



Manual & Installation Instructions

Calitec Water Heater WH-70



For R290 Refrigerant appliance:

- The Refrigerant (R290) is contained within the refrigerant circuit of the appliance, a natural gas with a high level of environmental compatibility, which is nevertheless flammable.
- During transportation and installation of the appliance, ensure that none of the components of the refrigerant circuit becomes damaged.
- The refrigerant (R290) is flammable.
- If the refrigerant circuit was damaged:
 - Avoid opening flames and sources of ignition.
 - Thoroughly ventilate the room in which the appliance is situated.
- Appliance is supplied with flammable refrigerant (R290). It must be transported and installed with the utmost care since any excessive knocking or shaking could damage the refrigerating circuit.
- Keep ventilation openings in the appliance enclosure or in the built-in structure clear of obstruction.
- Do not use mechanical devices or other means to accelerate defrosting process, other than those recommended by the manufacturer.
- Do not damage the refrigerant circuit.
- Do not use electrical appliance inside the food storage compartments of the appliance, unless they of the type recommended by the manufacturer.



Service operations : **WARNING**

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

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

Do not pierce or burn.

Be aware that refrigerants may not contain an odour.

- Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
- Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

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Specifications

WH-70 Heat Pump outdoor unit

Power Supply (V/ph/Hz) 220-240/1/50

Power input (W) 1360

Max. rated input current (A) 11

Water production (L/hr) $\Delta T=40$ 124

Water circulation pipe connection (inch) 1

Heat exchanger plate type GEA GHB 400H-26

Circulation pump Greenpro RS15-6 class A

Refrigerant R290

Noise (dB) ≤ 53

Max. rated water temperature ($^{\circ}\text{C}$) 65

Water-proof grade IPX4

Level against electric shock 1

Operation temp. range ($^{\circ}\text{C}$) -10 to 45

Netto weight (kg) 58

Case 304 stainless steel (mm) 1

Size (WxDxH) (mm) 1050x350x638

AS/NZS 5125.1.2014 test results

Ambient temperature 7°C Wet bulb / 8°C Dry bulb

$\Delta T = 46^{\circ}\text{C}$ (11 to 57°C)

Average COP = 4.01

Average Heating output = 5110 W

Ambient temperature 15°C Wet bulb / 18°C Dry bulb

$\Delta T = 43^{\circ}\text{C}$ (13 to 56°C)

Average COP = 5.06

Average Heating output = 6460 W

Ambient temperature 21°C Wet bulb / 30°C Dry bulb

$\Delta T = 44^{\circ}\text{C}$ (12 to 56°C)

Average COP = 6.22

Average Heating output = 7870 W

Installation & Maintenance

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

It must 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 must 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 will 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.

WARNING

Before cleaning, make sure that heat pump power is OFF.

Inside of heat pump must be cleaned by qualified person.

Do not use gasoline, benzene, detergent or insecticide etc. to clean the heat pump as it may damage the unit.

A special air conditioning cleaning is recommended.

Spray air conditioner cleanser into the evaporator, let the cleanser sit for 5~8 minutes.

Then, rinse the evaporator with clean water.

A soft brush works well for brushing surface dirt and lint off the fins.

