Calitec
HOT WATER SYSTEMS

Manual & Installation instructions Model KP-50

Content

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Installation & Maintenance

The installation of a Calitec Hot Water System is exclusively allowed by qualified tradesman.

It has to be done according to NZ building codes and local regulations. Do not install the unit by yourself (customer). Incomplete installation could cause injury due to fire or electric shock. Incorrect installation can also void the warranty.

It is a set-and-forget system with very little maintenance. Once your installer(s) are finished there is very little you have to do.

Maintenance of the outdoor unit:

It is very important that the air can flow unhampered through the outside unit. Keep it free from weeds and spider webs and don't block it off in any other way. A restricted or blocked air flow can result in a higher power consumption or failure of the unit.

It is also very important that the compressor unit is fitted level. Your installer will make sure that it is fitted correctly, but regularly check and make sure that it remains level. The lifetime of the compressor unit can be shortened with unlevelled operation.

Evaporator cleaning

The evaporator does not require any special maintenance, except when it is clogged by dust or any other obstacles. Cleaning by washing with detergent and water at low pressure, and then rinsing with clean water.

1. Before cleaning, make sure that heat pump power is OFF.
2. Inside of heat pump must be cleaned by qualified person.
3. Do not use gasoline, benzene, detergent or insecticide etc. to clean the heat pump as it may damage the unit.
4. A special air conditioning cleaning is recommended.
5. Spray air conditioner cleanser into the evaporator, let the cleanser sit for 5~8 minutes.
6. Then, rinse the evaporator with clean water.
7. A soft brush works well for brushing surface dirt and lint off the fins. Brush in the same direction as the lots between the fins so the bristles go between the fins.
8. After cleaning, use a soft and dry cloth to dry the unit.

Maintenance of the hot water cylinder:

Mains pressure systems are fitted with a Pressure & Temperature Relief Valve (PTR Valve), once a month the release mechanism on the valve has to be activated to ensure its continuing function.

Hot Water Cylinder - Installation

The hot water cylinder can be used as a low water pressure cylinder or as a mains water pressure cylinder.

The installation must be carried out by a qualified plumber and installed according to local rules and regulations. **The hot water cylinder is to be considered as a normal hot water cylinder**. Only the heating part is different. The cylinder <u>must</u> be installed vertically.

