

Midea Sanitary Water Cycle Split Type Heat Pump Water Heater Technical Manual

Applicable Model: (Single-wall Heat-exchanger)

RSJF-32/CN1-C

RSJF-50/CN1-C

RSJF-72/CN1-C

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1. General Information

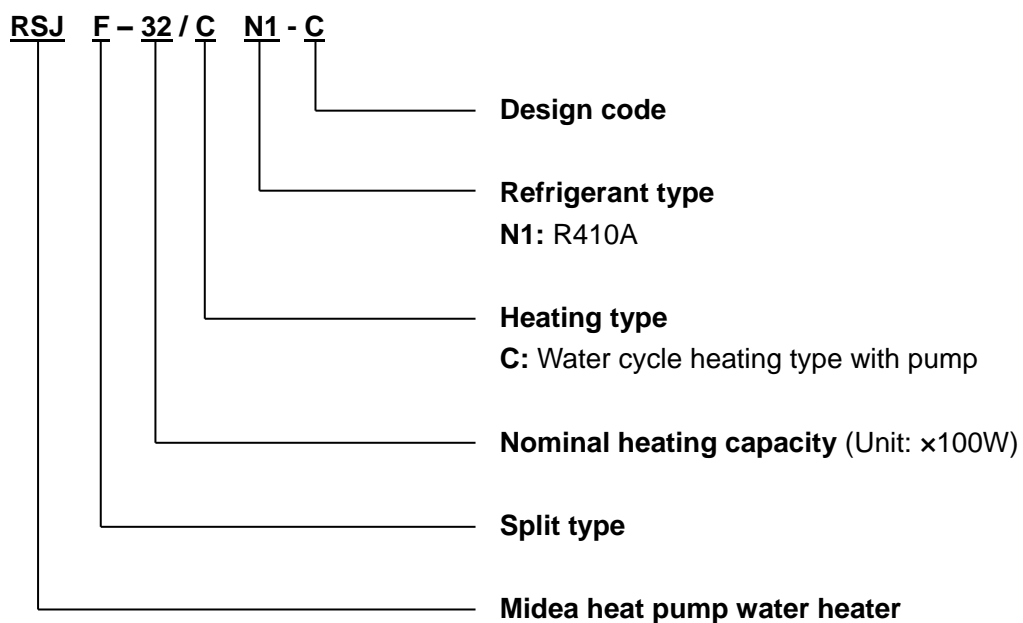
1.1 Measurements

Model	Net/Gross weight (kg)	Dimension WxHxD (mm)	Power Supply
RSJF-32/CN1-C	48/52	790x765x275	220-240V~, 50Hz, 1Ph
RSJF-50/CN1-C	55/58	790x765x275	220-240V~, 50Hz, 1Ph
RSJF-72/CN1-C	68.5/74	845x945x335	220-240V~, 50Hz, 1Ph

1.2 External appearance



1.3 Nomenclature



2. Specification & performance

2.1 Features

◇ Safety

1. Realize isolation between water and electricity. No electric shock problem.
2. No fuel tubes and storage, no potential danger from oil leakage, fire, explosion etc.

◇ Environmental protection

Environment friendly refrigerant R410A is used. No discharge of poisonous gas. No pollution to atmosphere and environment

◇ Max. water temperature: 60°C

◇ Rapid speed to produce hot water.

The water tanks can match with the same outdoor unit freely.

◇ Easy operation and automatic control

The system can be controlled simply through the wired controller.

◇ Automatic start-up and shutdown, automatic defrosting. Save you much extra operation.

◇ High efficiency and energy-saving

The unit adopts heat pump principle, which absorbs heat from outdoor air and produce heat water; thermal efficiency is high and it is energy-saving.

◇ Convenient installation and maintenance

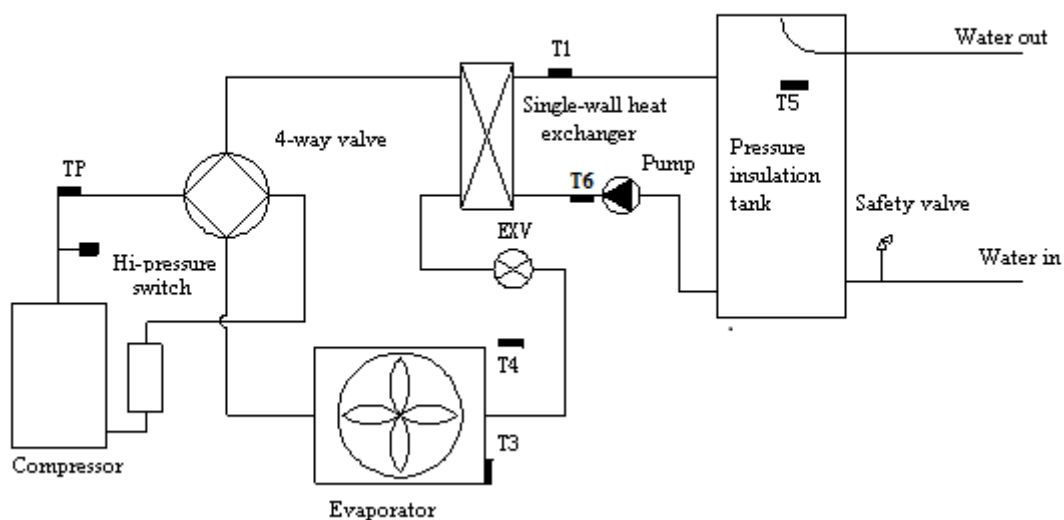
The quadrate type can be easily installed in a corner of the verandah even if it's very narrow.



◇ All-the-weather running.

Within the temperature range from -7 to 43°C, it will not be affected by night, overcast sky, rain and snow.

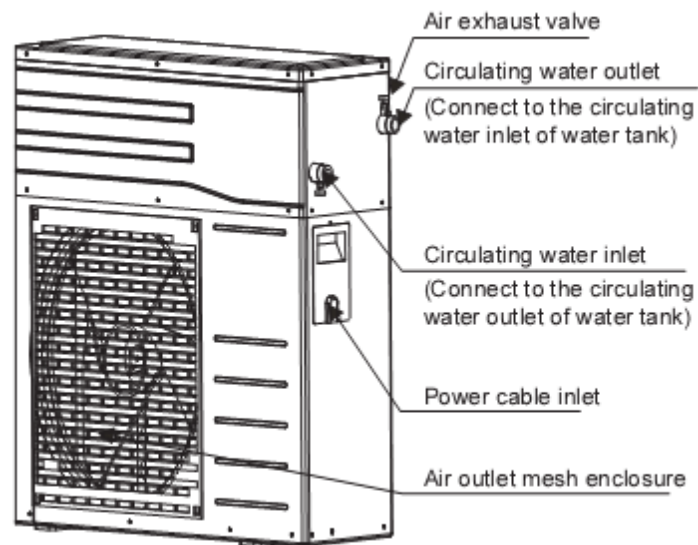
2.2 Refrigerant circuit



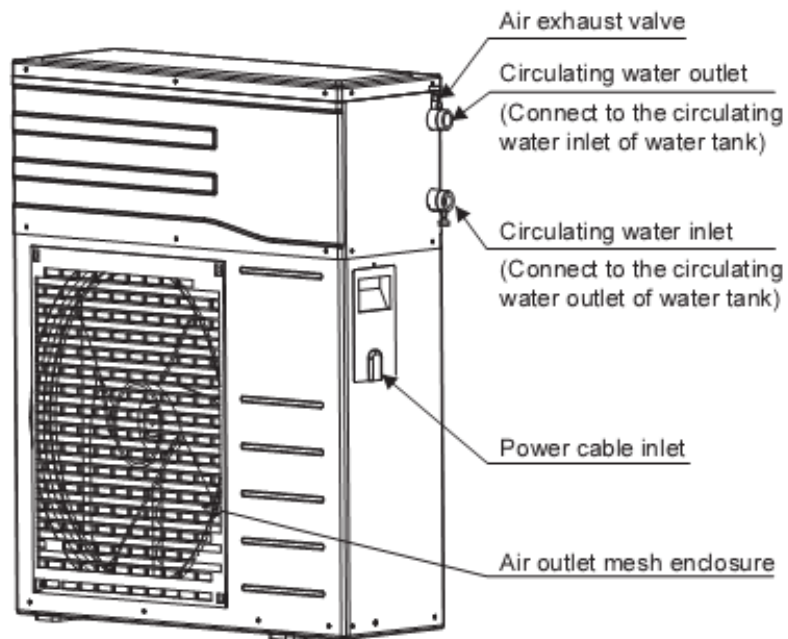
- ✧ **Compressor:** Compressors are supplied by GMCC. PA118M1C-4FZ2 is used in RSJF-32/CN1-C; PA160X2C-4FT is used in RSJF-50/CN1-C; PA240M2CS-4KU1 is used in RSJF-72/CN1-C.
- ✧ **Evaporator:** Copper tube and aluminum fin type heat exchanger.
- ✧ **Single-wall heat exchanger:** Single-wall heat exchanger is use for heat exchange between refrigerant and water.
- ✧ **EXV:** Electronic expansion valve, the opening is regulated according to the discharge air temperature of compressor.
- ✧ **Fan:** Axial fan with two speeds. The motor is supplied by Welling.
- ✧ **High Pressure Switch:** When the discharge pressure of compressor is 4.4Mpa or higher, the protection switch will be triggered, and if the discharge pressure is down to 3.2MPa, the protection switch will be recovered.
- ✧ **Pump:** Water pump built in main unit, the water pump head is 5.5 meters. Water pump is supplied by Wilo.