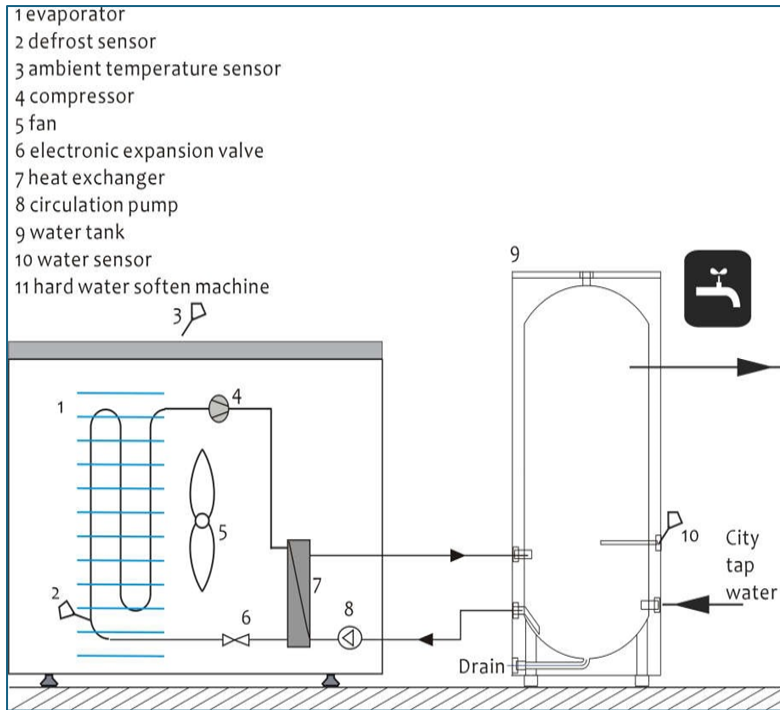
Brush in the same direction as the fins between the fins so the bristles go between the fins.

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 must be activated to ensure its continuing function. When the release mechanism is jammed, the hot water pressure in your system could become too high causing all kinds of trouble.

Working principle of a Heat Pump



Refrigerant system

The refrigerant system consists of 5 main components: compressor, 4-way-valve, heat exchanger (condenser, refrigerant to water), electronic expansion valve/capillary, evaporator (air to refrigerant).

* *Evaporator:* low temperature, low pressure refrigerant flows through evaporator, to boil and turn from liquid to gas. The refrigerant absorbs heat from air source.

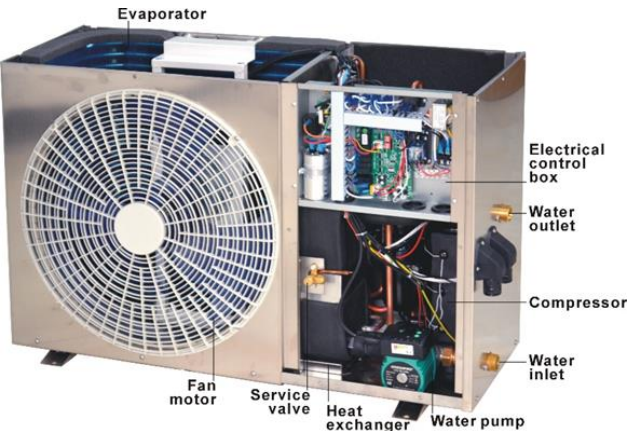
* *Compressor:* compressor absorbs the refrigerant, and compress to high temperature, high pressure status.

* *Condenser:* refrigerant release heat energy in the heat exchanger. The refrigerant temperature reduces, and it returns from gas status to liquid status.

* The heat energy is absorbed by the water, the circulation pump circulates the water through the hot water cylinder.

Physical installation

Heat pumps gather their energy from the ambient air. Make sure that the location of the heat pump ensures that there is a good air flow. Have the back of the heat pump at least 100mm from the wall. Place the heat pump on feet.



The 1-inch circulation pipe connections are at the right side of the unit. It is advised to connect the circulation pipes with detachable stop valves. This enables the unit to be detached without draining the whole hot water circuit.

The electrical connections are also at the right side of the unit. Unscrew the front plate to access the connectors. The wires can be feed through the 25mm flexi conduit adaptors.

T1 = Primarily Hot water cylinder =  mode

T2 = Second Hot water cylinder =  , remove the resistor before connecting the temperature sensor.

Controller = 4 wire connector

3-way valve = 3 wire connector

On-line switch = A short circuit to Neutral. When closed the unit can run, when open the unit will not run. When opening the short circuit while running, the unit will stop in a safely manor.

Control panel

Description of display panel:



 AUTO mode	 HEAT mode
 COOL mode	 DHW mode (Domestic Hot Water)
 defrost mode	 ECO mode (not working with hot water)
 WIFI	 compressor symbol
 water pump symbol	 fan motor symbol
 electrical heater symbol	 key lock
 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.



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

Key Lock function



When  lights up, the keys are locked. Hold the  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  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.



