



Heat Pump Water Heater

HPI-40/50C1.0AT

HPI-40/50C1.0AE



User Guide

About A. O. Smith

In 1936, A. O. Smith developed and patented the process of glass-lined water heaters, pioneering the modern standard in water heater design. Over the past years, A. O. Smith has gained respect and support of homeowners, contractors, architects, and specifying engineers in over 60 countries by providing innovative, energy-saving products designed for years of trouble-free service.

A. O. Smith Water Products Company, now the largest water heater manufacturer in the world, continues the tradition of innovation and becomes a global leader in water product industry.

CONTENTS

User Guide	1
Physical Characteristics	2
Specifications	2
Safety Features	3
Compressor overheating discharge protection.....	3
Abnormal operation protection of the relay.....	3
Abnormal operation protection of electronic expansion valve.....	3
High and low voltage protection.....	3
Refrigerant leakage protection.....	3
High water temperature protection.....	3
High Temperature Limit Protection Switch.....	3
Temperature and pressure relief valve.....	3
Product Features	4
Energy-saving Heating.....	4
MAX.....	4
AES (adaptive energy-saving system).....	4
Circulating pump.....	4
Power-off memory.....	4
Intelligent defrosting.....	4
Intelligent dormancy.....	4
Wired remote controller.....	4
Glass-lined special protective tank.....	4
Anode rod protection.....	4
High Efficiency Energy-saving Insulation.....	4
Installation Instructions	5
Tank installation.....	5
Pipe connection.....	5
Condensate Water Pipe Connection.....	6
Control box connection.....	6
Water filling.....	6
Operation Instructions	7
Electronic Controller Operation.....	7
Temperature and pressure relief valve Inspection.....	11
Maintenance Instructions	11
Maintenance.....	11
Troubleshooting	12
Wiring diagram	13
Notice	14
Packing list	14

User Guide

Please read this instruction carefully before installation and operation of the water heater and keep this instruction well for further reference.

- Only professional installers acknowledged by A.O.SMITH are permitted to install the heat pump water heater. If the water heater is installed with self-prepared installation materials or by un-authorized personnel, A.O.SMITH will not be responsible for all losses incurred thereby, including but not limited to pipeline leakage, fall or improper installation that may affect normal operation and performance of water heater.
- The heat pump water heater is for residential application. Therefore, it may affect life expectation if it is used for commercial application.
- After installation and operation of the heat pump water heater, users should inspect the system regularly and make necessary maintenance according to operation conditions. If any abnormality occurs, please stop operation immediately, and contact local authorized dealer for repair to ensure the normal, safe, and reliable operation of the water heater.
- The anode rod is a consumable part and it is generally suggested to check and replace the anode rod every 2 or 3 years. Users could contact the local authorized dealer for check and replacement to extend life expectation of water heater.
- Prior to any maintenance or repair of the heat pump water heater, please cut off power supply. Unauthorized personnel are not permitted to adjust and repair the heater.
- In case the water heater is subject to dry heating, the generated steam or burning water might lead to serious scald. Therefore, it is necessary to fill the water heater with water. If dry heating occurs, cut off the power and water supply at once, stop the operation, contact local authorized dealer, and carry out inspection or repair by our company recommended professional installers.
- In case of any component soaked by water, the water heater is not permitted to use until checked by authorized service staff.
- Main components of the storage electrical heater are protected by insulation material to ensure safety use. Any damaged power cords should be replaced by authorized service staff.
- The pressure relief valve, equipped on the heat pump water heater, is forbidden to change installation position or be blocked. Discharge pipe is required to connect the valve and down toward floor drain.
- Water, including hot water, out of the heat pump water heater is not permitted for drinking.
- Electricity for the heat pump water heater should be supplied by independent branch of circuit, of which electricity meter, breaker, maximum current need to be checked by professional electrician in advance.
- Power socket should be located at a dry place, and power cord should not be pushed or pulled with wet hand to avoid the danger of electric shock.
- Damaged electric wire, aged, loose and unfixed socket are not suggested to be used because of the danger of electric shock, short circuits, fires, etc. Please ensure power cord and socket could be connected well.
- A. O. SMITH water Heater Company Ltd reserves the rights to explain all provisions mentioned above.