The electric heater needs to be connected by a qualified electrician. The electric heater is strictly a back-up heater and should be <u>switched off</u> at normal operation of the heat pump hot water system. The electric heater must have its own isolation switch.
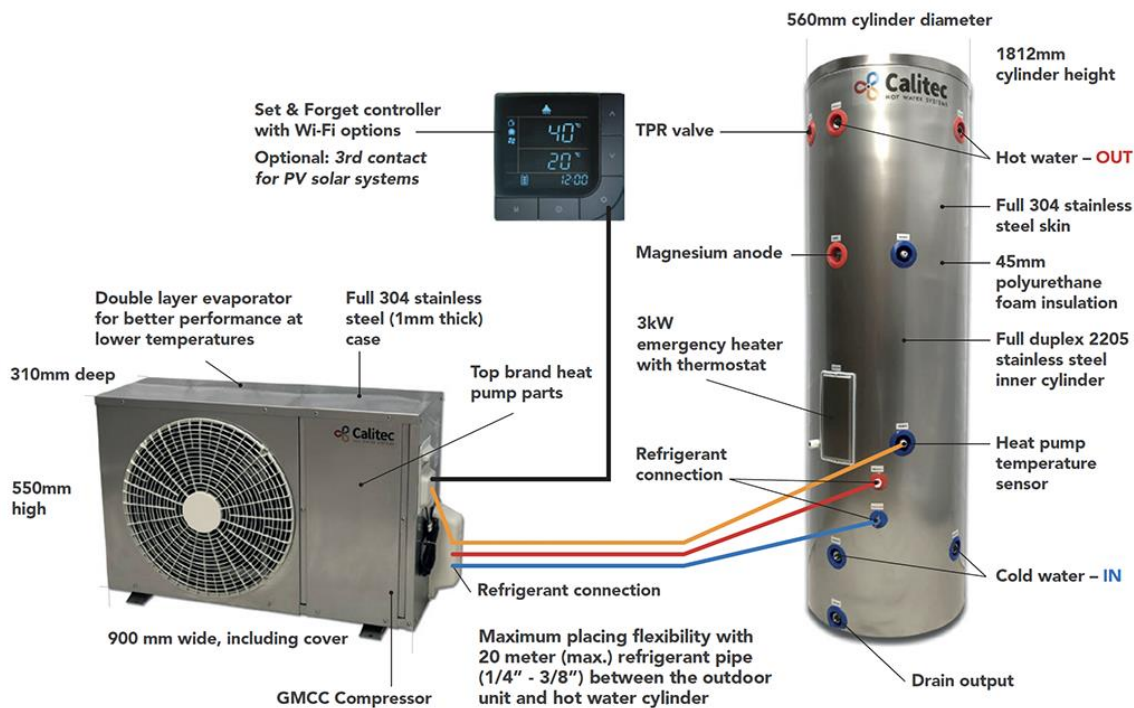
Under the cover you find the thermostat and electric heater behind a cover, remove this cover and connect the wiring. Top left for phase, top right for the neutral. Above the thermostat, on the inner cylinder, is a grounding point.
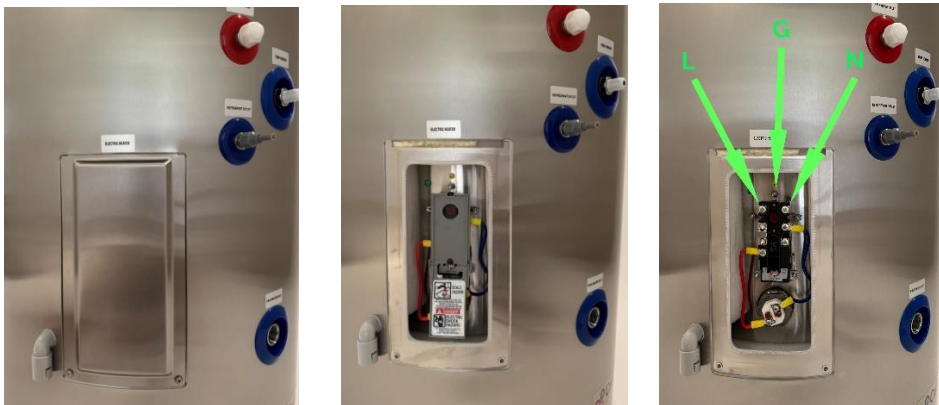
Outdoor Unit - Installation

IMPORTANT The outdoor unit needs to be installed by a qualified heat pump split system installer/ refrigerant filler.

The best location for the outdoor unit is a place where:

- It is not exposed to strong winds.
- Airflow is good and dustless. At least 100mm space around the unit and 800mm space at the front.
- Neighbours are not annoyed by the operation sound.
- There is no risk of combustible gas leakage.
- The condensation water can flow to a drain or will be absorbed by the soil.
- Flooding water cannot reach the base of the unit.
- The outdoor unit should be fitted on feet on a level base or on a wall bracket.

Please avoid locations where trouble is liable to occur:

- Where flammable gas could leak.
- Where there is much machine oil.
- Salty places such as the seaside.
- Where sulphide gas is generated.

The refrigerant R32, pre-charged in the outdoor unit, is suitable for 3 meter copper pipe. If the refrigerant pipes between the outdoor unit and the hot water cylinder exceeds 5 meter, please add 15g R32 refrigerant per extra meter of pipe. The maximum pipe length is 20 meters.

PCB Board

The PCB board and the wiring diagram can be found behind the front cover plate (next to the fan grill)