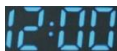
Shows that the Heat mode is active.



Shows that the hot water cylinder is currently 30°C.



is the current ambient air temperature.



is the current time.



has no function in this unit.

Clock setting



Hold the  key for 5 seconds to enter the clock settings.  will start blinking. Press the  key,  will blink. Press the   keys to adjust the hour setting.

Press the  key again and the  is blinking. Press the   keys to adjust the minute setting. Press the  key again to save the settings and leave the clock setting.

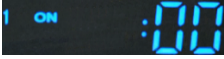
Timer Setting

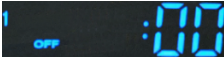


There are 4 different timer settings possible.

Press the  key to enter the timer settings.  will blink.

To change the timer number, press the  or  key.

Press the  key to set the timer ON hour,  will blink. Press the  or  key to change the ON hour setting. Press the  key again to set the timer ON minutes,  will blink. Press the  or  key to change the ON minutes setting.

Press the  key again to enter the Off-hour setting.  will blink. Press the  or  key to change the Off hour setting. Press the  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.

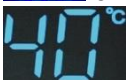
Timer setting cancelling

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.

Running unit



Shows that the DHW (Domestic Hot Water) mode is active.



Shows that the hot water cylinder is currently 40° C.



is the current ambient air temperature.



Indicates that compressor is running



Indicates that water pump is running



Indicates that fan motor is running

Changing the temperature setting of the hot water cylinder

See also page 22, changing parameter settings.



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.

When a second hot water cylinder is installed, press the  or  key to enter the temperature settings. Press the  key to change between the two cylinders. L5 is the primary cylinder and L1 is the second cylinder.

Press the  or  key to increase or reduce temperature setting.

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.



Download the [Multi-Machine] app in your app store (Apple or Google Play).

➤ Registration

LoginRegister

Country / RegionChina +86 >

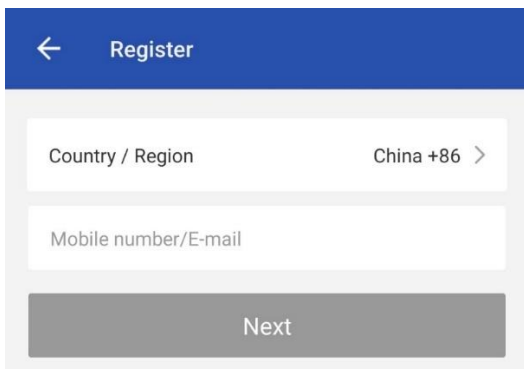
Mobile number/E-mail

Password

Login

Forgot password

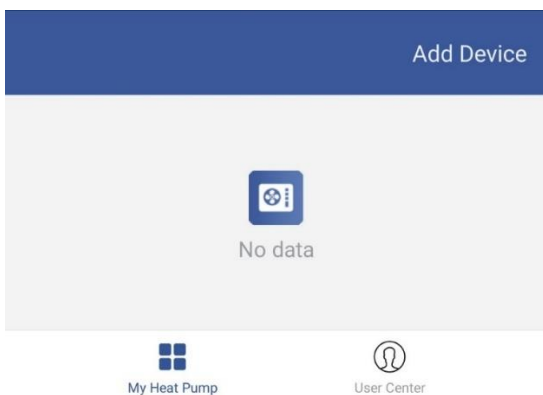
Click **Register** button

The image shows a mobile app screen titled "Register". At the top is a blue header with a white back arrow and the text "Register". Below the header is a light gray background. There are two white input fields. The first field is labeled "Country / Region" and contains the text "China +86" followed by a right-pointing chevron. The second field is labeled "Mobile number/E-mail". Below these fields is a wide, dark gray button with the word "Next" in white text.