2.3 Unit outlook

RSJF-32/CN1-C, RSJF-50/CN1-C



RSJF-72/CN1-C



2.4 Specifications

Model			RSJF-32/CN1-C	RSJF-50/CN1-C	RSJF-72/CN1-C
Power supply		\	1Ph, 220-240V~, 50Hz		
Ambient temperature		°C	-7~43		
Outlet water temperature		°C	40°C~60°C , default 50°C		
Storage size of optional tank		L	260/300/350/400		
Water heating	Capacity	kW	3.00	4.30	6.50
	Input	kW	0.87	1.22	1.72
	COP	W/W	3.45	3.53	3.78
	Max. current	A	6.8	8.5	12.4
Dimension (W×H×D)		mm	790×765×275	790×765×275	845×945×335
Packing (W×H×D)		mm	905×807×355	905×807×355	965×1,009×395
Net/gross weight		kg	48/52	55/58	68.5/74
Outdoor noise level		dB(A)	53	55	55
Refrigerant type/quantity		\	R410A/0.7kg	R410A/0.9kg	R410A/1.0kg
Refrigerant design pressure		MPa	4.4/2.6	4.4/2.6	4.4/2.6
Water side heat exchanger		\	Single-wall heat exchanger		
Throttling type		\	Electric expansion valve		
Air flow		m ³ /h	2,000	2,000	3,200
Compressor	Model	\	PA118M1C-4FZ2	PA160X2C-4FT	PA240M2CS-4KU 1
	Type	\	Rotary	Rotary	Rotary
	Brand	\	GMCC	GMCC	GMCC
	Capacity	kW	2.780	3.910	5.870
	Input	kW	0.955	1.350	1.985
	Rated current (RLA)	A	4.50	6.25	9.3
	Locked rotor Amp. (LRA)	A	27	27.4	36
	Thermal protector	\	Internal	Internal	Internal
	Capacitor	\	25μF/450V	35μF/440-450V	50μF/370V
	Refrigerant oil	ml	350	480	750

Continued:

Model		RSJF-32/CN1-C	RSJF-50/CN1-C	RSJF-72/CN1-C	
Fan motor	Model	\	YDK36-6R-1	YDK36-6R-1	YDK65-6N
	Brand	\	Welling	Welling	Welling
	Input	W	74/51	74/51	134/60
	Speed	r/min	770/480	770/480	830/450
	Insulation class	\	B	B	B
	Safe class	\	IPX4	IPX4	IPX4
	Locked rotor Amp. (LRA)	A	0.42	0.42	0.88
	Capacitor	\	3.5 μ F/450V	3.5 μ F/450V	3 μ F/450V
Evaporator	Number of rows	\	1.6	2	2
	Tube pitch(a) x row pitch(b)	mm	21x13.37	21x13.37	21x13.37
	Fin space	mm	1.5	1.5	1.5
	Fin type	\	Hydrophilic aluminum		
	Tube diameter	mm	Φ 7		
	Type	\	Inner groove copper tube		
	Lengthx Height	mm	757x504	741x508	755x630
	Number of circuits	\	3	4	4
Pump	Model	\	RS15/6-RG		
	Brand	\	Wilo		
	Max. Lift	m	5.5		
Water pipeline	Water inlet pipe	\	DN20	DN20	DN20
	Water outlet pipe	\	DN20	DN20	DN20
	Water circulating pipe	\	DN20	DN20	DN20
	Operating pressure	MPa	0.2~0.7	0.2~0.7	0.2~0.7
Controller	\	KJR-51/BMKE-A			
Hot water yield	m ³ /h	0.516	0.74	1.12	
Loading Quantity (20'/40'/40H)	Pcs	76/160/240	76/160/240	64/134/134	

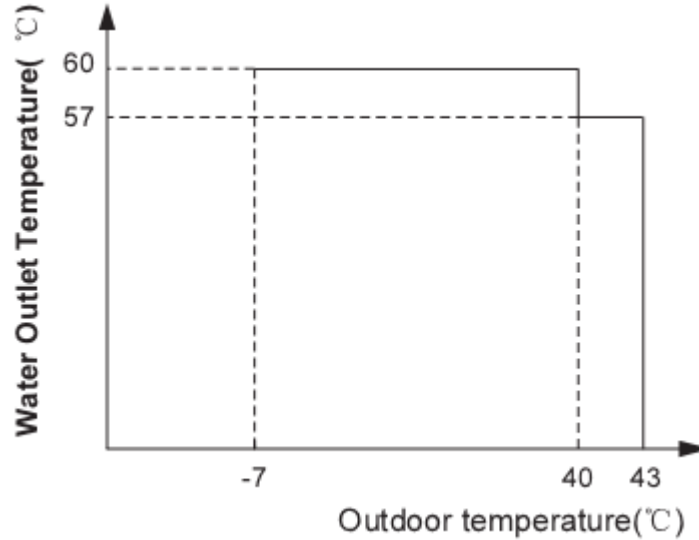
Notes:

1. The test conditions: outdoor temperature 7/6°C (DB/WB), inlet water temperature 30°C, outlet water temperature 35°C.
2. Sound pressure value test conditions: four side of the unit, distance: 1m, height: 1m plus half of the unit's height.
3. The specification may be changed for product improvement, please refer to the nameplate.

2.5 Performance diagram

◇ Operation range

Outlet water temperature range: 40~60°C. Running ambient temperature range: -7~43°C.

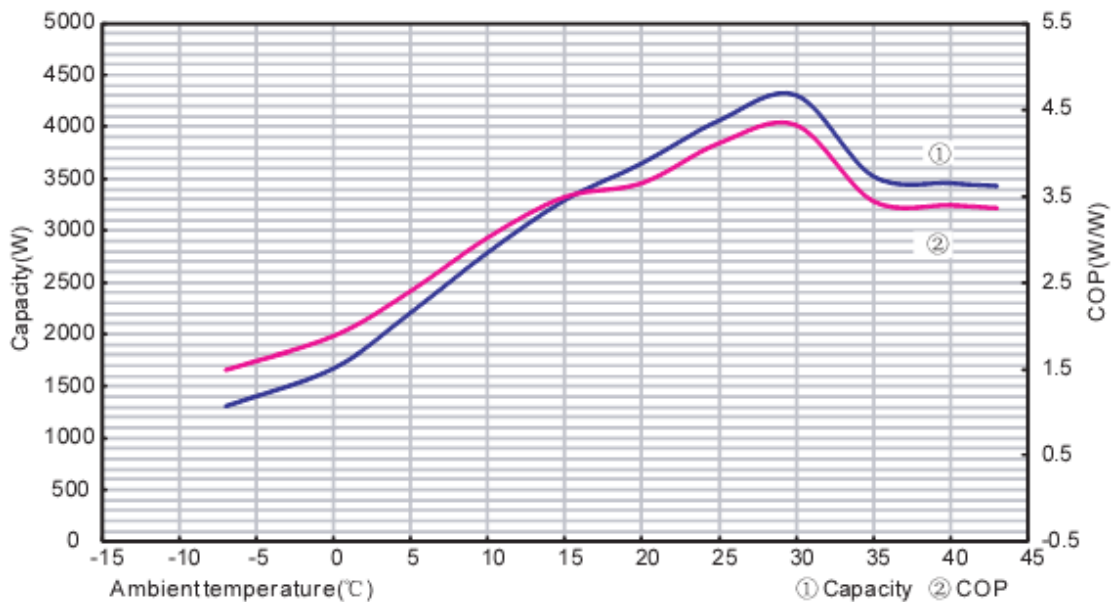


Notes:

The unit outlet water temperature is under full-automatic control and the water tank is the press type. When the user is using hot water, cold water will be added into the water tank constantly to decrease the temperature. Considering the actual using characteristics, the hot water (above 40°C) amount should account 90% of the tank volume.

◇ Unit capacity and energy efficiency diagram in different ambient temperature

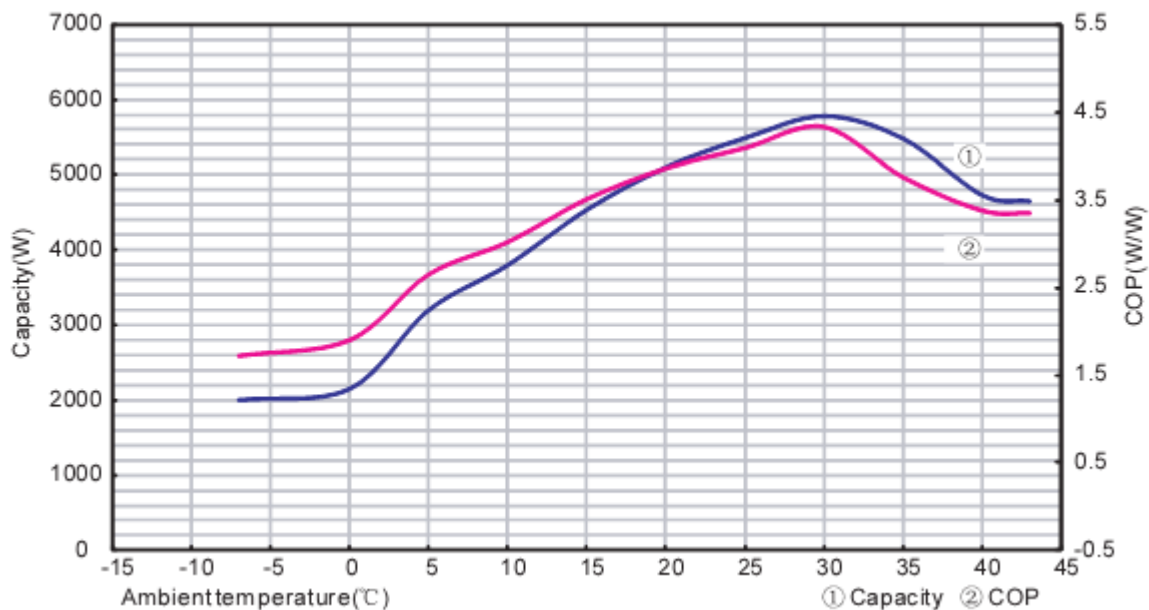
RSJF-32/CN1-C:



Notes:

The test conditions: outdoor temperature 7/6°C (DB/WB), inlet water temperature 9°C, outlet water temperature 55°C.

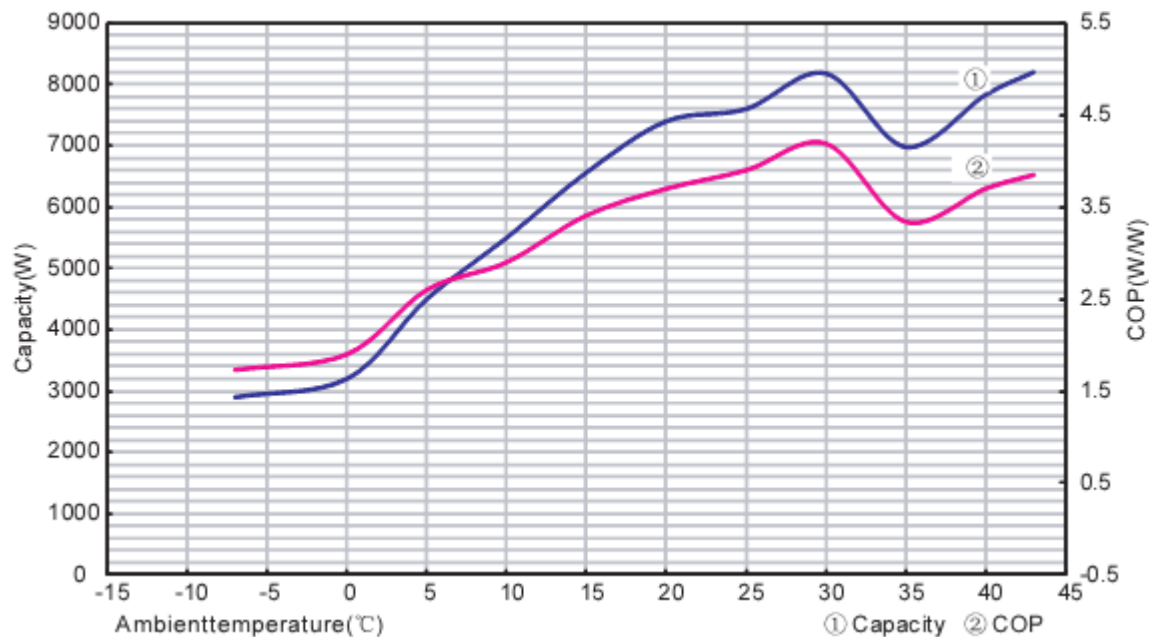
RSJF-50/CN1-C:



Notes:

The test conditions: outdoor temperature 7/6°C (DB/WB), inlet water temperature 9°C, outlet water temperature 55°C.