Display Controller - Installation

The models with the separate controller need to be connected to the outdoor unit with a 4 core cable (supplied with the system).
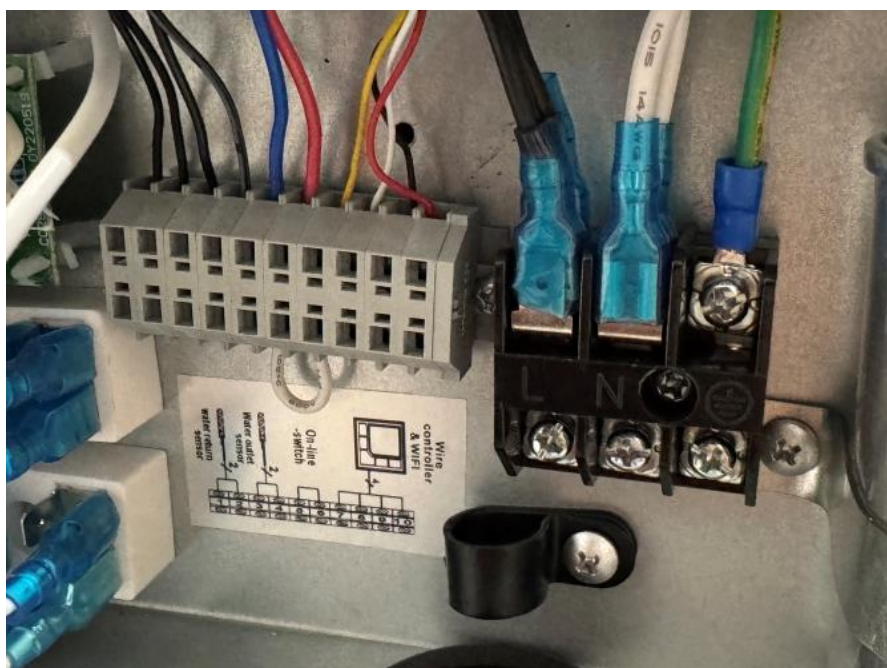
Temperature sensor cable

The sensor consists of two sensor parts, the sensor cable can cut to the required length and connected on the same terminal block as the controller. At the terminal block the sensors are labelled: Water return and Water outlet sensor.

The two sensors are the same value and have no parity. The separate sensors are paired red/black and yellow/white on the sensor cable.
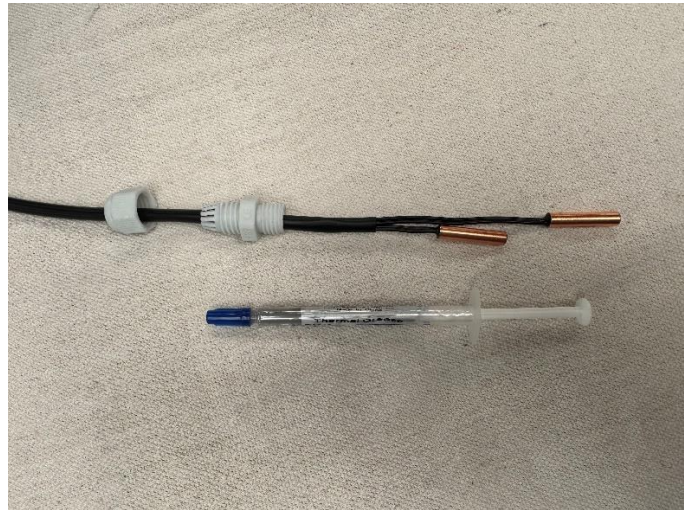
Use the supplied Thermal grease for optimal heat conduction from sensor pocket to the sensors. Make sure that the sensors are as far as possible (100mm or more) inside the sensor pocket of the cylinder.

On-line switch contact

At the terminal this is set as a short cut to neutral. This contact can be used by third party appliances such as PV-inverters to control the heat pump unit. The closed contact allows the unit the run, when needed, an open contact will stop or prevent the unit from running.

First start up

1) Open the high and low pressure refrigerant valves.
2) Open water switch and fill the hot water cylinder with water.
3) Make sure that the cylinder is filled with water.
4) Make sure that the temperature sensor is in temperature sensor pocket of the cylinder.
5) Switch On the power at the isolation switch.
6) Switch On the system on the controller.
7) The controller is pre-set for Cylinder heating at 60°C. All you have to do is set the clock and if required, the timer *(see Clock setting & Timer setting page 10 & 11).*

Control panel

Description of display panel:

△ AUTO mode		☀ HEAT mode	
❄ COOL mode		⛱ DHW mode (not working on this unit)	
❄💧 defrost mode		🌀 ECO mode (not working on this unit)	
📶 WIFI		🗄 compressor symbol	
◎ water pump symbol		🌀 fan motor symbol	
🔥 electrical heater symbol		🔒 key lock	
1 2 ON / 3 4 OFF 4 sets TIMER ON/OFF		⏱ clock	

∧ ∨ increase, reduce key.

⏻ ON/OFF key. In keylock, hold 5s to release keylock
hold 1s to ON/OFF unit in setting, press it to return main interface.

TIMER key. Hold 5 seconds to clock setting, press it TIMER ON/OFF.