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

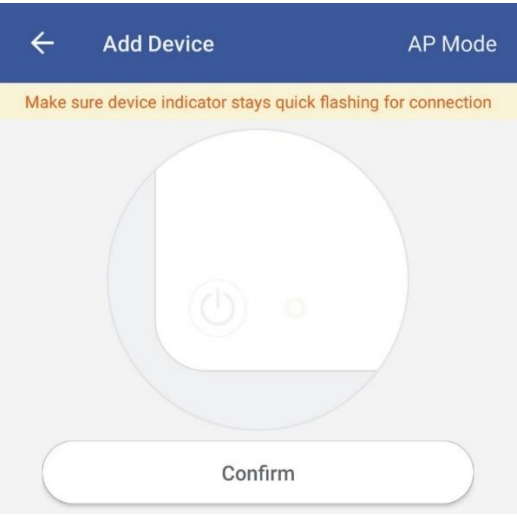


Click **Add Device** button.



Click **CONNECT DEVICE** button.

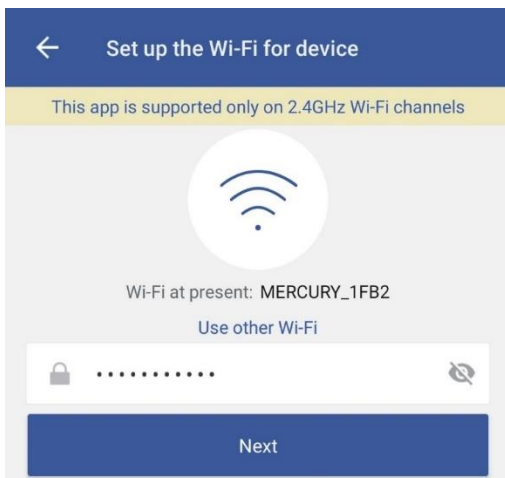
Note: by a recent update [connect device] was changed to [WIFI-DEVICE]



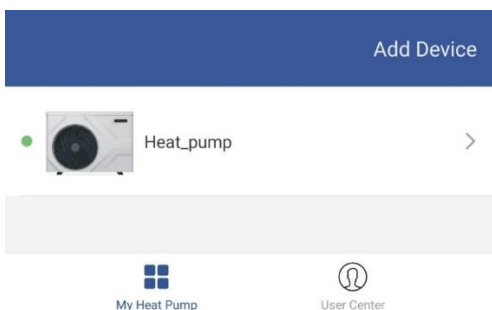
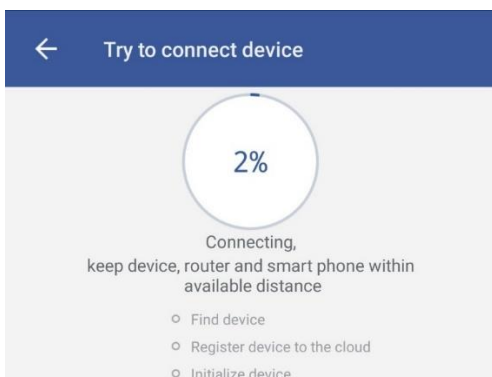
Click the [*Confirm*] button.



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



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, the mode (when 2 hot water cylinders are installed) and the timer settings. With the menu (3 dots right above) you can rename your heat pump.

Controlling two separate hot water cylinders

When two hot water cylinders are installed:



Indicates that the Heat (Primarily Domestic Hot Water cylinder) mode is active, with a current temperature of .



Indicates that the DHW (second hot water cylinder) mode is active, with a current temperature of .

Switching off one of the hot water cylinders



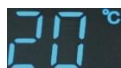
When pressing the  key for 5 seconds, the heat pump switches to the next mode:



Primarily hot water cylinder



is the water temperature primarily cylinder



is the current ambient air temperature



When pressing the  key for 5 seconds, the heat pump switches to the next mode:



Second hot water cylinder



is the water temperature of the second cylinder



is current ambient air temperature



When pressing the  key for 5 seconds again, the heat pump switches to the



starting point:  and  controlling both hot water cylinders.

Running state check



Press the  key to check the running state

o 1	Temperature of Second hot water cylinder
o 2	Temperature of Primarily hot water cylinder
o 3	Outlet sensor
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

System settings

Changing parameter settings



- Hold  button 3s to interface of parameter setting.
- Press  button to edit parameter,  flash.
- press  or  button to increase or reduce parameter.
- Press  button again to exist edit.
- press  or  button to next or previous parameter.
- press  button : exist to main interface



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.