CAUTION: Failure to follow instructions in the user guide may cause fire disaster, which would be a threat to life and property security.

WARNING: Heat pump water heater is not permitted for use without reliable ground wire circuit for power socket. In case of indicator lighted up for “ground wire circuit fault”, please immediately stop using, pull plug and contact local authorized dealer. Well-drained floor drain is essential to prevent the damage to surroundings or downstairs in case of leakage of heater or joint.

Physical Characteristics

Figure 1 Physical Characteristics

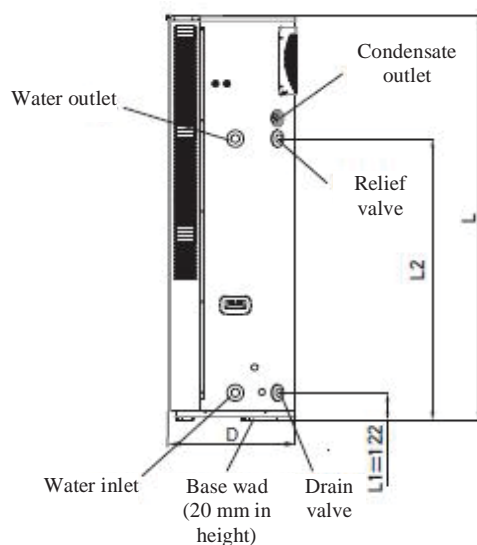


Table 1 Outline Dimensions

Model	HPI-40C1.0AT/AE	HPI-50C1.0AT/AE
Total Height L (mm)	1610	1800
Height between Undersurface and Water Outlet L2 (mm)	1056	1243
Tank Diameter D (mm)	Φ520	Φ520

Specifications

Table 2 Specifications

Model	Rated volume(L)	Voltage (V)/ Frequency (Hz)	Rated input power (W)	Rated current (A)	Setting temperature range (°C)	Noise level dB(A)	Rated pressure (MPa)	Maximum power of quick heating (W)	Maximum current of quick heating (A)	Net weight (kg)
HPI-40C1.0AT/AE	150	220~/50	3000	13.6	35-75	50	1.03	3000	13.6	89
HPI-50C1.0AT/AE	150									98

Safety Feature

Compressor overheating discharge protection

The system will promptly stop the operation of the compressor to ensure safety in case the compressor overheats due to the fault of the water heater.

Abnormal operation protection of the relay

The system will shut down all loads to prevent overvoltage, fire and other incident in case the water temperature continues rising after the stop of pump due to the fault of the relay.

Abnormal operation protection of electronic expansion valve

The system will stop the operation of the compressor to protect the pump due to the electronic expansion valve not working or not working properly.

High and low voltage protection

The system will promptly shut down all loads to protect the component and prevent the electric appliances accidents due to the high or low voltage beyond the safety level.

Refrigerant leakage protection

The system will promptly stop the operation of the compressor protect the pump in case the leakage of the refrigerant.

High water temperature protection

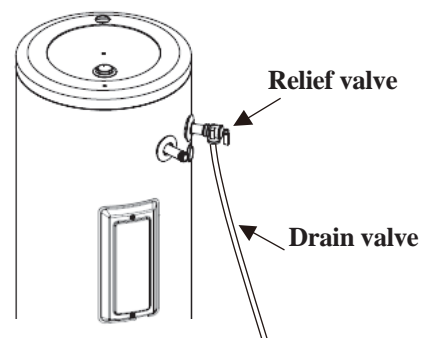
The system will shut down all loads to ensure safety in case any of the multiple sensors inside the water heater reaches 90°C.

High Temperature Limit Protection Switch

A high temperature limit protection thermal cutout is equipped on the heat pump water heater. The switch cuts off the phase and neutral line instantaneously and simultaneously to guarantee safety in case water temperature reaches the high temp limited due to water heater fault. If this happens, please contact local authorized dealer.

Temperature and pressure relief valve

The water heater has a temperature and pressure relief valve, model number: NPT3/4 1.03(see Figure 1), Default setting by factory is at 1.03MPa and not adjustable. The valve must be installed in the position shown in Figure 1. The valve will release the pressure automatically when the pressure in the water heater exceeds 1.03MPa or the temperature exceeds 99°C. This valve must install with a drain pipe at its outlet, and the pipe should be installed downward in a frost-free environment, the diversion pipe overflow water should be discharged to floor drain.



2 Figure
Temperature and pressure relief

Product Features

Energy-saving Heating

A new generation water heater, heating residential water by air-source based on the Inverse Cano Principle.

MAX

MAX function means more hot water output, therefore, better bath experience.

AES (adaptive energy-saving system)

By recording and learning user's habit of water usage, patented AES feature adopts heating cycles automatically, which will facilitate water usage and save energy by minimizing thermal loss.

Hot Water Amount Display

Five light blocks visibly indicate the hot water amount available in tank.

Circulating pump

The cold water section can be removed by pump circulation (sold separately) to ensure hot water at all time.

Power-off memory

By power-on more than 4 hours, the water heater could keep setting information for 72 hours when power supply is cut-off.

Intelligent defrosting

The automatic intelligent defrost function can solve the problems effectively such as freezing of exchanger, frost remaining etc., and ensure the system to be operated efficiently and stably.

Intelligent dormancy

If no operation is performed within 3 minutes, the water heater enters into a dormant state.

The unit will enter sleep state with no operation within three minutes.

Wired remote controller

The controller and the unit are to be installed separately for clear sight and convenient operation.

Glass-lined special protective tank

The Glass-lined protection tank is a patent by A.O.Smith, coating tank with Silicide smoothly and fusion at 870 . The anti-rust and anti-scaling glass coating has pass 100,000 cycles fatigue life test in accordance with relevant UL Standards.

Anode rod protection

A powerful steel-core-anode rod is used to protect tank and greatly prolong service life of the heat pump water heater.

High Efficiency Energy-saving Insulation

A polyurethane foam insulating layer without Freon reduces heat loss effectively.

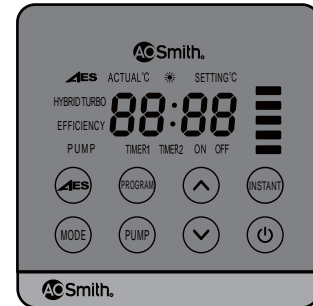


Figure 3

Installation Instructions

CAUTION:

- 2 or more staffs are needed to move or install the heat pump water heater due to the heavy weight.
- The water heater can be suitable for outdoor installation. In this situation, firm fixed measures for the water heater are required. The water heater has the risk of falling down and seriously injuring without a confirmation of the reliability before operation.
- To climb on the tank or outdoor unit of the water heater is prohibited, which has the risk of serious personnel injury accident.
- Do not touch the aluminum sheet on the air inlet side of the outdoor unit of the water heater, or there is a risk of cut.
- The maximum power of the water heater is 3000W. It's recommended to use separate circuit with the wire diameter no less than 2.5mm^2 .
- Ensure the water heater to stand still for at least 30 minutes after the unit is loaded, and then connect it to the power supply.

Tank installation

- Make sure the floor where the tank is placed can bear approximately 1.5 times weight of the tank when it is fully filled with water. During the installation, the tank cannot touch the floor directly, and there should be a raised bottom at around 20mm under the tank. Please make sure the tank is loaded steadily.
- The tank of the water heater shall be installed near to the power socket, sewer mouth and the area where water is needed (Figure 4).
- Because high temperature water may drain from the temperature and pressure relief valve on the tank during the usage of the water heater, the drainage pipes of the pressure relief port must be connected to floor drain to prevent scald.
- The water heater should be located in an area where leakage of the water heater or the pipe joint will not damage to the subjects around or the lower floors of the building.

Pipe connection

Please install the inlet and outlet pipe with the instruction on the according points on the water heater. The check valve in the accessories must be installed at the water inlet pipe. If the water pressure of the water inlet pipe is near to or exceeds the release value of relief valve (1.03MPa), please install a pressure reducing valve in the water inlet pipe far from the water heater (Figure 5).

CAUTION: Teflon tapes or sealing rings shall be used at the pipe joints to prevent leakage. Meanwhile, the relief valve cannot be too tight to prevent damage.

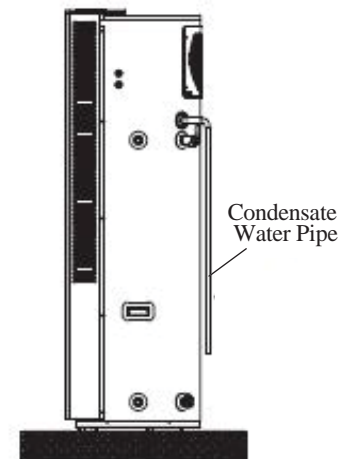


Figure 4
Installation diagram of tank

Condensate Water Pipe Connection

Ensure the condensate water pipe, connected with condensate water outlet, is unobstructed and toward floor drain without bended. (Figure 4)

Control box connection

When installing the control box on the wall, if the threading groove or wire clamber is installed on the surface, please put the control wire directly into the threading groove or wire clamber and then set the control box on the fixed plate (standard configuration) which is preinstalled on the wall. If the threading groove is pre-buried in the wall, firstly open the cover of the control box then remove the 4 screws from the control box. And open the control box and take out the control wire from it, pulling out it from the display board. And then let the control wire pass through the wire pipe (please note not to damage the two-core plug and the wire), inserting the two-core plug on the display board. Next send the display board back to the control box and close the lid of control box with tightened screw. Finally fix the whole control box on the 86 box which is preinstalled on the wall.

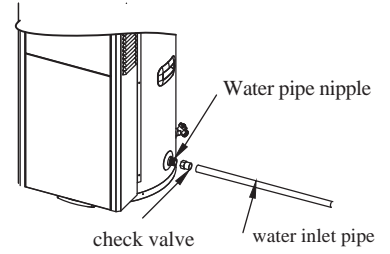


Figure 5
Installation diagram of check valve

Power Connection

- All the wires must come with water heater and be installed or replaced by authorized dealer, instead of being installed by user's own.
- It must be reliable grounded as showed in Figure 6 to avoid electric shocking. Make the ground wire connect the longer wire core than others and be the final one to be tightened under external force.
- Ensure the wires be fixed well with the plates after finish connecting.

Water Filling

After all the pipes connection, open the outlet valve of the heater and then the inlet valve. Fill heater tank with water until water flowing smoothly through outlet pipe, which means the tank is full of water. Shut off the outlet valve, and check if there is any leakage at joints. If yes, evacuate the tank, fix joints and repeat until no leakage appears.

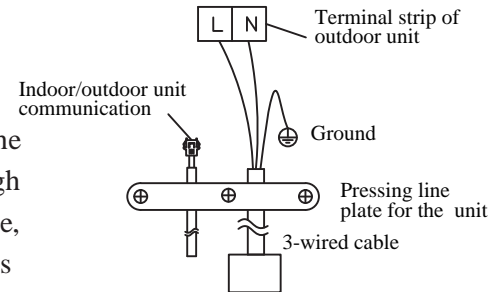


Figure 6
Power supply wiring diagram

Operation Instructions

NOTICE: Please make sure the water has been fully filled into the tank and power cord is well connected. Then make sure the water heater stand still for at least 30 minutes before powering up.

Electronic Controller Operation


1. Initial Power On

For the first-ever power connection, the electronic controller will run a self-inspection program. All indicators on the screen will light up and last for a few minutes and then power-off. (Figure 7)

Note

If the water heater is powered off (power outage or power supply disconnected), when the water heater is recycled, the temperature, timer, AES, operating mode settings will return to the states before power off.


2. Power On/Off

Press Power “

When heater is power on, pressing Power ON/OFF button turns the heater into power-off status.

Default settings: Temperature at 65 °C, Clock at 12:00.

3. Temperature setting

With the power on, press “

4. Timing


Prior to timing, clock should be set to the standard time. With the power on, Press “

Figure 7



Figure 8

Clock setting
















Long press the key “” to enter clock setting state under non-timing state, the hour digit will flash; press the key “” or “” to set the hour with a range of “0-23”, then press the key “”, the minute digit will flash; press the key “” or “” to set the minute with a range of “0-59”. If the key is hold, the data will change consecutively, then press the key “”, the clock setting will be completed and exit the clock setting state.



Figure 9

Clock view:








Under the startup state, press the key “” once to display the time (Figure 9) for 16 seconds and then to return to original state.

Long press the key “” to enter clock setting state under non-timing state, the hour digit will flash; press the key “” or “” to set the hour with a range of “0-23”, then press the key “”, the minute digit will flash; press the key “” or “” to set the minute with a range of “0-59”. If the key is hold, the data will change consecutively, then press the key “”, the clock setting will be completed and exit the clock setting state.

Clock view: under the startup state, press the key “” once to display the time (Figure 9) for 16 seconds and then to return to original state.

Timer Setting

The heating timer interval can be set based on the personal water consumption need, i.e. the point to start or stop of the water heater.

With the indicator TIMER 1 lighted up, long press and hold “” button to enter TIMER1 starting time setting state. “TIMER 1” “ON”, hour and minute digits will flash at the same time. Press “” or “” to increase or decrease the hour by 1 and the minute by 30. If the key “” or “” is hold, the set digit will change consecutively. After finishing the start time setting, press “” button to enter TIMER 1 ending time setting state. “TIMER 1” “OFF”, hour and minute digits will flash at the same time. The stop time setting is same as above. Press “” button to confirm the “TIMER 1” setting. (Figure 10, 11)

When the indicator light “TIMER 2” is on: the setting method is same as above.

With indicator of both Timer-1 and Timer-2 light up, water heater will work in both periods.



Figure 10



Figure 11

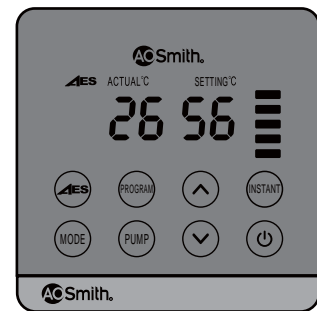


Figure 12

NOTICE:

- 1. “TIMER 1” default timer interval: 21:00-08:00;
- 2. “TIMER 2” default timer interval: 08:00-13:00;

Neither TIMER 1 nor TIMER 2 could work simultaneously with AES, that means once TIMER 1 or TIMER 2 turns on, AES will turn off automatically.

4.AES

Press “AES” button to display AES and enter AES mode. Press “AES” button again to exit from AES working mode. (Figure 12)

Note: AES could not work simultaneously with any timer, which means once AES turns on, Timer will turn off automatically.

5. Instant heating

Press “INSTANT” to turn on “Instant heating” with ✱ flashes for three times, both electric heater and pump heater are operating at same time (Figure 12, 13), the circulating pump is operating single time at same time, the electric heater will be activated in case the pump heater is not under operation condition. Press “INSTANT” again to turn off “Instant heating” with ✱ flashes for three times.

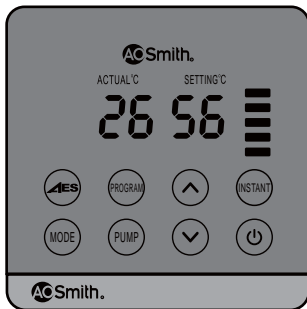


Figure 13

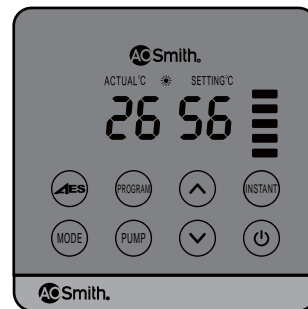







Figure 14

6. Pump circulation (Figure 15)

Press the key “”, and then the character “Pump” will be lighted on and the pump installed in the inlet and outlet pipes of the water heater will start the circulation immediately.

Timing setting of circulation pump

Long press the key “” to enter the setting of the circulation pump, and press the key “” or “” to adjust the temperature. Then press the key “” to enter the setting of the starting and ending time of the circulation pump. Detailed timing setting operation please refers to the timing setting.

The default set temperature of the circulation pump is 45°C; the adjustable range of the temperature is 40°C-65°C.

The default operation period of the circulation pumps respectively are 06:00-09:00 and 17:00-22:00.

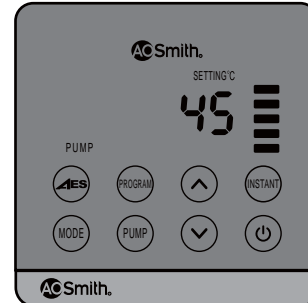



Figure 15

7. Reset

Reset may help heater recover from misoperation or fault. Press and hold both “PROGRAM” and “INSTANT” simultaneously for 8 seconds, will turn off the heater after 2 seconds display off all characters on screen, and reset setting temp, clock, timer to default status and remove AES memory and faulty code.

8. Heating mode

Press the key “” to switch the heating mode between “EFFIENCY” and “HYBIRD TURBO” with the lighted up indicator.

In Efficiency mode, the heater is heating highly efficiently;

In Hybrid Turbo mode, the heater is heating rapidly.

Temperature and pressure relief valve Inspection

Temperature and pressure relief valve is a kind of protection device against overpressure, thus it is a normal phenomenon to see water discharged from safety valve when water pressure rises over 0.8Mpa due to heating or supply reason. User should check temperature and pressure relief valve regularly as follow: open handle on temperature and pressure relief valve to get rid of the calcium carbonate deposit and etc., if water dose not discharge from valve, please contact local authorized dealer.

Maintenance Instructions

DECLARATION: Only authorized service staff is permitted for maintenance service. Improper maintenance may have risk of serious injury or property damage.

WARNING: Ensure heater is disconnected from power source before maintenance to avoid electric shock.

CAUTION: User may do some easy repair works referring to the trouble shooting chart, before contact local authorized dealer.

Maintenance

- Drain the tank if needed: Close water inlet valve, open drain valve, rotate the handle on the temperature and pressure relive valve then drain water through discharge pipe.
- Clean the tank regularly.
 1. Cut off the power and empty the tank
 2. Connect the water outlet pipe with tap water and fill water through this end. Open the drain valve to connect with floor drain, and discharge water through this end.
 3. Open water inlet valve to get maximum tap water flow, flush the tank until clean water come out of tank.
 4. Close the drain valve and reconnect the pipe joint, and check if there is leakage.

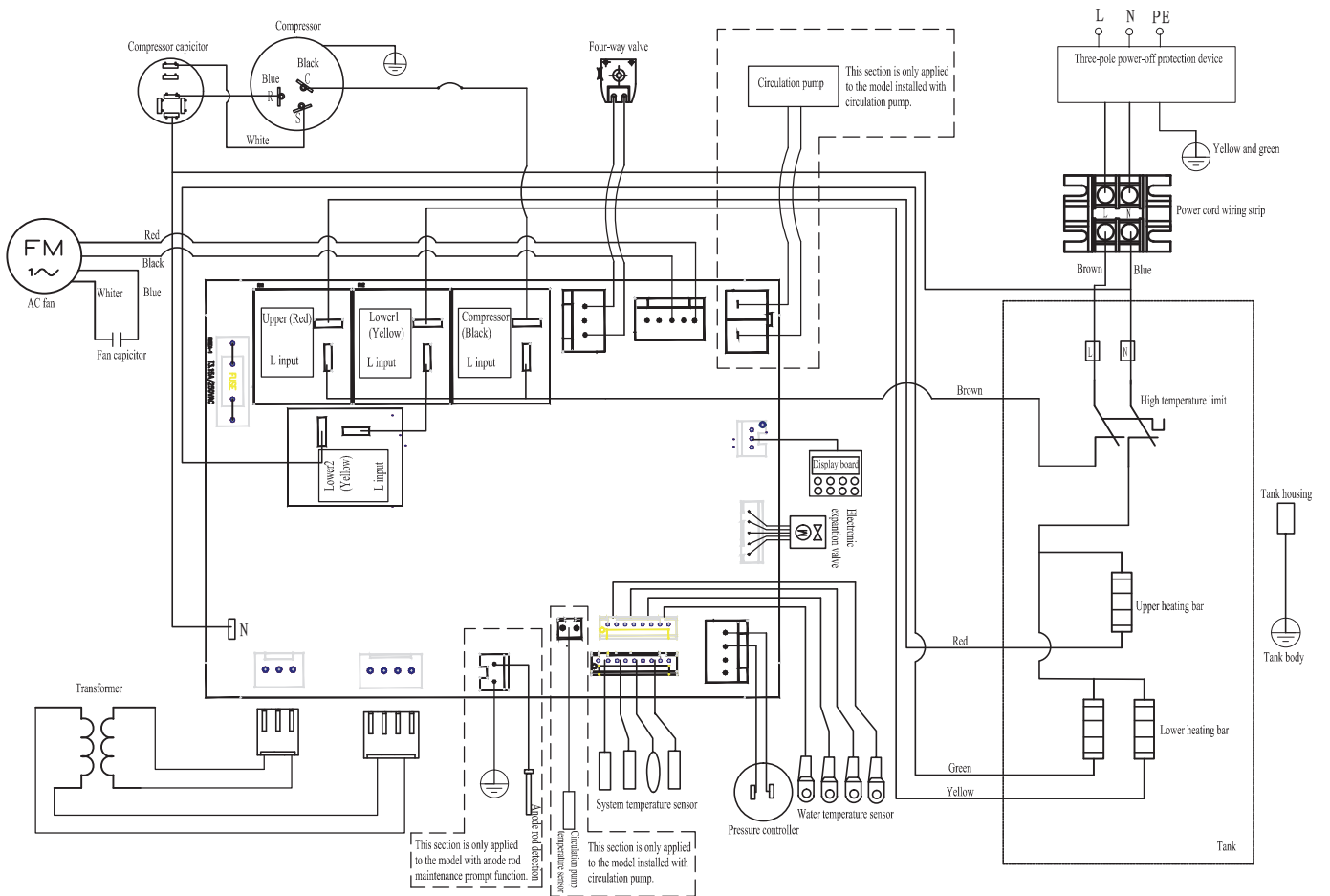
CAUTION: Be cautions in the hot water discharged from the tank, as it is at the risk of scald.

Troubleshooting

Fault phenomenon	Possible reasons	Solution
No display No hot water	Water heater power off No power available in electric socket Failure in control circuit or internal wiring	Power on water heater Check electric socket Contact local authorized dealer.
No display Too high water temperature	ECO error Power board error	Contact local authorized dealer
Display No hot water	Heating element or internal wiring failure	Contact local authorized dealer
Water leakage	Pipe connection lose Tank leakage	Contact local authorized dealer
Display “E1”	White wiring with eight-core terminal short circuit or open circuit	Contact local authorized dealer
Display “E2”	Blue wiring with eight-core terminal short circuit or open circuit	Contact local authorized dealer
Display “E4”	Black wiring with eight-core terminal Short circuit or open circuit	Contact local authorized dealer
Display “E6”	Red wiring with eight-core terminal short circuit or open circuit	Contact local authorized dealer
Display “E8”	Abnormal anode bar wiring	Contact local authorized dealer
Display “H6”	Green wiring with eight-core terminal short circuit or open circuit	Contact local authorized dealer
Display “H7”	Blue wiring with eight-core terminal short circuit or open circuit	Contact local authorized dealer
Display “H8”	Yellow wiring with eight-core terminal short circuit or open circuit	Contact local authorized dealer
Display “H9”	Black wiring with eight-core terminal Short circuit or open circuit	Contact local authorized dealer
Display “H0”	The circulation pump temperature probe is shorted or opened when the circulation pump is started.	Contact local authorized dealer
Abnormal noise	The inner components, brackets or pipe deformation. Screw is loosing	Contact local authorized dealer
Abnormal noise during operation	The normal noise during operation including: Fan operation Compressor operation Refrigerant flowing Action of relay.	Contact local authorized dealer

Wiring diagram

Figure 16 Electrical wiring diagram



Notice

- Before installation, check and confirm if water heater power, electricity meter and wiring match up with each other.
- The heat pump water heater should be grounded reliably. It is prohibited to connect the earth wire to neutral wire or tap water pipe.
- Water of 50 or above may have risk of scald. Please check water temp by hand and use water mixing valve to get water in appropriate temperature.
- Be cautious about the hot water discharge through temperature and pressure safty valve, as it may have risk to cause scald.
- For indoor installation, it is normal that the air outlet grill may have a little condensate water if the indoor environment temperature and humidity is at a higher level.
- The display panel needs to be installed indoors, and waterproof measures must be taken if installed outdoors.

Packing list

ITEM	DESCRIPTION	QTY
1	Tank of water heater	1
2	Fixed plate of controller	1
3	Screw	2
4	Silicon rubber sealing ring	4
5	Drain pipe	1
6	Water pipe nipple	2
7	Temperature and pressure relief valve	1
8	Check valve	1
9	Drain valve	1
10	Manual	1



A.O.SMITH WATER HEATER CO., LTD