M function key. Press it to view running state, hold 3 seconds to parameter setting

Key Lock function

When ![lock icon] lights up, the keys are locked. Hold the ![power key] key for 5 seconds to release the key lock. When no keys are pressed for 30 seconds, the key lock switches on automatically.

Switching the unit on or off

Hold the ![power key] key for 1 second to switch the unit on or off. When switching on, the selected mode will light up and the unit will begin the start-up cycle.

Running unit
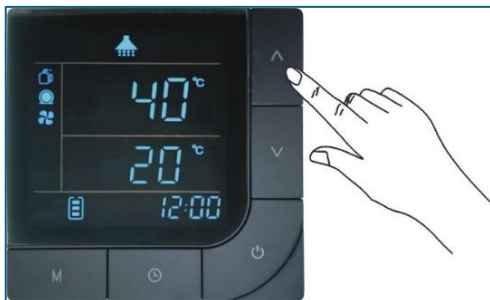
![DHW icon] Shows that the DHW mode is active. We use the ![heat mode icon] heat mode.

![40°C display] Shows that the hot water cylinder is currently 40° C.

![20°C display] is the current ambient air temperature.

![compressor icon] Indicates that compressor is running

![water pump icon] Indicates that water pump is activated, in this unit however there is non.

![fan icon] Indicates that fan motor is running

![12:00 display] is the current time

Changing the temperature setting of the hot water cylinder

Press the ∧ or ∨ key to enter the temperature setting.

L5 is parameter for temperature setting of the hot water cylinder (DHW). Press the ∧ or ∨ key to increase or reduce temperature setting.

Press the ⏻ key to save and exit.

Running state check

Press the M key to check the running state

o 1	Cancelled
o 2	Temperature hot water cylinder (T2)
o 3	Temperature hot water cylinder (T7)
o 4	Temperature of ambient air
o 5	Cancelled
A 1	Compressor exhaust sensor
A 2	evaporator sensor
A 3	Compressor return sensor
A 4	Compressor Amp
A 5	EEV opening

Clock setting

Hold the [L] key for 5 seconds to enter the clock settings. [12:00] will start blinking. Press the [L] key, [12] will blink. Press the [∧] [∨] keys to adjust the hour setting.

Press the [L] key again and the [00] is blinking. Press the [∧] [∨] keys to adjust the minute setting. Press the [L] key again to save the settings and leave the clock setting.
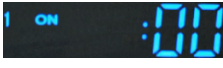
Timer Setting
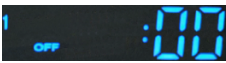
There are 4 different timer settings possible.

Press the [L] key to enter the timer settings. [1] will blink.
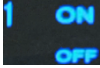
To change the timer number, press the [∧] or [∨] key.

Press the [L] key to set the timer ON hour, [1 ON 00:] will blink. Press the [∧] or [∨] key to change the ON hour setting. Press the [L] key again to set the timer ON minutes, [1 ON :00] will blink. Press the [∧] or [∨] key to change the ON minutes setting.

Press the [L] key again to enter the Off-hour setting. [1 OFF 00:] will blink. Press the [∧] or [∨] key to change the Off hour setting. Press the [L] key

again to set the timer OFF minutes, will blink. Press the or key to change the OFF minutes setting. Press the key to save and exit.

Timer setting cancelling

To cancel the timer setting(s) press the key. will blink. To change the timer number, press the or key. Hold the key for 5 seconds to cancel the timer setting, when done only the will blink. Press the key to save and exit.

WiFi controlling

This unit can be controlled via an app on your phone. During the installation the controller and your phone should be in the same place.

The following apps can be used. Download the app in your app store (Apple or Google Play). And follow the registration instructions in the app.

➢ Registration
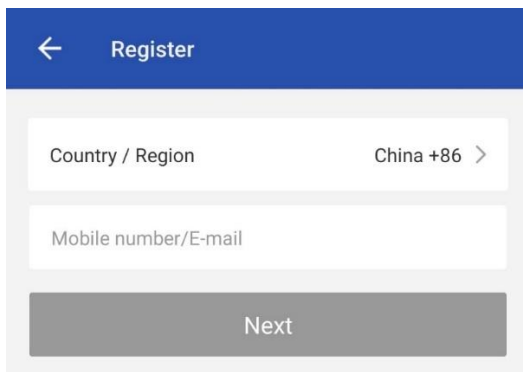
Click Register button

Change the country to *[New Zealand]* and add your email, then click [*next*]

You will get a verification code by email, enter this and a password.