Heat Mode, primarily hot water cylinder

Water pump, fan motor, compressor, 3-way-water-valve switch ON, with IN6 (on-line-switch) CLOSE

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



DHW (Domestic Hot Water) Mode, second hot water cylinder

Water pump, fan motor, compressor ON. 3-way-water-valve, 4-way-water switch OFF.

The compressor stop/start activated by Water tank sensor T2 (T1 on PCB)



+

HEAT & DHW Mode, primarily and second hot water cylinder

DHW has Priority. When DHW reaches temperature unit stop, then HEAT run.

Four-way-valve:

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



Water pump:

The water pump switch ON 60 seconds before the compressor start.

The water pump continues running for 30 seconds after the compressor stops.



Defrost

When ambient temperature ≤ -10 , then condition Simultaneously satisfy ABC or ABD:

A. ambient sensor ≤ -10

B. evaporator sensor ≤ -4

C. compressor running time $\geq 2 * 38$

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 $\geq L13$ or defrost running time ≥ 10 .

Outlet sensor $\leq 5^{\circ}\text{C}$, 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.



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.

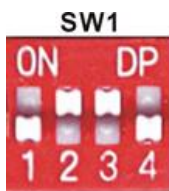
The fan motor stop in defrost.

Three-way-water-valve (optional: for second hot water cylinder):

3-way-water-valve switch ON at COOL/HEAT/AUTO mode, switch OFF at DHW.

3-way-water-valve keep previous state in defrost.

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.

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	Water outlet sensor failure (T2)
E19	T1 Primarily water tank sensor failure (T7 on PCB)
E20	T2 Second water tank sensor failure (T1 On PCB)
E21	Communication problem (controller & PCB)
E22	Ambient sensor (T6)
P01	Water-flow-switch protection (In3)
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

P01 Water flow protection

A water flow switch is installed as standard on the water outlet pipe to ensure adequate water flow on heat exchanger before the compressor start.

It acts if partial block, or less water flow.

The hydraulic module requires no special maintenance. The install of a mesh filter on the water inlet pipe is strongly advised.

The water pump run 15 seconds, if water flow switch continues OPEN for 5 seconds, then PCB judge as water flow fault. The compressor and fan motor do not start. The water pump switches OFF after 10 seconds. The controller displays error code P01.

If water pump fails for consecutive 3 times, water pump will not be started. When water flow switch is detected to be closed, it will resume operation.

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 $\geq$ parameter H2, unit stop, controller display P11. 3 minutes later, exhaust temperature is $\leq$ 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 $\geq$ 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 $2^{\circ}\text{C} < \text{outlet temperature} \leq 4^{\circ}\text{C}$, and ambient temperature $\leq 1^{\circ}\text{C}$, water pump run.

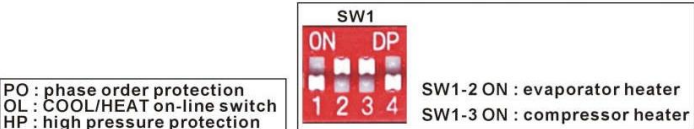
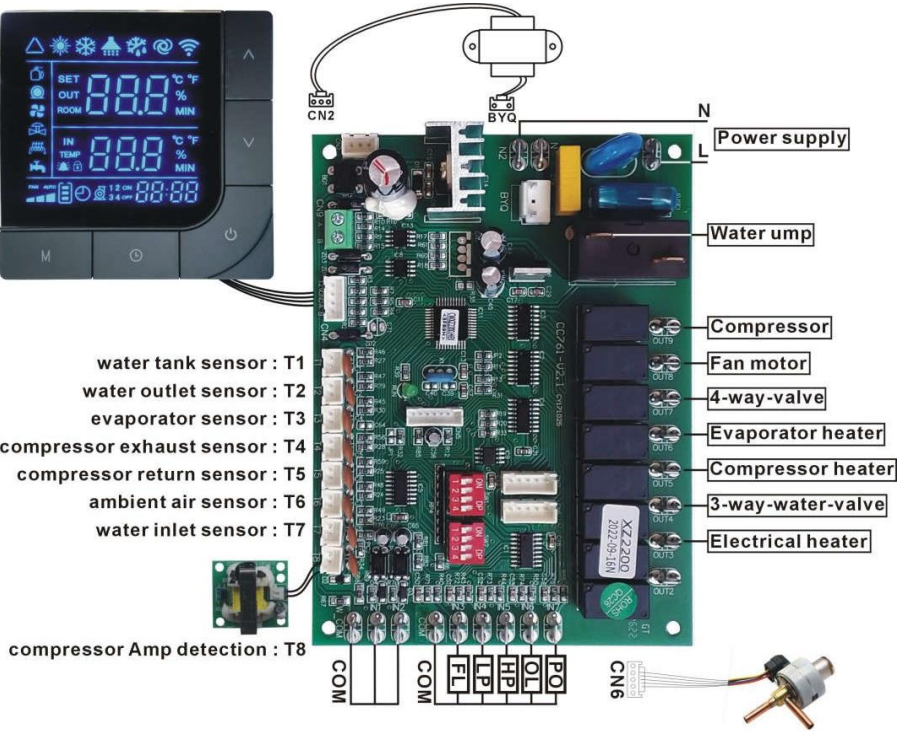
When outlet temperature is $\geq 6^{\circ}\text{C}$, or ambient temperature $> 2^{\circ}\text{C}$, water pump stop.

When outlet temperature $\leq 2^{\circ}\text{C}$ and ambient temperature is $\leq 1^{\circ}\text{C}$, whole unit will automatically run at HEAT mode.

When outlet temperature $\geq 20^{\circ}\text{C}$, or ambient temperature $> 2^{\circ}\text{C}$, unit stop.

[illegible]

PCB



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

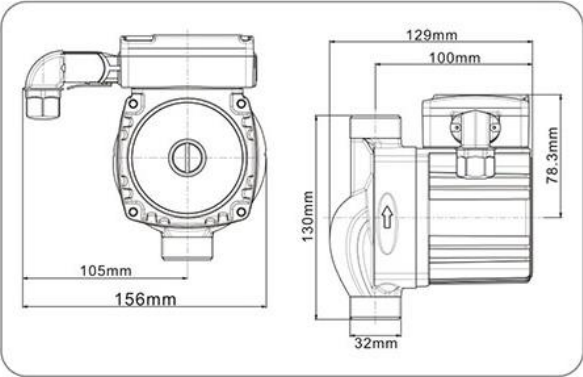
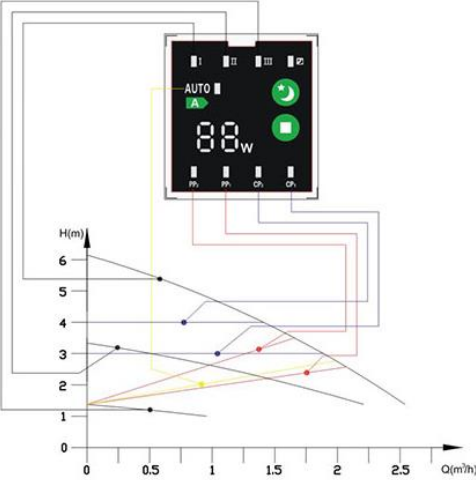
relay
OUT3 : electrical heater
OUT4 : 3-way-water-valve
OUT5 : compressor heater
OUT6 : evaporator heater
OUT7 : 4-way-valve
OUT8 : fan motor
OUT9 : compressor
RY1 : water pump

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.

Greenpro 15/6 EA circulation pump

RS15/6EA



TECHNICAL PARAMETER

Model	Power(W)	Max Flow(L/min)	Max Head(m)	Inlet/Outlet(inch)	N. W(KG)
RS15/4EA	22	30	4	1"	2.1
RS15/6EA	45	41.5	6	1"	2.1

Contact details

Calitec Hot Water Systems Limited

www.calitec.nz

ph. 0800 125 225

info@calitec.nz

Your local installer: