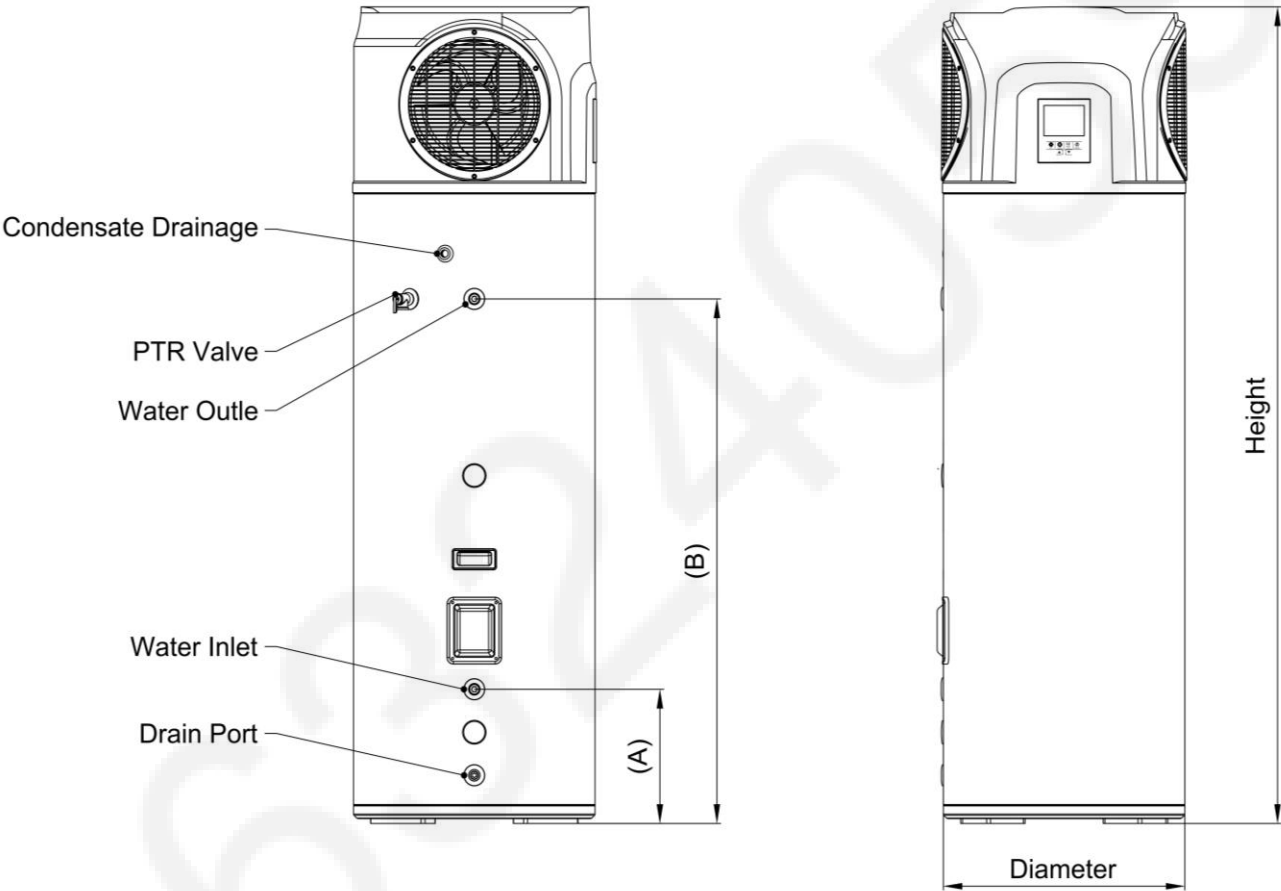
SYSTEM SPECIFICATIONS

Model		PHE-30ABR
Net Weight / Filled Weight		120 / 424 kg
Sound Power Level (L _{WA})		≤ 58 dB(A)
Sound Pressure Level (L _{PA})		≤ 47 dB(A)
Ambient Temperature Limits (for heat pump operation - element will operate beyond these limits)		-10°C to 43°C
Ingress Protection		IPX4
Storage Cylinder - Hot Outlet and Cold inlet Connections		ISO 7.1 ¾" RP
Storage Cylinder - PTR Valve Connection		ISO 7.1 ¾" RP
Pressure & Temperature Relief (PTR) Valve (Supplied) Setting / Rating		850 kPa / 10 kW
ECV Fitted	Fit PLV if mains pressure exceeds	680 kPa
	Recommended PLV pressure rating	500 kPa
ECV Not Fitted	Fit PLV if mains pressure exceeds	800 kPa
	Recommended PLV pressure rating	500 kPa
Rated Input Electric Element (Factory)		1.5 kW
Rated Input Refrigeration Module (Factory Wired)		0.73 kW
Total Rated Input (To be wired by installer)		2.23 KW
Maximum Energy Output		4.8 kW
Power Supply		220-240 V AC, 50 Hz.
Rated Current		9.8 A
Refrigerant Type / Mass		R290 / 0.4 kg
Refrigerant Circuit Maximum Pressure		2800 kPa
Coefficient Of Performance (COP)	32.6°C Ambient 21.1°C cold water inlet	11
Heat Output	32.6°C Ambient 21.1°C cold water inlet	3.6 kW

SPECIFICATIONS

DIMENSIONS

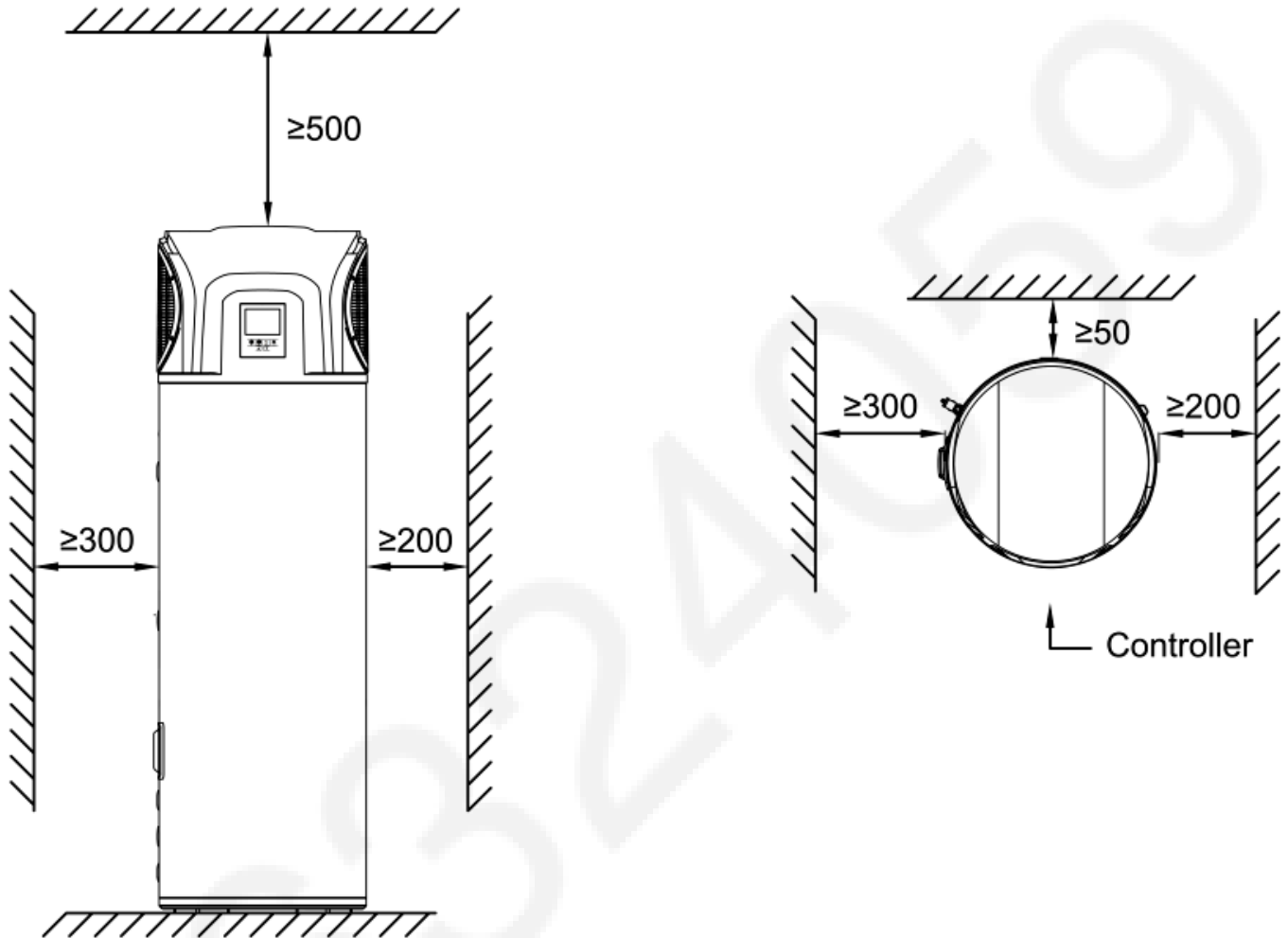
Model	PHE-30ABR
Cylinder height	2130
Hot Outlet/PTR (B)	1368
Cold water inlet (A)	352
Cylinder diameter	640



CLEARANCES

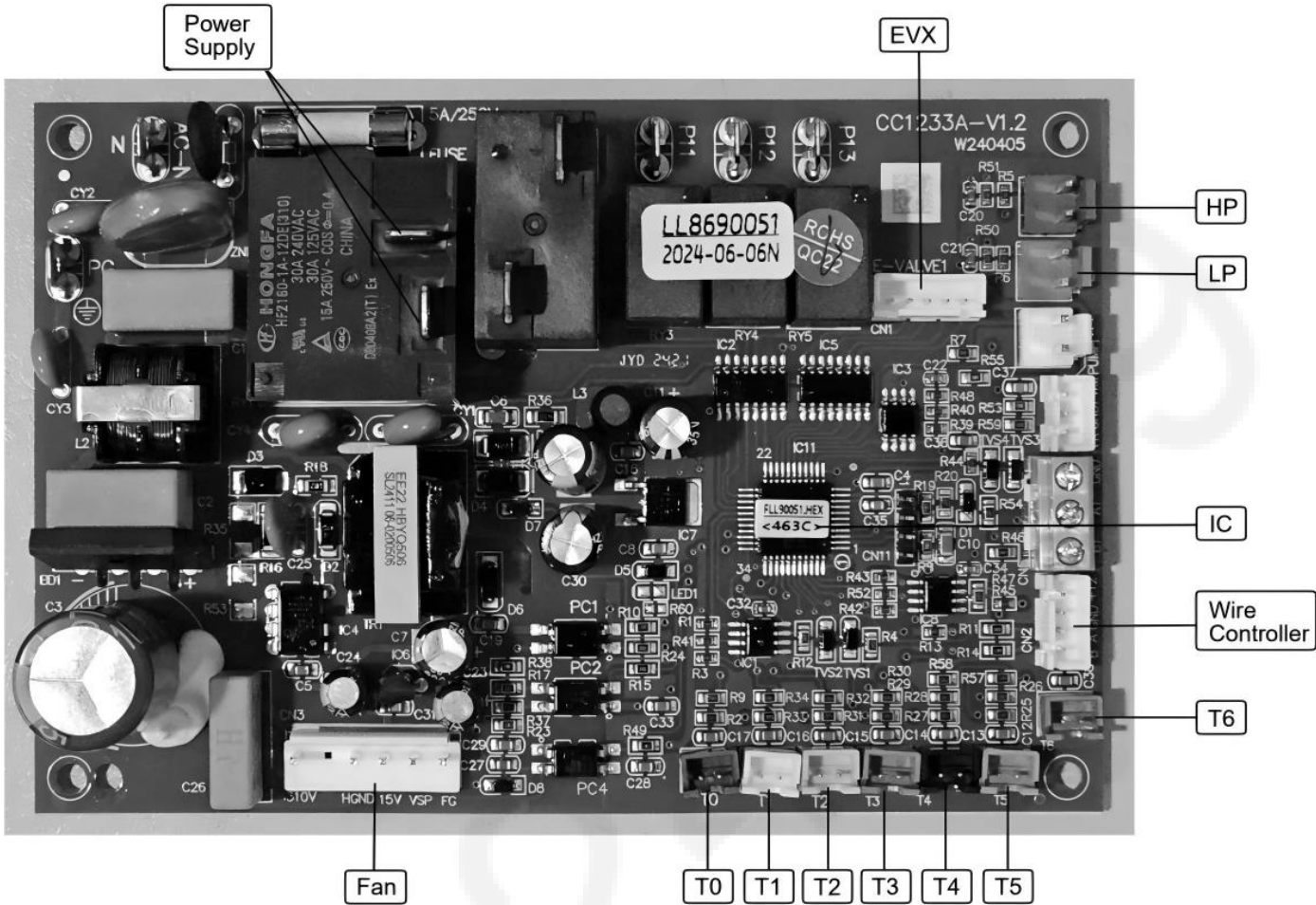
Allow 600mm on the fan discharge side and 200 mm clearance on the fan suction side to allow for sufficient air flow through the fan.

All Dimensions in mm



MAIN COMPONENTS

PRINTED CIRCUIT BOARD (PCB)



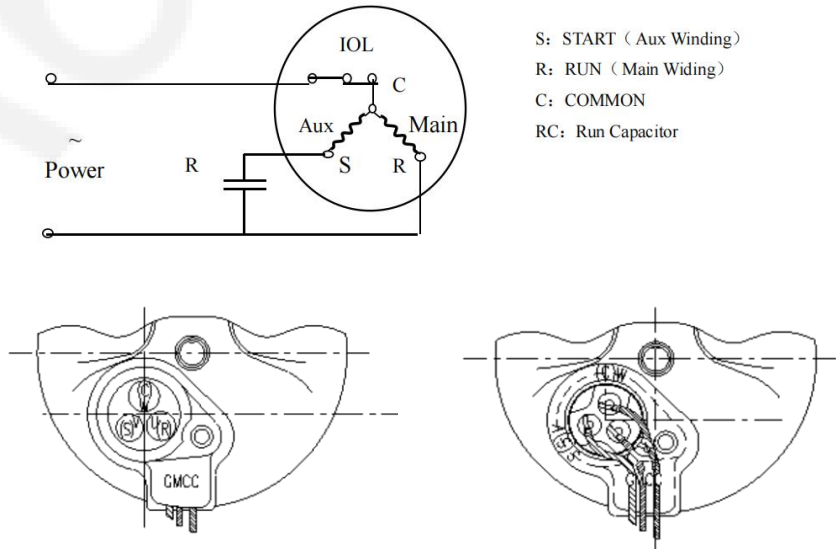
COMPRESSOR

During heat pump operation, the PCB sends 240 V AC power to the compressor.

Rotary Compressor RDSN108V11TBZ

Main Winding: $6.28 \pm 5\% \Omega$ @ 20°C

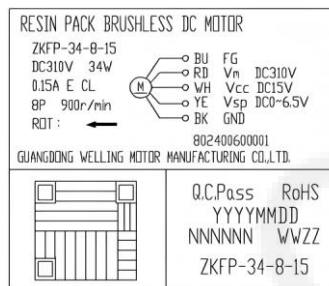
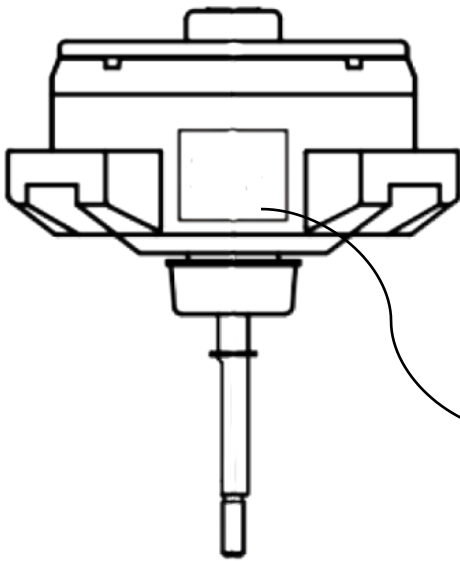
Auxiliary Winding: $6.35 \pm 5\% \Omega$ @ 20°C



MAIN COMPONENTS

FAN MOTOR ASSEMBLY

During heat pump operation, the PCB sends 310 V DC power and speed control command to the BLDC fan motor which drafts air from the evaporator coil and discharges it across the fan motor.



FAN MOTOR

BLDC FAN MOTOR

BLUE: Revolution pulse output 12V

RED: Motor power voltage input

WHITE: Control power voltage input

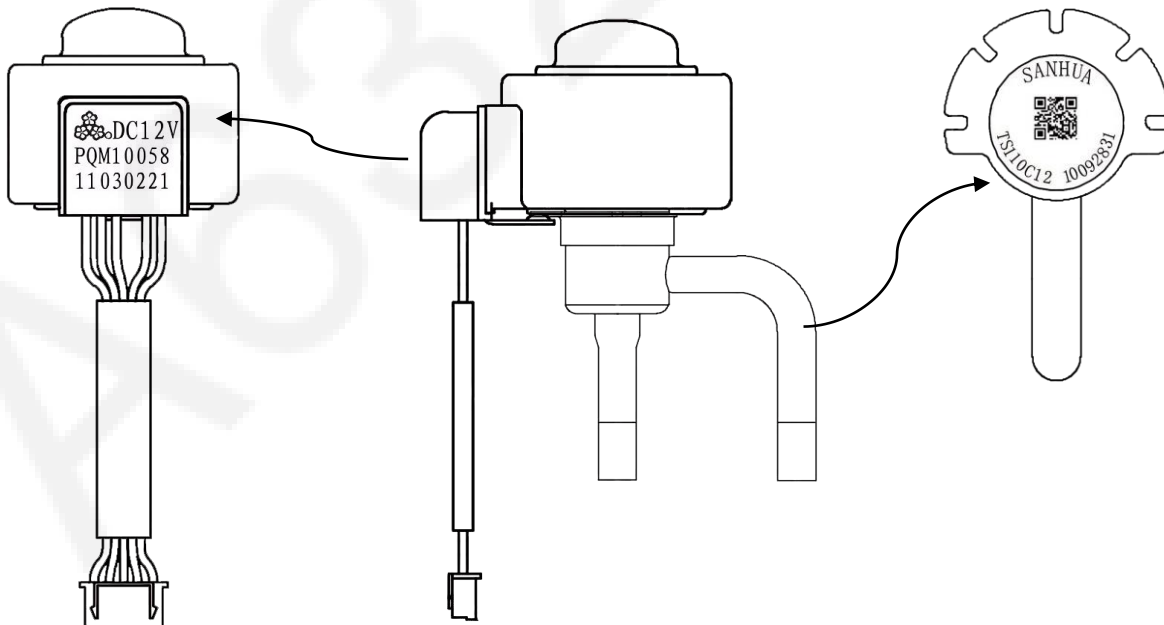
YELLOW: Speed control voltage input

BLACK: GND (Minimum potential in common with input and output)

Unplug Fan / Motor from the main power loom, remove the front cover and measure the resistance across motor winding

ELECTRONIC EXPANSION VALVE

Electronic expansion valve is used to inject the R290 refrigerant (in liquid form) into the evaporator. This valve is compact in design and light weight.



REGULATIONS AND OCCUPATION HEALTH AND SAFETY (OH&S)



Installation and commissioning **MUST** be performed by authorised persons.

The heat pump **MUST** be installed in accordance with these instructions and all regulatory requirements which exist in your area including those in relation to manual lifting.

Applicable publications and regulations may include:

- AS/NZS 3500 National Plumbing and Drainage AS/NZS 3000 Wiring Rules.
- Building Codes of Australia (BCA).
- Local Occupational Health and Safety (OH&S) regulations.

This appliance is not suitable for use as a domestic spa pool or swimming pool heater.

Electric Heat pumps are heavy and bulky items. Australian States and Territories have Principal Occupational Health and Safety (OH&S) Acts with requirements relating to handling of large, bulky or awkward items. Persons installing heat pump systems **MUST** be aware of their responsibilities and be adequately trained and qualified, in accordance with local OH&S requirements.

LOCATION

The electric heat pump can be installed externally or internally.

The electric heat pump should be placed as close as practicable to the most frequently used hot water outlet point or points to minimize the delay time for hot water delivery. This will usually be the kitchen tap. For installations where the distance between the heat pump and the outlets is considerable, a flow and return system can be used which minimize the waiting time for hot water delivery.

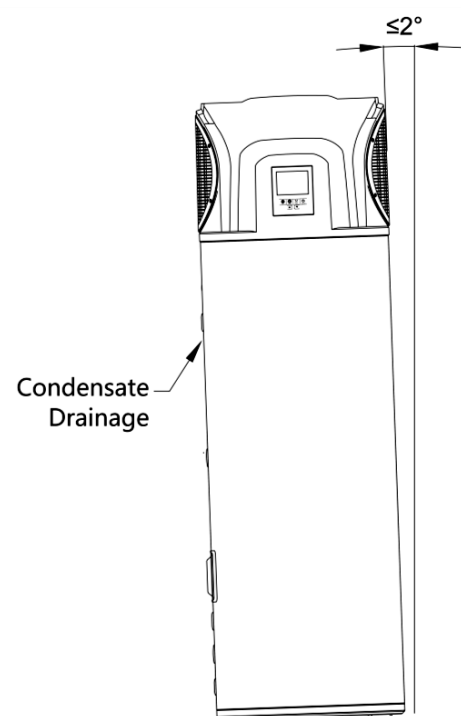
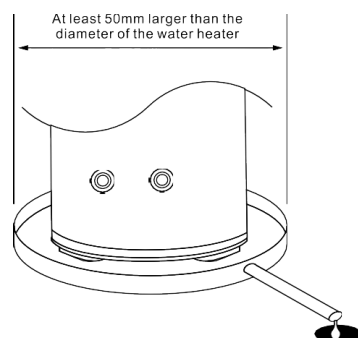
It is recommended that all components are installed at ground or floor level with consideration for easy service, repair or replacement access. The heat pump **MUST** be installed in a vertically upright position. All components **MUST** be accessible without the use of a ladder or scaffold. The unit **MUST NOT** be installed in roof spaces.

The air inlet and outlet of the heat pump module **MUST** be away from areas with strong wind and **MUST** be provided with sufficient clearances as per those shown in the section 'Clearances' on page 14.

The heat pump **MUST** be connected to an independent AC 240 V, 50 Hz power supply.

Ensure the pressure and temperature pressure relief (PTR) valve and any access covers have sufficient clearances and are accessible for service and removal. The information on the rating plates **MUST** also be readable.

The heat pump **MUST** be installed free-standing on a level and stable base no more than 2° off perpendicular to level ground. The cylinder should be mounted on a concrete base at least 50mm thick or on, evenly spread hardwood slats with a thickness of at least 25mm. Where property damage can occur as a result of water leakage, the storage cylinder **MUST** be installed with a safe tray (overflow tray) at least 50mm larger than the diameter of the water heater and drain in accordance with AS 3500.4. Ensure the storage cylinder **DOES NOT** stand on wet surfaces.



INSTALLATIONS

Internal Installation

For internal installations the area **MUST** meet the following requirements:

- Minimum room volume of 10m³ per unit.
- Good Ventilation (i.e minimum 200 L/s per unit).
- Away from any ignition sources or corrosive environments.

If the heat pump is installed internally careful consideration should be taken in regards to positioning and limiting the effect of unit noise and reverberation during operation.



Ensure the location complies with the requirements of AS/NZS 60335.2.40 & AS / NZS 5149.

Condensation

As this heat pump is highly efficient the surrounding air temperature could be cooled by up to 4°C and condensate formed, the condensate will need to be plumbed to a suitable drain.

Drainage

Where property damage can occur as a result of water leakage, the water heater **MUST** be installed with a safe tray (overflow tray) and drain. Construction, installation and draining of the safe tray **MUST** comply with local regulatory requirements and. AS/NZS 3500.4 also requires the use of a safe tray for particular situations.

WATER SUPPLY

This appliance is intended to be permanently connected to the water mains and not to be connected by a hose set.

The maximum water pressure is listed on page 12. An approved pressure limiting valve may be required if the maximum rated water supply pressure is exceeded.

Water chemistry and impurity limits are detailed in the separate warranty document. Most metropolitan water supplies fall within these requirements. If you are unsure about water quality and suitability, contact your water authority.

A water filter **MUST** be fitted on the inlet to the tank to prevent sludge or foreign matter entering the system.

In a scaling water supply, calcium carbonate and possibly other compounds are deposited out of the water onto any hot metallic surface and form a scale. Scaling water may cause scale deposits to form onto the metallic surfaces of the PTR valve and may prevent it from operating properly. To prevent this, an Expansion Control Valve (ECV) **MUST** be fitted on the cold water line after the non-return valve in areas of scaling water. ECVs **MUST** be fitted in South Australia and Western Australia to comply with local regulations.

STORAGE TEMPERATURE

To meet regulatory requirements the thermostat control on the heat pump water heater is factory pre-set to 60°C. It is recommended that this temperature is not altered.

HOT WATER DELIVERY TEMPERATURE

This appliance may deliver water at high temperature. Refer to the Plumbing Code of Australia (PCA), local requirements and installation instructions to determine if additional delivery temperature control is required.

The PCA, local regulations and the requirements of AS/NZS 3500.4 **MUST** be considered regarding the temperature limitations of hot water supplied to areas used primarily for personal hygiene.

The temperature of water to certain areas is limited to different temperatures according to purpose, for e.g. early childhood centres, primary and secondary schools and nursing homes or similar facilities for young, aged, sick or people with disabilities and for all other buildings. To comply with these requirements, a temperature limiting device, such as a thermostatic mixing or tempering valve, will be required on hot water systems.

VALVES AND FITTINGS



IMPORTANT

A 30 kW capacity, combined Pressure and Temperature Relief (PTR) valve is supplied with the Heat Pump hot water system. This valve is fitted at the top of the storage cylinder. The PTR valve is a safety device and it is mandatory that it is fitted by the installer in all installations.

The following valves & fittings are to be supplied by the installer:

- A cold water Expansion Control Valve (ECV). An ECV **MUST** be fitted in Western Australia and South Australia to the cold water supply to the storage cylinder to comply with local regulations. An ECV is recommended in all other geographical areas where the water supply has a tendency to cause scaling. This will reduce hot water discharge from the pressure and temperature relief (PTR) valve which minimises wear on this valve.
- A stop cock, non return valve and line strainer. Combination valves incorporating two or more of these functions (such as 'Trio' valves) are suitable. These are fitted to the cold water supply to the storage cylinder by the installer.
- Cold water supply and hot water discharge pipework to and from the storage cylinder. This pipework **MUST** be insulated as specified in AS/NZS3500.4.
- An approved pressure limiting valve (supplied with some systems) is required if the maximum rated water supply pressure on page 12 is exceeded.
- Tempering valve(s) or thermostatic mixing valve.

TRANSPORT AND HANDLING



IMPORTANT

When moving the unit, it **MUST** be close to vertical at all times.

When using a trolley to move the unit, ensure it is not tilted more than 45° from the vertical.

Non compliance will void warranty and severely affect product performance and operation.

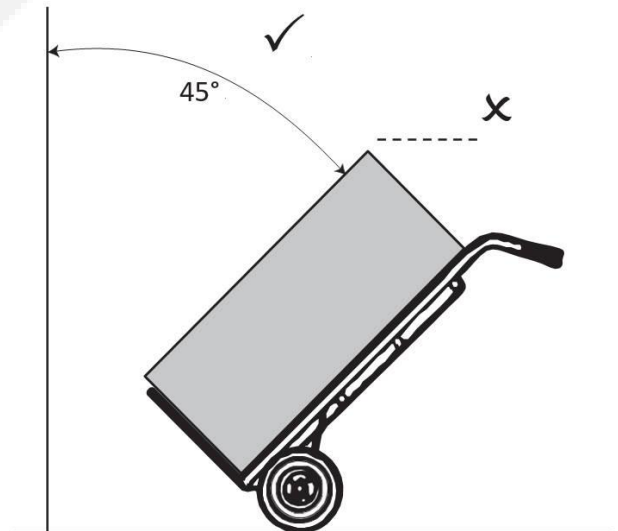
The PANASONIC Electric Heat Pump **MUST** be transported at an angle no greater than 45° from vertical.

As the compressor unit is located at the top of the electric heat pump, should the heat pump be tilted at a greater angle than 45° from vertical, the lubrication oil within the compressor can run down into the mufflers.

This will leave the compressor motor without sufficient lubrication and lead to premature failure of the compressor unit.

As a general good practice it is better to keep the compressor upright as much as possible to avoid any risks. Returning the PANASONIC Electric Heat Pump to a vertical position will allow the oil to properly flow back into the compressor motor.

Tilting the heat pump beyond 45° from vertical will also place undue strain on compressor motor mounts and associated piping.



Never tilt unit more than 45° from vertical

INSTALLATIONS

POSITIONING THE HEAT PUMP

Arrive at site and conduct a safety audit (Safety audits can also be known as Work Method Statements (WMS) or Job Site Analysis (JSA).

Park your vehicle as close as allowable to your installation. Unload all materials in a safe manner.

Position all materials in a convenient position near the work area.

Refer to "Location" on page 15 positioning consideration and requirements for all installations. Where the requirements for internal installation can't be met, the heat pump **MUST** be installed outdoors.

The location **MUST** also consider noise impact on living areas. Avoid positioning near bedrooms or neighbours' bedrooms. Although the running noise level is very low it can be expected that the heat pump will run during the night.

Adequate access **MUST** be available to the relief valve and anode.

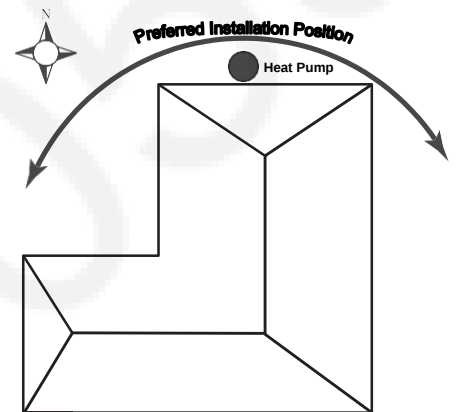
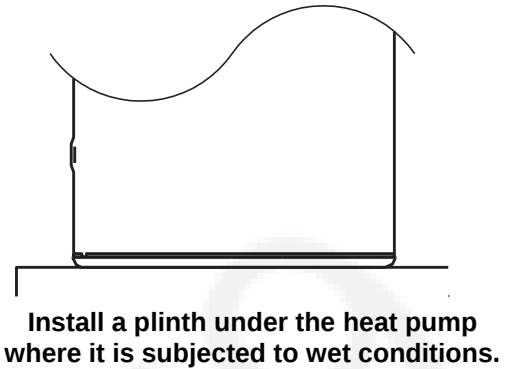
Safely position the new unit on a level surface in accordance with all plumbing and building regulations.

A properly drained overflow tray **MUST** be used where property damage could occur from water spillage. (See AS/NZS3500.4.2 for further details.)

DO NOT drain on to grass or garden beds.

DO NOT commence a job where the risks cannot be controlled.

Ensure the requirements specified in the section 'Clearances' on page 14 are complied with. The area **MUST** also be clear of debris such as leaves and tree branches.



Optimum installation location is on the warmest side of house.

CONNECT THE PTR VALVE

Connect the PTR valve to the uppermost fitting of the storage cylinder. See the diagram on page the section 'Dimensions' on page 13.

The PTR pressure rating **MUST** be suited for the cylinder and adequate for the thermal loading applied to the storage cylinder, as specified in the table on 12. The supplied PTR valve input rating is 30.0 kW. The PTR valve rating **MUST EXCEED** the total input from the heat pump. For example, the maximum output is 5.5 kW (see the table on page 12). This is less than 30.0 kW, hence the supplied PTR valve is of sufficient capacity.

Use Teflon thread tape on the valve, never use hemp or other sealing materials. Ensure the tape does not protrude past the end of the thread, which could result in it hanging over the end of the thread and blocking the water passage through the valve.

The PTR valve **MUST** be installed on the connection marked 'hot water outlet' near the top of the cylinder. Leave the valve outlet pointing down. Tighten the valve using the spanner flats - never use the valve body.

Connect the supplied PTR valve into the top socket marked "Relief Valve" and discharge according to plumbing regulations. PTR Valves for the unit are rated at 850kpa.

The drain line from this valve **MUST** run in a continuously downward direction with the discharge end left permanently open to atmosphere.

PLUMBING CONNECTIONS

Refer to the diagram on page 20 for detailed information on position of plumbing.

An approved isolating valve, non return valve, line strainer, and union **MUST** be fitted between the supply main and the RP ¾ socket in the water heater. All fittings **MUST** be approved by the relevant installation Authority.

An ECV **MUST** be fitted in Western Australia and South Australia to the cold water supply to the storage cylinder to comply with local regulations.

INSTALLATIONS

An ECV is recommended in all other geographical areas where the water supply has a tendency to cause scaling.

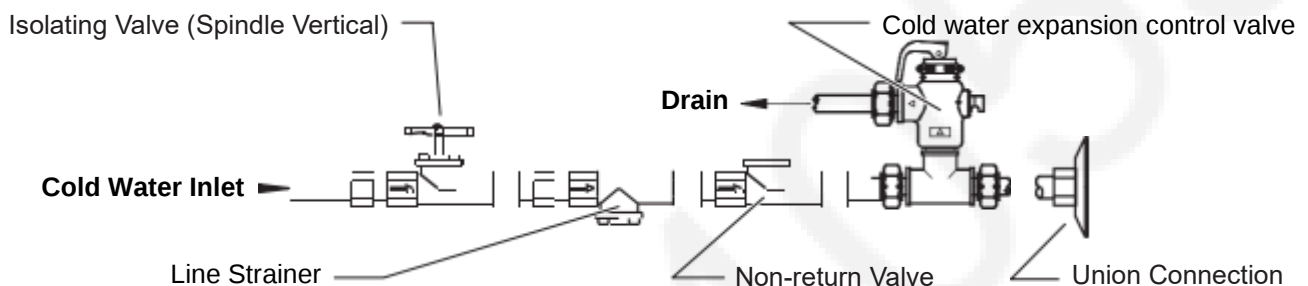
This will reduce hot water discharge from the pressure and temperature relief (PTR) valve which minimises wear on this valve.

This water heater is designed for direct connection to water supply pressures of no greater than those specified on page 12. Where the mains pressure can exceed or fluctuate beyond this, a pressure limiting (PLV) device (complying with AS1357) **MUST** be fitted.

CONNECT COLD / HOT WATER SUPPLY

Connect cold water supply, Pressure Limiting Valve (PLV) and or Expansion Control Valve (ECV). Connect cold water supply to the storage tank (refer to Diagram BELOW).

A stop cock, non return valve and line strainer **MUST** be fitted.



Connect the pipe work supplying hot water to the premises to the hot water outlet on the tank.

A temperature limiting device may be required as detailed in the section the section 'Hot Water Delivery Temperature' on page 16.

It is recommended that all hot water lines are insulated with high temperature, UV resistant 13mm closed cell insulation.

CONNECT CONDENSATE DRAIN LINE

A condensate drain line is required to be fitted to carry discharge clear of the water heater.

The condensate drain line should not be connected to the PTR drain line but can exit to the same point. The diagram below shows the location of the condensate drain on the heat pump.

Independent 15mm copper pipes **MUST** be fitted to the drain outlets of the PTR and ECV.

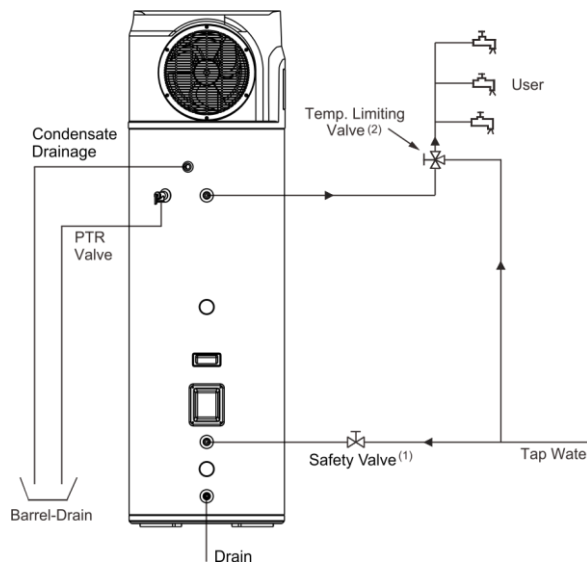
Each pipe **MUST** be open to atmosphere and run with a continual downward grade in a frost free environment to a visible discharge point.

Drain lines **MUST** not exceed 9 meters in length.

Valves or other restrictions **MUST NOT** be placed in the relief valve drain outlet line.

INSTALLATIONS

TYPICAL PLUMBING LAYOUT



Notes:

- (1) A check valve needs to be installed in front of the water inlet of the water tank to prevent the hot water in the water tank from flowing back into the water pipe.
- (2) The temperature limiting valve is required on the hot water usage terminal.

ELECTRICAL CONNECTIONS



WARNING

The power supply to the heat pump module **MUST NOT** be activated until the system is filled with water.

The premises wiring to the heater **MUST** be capable of withstanding the appliance load. Refer to specification table for load details.

All electrical connections and wiring **MUST** be installed, maintained and removed by authorised persons in accordance with AS/NZS 3000, and all other relevant local regulations and municipal building codes including OH&S requirements.



IMPORTANT

The Heat Pump is fitted with a power cord & plug, It **MUST** connect to an independent, fused, AC 240V 50 Hz power supply with an isolating switch installed at the switch board, which shall effectively isolate all active supply conductors from the circuit and means for disconnection **MUST** be incorporated in the fixed wiring in accordance with the wiring rules.

A Residual Current Circuit Breaker is recommended for the power supply to this appliance (this may be a mandatory requirement in some states or jurisdictions).

This appliance **MUST NOT** be connected via a switchable or a solar (photovoltaic - PV) power supply without manufacturer consultation and authorisation.

The switching of the supplies will place the water heater into a re-start cycle which reduces the available heating time and may result in a lack of hot water.

It is recommended this appliance is connected to either a 24 hour continuous tariff or an extended off-peak power supply (minimum 16 hours per day), noting that the minimum required running time is governed by hot water demand and the climate zone.

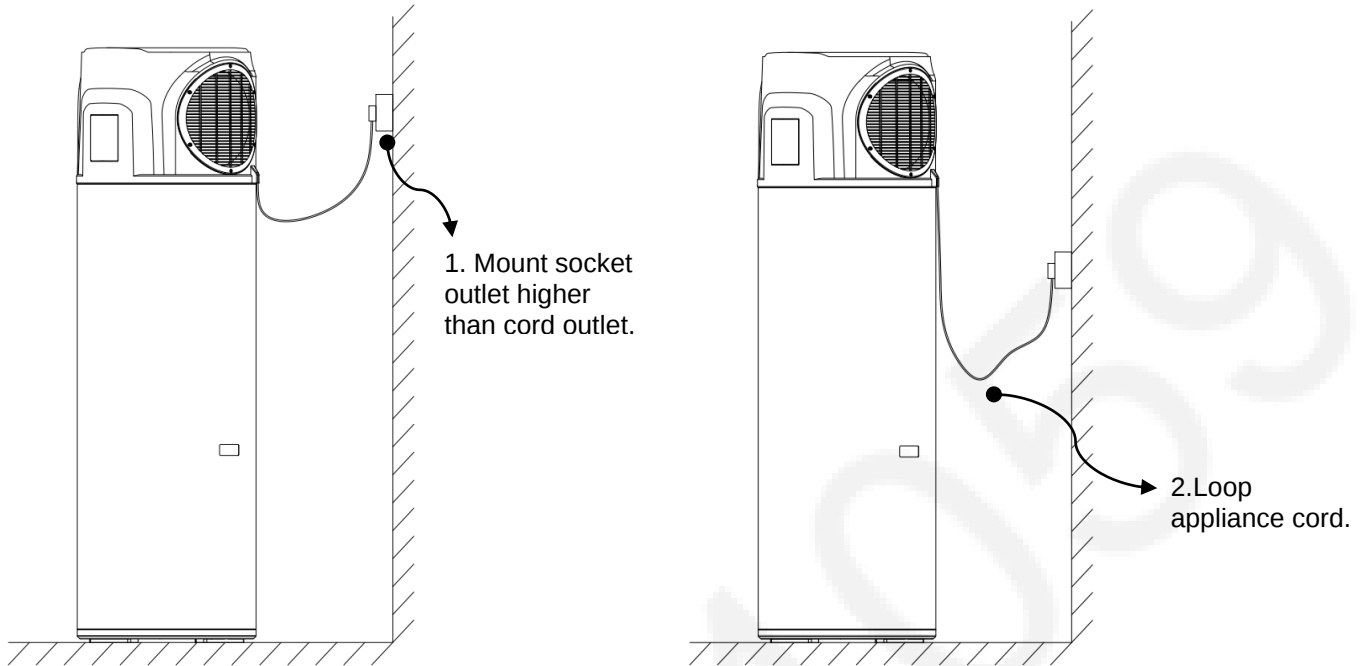
If this appliance is replacing an electric water heater with a capacity of 250 litres (or greater), then a connection to a 24 hour continuous tariff supply is recommended.

Disconnect all power prior to installation and commissioning.

This appliance is designed for single phase 240 Volts, AC mains electrical operation.

Cord Management

Make sure that the power cord attaches to the power outlet at a point higher than it exits the appliance (1). Alternatively loop the cord (2) so that any water is not directed to the power socket.



ELECTRICAL TESTS

DO NOT turn on the power supply to the appliance until it has been filled with water and a satisfactory insulation (Megger) test has been performed.

Conducting Insulation (Megger) Tests

When conducting an insulation test using a Megger on this appliance, observe the then the following:



WARNING

This appliance contains electronic components, when performing insulation tests (500 Volts) this **MUST ONLY** be conducted the across active terminal to earth and then across the neutral terminal to earth.

Tests between the active to neutral terminals **MUST NOT** be performed as this **WILL** damage the electronic components.

Insulation test results of between **100 k Ω** and **660 k Ω** are normal for this appliance.

In accordance with AS/NZS 3000 an insulation test with a result less than **1 M Ω** is permitted where the appliance is approved to a Standard applicable to that class of appliance.

This appliance is categorised and certified as a 'stationary Class 1 motor operated appliance' and therefore satisfies the requirements of AS/NZS 60335.2.40 for leakage current and electric strength. As such, this appliance complies with the insulation resistance requirements of AS/NZS 3000.

INSTALLATIONS

FILLING THE SYSTEM

Open hot water tap at sink.

Open the stop cock in the cold water main supply line. Allow the system to fill and the air to bleed through the tap.

Turn off the hot tap at the sink when water flows freely without any air bubbles or air bursts.

Bleed any remaining air from the PTR valve.

If leaks are detected turn off power to the heat pump, repair any leaks and repeat the filling process to remove any air.

If no leaks are detected water heating can commence. The heat pump will start up after the 2 minute protection delay.

COMMISSIONING AND FINISHING THE INSTALLATION



IMPORTANT

Please confirm the following before commissioning:

- Piping and electrical wiring are all correct.
- Earthing wire is installed properly.
- Pipe insulation is completed.
- Tank is filled.
- Supply Voltage complies with rated voltage.
- Air intake and discharge are not obstructed.

Turn on power to the heat pump unit and wait a few seconds for the system to start. Change operation mode or water temperature setting if required (it is recommended to retain default setting however).

After testing is completed, explain to the customer the functions and operation of heat pump water heater components. Explain the need to drain the heat pump if freezing conditions are likely or power is likely to be shut off for an extended time.

Also explain to the customer the importance of carrying out maintenance in accordance with this manual. Leave the manual with them upon completion of the installation.

COMPONENTS & CIRCUIT CHECK

Electric connection

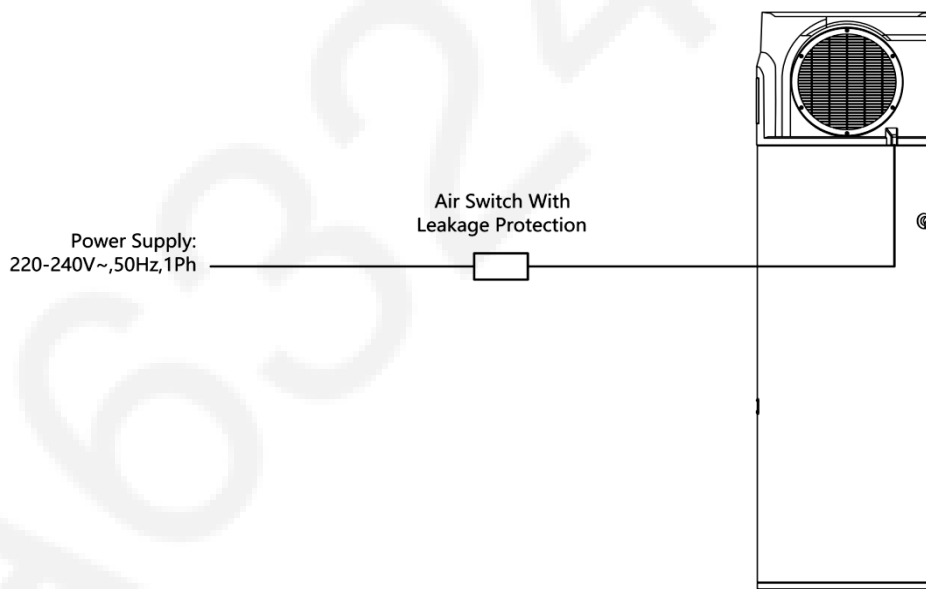
- The water heater shall use a special power supply, and the power supply voltage shall conform to the rated voltage.
- The power supply circuit of the water heater must be well grounded, and the grounding wire of the power supply shall be reliably connected with the external grounding wire, and the external grounding wire shall be effective.
- Wiring construction must be carried out by professional installation technicians according to the circuit diagram.
- Set up leakage protection devices according to the requirements of relevant national technical standards of electrical equipment.
- After all wiring work is completed, check carefully before switching on the power.

Specifications of power supply

Project Model	Power supply	Wire diameter(mm ²)		Manual switch(A)	Leakage protector	Fuse(A)
		Dimensions (Continuous length ≤ 30m)	Grounding wire	Capacity		
PHE-300ABR	220-240V~50Hz	≥1.5	≥1.5	20	30mA Below 0.1sec	15

Choosing the power cord according to above table, and it should comply with local electric standard.

Electric leakage protector



DISMANTLING FOR SERVICE

REQUIRED TOOLS FOR SERVICE



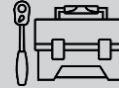
Screwdriver



Wire Cutters



Long-Nose Pliers



Socket Wrenches

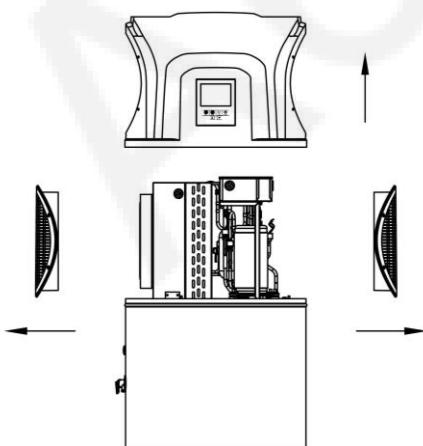


Pipe/Valve Wheel Wrenches

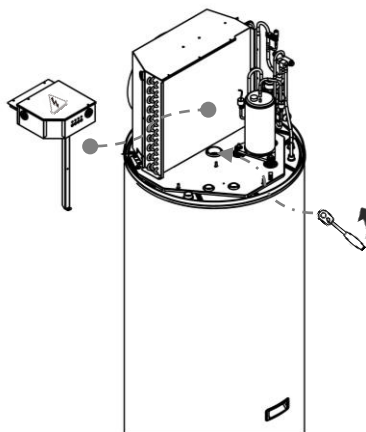
REGULAR MAINTENANCE

- Check the connection between power supply plug and socket and ground wiring regularly;
- In some cold area (below 0°C), if the system will be stopped for a long time, all the water should be Released in case of freezing of inner tank and damage of E-heater.
- It is recommended to clean the inner tank and E-heater regularly to keep an efficient performance:
 - 1) Cut off the power.
 - 2) Close the cold water inlet valve, open the hot water tap.
 - 3) Use a flexible pipe to connect the drain port to a suitable sewage draining exit. (The minim heat resistance of the drain pipe is not less than 93°C, if the drain pipe cannot meet the requirement, please open the cold water inlet valve, open the hot water tap, until there is no hot water flow out.)
 - 4) Open the drain port of the water heater; drain out all the water in the inner tank. If it is needed, use water to wash the inner tank several times to clear the deposits.
 - 5) Close the drain port, re-fill the inner tank with water, and re-power on.
- Check the sacrificial anode every half year and change it if it has been used out. For more details, please contact the supplier or the after-sale service. Methods to change Magnesium anode:
 - 1) Turn off the power, and turn off the water inlet valve.
 - 2) Open hot water tap, and decrease the pressure of the inner container.
 - 3) Open the drain port, and release about 20L water.
 - 4) Get off the magnesium stick according to instruction.
 - 5) Replace with a new one, and **make sure effective sealed**.
 - 6) Open cold water valve until hot water flows out, and turn off the hot water tap.
 - 7) Restart the unit and it can be used normally.

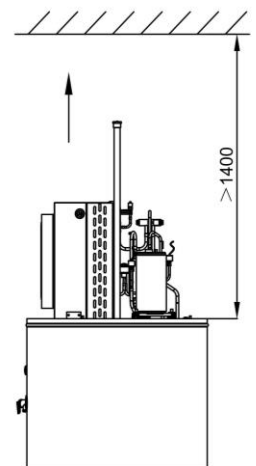
All Dimensions in mm



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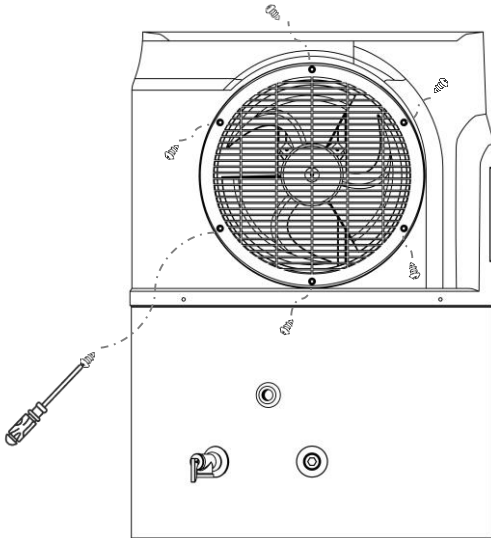
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DISMANTLING FOR SERVICE

DISASSEMBLY OF PRODUCT COMPONENTS

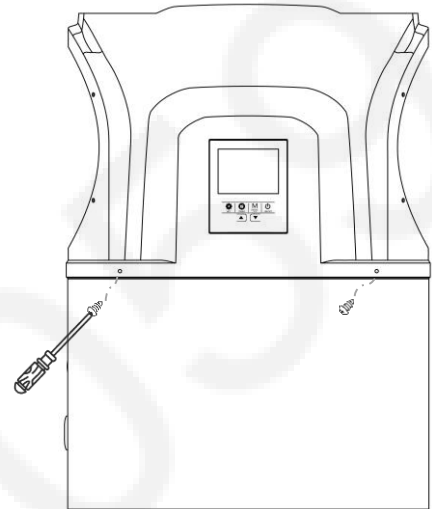
1. Removal of the grilles

- 1) Remove six screws on the grille.
- 2) Take out the grille.
- 3) Repeat the process to remove the grille on the other side.



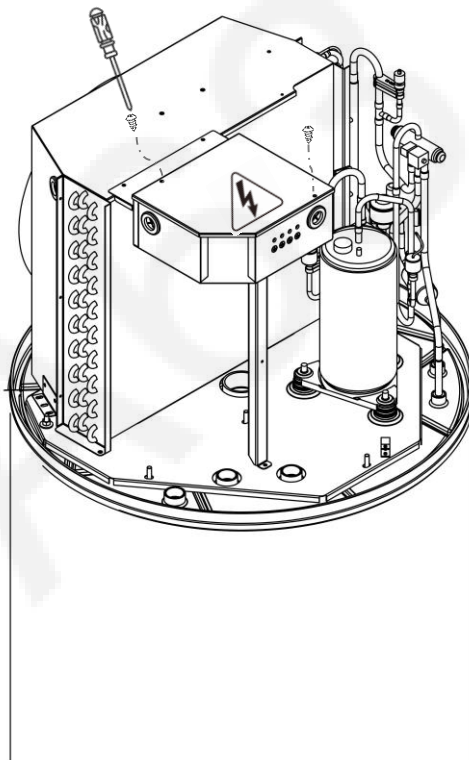
2. Removal of the top cover

- 1) Remove four screws on the top cover.
- 2) Disconnect the internal controller connection cable interface.
- 3) Take out the top cover.

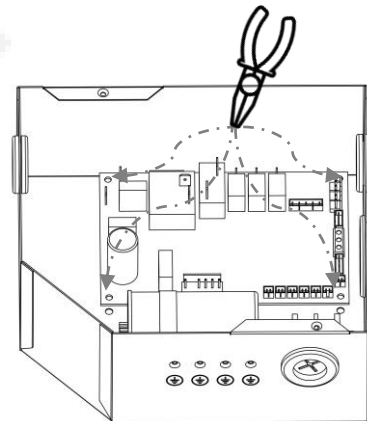


3. Removal of the PCB (Main Board)

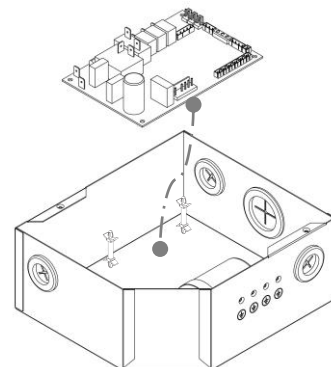
- 1) Remove two screws on the electrical box cover.
- 2) Unplug the connectors on the PCB.
- 3) Carefully remove four mounting brackets on the PCB.



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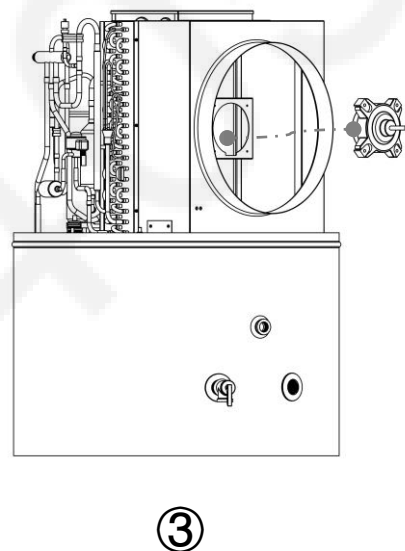
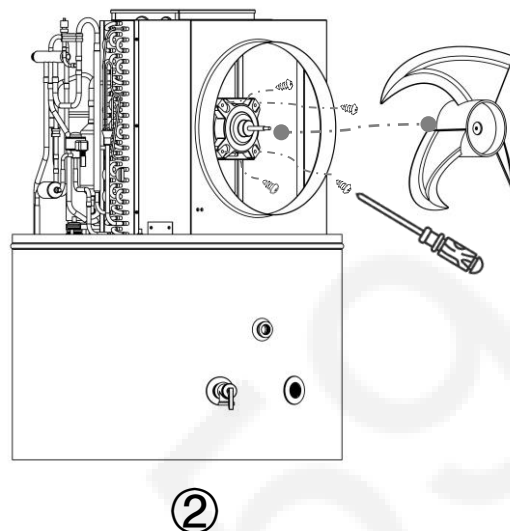
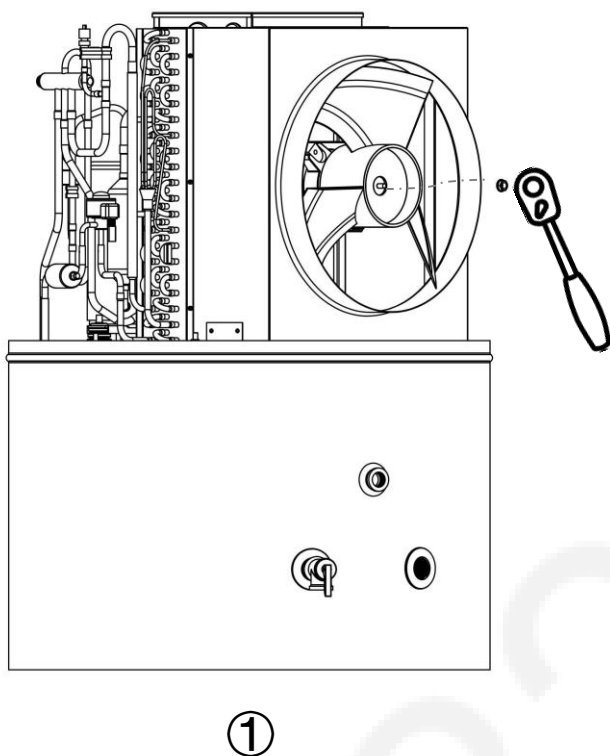


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DISMANTLING FOR SERVICE

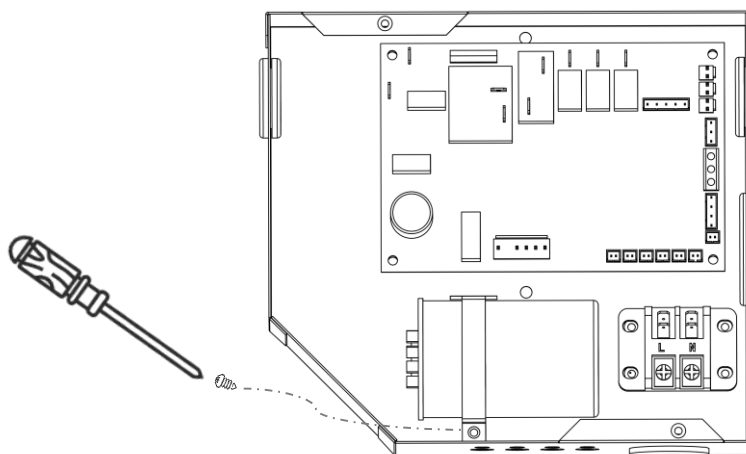
4. Removal of the fan motor

- 1) Disconnect the fan motor cable from the PCB.
- 2) Remove one mounting screw on the fan blade.
- 3) Remove the fan blade.
- 4) Remove four mounting screws on the fan motor.
- 5) Remove the fan motor.



5. Disconnection of the compressor capacitor

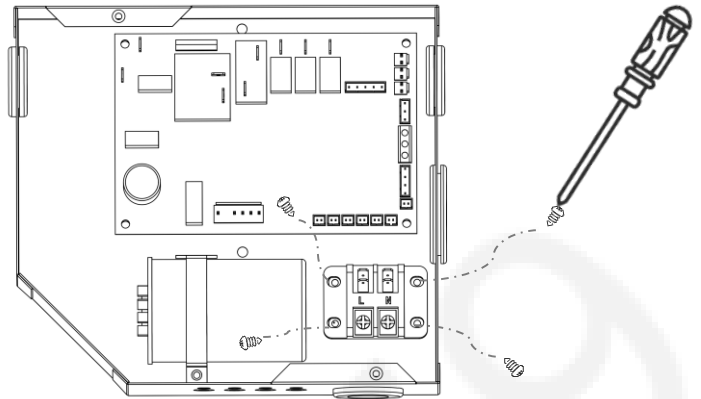
- 1) Unplug the compressor capacitor cable.
- 2) Remove one screw on the mounting bracket.
- 3) Take out the compressor capacitor.



DISMANTLING FOR SERVICE

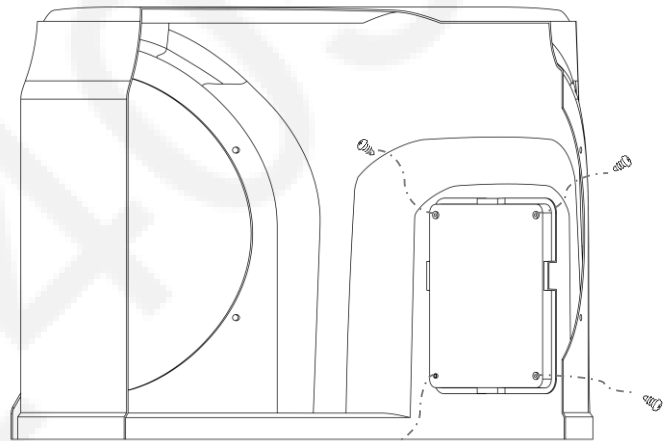
6. Disconnection of the terminal

- 1) Unplug the terminal cable.
- 2) Remove four screw on the terminal.
- 3) Take out the terminal.

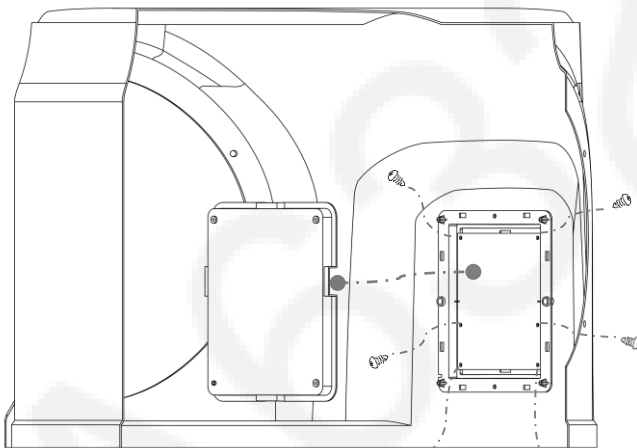


7. Disconnection of the control board

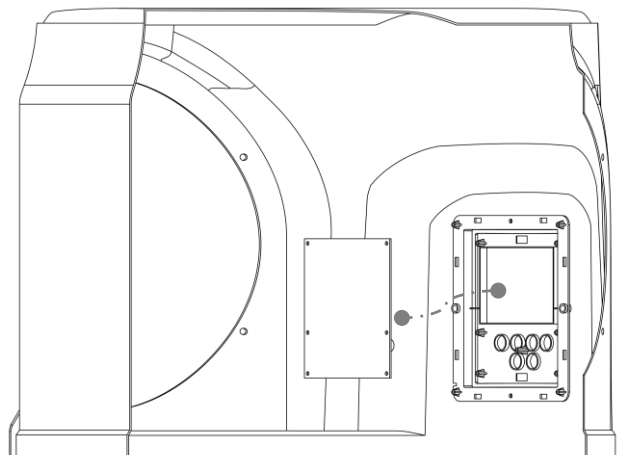
- 1) Remove four screw on the rear cover for controller.
- 2) Take out the rear cover for controller.
- 3) Remove six screw on the control board.
- 4) Take out the control board.



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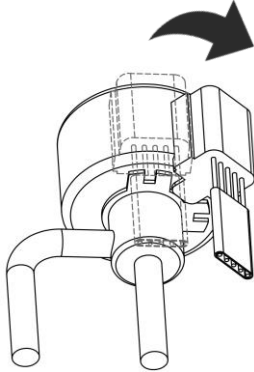


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DISMANTLING FOR SERVICE

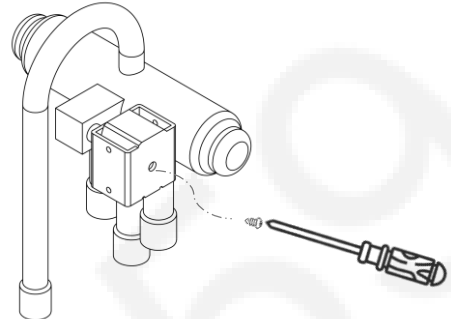
8. Removal of the EEV coil

- 1) Disconnect the coil cable from the PCB.
- 2) Twist the coil.
- 3) Take out the coil.



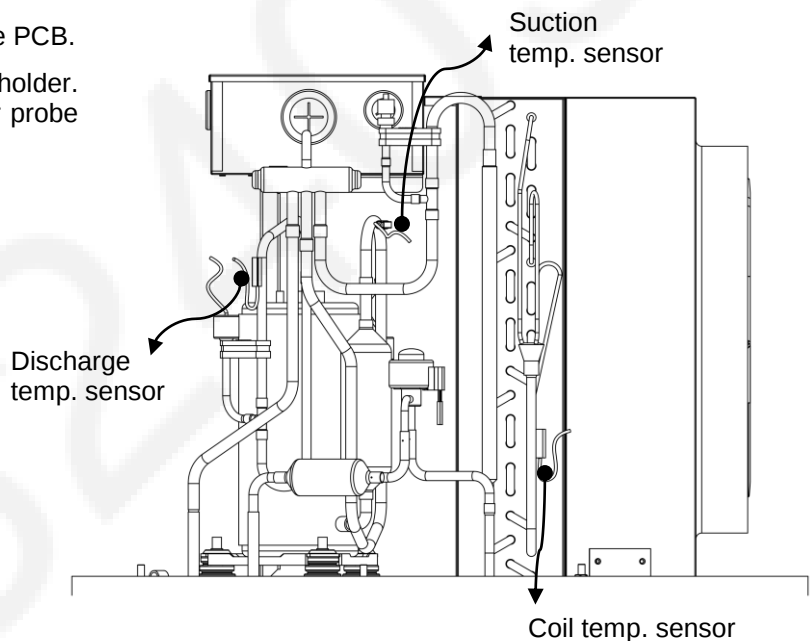
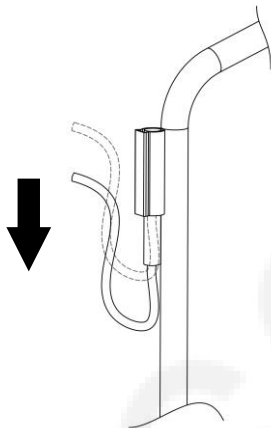
9. Removal of the 4-way reversing valve coil

- 1) Disconnect the coil cable from the PCB.
- 2) Remove one screw on the coil.
- 3) Take out the coil.



10. Removal of the temperature sensor

- 1) Disconnect the temp. sensor cable from the PCB.
- 2) Remove the temp. sensor from the sensor holder. (Pull out from the end of the temp. sensor probe wire.)

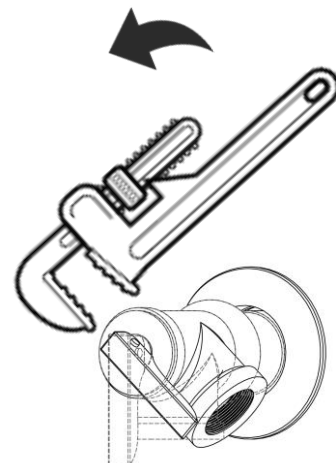


11. Removal of the PTR valve

- 1) Remove all connecting pipes from the PTR valve.
- 2) Turn CCW to remove the PRT valve.



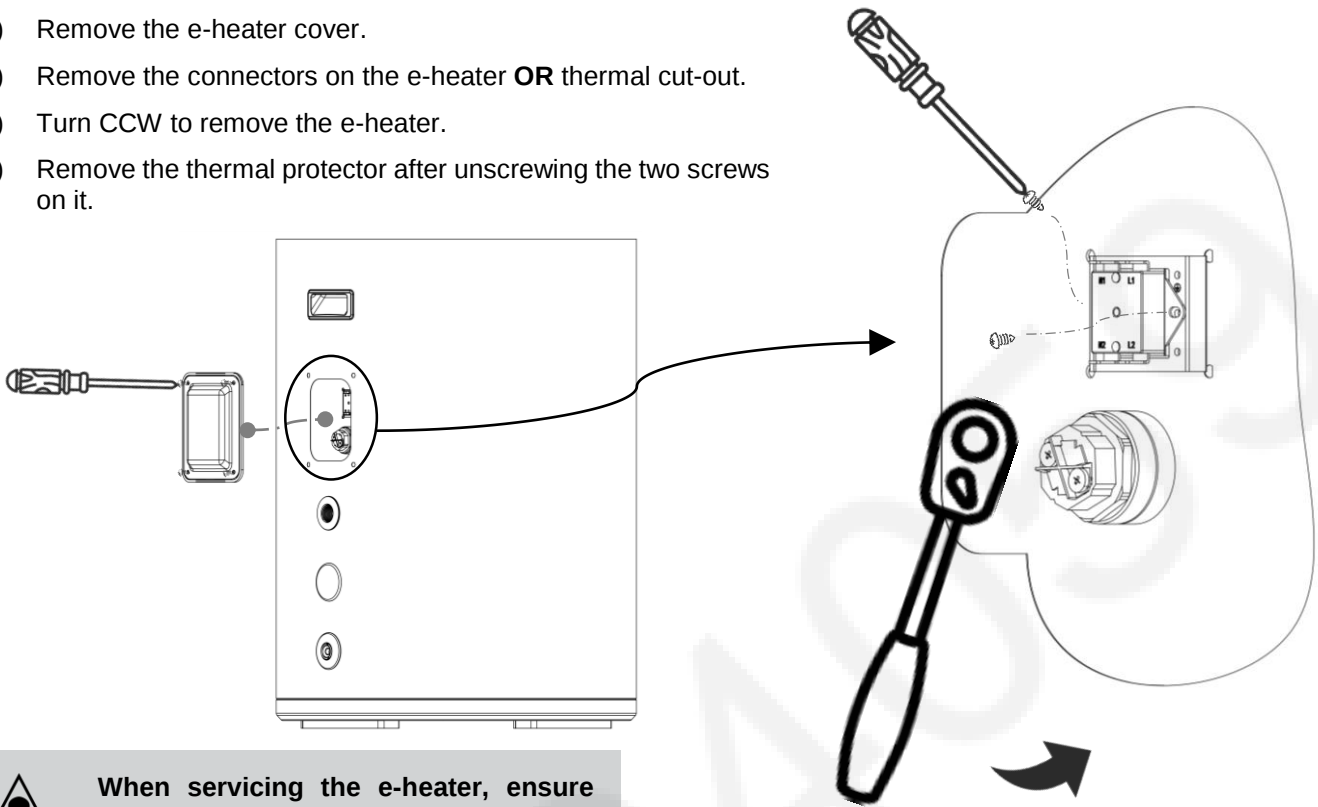
When servicing the PTR valve, ensure proper thread sealing to prevent water leakage.



DISMANTLING FOR SERVICE

12. Removal of the e-heater OR thermal cut-out

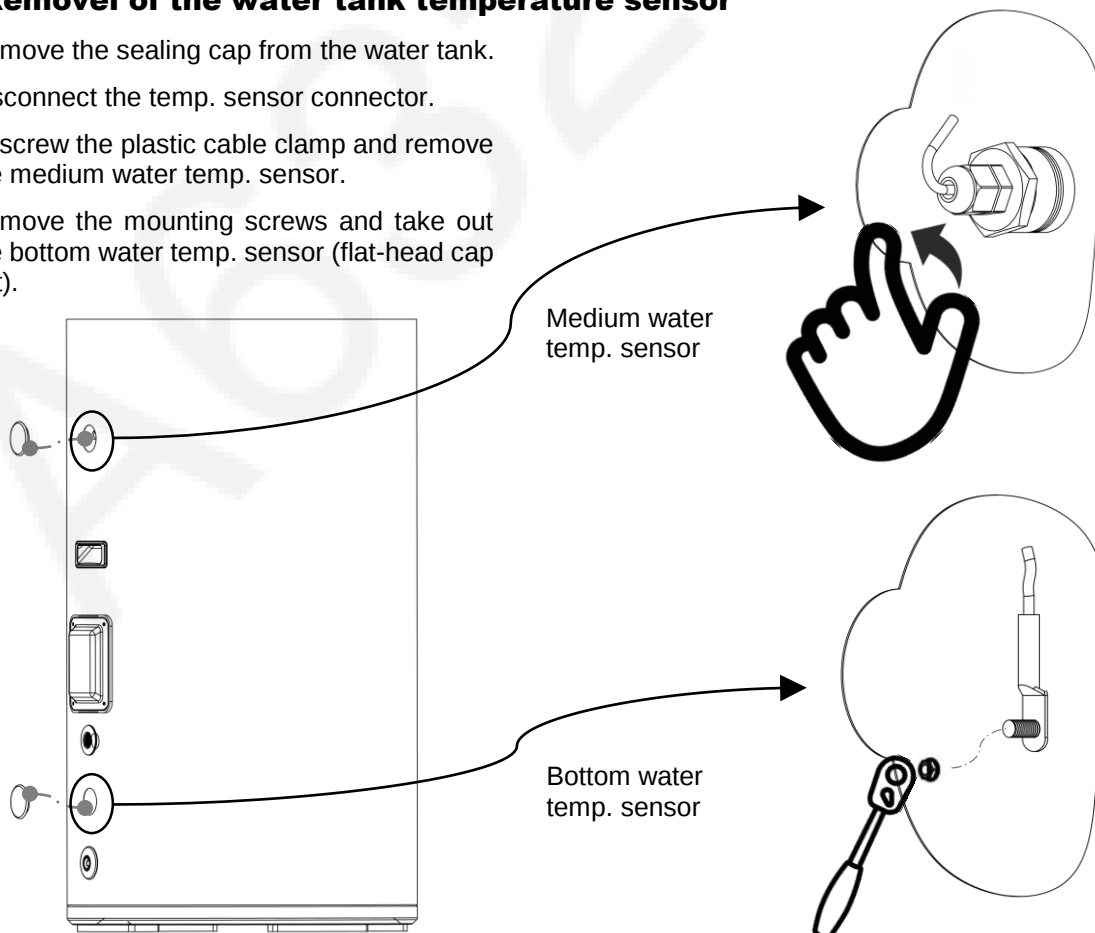
- 1) Remove four screws on the e-heater cover.
- 2) Remove the e-heater cover.
- 3) Remove the connectors on the e-heater **OR** thermal cut-out.
- 4) Turn CCW to remove the e-heater.
- 5) Remove the thermal protector after unscrewing the two screws on it.



When servicing the e-heater, ensure proper thread sealing to prevent water leakage.

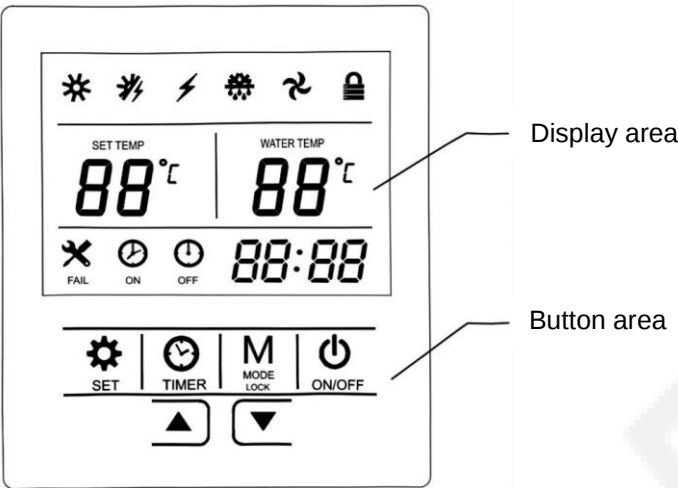
13. Removal of the water tank temperature sensor

- 1) Remove the sealing cap from the water tank.
- 2) Disconnect the temp. sensor connector.
- 3) Unscrew the plastic cable clamp and remove the medium water temp. sensor.
- 4) Remove the mounting screws and take out the bottom water temp. sensor (flat-head cap nut).



OPERATION

CONTROLLER LAYOUT



Controller Icons

Icons	Explanations
	Heat pump mode.
	Electric heater mode. (heat pump + boost E-heater)
	Electric heater mode.
	Defrost icon. Under the defrost mode, it will be lightened. Under the protection of the anti-freezing function, it will be flashed.
	Fan icon. It will be lightened, once the fan runs.
	Lock icon.

Icons	Explanations
	Malfunction icon.
	Timer on/Timer off icon.
	Clock icon.
	The setting value of water temperature.
	The current value of water temperature.

After the unit is powered on, the display screen will display all the icons for 3 seconds, and it will be display the regular interface automatically.

Control Keys

Icons	Name
	Setting button.
	Timer button.
	Mode button.

Icons	Name
	On/Off button.
	Increase/up button.
	Decrease/down button.

OPERATING FUNCTIONS

On / OFF

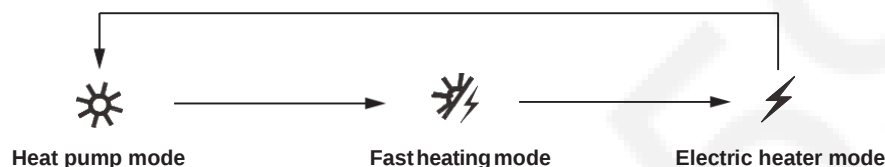


In the unit standby state, press this button for 2 seconds to switch on the unit. When the unit is running, press it for 2 seconds to shut down the unit.

Mode / Lock



During the unit running, press mode button, and the unit will change the operating mode as following figure (This function is invalid for models without electric heating):



During the unit running, after keep pressing the button for 3 seconds, all the buttons will be locked and the icon  will be displayed. Press it for 3 seconds again, the lock function will be canceled.

- ECO mode (Heat pump mode) , the default setting temperature is 55°C.
- HYBRID MODE (Fast heating mode) uses a heat pump and an electric heater to quickly heat hot water. If the user has emergency water needs, he or she can manually switch to this mode for heating. However, to ensure that the heat pump can continue to save energy, it will automatically switches back to ECO mode after 24 hours.
- E-HEAT MODE (Electric heater mode), this mode is only used as an emergency when the heat pump system fails and cannot be used. Similarly, it will automatically switch back to ECO mode after 24 hours of use, even if the heat pump is still faulty.

Setting



Press the set button, the running parameters of the unit will be display. Press the ▲ and ▼ buttons to change the parameter items.

Item	Explanation	Range of the parameter
A	Temperature of the Medium water layer in tank	-20°C - 99°C
B	Temperature of the Bottom water layer in tank	-20°C - 99°C
C	Refrigerant temperature inside the coil	-20°C - 99°C
D	Suction temperature of the compressor	-20°C - 99°C
E	Outdoor ambient temperature	-20°C - 99°C
F	Running steps of the EXV	100 - 470
H	Current speed of DC motor	0 - 1500 (Display 00 - F0 or 00 - 150)
L	Discharge temperature of the compressor	0°C - 125°C

OPERATION

Timer setting

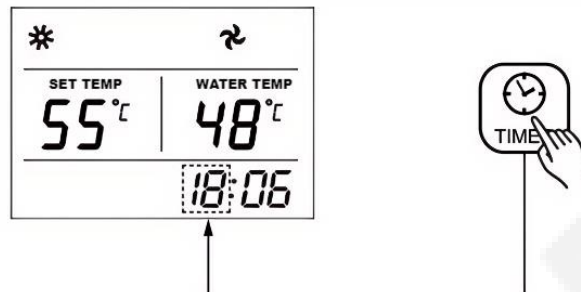


TIMER

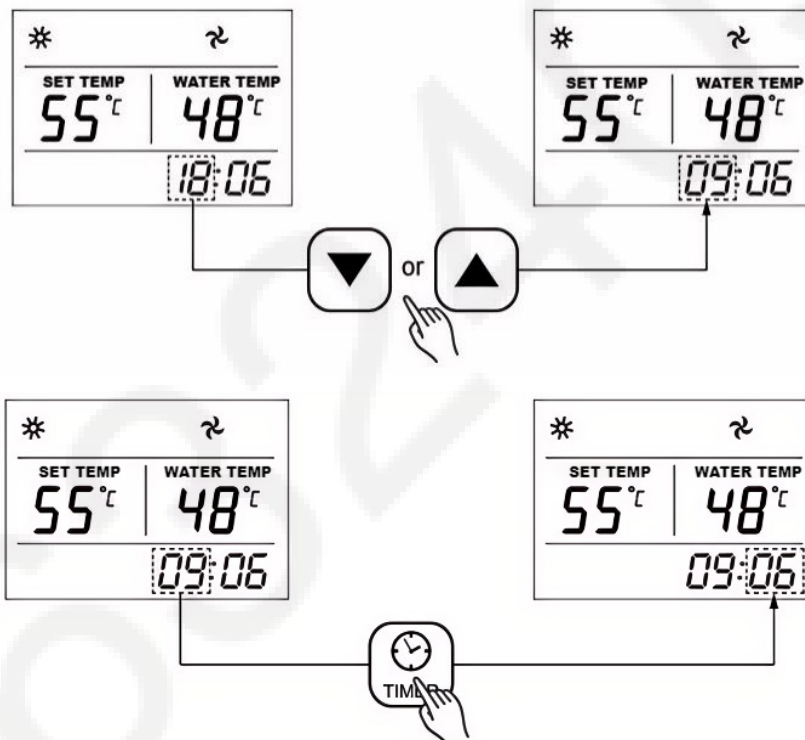
Press the timer button to set the clock and timer on/off.

- **Clock setting -**

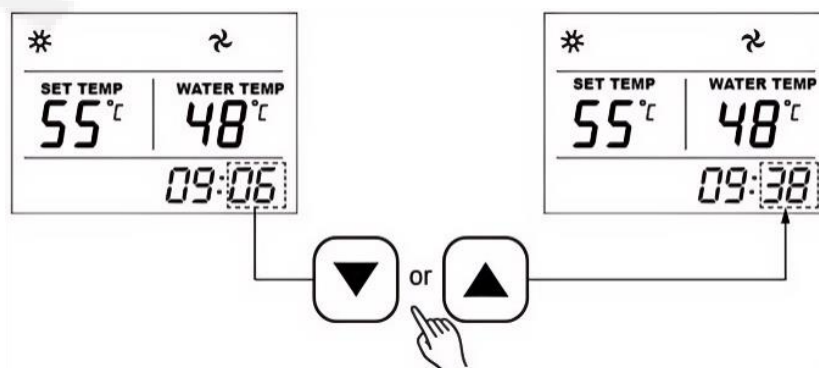
Step 1: Press the Timer button to set the clock. So the hours of clock begins to flash.

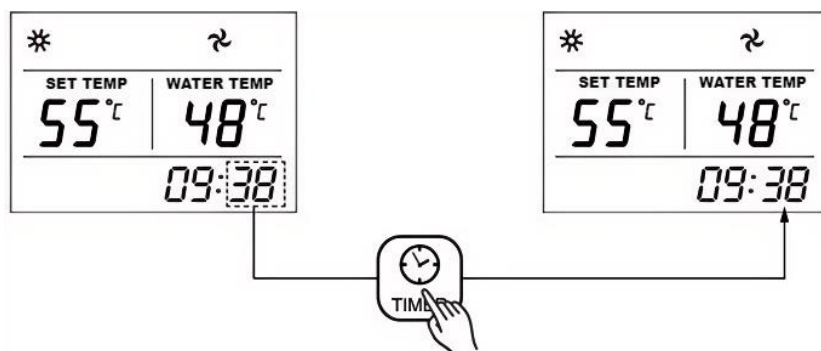


Step 2: Press Increase or Decrease button to set correct hours of clock. After setting the hours, press the Timer button again to begin to set the minutes of clock. So the minutes of clock begins to flash.



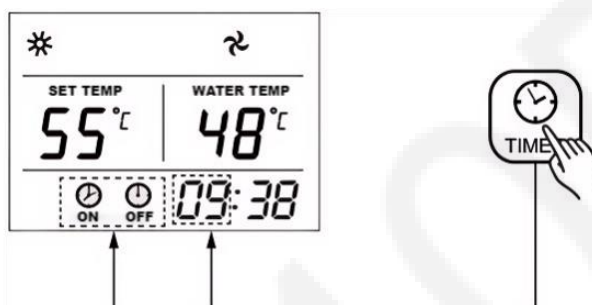
Step 3: Press Increase or Decrease button to set correct minutes of clock. Finally, press the timer button again to confirm and exit the clock setting.



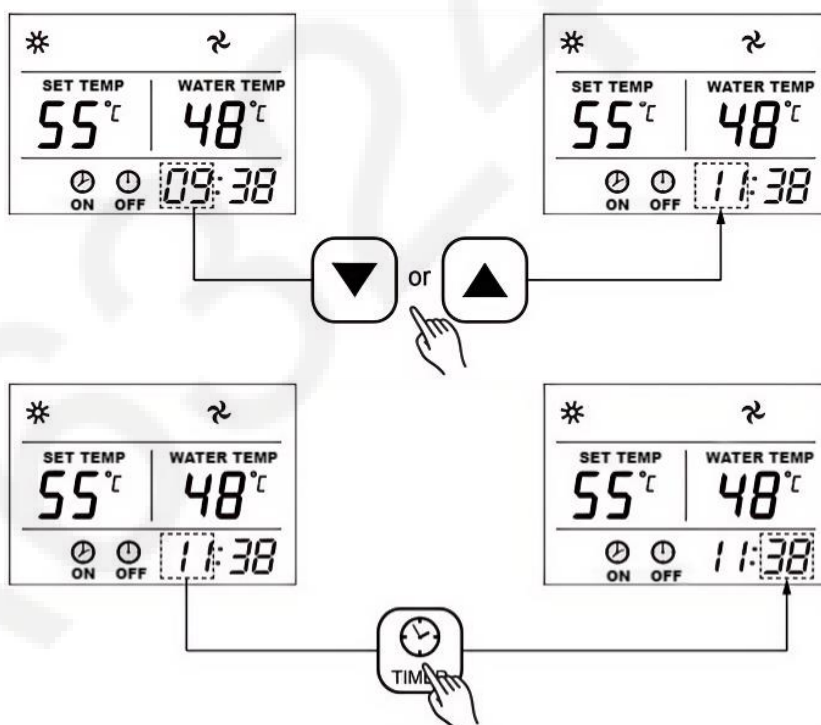


● timer setting -

Step 1: Keep pressing the Timer button for 5 seconds till the icon of timer on is flashed and the icon of timer off displayed. So timer on can be set now. At the same time, hours of timer on flashes.



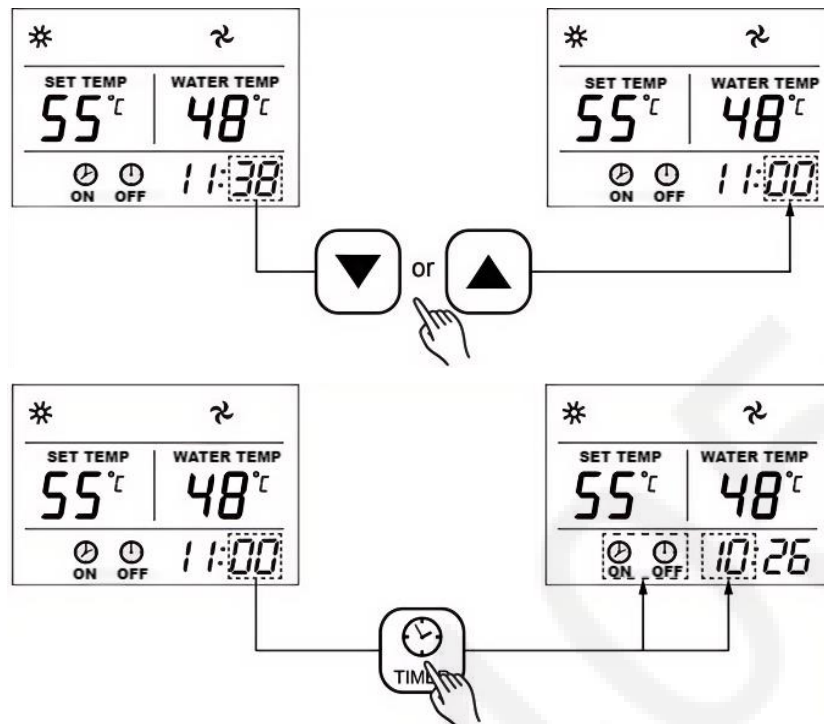
Step 2: Press Increase or Decrease button to set required hours of timer on. After setting the hours, press the Timer button again to begin to set the minutes of timer on. So the minutes begins to flash.



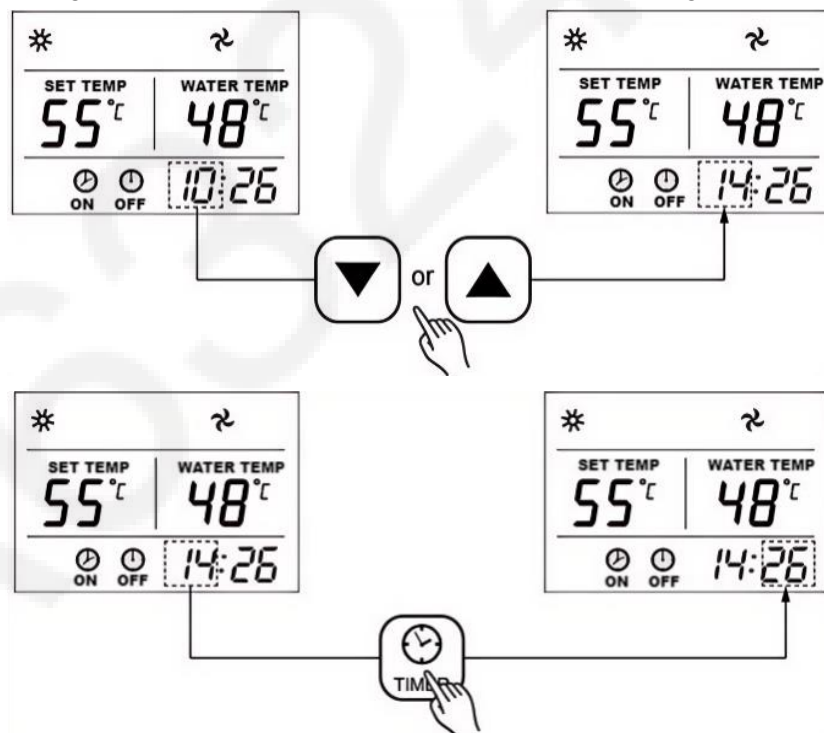
Notes: During the setting of timer on, the icon of timer on will keep flashing.

OPERATION

Step 3: Press Increase or Decrease button to set required minutes of timer on. Finally, press the Timer button again to confirm the timer on setting and begin to set timer off. At this time, the icon of timer off and hours of timer off will flashing.

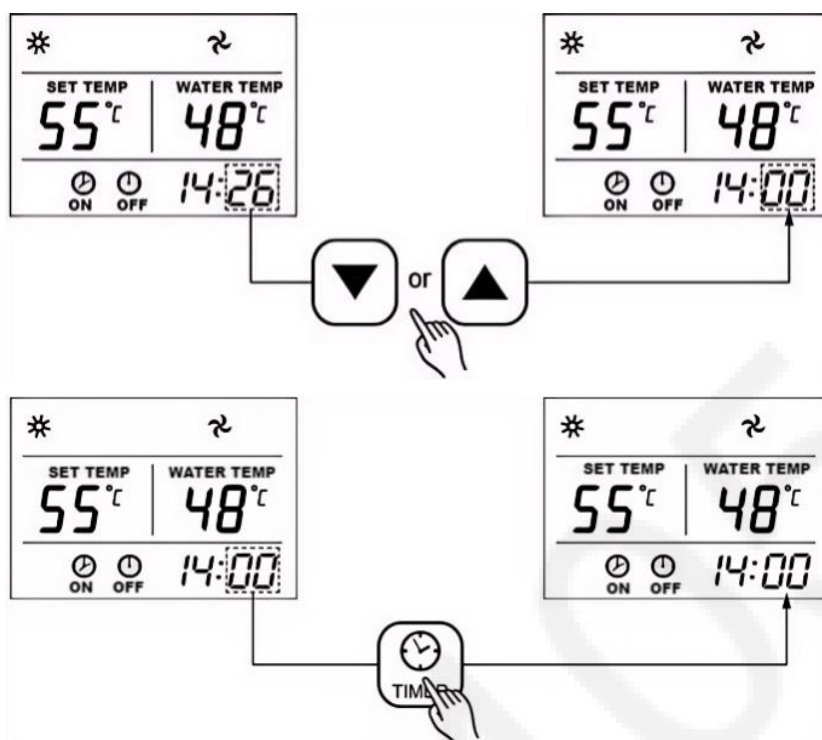


Step 4: Press Increase or Decrease button to set required hours of timer off. After setting the hours, press the Timer button again to begin to set the minutes of timer off. So the minutes begins to flash.



Notes: During the setting of timer off, the icon of timer off will keep flashing.

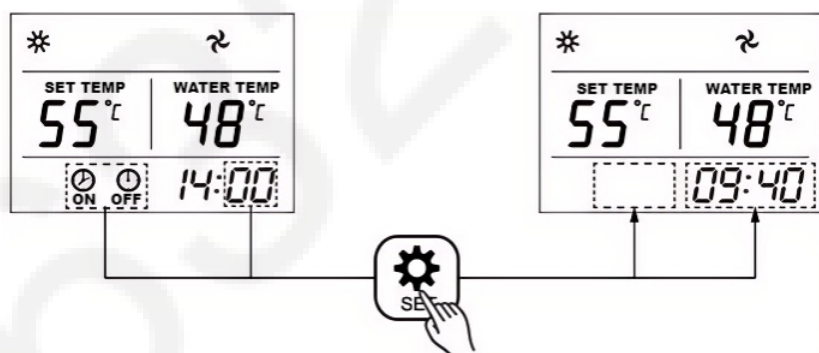
Step 5: Press Increase or Decrease button to set required minutes of timer off. Finally, press the Timer button again to confirm the timer off setting and exit the timer setting.



Notes: Once timer on/off is successfully set, the icons of timer on and off will be displayed.

● Canceling timer setting -

In the process of timer on/off setting, press the Set button, and all the timer setting will be canceled.



Temperature Up / Down



These two buttons are used when the temperature setting, the clock setting and parameters query.

Under the running state of the unit, the water setting temperature can be raised by pressing the increase / up button, while the water setting temperature can be lowered by pressing the Decrease / down button.

TEMPERATURE / RESISTANCE TABLE

AMBIENT TEMP, COIL TEMP, SUCTION TEMP, AND WATER TANK SENSOR RESISTANCE VALUES

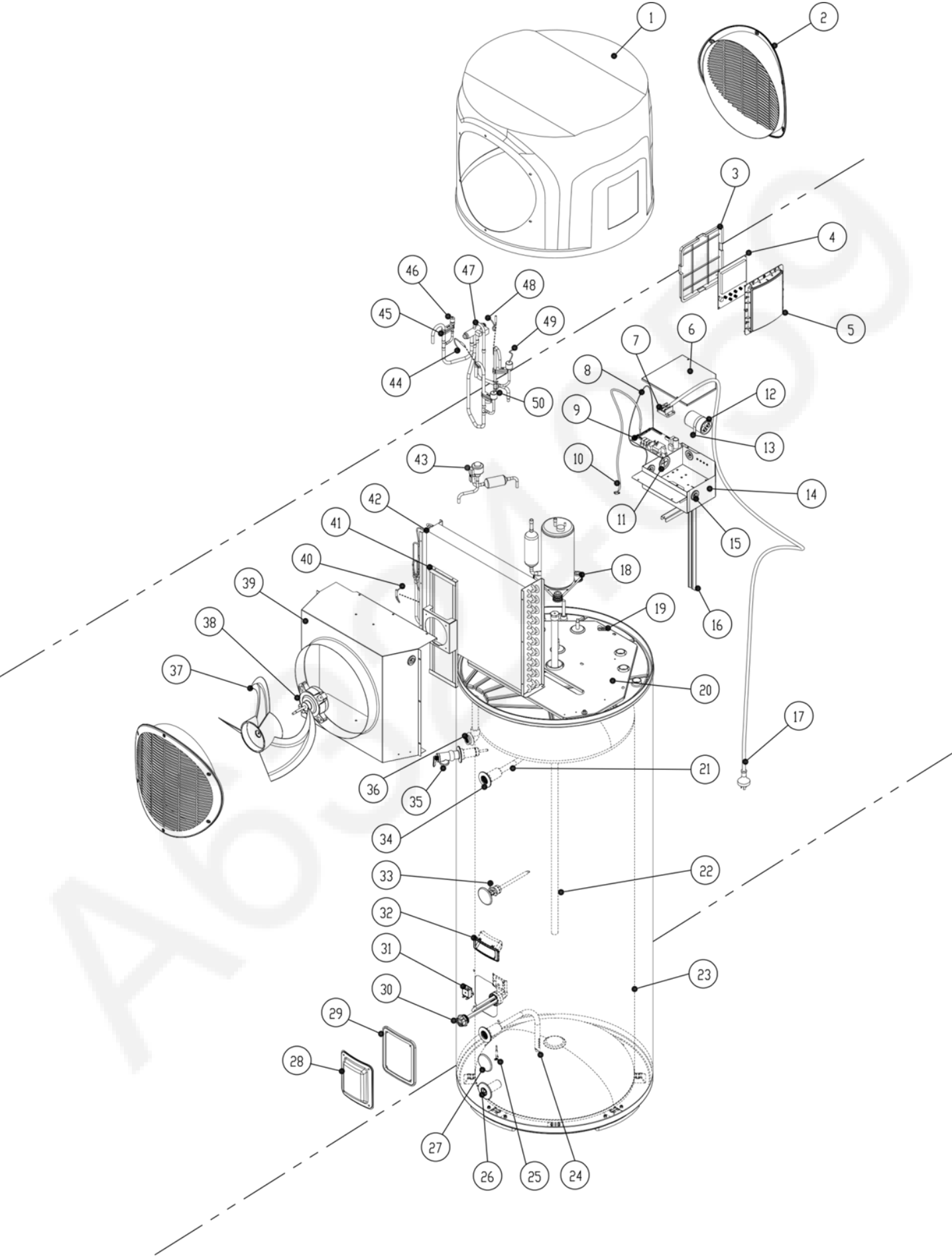
Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)
-20	39.579	20	6.098	60	1.472	100	0.482
-19	37.501	21	5.857	61	1.427	101	0.470
-18	35.547	22	5.628	62	1.383	102	0.459
-17	33.709	23	5.409	63	1.341	103	0.448
-16	31.979	24	5.200	64	1.301	104	0.437
-15	30.350	25	5.000	65	1.262	105	0.426
-14	28.816	26	4.809	66	1.224	106	0.416
-13	27.370	27	4.627	67	1.188	107	0.406
-12	26.007	28	4.453	68	1.153	108	0.397
-11	24.722	29	4.286	69	1.119	109	0.387
-10	23.509	30	4.127	70	1.087	110	0.378
-9	22.365	31	3.974	71	1.055	111	0.369
-8	21.284	32	3.828	72	1.025	112	0.361
-7	20.262	33	3.689	73	0.996	113	0.352
-6	19.297	34	3.555	74	0.967	114	0.344
-5	18.385	35	3.427	75	0.940	115	0.337
-4	17.522	36	3.305	76	0.913	116	0.329
-3	16.705	37	3.187	77	0.888	117	0.321
-2	15.932	38	3.075	78	0.863	118	0.314
-1	15.200	39	2.967	79	0.839	119	0.307
0	14.507	40	2.863	80	0.816	120	0.300
1	13.850	41	2.764	81	0.794	121	0.294
2	13.228	42	2.669	82	0.772	122	0.287
3	12.637	43	2.577	83	0.751	123	0.281
4	12.077	44	2.490	84	0.731	124	0.275
5	11.545	45	2.406	85	0.712	125	0.269
6	11.041	46	2.325	86	0.693	126	0.263
7	10.562	47	2.247	87	0.674	127	0.257
8	10.106	48	2.173	88	0.657	128	0.252
9	9.674	49	2.101	89	0.639	129	0.247
10	9.263	50	2.032	90	0.623	130	0.241
11	8.872	51	1.966	91	0.607		
12	8.500	52	1.902	92	0.591		
13	8.146	53	1.841	93	0.576		
14	7.809	54	1.782	94	0.561		
15	7.488	55	1.725	95	0.547	B(25/50) = 3470K	
16	7.183	56	1.671	96	0.533		
17	6.892	57	1.618	97	0.520	R25 = 5KΩ	
18	6.614	58	1.568	98	0.507		
19	6.350	59	1.519	99	0.494		

TEMPERATURE / RESISTANCE TABLE

DISCHARGE TEMP SENSOR RESISTANCE VALUES

Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)
-20	542.7	20	68.66	60	13.59	100	3.702
-19	511.9	21	65.62	61	13.11	101	3.595
-18	483	22	62.73	62	12.65	102	3.492
-17	455.9	23	59.98	63	12.21	103	3.392
-16	430.5	24	57.37	64	11.79	104	3.296
-15	406.7	25	54.89	65	11.38	105	3.203
-14	384.3	26	52.53	66	10.99	106	3.113
-13	363.3	27	50.28	67	10.61	107	3.025
-12	343.6	28	48.14	68	10.25	108	2.941
-11	325.1	29	46.11	69	9.902	109	2.86
-10	307.7	30	44.17	70	9.569	110	2.781
-9	291.3	31	42.33	71	9.248	111	2.704
-8	275.9	32	40.57	72	8.94	112	2.63
-7	261.4	33	38.89	73	8.643	113	2.559
-6	247.8	34	37.3	74	8.358	114	2.489
-5	234.9	35	35.78	75	8.084	115	2.422
-4	222.8	36	34.32	76	7.82	116	2.357
-3	211.4	37	32.94	77	7.566	117	2.294
-2	200.7	38	31.62	78	7.321	118	2.233
-1	190.5	39	30.36	79	7.086	119	2.174
0	180.9	40	29.15	80	6.859	120	2.117
1	171.9	41	28	81	6.641	121	2.061
2	163.3	42	26.9	82	6.43	122	2.007
3	155.2	43	25.86	83	6.228	123	1.955
4	147.6	44	24.85	84	6.033	124	1.905
5	140.4	45	23.89	85	5.844	125	1.856
6	133.5	46	22.89	86	5.663	126	1.808
7	127.1	47	22.1	87	5.488	127	1.762
8	121	48	21.26	88	5.32	128	1.717
9	115.2	49	20.46	89	5.157	129	1.674
10	109.8	50	19.69	90	5	130	1.632
11	104.6	51	18.96	91	4.849		
12	99.69	52	18.26	92	4.703		
13	95.05	53	17.58	93	4.562		
14	90.66	54	16.94	94	4.426		
15	86.49	55	16.32	95	4.294	B(25/50) = 3950K	
16	82.54	56	15.73	96	4.167		
17	78.79	57	15.16	97	4.045	R(90°C) = 5KΩ+-3%	
18	75.24	58	14.62	98	3.927		
19	71.86	59	14.09	99	3.812		

EXPLODED DIAGRAMS



PART LIST

Num.	Code	Name	Lv.	Num.	Code	Num.	Lv.
1	R09.01.0086	Top Cover	**	27	A06.03.0062	Sealing Cap	**
2	R09.01.0046	Grille	**	28	P2.091.0120	E-heater Cover	**
3	R09.01.0019	Rear Cover For Controller	**	29	A06.05.0108	Sealing Ring For E-Heater Cover	**
4	R03.02.0058	Control Board	*	30	R02.07.0018	E-Heater	*
5	R09.01.0023	Panel For Controller	**		R09.04.0027	Sealing Ring For E-Heater	*
6	R06.02.0031	E-Box Cover	**	31	R02.07.0003	Thermal Cut-Out	*
7	R03.05.0002	Terminal	*	32	A06.01.0012	Handle	
8	R03.07.0049	Ambient Temp. Sensor	*	33	R03.07.0064	Water Tank Temp. Sensor	*
9	R03.01.0108	Main Board	*	34	A06.03.0020	Decorative Ring	**
10	R03.04.0157	Communication Line	*	35	R05.02.0029	PTR Valve	*
11	R09.04.0003	40# Wire Cable Grommet	**	36	A06.02.0029	Drain Fitting	
12	R02.04.0007	Compressor Capacitor	*	37	R07.01.0013	Fan Blade	**
13	R06.02.0004	Capacitor Fixing Clip	**	38	R02.02.0005	Fan Motor	*
14	R06.02.0112	E-Box	**	39	R06.01.0368	Fan Cover	**
15	R09.04.0002	25# Wire Cable Grommet	**	40	R03.07.0048	Coil Temp. Sensor	*
16	R06.02.0090	E-Box Support	**	41	R06.02.0104	Motor Support	**
17	R03.04.0143	Power Cord	*	42	R04.03.0040	Evaporator	***
18	R01.01.0040	Compressor	***	43	R04.01.0039	EEV	***
	R09.03.0025	Sound-Absorbing Cotton	**		R04.01.0016	EEV Coil	*
	R03.04.0111	Compressor Power Cord	*	44	R03.07.0047	Suction Temp. Sensor	*
19	R09.01.0082	Cable Clamps	**	45	R09.04.0010	Shock Absorption Fixing Block	**
20	R06.01.0404	Supporting Plate	**	46	R04.01.0023	Needle Valve	***
21	P2.060.0281	Outlet Pipe	**	47	R04.01.0003	4-Way Reversing Valve	***
22	R08.06.0041	Anode Rod	*		R04.01.0004	4-Way Reversing Valve Coil	*
23	P2.033.0164	Inner Tank		48	R03.07.0046	Discharge Temp. Sensor	*
24	P2.060.0275	Inlet Pipe	**	49	R04.02.0025	High Pressure Switch	***
25	R03.07.0065	Water Tank Temp. Sensor (Flat Lug Head)	*	50	R04.02.0026	Low Pressure Switch	***
26	P2.060.0284	Drain Plug	**				

Level Explanation

Level	Classification	Explanation
	Non-replaceable part	Once damaged, It cannot be repaired.
*	Wear parts	Replacement may be performed according to the repair manual instructions.
**	Replaceable parts	Which typically do not fail. Can be replaced using tools.
***	Sealed system parts	Usually do not fail. Replacement MUST be done by trained professionals.

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