Add your device
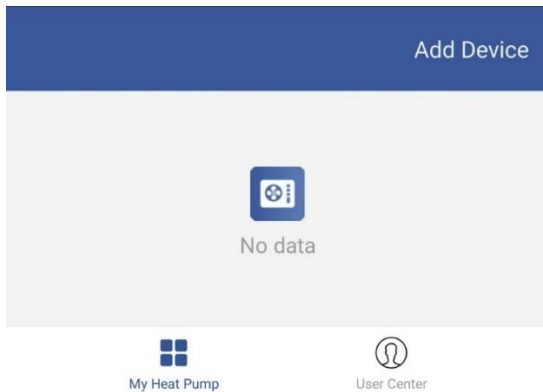
Click Add Device button.

Click WiFi DEVICE button.

Make sure device indicator stays quick flashing for connection
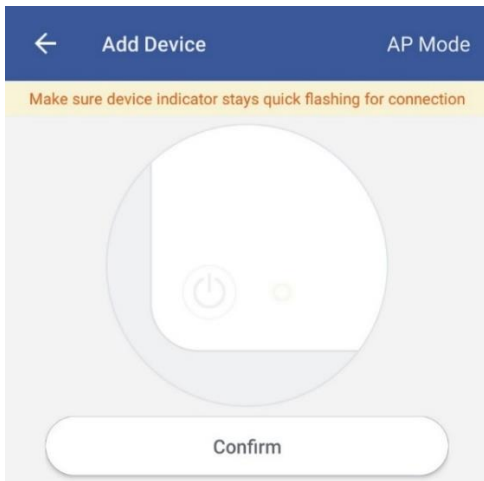
Confirm

Click the [*Confirm*] button.

Hold the 🕐 and the ⌄ keys for 6 seconds to SMART network mode. 📶 will start to blink quickly.

← Set up the Wi-Fi for device

This app is supported only on 2.4GHz Wi-Fi channels

Wi-Fi at present: MERCURY_1FB2
Use other Wi-Fi

🔒 ··········   👁

Next
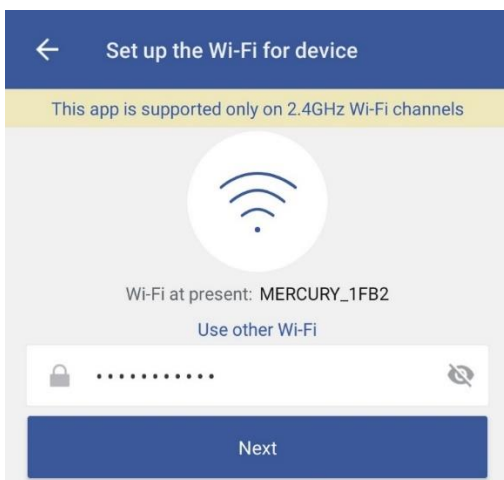
When your WiFi network is found, put in the password for access.
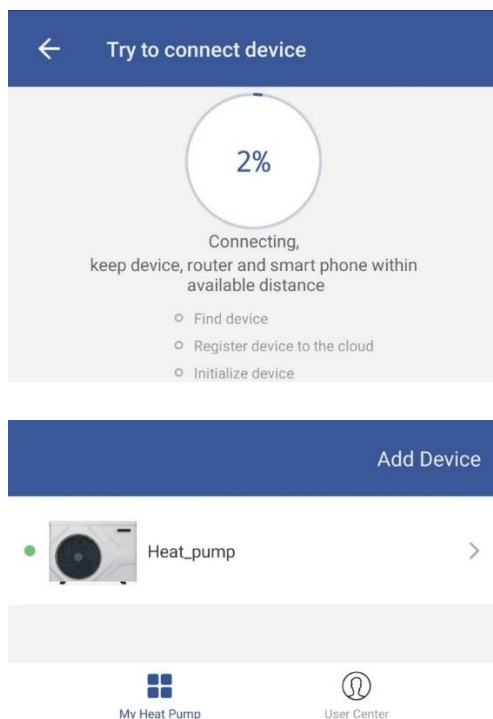
Click Heat pump button.

When the heat pump is switch on you can change the temperature settings and the timer settings. With the menu (3 dots right above) you can (re)name your heat pump.