RSJF-72/CN1-C:

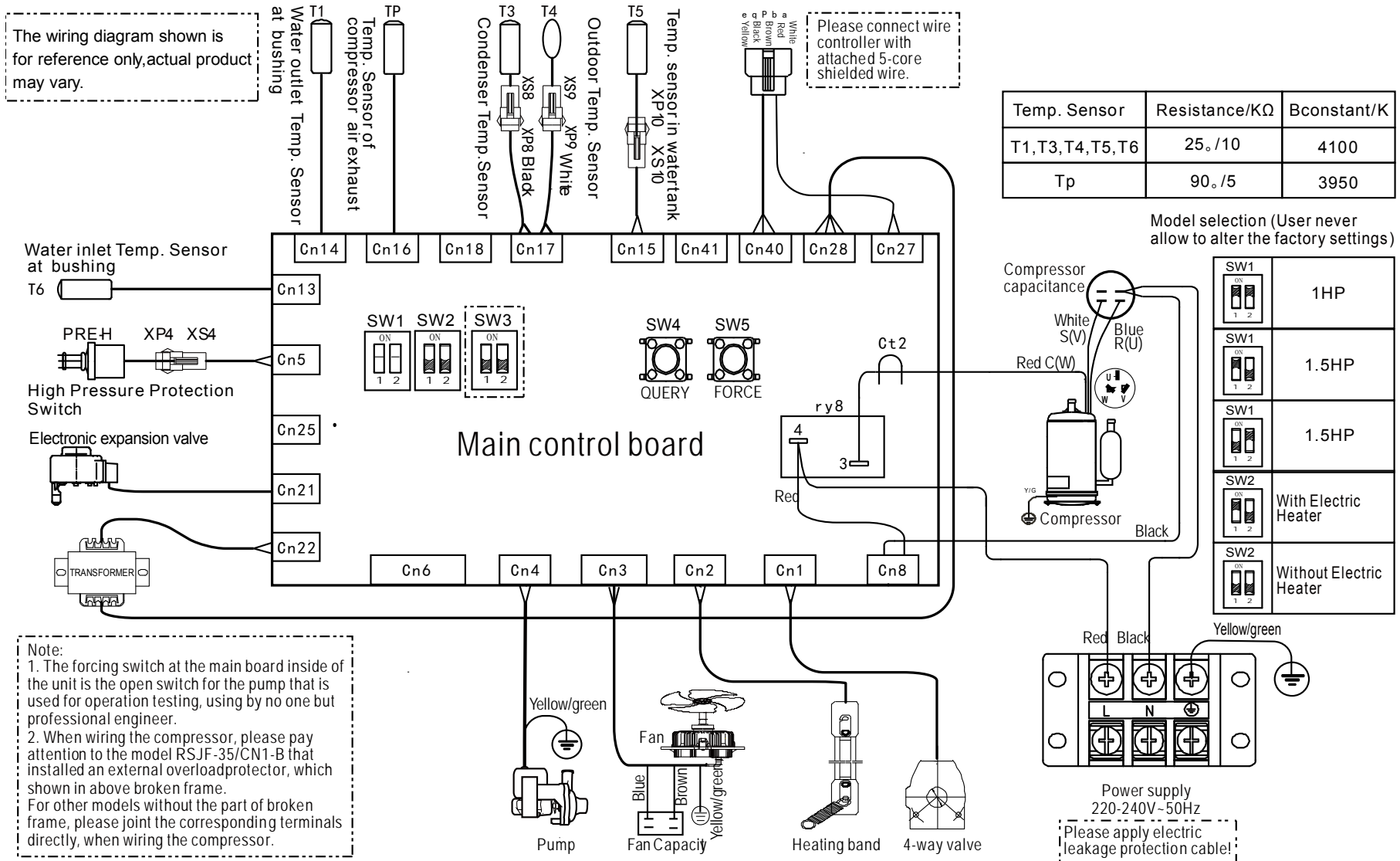


Notes:

The test conditions: outdoor temperature 7/6°C (DB/WB), inlet water temperature 9°C, outlet water temperature 55°C.

There is different COP in different ambient temperature. Normally lower ambient temperature result in longer heat-up time because of lower effective performance.

2.6 Wiring diagram RSJF-32(50)/CN1-C



RSJF-72/CN1-C

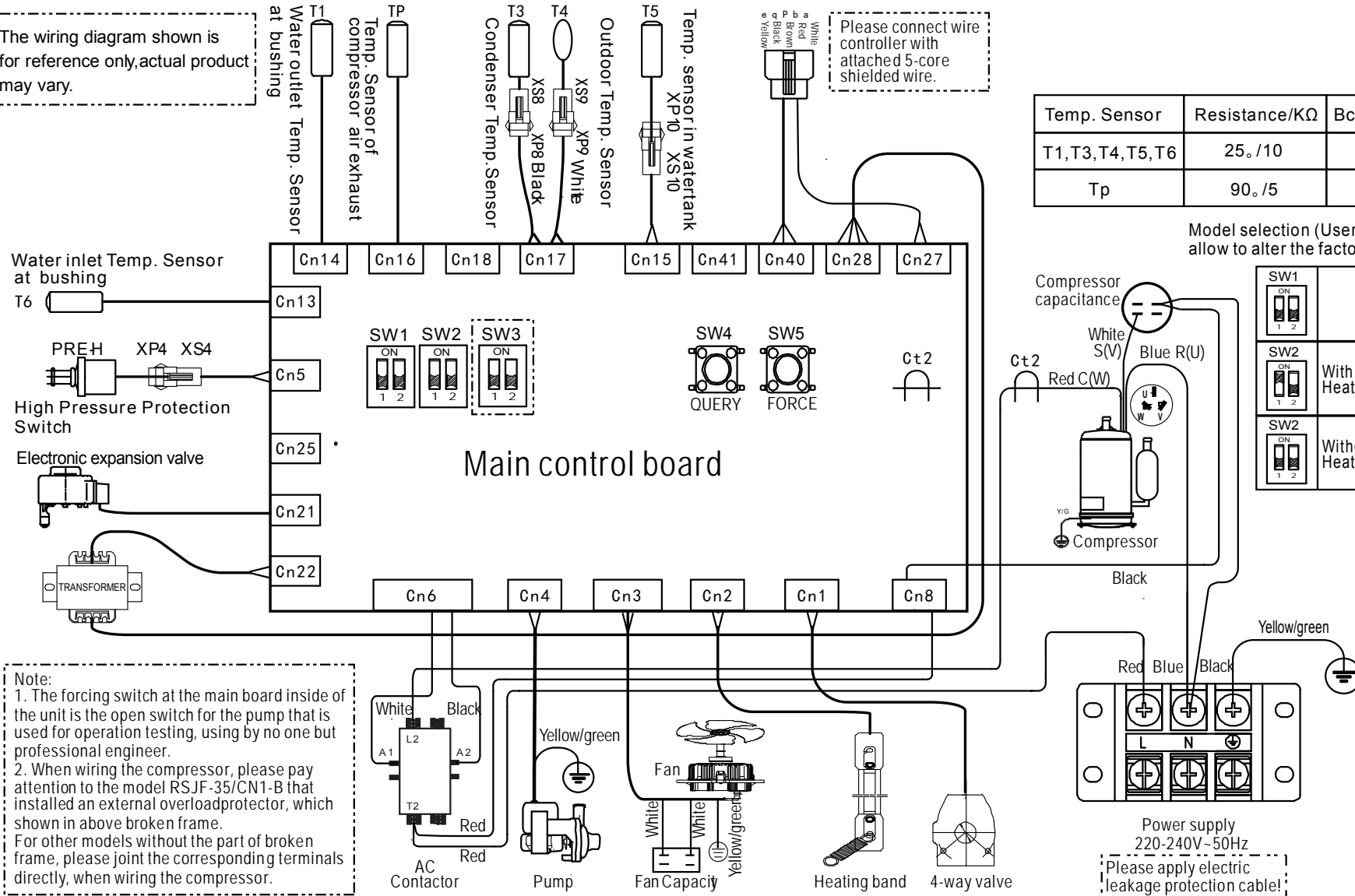
The wiring diagram shown is for reference only, actual product may vary.

Please connect wire controller with attached 5-core shielded wire.

Temp. Sensor	Resistance/KΩ	Bconstant/K
T1, T3, T4, T5, T6	25. /10	4100
Tp	90. /5	3950

Model selection (User never allow to alter the factory settings)

SW1	2HP
SW2	With Electric Heater
SW2	Without Electric Heater



Note:
 1. The forcing switch at the main board inside of the unit is the open switch for the pump that is used for operation testing, using by no one but professional engineer.
 2. When wiring the compressor, please pay attention to the model RSJF-35/CN1-B that installed an external overload protector, which shown in above broken frame.
 For other models without the part of broken frame, please joint the corresponding terminals directly, when wiring the compressor.

Please apply electric leakage protection cable!

2.7 Installation

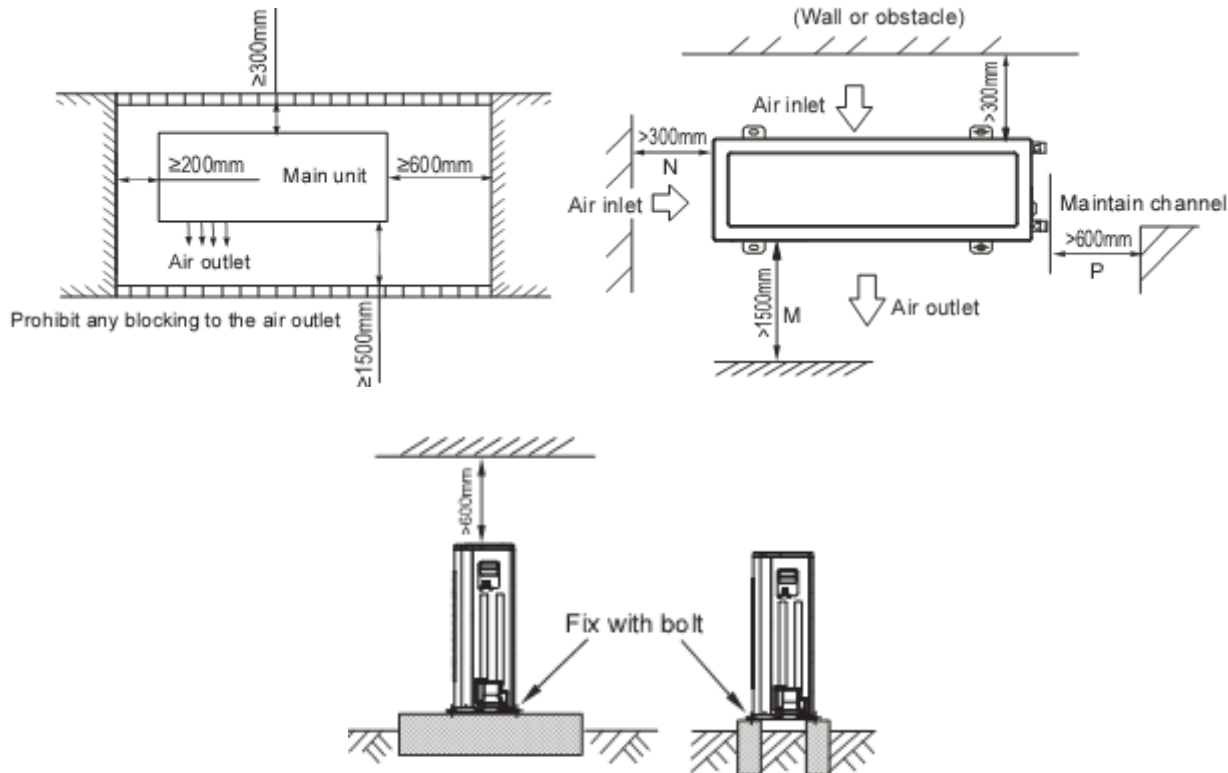
2.7.1 Transport

- ✧ Choose the correct way of conveying the equipment.
- ✧ Try to transport the equipment with the original package.
- ✧ The main unit should be put down gently during transportation, and main unit could not be leaned more than 45 degree.
- ✧ Guard boards could be applied to avoid scratching and deforming of the unit surface.

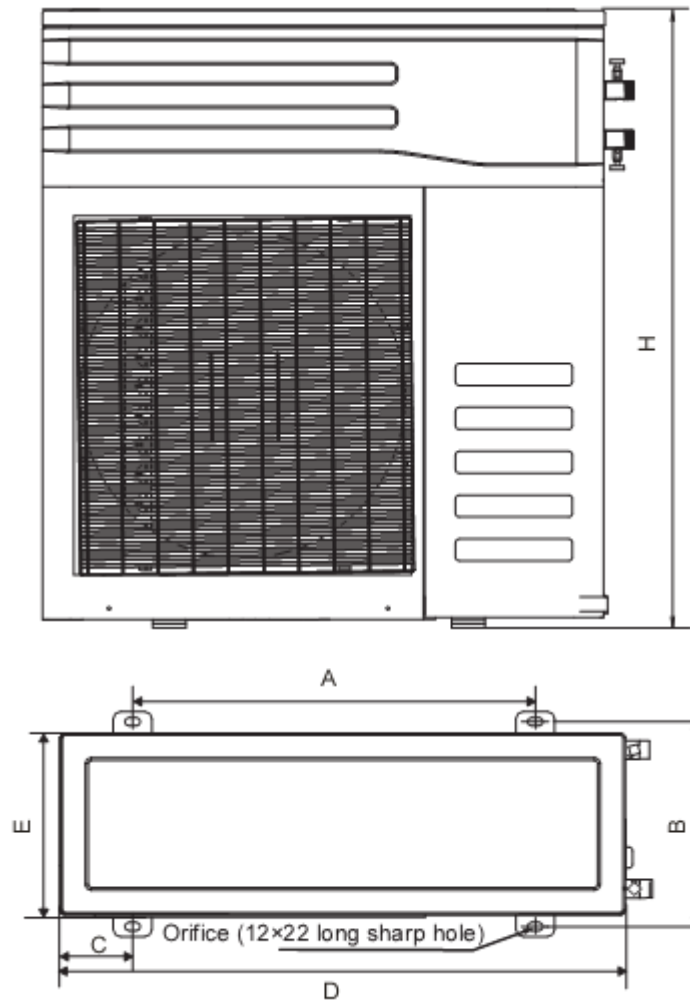
2.7.2 Main unit installation

Location of outdoor installation

- ✧ Ensure enough space for installation and maintenance.
- ✧ A distance of no less than 200mm should be preserved between the bottom of the outdoor unit and the ground or bracket for the installation of the duct pipe.
- ✧ If the unit installed in an underground chamber, an indoor room or other hermetic place, pay attention to where surrounding air, as well as which air exhaust and air circulating system. For every signal unit, which circulating air volume shall no less than $2400\text{m}^3/\text{h}$.



Space of foot screw bolts (unit: mm)



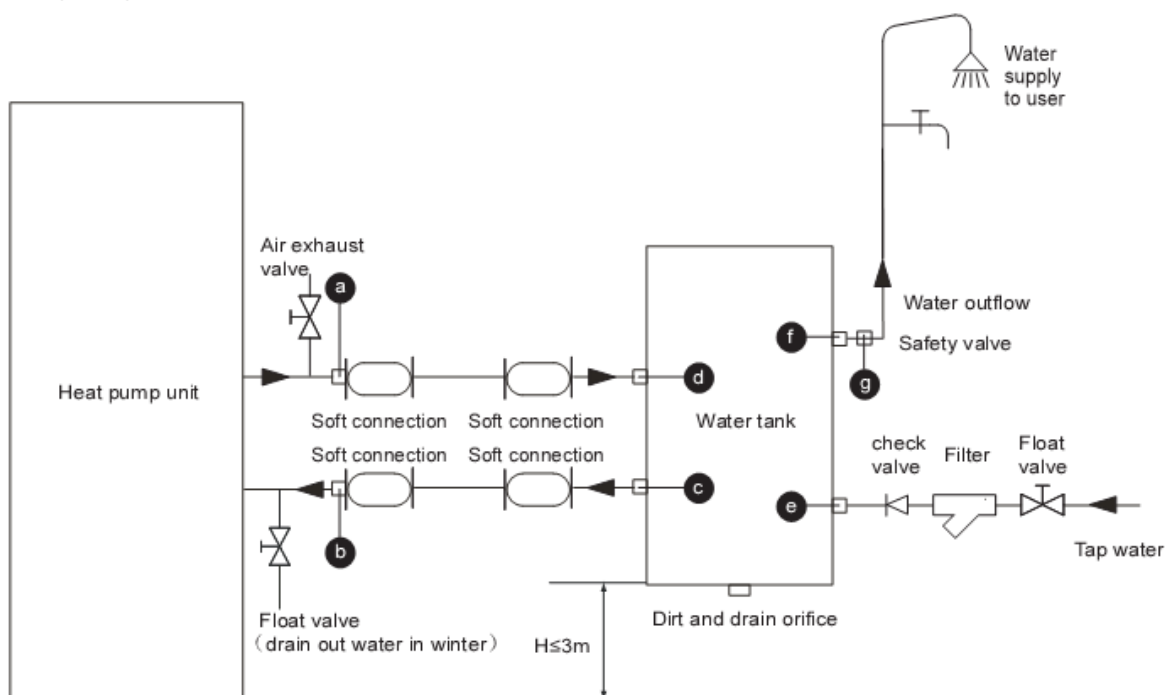
Model	A	B	C	D	E	H
RSJF-32/CN1-C	563	295	100	790	275	765
RSJF-50/CN1-C	563	295	100	790	275	765
RSJF-72/CN1-C	560	330	140	845	320	945

2.7.3 Water system piping

Installation material preparative

Name	Quantity	Specification and usage
Water pipe, flexible joint	Decided by the project needs.	Metal, non-metal composite pipes; PPR pipe, polyethylene-aluminum composite pipeline, etc.
Hydraulic gauge	One per unit	Scale 0.2bbar; Measure 8bar
Ball valve	One per unit	Water tank inlet pipeline
Heat preservation material for hot water pipeline	According to the length of the hot water pipeline.	Heat preservation material for hot water pipeline.
Heat preservation material for refrigerant pipeline	According to the length of the refrigerant pipeline.	Heat preservation material for refrigerant pipeline
Electric Control Box	One	Power supply connection; Install the wired controller, ammeter, etc.

Connecting diagram of the water heater



No.	Name	Connective pipe specification
a	Circulating water outlet of main unit	DN20
b	Circulating water inlet of main unit	DN20
c	Circulating water outlet of water tank	DN20
d	Circulating water inlet of water tank	DN20
e	Cold water inlet	DN20
f	Heat water outlet	DN20
g	Safety valve	DN20

Pipe installation notes

- ✧ During installation of pipe connection, make sure no dust or other impurities is intruded into the pipeline system.
- ✧ The height difference between the water outlet of heat pump and water inlet of water tank should be less than 3 meters. If the height difference is higher than 3 meters, please contact your dealer.
- ✧ Water inlet and outlet pipes can be installed as long as the water-heating A/C has been fixed.
- ✧ Thermal insulation materials should be employed to seal up water outlet and inlet pipes.
- ✧ Connection and installation of the unit pipeline

When connecting the inlet and outlet pipeline of the unit, use pipeline grips to vice the two parts that should be connected together to ensure that the inlet and outlet pipelines will not rotate.

- ✧ The water inlet and outlet pipeline cannot be installed until the water heater is fixed well.
- ✧ Before operation, please confirm that the specifications of connective pipes are correct, and thermal insulation layer have been wrapped on pipes. It requires that the length of circulating pipe should not longer than 10 meters; all pipes have been sealed up; no water leakage.

2.7.4 Electric connection

- ✧ The air source water heater shall have a specialized power supply, which in compliance with rated voltage.
- ✧ If the unit needs to be installed on a metal part of the building, electric insulation must be performed, and the installation must meet the relevant technical standards of electric devices.
- ✧ Power supply circuit of the air source water heater should be earthed, the power cord should be connected with the external earthing line in reliable state and all the external earthing cables are effective.
- ✧ Wiring must be performed by professional technicians in accordance with the circuit diagram.
- ✧ Set up leakage protection devices in accordance with the requirements of the relevant national technical standards.
- ✧ Power cord and the signal cable shall be laid out orderly and separately.
- ✧ The unit is not equipped with power cord. User could select power cable by reference to power supply specifications. Shield wire must be employed for signal wire.
- ✧ All wiring should be finished, before power is switched on to the unit, be confirm all connection are correct.

Specifications of power supply

Model	Power supply	Min. wire size(mm ²) (Metal pipe & synthetic resin pipe wire)		Manual switch(A)		RCCB	Model
		Size (Continuous length:≤30m)	Ground wire	Cap.	Fuse		
RSJF-32/CN1-C	220-240	1.5	1.5	20	15	30mA ≤ 0.1sec	LBC-16 -1-CP
RSJF-50/CN1-C	V~, 50Hz	1.5	1.5	20	15		
RSJF-72/CN1-C		2.5	2.5	30	25		

- ✧ No power supply device is used; the specifications depend on connected unit's actual status.
- ✧ Power supply device is used; the specifications can be derived from the above table according to the total horsepower of heating water air conditioner.
- ✧ The power cord type designation is H07RN-F.
- ✧ Wire size and continuous wire length in the table above only available for the case of the voltage decreasing range not exceeds than 2%.
- ✧ If the continuous wire length value larger than the one of the table, please choose its size in compliance with the relevant rules.

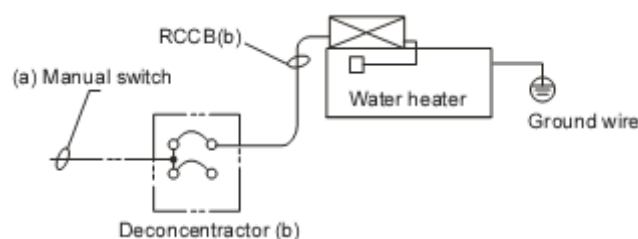
Specifications of wired controller wiring

Name	Quantity	Specification	Remarks
5-core shielded cable	1	RVVP-300/300 5× 0.75mm ²	Length < 50m

Notes:

When the power cord and the controlling wire are parallel, please place the wire in the respective tube and leave suitable distance between the lines.

Power supply device



Notes:

Although there is a leakage protector in the electric control box of the unit, for the security reason, it is required that a leakage protector should be installed in the external electric control box of the unit according to the requirement on the above diagram.

Cable diameter selection

✧ The power supply wiring refers to the wiring to the main line (a) of junction box and the wiring (b) to the power supply equipment. Please select the cable diameter according to the following methods

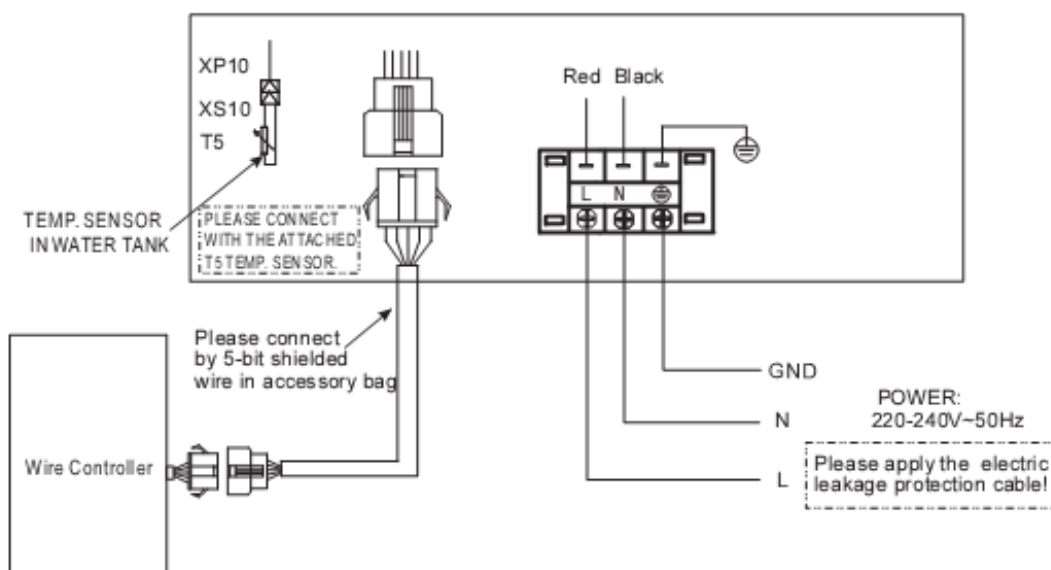
✧ Diameter of the main line (a):

Get from the power supply specification table according to the sum of horsepower of the unit.

✧ Diameter of the wiring from the junction box to the power supply equipment:

When the water heaters are less than 5 sets, the diameter the wiring from the junction box to the power supply equipment should be the same as the main line (a); when the water heaters are more than 6 sets, the power supply equipment should have two sets of electric control box and the diameter should be get from the power supply specification table according to the sum of horsepower of the units connected by the electric control box.

Electrical connection diagram

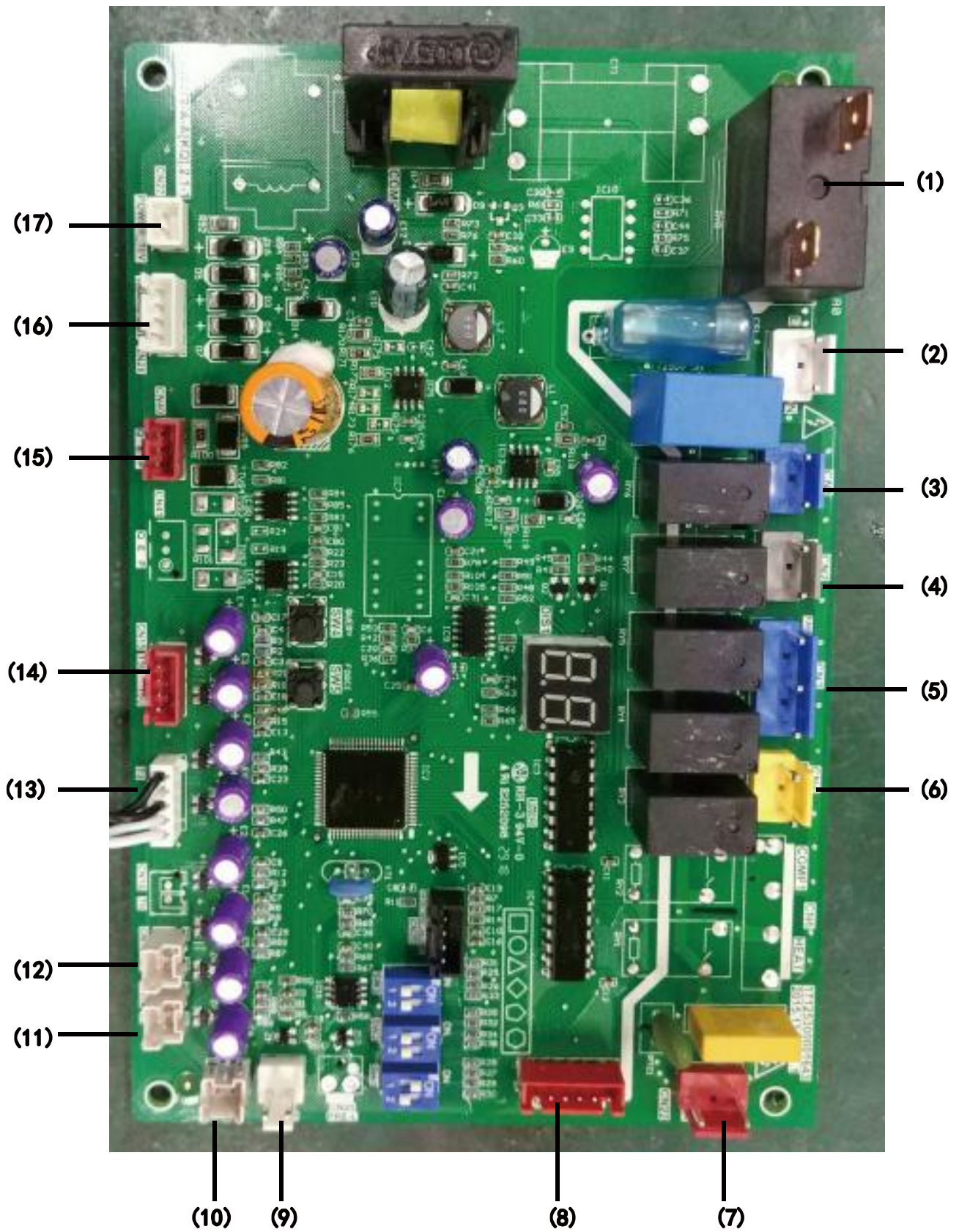


✧ Do not reverse connections of low voltage electric signal wire with heavy electric wire, otherwise some of electric control elements will be burned out.

✧ The illustration of water pump override button.

✧ The length of tank temperature sensor should not exceed 10 meters.

2.7.5 PCB I/O Ports description



Label	Port code	Content
1	RY8	Compressor power control port
2	CN8	PCB power input port
3	CN1	Four-way valve control port
4	CN2	Crank heater control port
5	CN3	Fan motor control port
6	CN4	Water pump control port
7	CN22	Transformer input port
8	CN21	EEV drive port
9	CN5	High pressure switch connection
10	CN13	Water inlet temperature sensor (T6) connection
11	CN14	Water outlet temperature sensor (T1) connection
12	CN20	Compressor discharge temperature sensor (Tp) connection
13	CN17	Heat exchanger temperature sensor outlet (T3) and ambient temperature sensor (T4) connections
14	CN15	Water tank temperature sensor (T5) connection
15	CN40	Communication port
16	CN28	Transformer output port
17	CN7	Wired controller output port

2.8 Water resupplying operation

Steps of water tank water resupplying and water pipe and pump air exhaust (artesian pressure water tank) are as follow:

- ✧ Close all air exhaust valves and customer water supply taps.
- ✧ Open water replenishing valve.
- ✧ Open user water supply tap.
- ✧ Upon tap water have been coming out and flow normally, close user water supply tap.
- ✧ Open air exhaust valves.
- ✧ After 10 minutes upon water have been coming out from air exhaust valves and flow is normal, start the pump (Within 1 minute of powering on, under off state to long press “QUERY” key over 3 seconds and then loose pressing, then the digital pipe will display “0” and be flashed with the 2Hz. Short press “QUERY” key again, till the digital pipe flashed and displayed “6”, then wait for 5 seconds, the digital pipe still display number, but the flashing frequency will be changed from 2Hz to 1Hz, and the water pump starts to constraint operation.).
- ✧ Running the pump about 10 minutes, and then turn off (Long press “QUERY” key for 3 seconds, the water pump will stop operation.), and turn off exhaust valves. Air exhaust process is finished.
- ✧ Open user water supply tap and out flow water for about 1 to 2 minutes and then close it up, heat

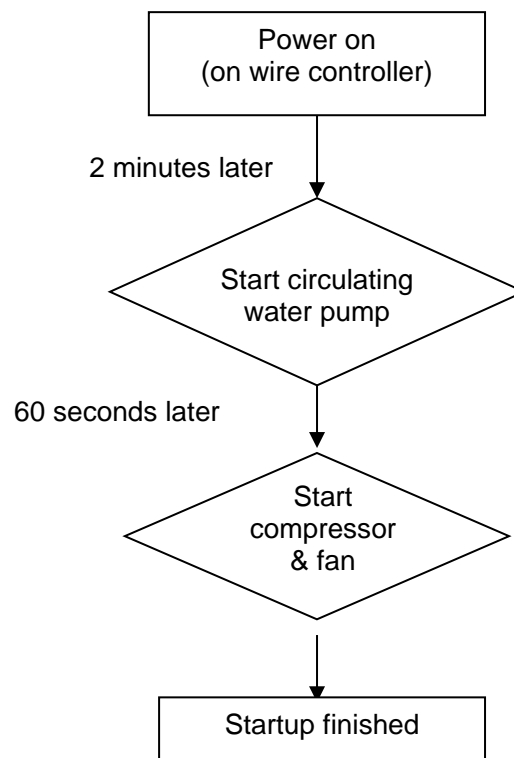
pump unit can now be started.

2.9 Trial run

Checking list before trial-running:

- ◇ All the installation is complete.
- ◇ Water heater is installed correctly.
- ◇ The pipelines and wiring are correct.
- ◇ The accessories are installed correctly.
- ◇ The drainage is smooth.
- ◇ The thermal insulation is sound.
- ◇ The earthing wire is connected correctly.
- ◇ The power voltage is consistent with the rated voltage of the heater.
- ◇ No obstacle at the air inlet and outlet of the unit.
- ◇ The leakage protector can work effectively.

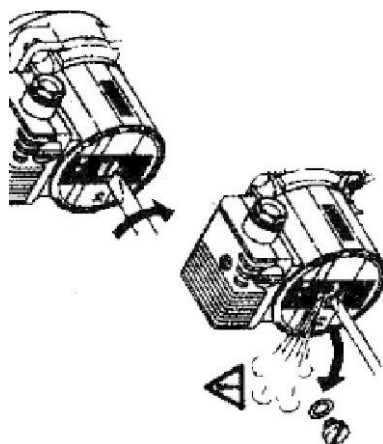
Startup process



Trial operation check

Control the water heater operation by wired controller (from accessory) and check the following items in accordance with the User's Manual (If any error, please eliminate it according to the error code explanation and analysis in the end of this manual.):

- ✧ Whether the wired controller switch is normal.
- ✧ Whether the functional buttons of the wired controller are normal.
- ✧ Whether the indicators light up normal.
- ✧ Whether the manual operation button is normal.
- ✧ Whether the drainage is normal.
- ✧ Test whether the unit operates normally in the heating mode.
- ✧ Whether the outlet water temperature is normal.
- ✧ Whether there is vibration or abnormal sound when operating.
- ✧ Whether the wind, noise and condensed water would affect neighbors.
- ✧ Whether there is refrigerant leakage.
- ✧ When trial operating, if the water pump cannot start normally, there is air in the pump or water pump motor has frozen. Operate water pump according to the following figure, use a proper screw driver to remove the plug at the end of water pump to discharge air carefully.
- ✧ After air discharge, utilize the sink at the end of the water pump motor axial, use a screwdriver to rotate water pump rotor.
- ✧ During the process, please pay attention to prevent electric parts from being splashed wet by leak water.



2.10 Maintenance

- ✧ Inspect the air intake orifice or air outlet is blocked periodically. If any, remove the foreign substance to let the air flow fluently.
- ✧ After the unit service for a period, dirt would accumulate in the tank, so clean the tank periodically.
- ✧ Recommend tank cleaning once a month. Close all float valve and take off drain orifice under the tank, drain out water and then close all float valve and open water inlet valve. Wait until the water draining out become clear, close the drain orifice, and then done the clean process. You could reset the unit for new start.
- ✧ After a long use, check the unit stand and fitting for damage. If damaged, the unit may fall and result in injury.
- ✧ If the coil of outdoor unit is dirty, please clean it on time. Before cleaning, be sure to stop the operation, turn the breaker off or pull out the supply cord.
- ✧ Clock time displayed in wired controller should be checked monthly.

Before asking for service or repairing, check the following points:

	Condition	
Normal operation	<ul style="list-style-type: none"> ■ White aerosol or globule is give out ■ Make sound of "hiss" every now and then 	<ul style="list-style-type: none"> ■ Air supply motor stop automatically to defrost. ■ At the beginning and the end of defrost process, sound is give out in motor valve. ■ During the process of just after have stopped, sound like water flow occur, which will be amplified at the first 2~3 minutes, this is caused by the process of refrigerant current or water.
Please check that again	Stop operation or start up automatically	<ul style="list-style-type: none"> ■ Check the timer whether it is correctly set ■ Detect anti-freezing mode is operating
	No operate	<ul style="list-style-type: none"> ■ Whether the power is cut ■ Whether the manual power supply switch is off ■ Whether fuse is broken ■ Whether the protection device works (Operation lamp is lightened) ■ Whether it is the time set(Operation lamp is lightened) ■ Check whether the water pump can start normally or not. If not, there is air in the pump or water pump motor has frozen. Operate water pump according to the following figure, use a proper screw driver to remove the plug at the end of water pump to discharge air carefully. After air discharge, utilize the sink at the end of the water pump motor axial, use a screwdriver to rotate water pump rotor. During the process, please pay attention to prevent electric parts from being splashed wet by leak water. <div data-bbox="965 1272 1252 1601" style="text-align: center;"> </div>
	Inefficient heating	Whether the inlet and outlet of heat pump units is blocked

In case of the flowing malfunctions, please cut off the manual power switch and contact the local dealer or after service center:

- ✧ ON/OFF is ineffective
- ✧ IL/B trips frequently

2.11 Trouble shooting

Code	Explanation	Cause Analysis	Solution
E2	Communication failure	Communication failure between the main unit and the wired controller	Connect the main unit with the A, B, P, Q and E lines of the wired controller correctly.
		Electromagnetic interference because communication line is not the shielded line	Replace the communication line with the shielded line.
		Damage of the sensor	Replace the sensor
E3	Heating exchanger water outlet temp. sensor failure	The T1 port between the sensor and the motherboard is loose	Insert the port well.
		Sensor damage	Replace the sensor.
E4	Water temp. sensor failure in the water tank	The T5 port between the sensor and the motherboard is loose	Insert the port well.
		Sensor damage	Replace the sensor.
E5	Condenser Temp. sensor failure	The T3 port between the sensor and the motherboard is loose	Insert the port well.
		Sensor damage	Replace the sensor.
E6	Outdoor ambient temp. sensor failure	The T4 port between the sensor and the motherboard is loose	Insert the port well.
		Sensor damage	Replace the sensor.
Ed	Sensor failure at water pump outlet	The T7 port between the sensor and the motherboard is loose	Insert the port well.
		Sensor damage	Replace the sensor.
		Leakage of refrigerant	Check the leaking place, mend by welding, exhaust the air and add refrigerant again.
EA	Sensor failure at the discharge	The TP port between the sensor and the motherboard is loose	Insert the port well.
		Sensor damage	Replace the sensor.
P1	System high pressure protection	The circulating pipe between the water tank and the main unit is too small	Use the DN 20 pipe
		The circulating pipe between the water tank and the main unit is too long	The length of the connecting pipe should be ≤ 5 m
		The height difference between the water tank and the main unit is too large	The height difference should be ≤ 3 m
		There is air in the water pump	Exhaust the air (see Chapter Three)
		The water pump is not started	Check whether the water pump is damaged
		The capillary is blocked off (small possibility)	Weld the capillary and add refrigerant. Blow it clear by high pressure air or replace it.
P2	System current protection	No water in the water tank and the tap water supply is stopped	Shut down the unit and start until the tap water supply recovers to be normal
		The circulating pipe between the water tank and the main unit is too small	Use the DN 20 pipe
		The height difference between the water tank and the main unit is too large	The height difference should be ≤ 3 m
		There is air in the water pump	Exhaust the air
		The water pump is not started	Check whether the water pump is damaged
The capillary is blocked off (small possibility)	Weld the capillary and add refrigerant. Blow it clear by high pressure air or replace it.		

Continued:

P4	Protection for the over-high temp. at the outlet of the condenser (T2 ≥ 60 °C)	Water pump is not started	Cut off the power supply, remove the bolt on the back of the water pump and turn the water pump axis
		There is air in the water pump	Exhaust the air
		The water pump is not started	Check whether the water pump is damaged
P8	High discharge temperature protection	System short for refrigerant	Recharge or add refrigerant
		The pipe for refrigerant is blocked	Check whether the pipes is blocked
db	Anti-freezing protection	Prevent PTE cracking by freezing in the winter	Normal protection, no need for treatment.

2.12 Function**Starting modes**

There are 3 kinds of starting modes: Automatic mode, Manual mode and Timing mode.

- ✧ Automatic mode: Units starts up/ shuts down according to the water temperature in tank. When the temperature decreases to drive-up temperature, it will start up automatically; when temperature is heated to setting temperature, it will shut down automatically.
- ✧ Manual mode: To start up/ shut down the unit according to the water temperature in tank. When the temperature decreases to drive-up temperature, please start it up manually; when temperature is heated to setting temperature, please shut it down manually.
- ✧ Timing mode: Set the unit starting up/ shutting down according to water temperature in tank. During the setting period, the unit will automatically drive-up and shut down according the water temperature detected.

3-minute protection

Restart or open the manual switch after the unit stops, the unit will not start within three minutes because of the self-protection function of the compressor.

Characteristics of heat pump heating operation

During operation, if outdoor temperature is higher than normal, the air supply motor will run at low air volume,

Defrosting function perform at heating operation

In case of the unit requiring deicing during heating operation, to prevent the heating efficiency from decreasing, defrosting operation will turn on automatically (approx. 2~5 minutes).

The fan motor will stop running when defrosting.

Operation condition

For proper using of water heater, please operate at the outdoor temperature -7°C~43°C. Since there are fine electronic components inside the unit, it is strictly prohibited to use the water directly from the lake

and river or the untreated groundwater.

About protection device

- ✧ When protection device operates, though the unit stops, the operating indicator of wire control still will be blinking.
- ✧ When protection device operates, nixie indicator will display malfunction code (unit).
- ✧ Protection device will act when the following circumstances occur:
 - ✓ Air inlet or outlet is blocked.
 - ✓ Air in water or refrigerants system not completely exhausted.
 - ✓ Voltage is a little higher or lower compare to the voltage range (Exceeding the range of 207V~255V).

About Power off

- ✧ All operations stop when the power is off.
- ✧ At the next startup after power failure, the RUN indicator of wired controller will blink slowly for several seconds for noting user.
- ✧ Mis-operation occur during unit working:

In case mis-operation caused by lighting or vehicle radio, cut off the manual power switch, and turn it on again, afterword press RUN/STOP key.

- ✧ It is forbidden to switch the power off if ambient temperature below -5°C . In case of power failure or power need to be cut because of maintenance, please open the drainage valves at the joints of water inlet and outlet pipes as soon as possible to draining out all water. Otherwise, components inside of the units may be damaged by freeze. Upon draining water, please close the water drainage valves.

Shut-off memory

Every time when power is shut off, the wired controller will save the current operate status automatically, when power come on the next time, controller will send the ON/OFF signal to the water heater according to the memory before shut off. The function keeps unit always working on the mode which was set in the last time before power failure.

Start the unit after a long period out of service

Start-up the unit after out of service for a long period (includes drive up a unit at the first time), you would see rust mix up water in red, flow out from tap. That is normal, just keep draining and the rust will disappear after a while.

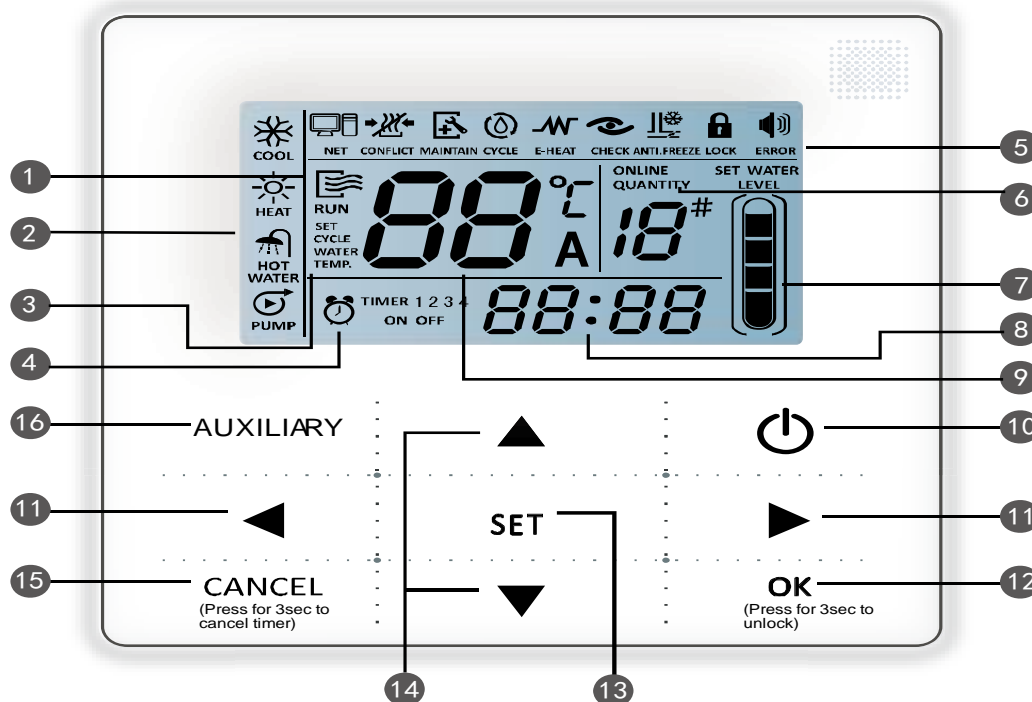
About RCCB

Outdoor unit must use RCCB, be install a RCCB between in user power supply and the outdoor unit. In case the unit cannot act but not attribute to power failure, please check these RCCB switches at first.

Before operate the RCCB, be ensure that the user installing switch is break off.

After the RCCB has serviced for a period of time, it is necessary to press the test button at close circuit to check whether the performance of RCCB is work normally (Every time you press this button, RCCB break up once). In case malfunction occurs, but no cause was found, it is permit to delivering power to detect failure. If RCCB doesn't work when being powered, check out the cause by feature if necessary. If which is detected and confirmed as its self-malfunction, consign a professional person repair it or replace it for a new one.

2.13 Wired controller



1	Operation icon	2	Mode area
3	Setting temperature	4	Timing on/off
5	Function icon	6	On-line units quantity indication
7	Water level indication	8	Clock
9	Water temperature	10	On/OFF key
11	Left/Right key	12	Confirm key
13	Set key	14	Add and reduce key
15	Cancel key	16	Auxiliary key

Technical data and characteristic

1. Input voltage 10V AC
2. Operation ambient temperature of wired controller: -10°C~43°C
3. Operation relative humidity of wired controller: 40%~90%
4. Touch key operation and LED displays operation parameters


5. Multiple timer and real-time clock (battery life: 5~8 years).

Icon description


1. **Operation icon**  : Indication of unit ON or OFF status


2. **Mode area**: Indicate the main unit operation mode.


3. **Setting temperature**: Three statuses about water temperature, setting water temperature and setting cycle water temperature can be displayed.


4. **Timing On/OFF indication**  : Indicate the timing information. Three timers can be set on the wired controller: Timer 1, Timer 2, and Timer 3. These three timers can control the main unit to turn ON and OFF three times at most during one day.

5. Function icon:


1)  : Display when water heater system connects to Modbus network;


2)  : Display when other heat source is provided to the system;


3)  : Display when water heater maintenance is needed. You can press and hold “AUXILIARY” key for 3 seconds to cancel the icon and timing will restart until next maintenance;


4)  : Display when cycle heating function is operational;

5)  : Display when electric auxiliary heating function is operational;

6)  : Display when check function is operational;

7)  : Display when ambient temperature is below 2 °C which means the main unit need anti-freezing action;

8)  : Display when no key operation for 2 minutes and all keys are locked.
You can press and hold “OK” key for 3 seconds to unlock;

9)  : Display when error or protection occurs and means the unit need maintenance by professionals.

6. **On-line unit qty. indication**: Under normal status display the quantity of units connected to the wired

controller; under check status display the device serial number;

7. **Water level indication:** Under normal status displays water level; under water level setting status displays setting value;

8. **Clock:** Under normal status displays clock; under timing setting displays the setting timing;

9. **Water temperature:** Under normal status display water temperature; under water temperature setting status displays the setting value; under cycle heating water temperature setting status display the setting value; under check status displays check parameter;

10. **ON/OFF key:** Turn on and turn off functions;

11. **Right and Left key:** Press these keys to check setting water temperature, setting cycle heating water temperature and setting water level under main page; Press right key to shift to the next step setting under timing setting status; Press these keys to turn over the unit parameter information under check status;

12. **OK key:** Press this key to confirm settings. Press and hold this key for 3 seconds to unlock under locking status;

13. **Setting key:** Setting water temperature, timing and mode etc.; Press and hold this key for 3 seconds to enter check status;

14. **Add and Reduce key:** Move up or move down values of temperature, timing, water level etc.; Turn over #0~#15 units under check status;

15. **Cancel key:** Press this key to cancel parameter setting under setting status; Press and hold this key for 3 seconds to cancel timing when timing is valid;

16. **Auxiliary key:** Power on the cycle heating function, electric auxiliary heating function or water pump function.

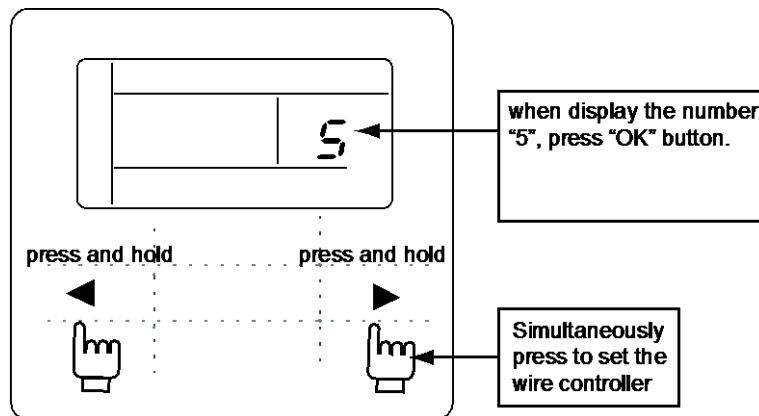
Operation instruction

1. Setting wired controller

This controller needs setting before applying to certain HPWH models.

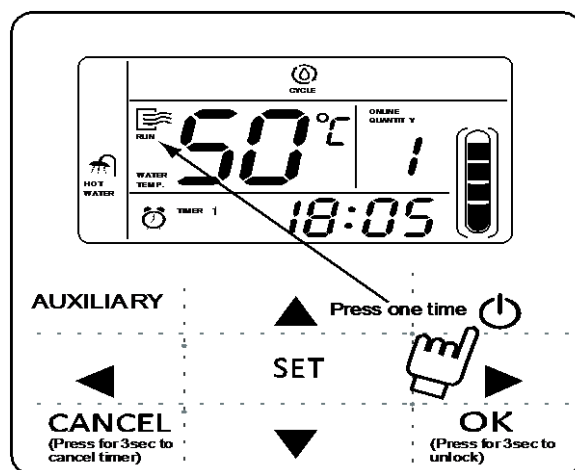
Setting method: When the controller is "OFF" , press and hold "◀" "▶" two buttons, waiting for one number (1 to 5) displayed on the screen, press "▲" or "▼" button and select the number "5" which match

with the main unit, then press “OK” button to confirm.



2. Turn on and turn off the main unit

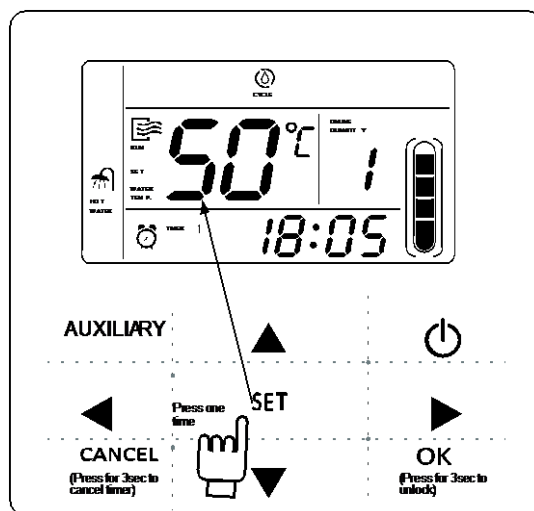
- 1) Press the On/Off key to control on and off status of the main unit.
- 2) Under off status, press the On/Off key “” to run the main unit, at the same time the LCD of wired controller will display the operation icon “”. The main unit will running as the current setting of the wired controller.
- 3) Under on status, press the On/Off key “” to turn off the main unit and the operation icon “” on the LCD will disappear.



3. Setting water temperature

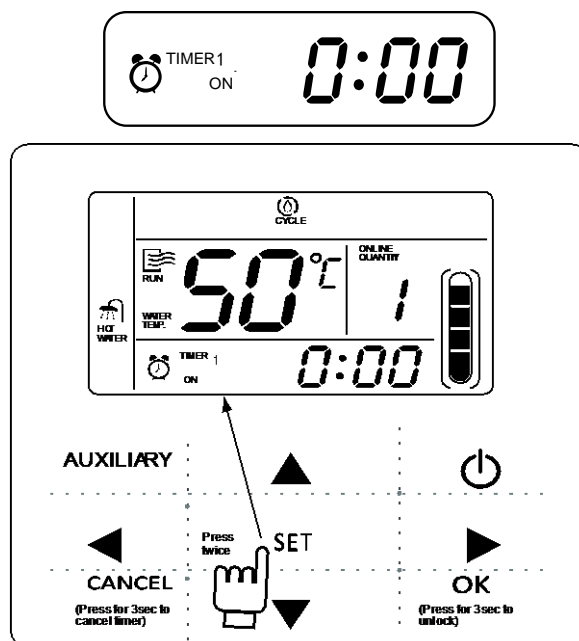
You can press the “▲” or “▼” to adjust the water temperature after the controller is powered on. Or press “SET” key once when “SET WATER TEMP” is displayed on the LCD and then press “▲” or “▼” to adjust water temperature.

Water temperature setting check: To check the water temperature setting value, press the “◀” or “▶” key under the main page (the page displayed after the controller is powered on).

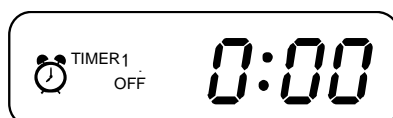


4. Timing setting

Press “SET” key under main page twice to enter timing setting. Then the LCD will display as the following:



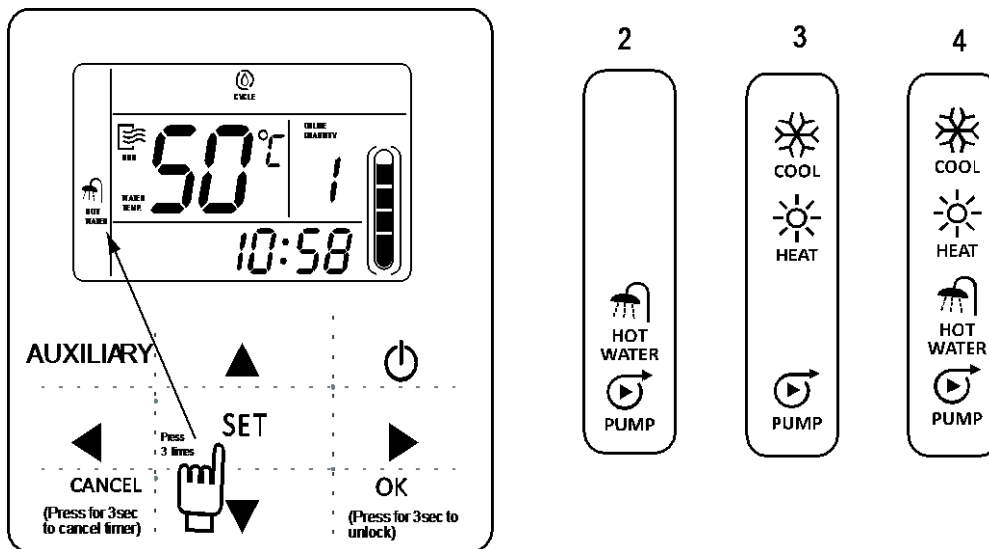
At this time the hour of the clock will flash, which means the current setting is the hour of Timer 1, please press the “▲” or “▼” to adjust and “▶” key to confirm when finished; and then the minute of the clock will flash, which means the current setting is the minute of Timer 1, press the “▲” or “▼” to adjust and “▶” key to confirm when finished, the LCD will display as the following:



The setting of Timer 2 and Timer 3 are the same method as this.

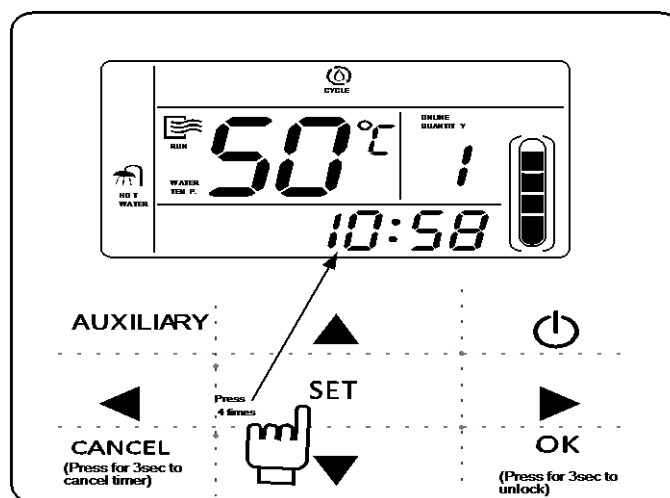
5. Set working mode

Pressing “SET” key three times to enter the working mode setting page, then pressing the “▲” or “▼” key to adjust , after selecting your need mode you can press “OK” key or wait seven seconds to confirm; During setting process you can press “CANCEL” key to exit without saving. The controller will show different working mode when it is applied to different main unit respectively.



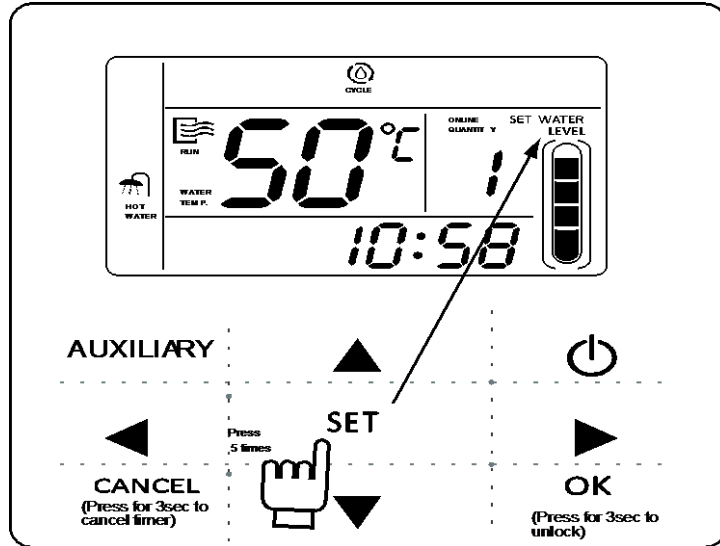
6. Set clock

Press the “SET” key 4 times to enter clock setting. The hour of the clock will flash, which means the current setting is the hour of the clock, press the “▲” or “▼” to adjust, press “▶” key when finished, and then the minute of the clock will flash, it means the current setting is the minute of the clock, press the “▲” or “▼” to adjust, press “OK” key when finished or wait for 7 seconds to confirm. During the setting process you can press the “CANCEL” key to exit without saving.



7. Setting water level (Just direct heating water heater has this function, the split type only display 100% level)


You can press the “SET” key 5 times to enter the water level setting, then press “▲” or “▼” to adjust the water level, at last press “OK” key when finished or wait for 7 seconds to confirm. During the setting process press the “CANCEL” key to exit without saving. The setting value is 50%, 75% or 100%. You can press “◀” or “▶” key under main page to check the water level which has been set.

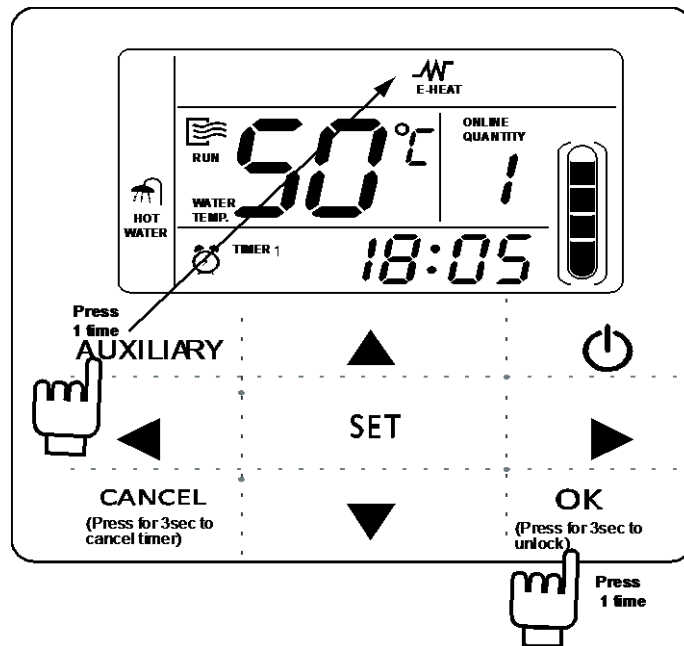


8. Auxiliary operation

1) Electric auxiliary heating


This function allows running the electric auxiliary heating of main unit manually.

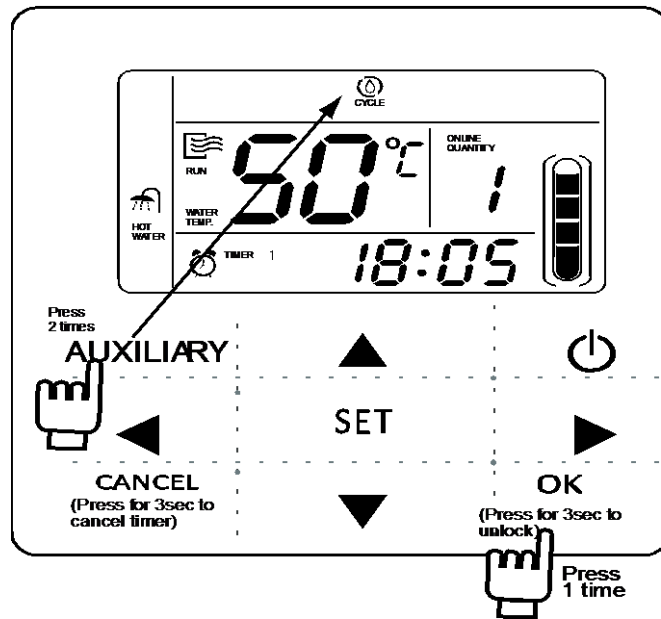
Operation method: press “AUXILIARY” key once to enter this function “” icon will flash, and then press “OK” key to confirm.



2) Cycle heating (Direct heating water heater has this function).


Cycle heating function makes the direct heating water heater to run the cycle heating function. Operation

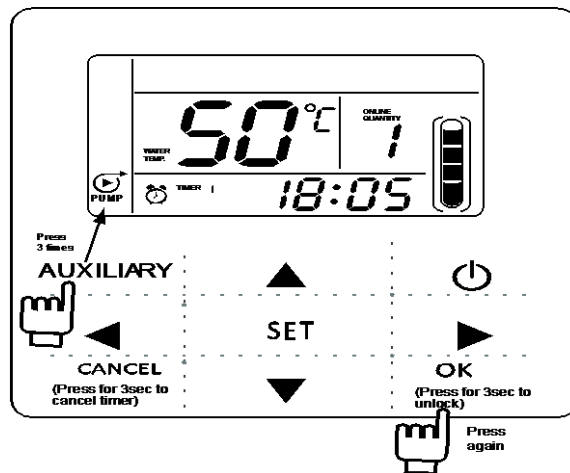
method: Press “AUXILIARY” key twice to enter this function “ ” icon will flash, press “OK” key to confirm.



3) Water pump (reserved for future use.)

This function is used to run the main water pump in the device installing and debugging.

Operation method: when the wired controller is set to be 1, press “AUXILIARY” key 3 times to enter this function. “ ” icon will flash and then press “OK” key to confirm.



4) Cancel auxiliary: To stop the auxiliary function, press the “AUXILIARY” key again, and then press “CANCEL” key when the corresponding icon is flashing. Then the auxiliary function will be cancelled.

2.14 Spot check

Main control board spot check

Sequence	System operation parameters	Remarks
1st	Outlet water temperature	Value of T1
2nd	Pipe temperature	Value of T3
3rd	Ambient temperature	Value of T4
4th	Water tank temperature	Value of T5
5th	--	--
6th	Water-in temperature	Value of T7
7th	Compressor discharge temperature	Value of Tp
8th	--	--
9th	Setting water temperature	Value of Ts
10th	Return difference temperature	Value of Tr
11st	--	--
12nd	Compressor current	Value of current
13rd	--	--
14th	Electronic expansion valve opening	Electronic expansion valve opening / 8
15th	--	--
16th	--	--
17th	Running mode	0: Idle shutdown 2: Heating water df: defrosting db: Anti-freezing 08: OFF
18th	Fan speed	F0: OFF F1: Low F2:High
19th	This outdoor unit capacity	10: 1HP 15: 1.5HP 20: 2HP
20th	--	--
21st	--	--
22nd	The last error code or protection code	Display the latest error code or protection code

Wired controller spot check

Outlet Temp. T1 -> Outdoor Pipe Temp. T3 -> Ambient Temp.-> Compressor Current -> Error-> Error Protect

2.15 Accessories

Name	Quantity	Purpose
Installation & Owner's Manual	1	Installation and use instruction.
Y-shaped filter	1	Filtrate inlet water
Wired controller assembly	1	Control units and display units status
Seal ring	1	Discharge condensate water
Water outlet joining pipe	1	Discharge condensate water
Water tank sensor	1	Detect water tank temperature
5-core shielded cable	1	Connect unit and wired controller

3. Resistance characteristic of temperature sensor

➤ Resistance characteristic of ambient Temp., pipe Temp. and suction Temp. sensor.

Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)	Temp. (°C)	Resistance value (kΩ)
-20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.219	25	10	65	1.96532	105	0.54448
-14	79.311	26	9.55074	66	1.89627	106	0.52912
-13	74.536	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.486
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44	36	6.13059	76	1.34105	116	0.4006
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.2133	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.5705	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.3239
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.8795	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.2777
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.918	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231

➤ Resistance characteristic of discharge temperature sensor

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		