System settings

☀ Heat Mode

Water pump, fan motor, compressor, IN6 (on-line-switch) CLOSE

The compressor stop/start activated by Water tank sensor T1 (T7 on PCB).

The Heat mode is chosen for controlling the hot water cylinder as this mode can be controlled by the 'On-line-switch'

❄ Defrost

When ambient temperature ≤ -10, then condition Simultaneously satisfy ABC or ABD:
A. ambient sensor ≤ -10
B. evaporator sensor ≤ -4
C. compressor running time ≥ 2 * 38
D. ambient sensor - evaporator sensor ≥ 3, and compressor running time ≥ 38

Defrost start action:
Compressor, fan motor stop
Water pump continue running
3-way-water-valve keep previous statue
Electrical heater forced switch ON
55 second, 4-way-valve ON
60 second, compressor ON

Defrost exit condition:
Evaporator sensor ≥ L13 or defrost running time ≥ 10.
Outlet sensor ≤ 5°C, then Exit defrost immediately.
If big difference between inlet & outlet sensor, then Exit defrost immediately.

Defrost exist action:
Compressor stop, fan motor run.
55 second, 4-way-valve OFF.
60 second, compressor ON.
Electrical heater reset to previous statue.

Four-way-valve:
4-way-valve switch OFF at DHW/HEAT mode, switch ON at defrost/COOL mode.

Dip switch on PCB

 Dip switch module on controller PCB

Evaporator heater (SW1-2 set ON):
When ambient < 8°C &compressor run, then evaporator heater switch ON.
When ambient > 8°C, then evaporator heater switch OFF.

Compressor heater (SW1-3 set ON):
When ambient < 8°C &compressor stop, then compressor heater switch ON.
When ambient > 8°C or compressor start, then compressor heater switch OFF.

 Eco mode

Eco mode only works with Heating and Cooling. When activated the display will show the icon. Hold the and the key to activate / cancel the Eco mode.

 Fan motor
The fan motor starts 5 seconds before the compressor start.
When the unit stop, the fan motor & the compressor stop at the same time.
The fan motor stop in defrost.

Refrigerant recovery mode (cool)

Hold [power] [up] button 3s to password interface.

Press [clock] button to change switch the password bit.

press [up] or [down] button to increase or reduce value.

Password : 0814

Press [M] button to confirm password.

In factory interface of factory parameter setting:

Press [M] button to edit parameter, -30 flash.

press [up] or [down] button to increase or reduce parameter.

Press [M] button again to exist edit.

press [up] or [down] button to next or previous parameter.

press [power] button : exist to main interface

The normal operation mode is HEAT. To change to COOL mode for refrigerant recovery, change parameter H1 from 4 (HEAT) to 5 (COOL).

H1	Mode 0: DHW 1: C/H/AUTO 2: DWH/H 3: all mode 4: HEAT 5: COOL 6: DHW/C

Error Codes

E01	Compressor exhaust sensor failure (T4)
E05	Evaporator sensor failure (T3)
E09	Compressor return sensor failure (T5)
E17	User water return sensor failure
E18	Hot water cylinder outlet sensor failure (T2 on PCB)
E19	Hot water cylinder sensor failure (T7 on PCB)
E20	connection failure (T1 0n PCB)
E21	Communication problem (controller & PCB)
E22	Ambient sensor (T6)
P02	High pressure protection (In5)
P06	Low pressure protection (In4)
P10	Phase-order protection
P11	Compressor over-heat protection
P15	Water temp. too big between inlet & outlet water
P16	Cooling too low protection
P17	Anti-freeze protection in winter
P19	Compressor current-limiting protection
P23	Water outlet temperature too low in defrost
P24	Fan motor over-heat protection

P02 High pressure protection

The compressor starts for 5 seconds, if high pressure switch continues OPEN for 5 seconds, then PCB judge as high-pressure protection. Controller displays error code P02 and stop compressor. Compressor will restart 3 minutes later. Within 30 minutes, 3 times of high-pressure protection, unit needs to be powered on again to resume operation.

High pressure protection does not affect the operation of electric heater.

P06 Low pressure protection

The compressor starts for 5 seconds, if low pressure switch continues OPEN for 5 seconds, then PCB judge as low-pressure protection. Controller displays error code P06 and stop compressor. Compressor will restart 3 minutes later.

Within 30 minutes, 3 times of low-pressure protection, unit needs to be powered on again to resume operation.

Low pressure protection does not affect the operation of electric heater.

P11 Compressor over-heat protection

Compressor is running, if compressor exhaust temperature ≥ parameter H2, unit stop, controller display P11. 3 minutes later, exhaust temperature is ≤ H2 - 20°C, unit restart.

Within 30 minutes, 3 times of compressor over-heat protection, unit needs to be powered on again to resume operation.

P15 Excessive inlet & outlet temperature difference protection

In COOL/defrost operation, inlet temperature - outlet temperature is ≥ 13°C, compressor stop, water pump continues running, controller display error code P15. Compressor will restart 3 minutes later.

Within 30 minutes, 3 times of excessive inlet and outlet water temperature difference protection, whole unit stop, unit needs to be powered on again to resume operation.

P17 Anti freezing function

When 2°C < outlet temperature ≤ 4°C, and ambient temperature ≤ 1°C, water pump run.
When outlet temperature is ≥ 6°C, or ambient temperature > 2°C, water pump stop.

When outlet temperature ≤ 2°C and ambient temperature is ≤ 1°C, whole unit will automatically run at HEAT mode.
When outlet temperature ≥ 20°C, or ambient temperature >2°C, unit stop.

Wiring diagram

PCB

water tank sensor : T1
water outlet sensor : T2
evaporator sensor : T3
compressor exhaust sensor : T4
compressor return sensor : T5
ambient air sensor : T6
water inlet sensor : T7

compressor Amp detection : T8

CN2 BYQ N **Power supply** L

Water ump

Compressor
Fan motor
4-way-valve
Evaporator heater
Compressor heater
3-way-water-valve
Electrical heater

COM COM FL LP HP OL PO CN6

SW1

SW1-2 ON : evaporator heater
SW1-3 ON : compressor heater

PO : phase order protection
OL : COOL/HEAT on-line switch
HP : high pressure protection
LP : low pressure protection
FL : water-flow protection

Sensor
T1 : water tank sensor
T2 : water outlet sensor
T3 : evaporator sensor
T4 : compressor exhaust sensor
T5 : compressor return sensor
T6 : ambient air sensor
T7 : water inlet sensor
T8 : compressor Amp detection

relay
OUT3 : electrical heater
OUT4 : 3-way-water-valve
OUT5 : compressor heater
OUT6 : evaporator heater
OUT7 : 4-way-valve
OUT8 : fan motor
OUT9 : compressor
RY1 : water pump

Error
E01 Compressor exhaust sensor failure
E05 Evaporator sensor failure
E09 Compressor return sensor failure
E17 User water return sensor failure
E18 Water outlet sensor failure
E19 Water inlet sensor failure
E20 water tank sensor failure
E21 Communication problem between controller & PCB
E22 Ambient sensor
E25 Water-level-switch protection
P01 Water-flow-switch protection
P02 High pressure protection
P06 Low pressure protection
P10 Phase-order protection
P11 Compressor over-heat protection
P15 Water temperature too big different between inlet & outlet water
P16 Cooling too low protection
P17 Anti-freeze protection in winter
P19 Compressor current-limiting protection
P23 Water outlet temperature too low

Note:
This diagram is correct at the time of publication, manufacturing changes could lead to modifications. Always refer to the diagram supplied with the heat pump.

Specifications:

Model: KP-50

Protection Class: 1 Class

Moisture protection: IPX4

Refrigerant R32 / 850 gram – pre charged for max 5 meters pipe. Add 15 gram per extra meter pipe. Max 20 meter pipe.

Refrigerant pipe connection: ¼" – 3/8"

Weight: 37 KG

Noise: 56 dB(A)

Power supply:

220-240 Volt, single phase, 50 Hz

Heating current 4.5 A

Max current 8 A

Rated heating output 4 kW

Performance:

Water temperature rise = 10°C to 55°C (ΔT=45) and 10°C to 60°C (ΔT=50). Mentioned savings are compared to a standard electric hot water cylinder.

Ambient Temp. In °C	COP @ 55°C / Savings	COP @60°C / Savings
25	5.9 / 84%	4.8 / 80%
15	4.6 / 79%	3.9 / 75%
7	3.6 / 73%	2.9 / 66%
0	2.6 / 62%	2.1 / 53%
-3	2.1 / 53%	1.9 / 48%

Contact details

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Your local installer: