

ALPHA HEATING & SOLAR NZ LTD (AHS)

Domestic Hot-water Center

EFFECTIVE FEBRUARY 2008

Owner's Manual



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I. Overview

ALPHA HEATING AND SOLAR(AHS) Solar Hot-water collector is manufactured by KLOBEN SOLAR of Italy, the Australasian & South Pacific distributor is ALPHA SOLAR NZ LTD

This System has been designed and developed using quality Italian technology. The Accessories required for the system for example, the solar station and the expansion vessel are imported from Germany and Italy respectively , the solar controller is New Zealand made

The System is available in both an Open Loop/Direct System and a Closed Loop/Indirect System dependant on the quality of water available. Systems are also available for both domestic and commercial users depending on requirements.

The benefits of the AHS System include:

- 1) Italian(European) Technology , vacuum tube technology
- 2) Higher efficiency in water heating than traditional solar heating systems
- 3) Protects the environment by drawing on the natural energy of the sun
- 4) Low operational costs , faster heating , works on cloudy and cold day
- 5) Anodised aluminium frame , longer lasting 25 years plus
- 6) Stable and durable systems
- 7) Light weight construction , no extra roof bracing required

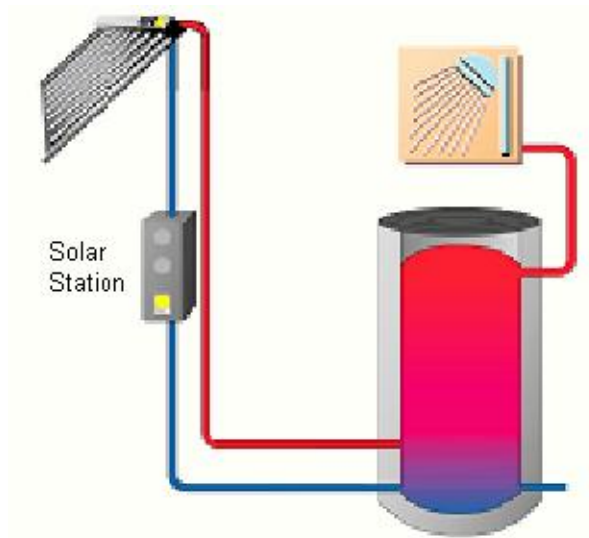
The AHS products are listed as "Complying Products" by the New Zealand Solar Industry as meeting the Code of Practice for Manufacture & Installation of SWH in New Zealand. Standard Compliance for Solar Hot Water Systems.

Standard warranties are available on AHS Solar Systems.

For any enquiries on AHS solar systems you should contact your installer or AHS (NZ) Limited, 34 La Colina Place , Bethlehem , Tauranga New Zealand
Tel: 64 7 5712493 or Fax:64 7 5712494

II. Introduction of Systems

The AHS Solar System uses a Compound Parabolic Concentrator (CPC) Solar Collector, being an evacuated tube collector which is used in both the Open Loop and Closed Loop Systems. It can be operated in either mains pressure or a low pressure water system. It can be used for a residential home as well as larger-scale commercial hot water project.



Pumped Open Loop / Direct System

Solar heated hot water circulates directly into and out of the hot water cylinder



Pumped Closed Loop / Indirect System

Solar heated hot water continually circulates through a heat exchange coil situated in the water cylinder.

Which system is chosen will depend upon a number of factors including the quality of water available and the local temperature in which the system is being installed. The hot water can be temperate controlled to meet the needs of the user.

The AHS KT Collector is often retro-fitted in a property. It works with almost any type water tank, including an electric cylinder, a gas cylinder or a pre-heated tank.

With different system design, the AHS KT Collector is also able to provide the heat required for under floor heating, space heating and swimming pool heating. It can also be used for air conditioning.

In meeting New Zealand industry-Code of Practice, the AHS Solar Hot Water System includes Over Heating Protection and Anti-Freeze Functions. AHS Solar Evacuated Tubes have also passed a European test to resist 25mm diameter hail. A hail protection cover installed over the collector is recommended in locations where heavy hail is likely.

The AHS KT Collector meets the manufacture requirement of the standard AS/NZ 2712. 2007 The hot store cylinders used may be provided as part of the system supplied, or be an existing cylinder, or be purchased separately. In each case, the cylinder must meet the standard for electric cylinder AS/NZS 1056 or meet gas cylinder specifications.

This manual covers a pumped Open Loop System (Direct System) and the Closed Loop System (Indirect System).

Thermosiphon systems are also available but are not covered by this manual.

III. Introduction of Components and their Functions

The AHS Solar System includes the following components:

- A. AHS KT Collectors (KT12, 18, 21) Absorb the heat from the sun. It comes fully assembled.
- B. Water Tank/Cylinder Store the heated water.
- C. Solar Station Include pump-circulating unit and controller box. The pump, pressure gauge, flow meter gauge, safety valve and digital display are assembled in one unit as the pump-circulating unit. There are two tank sensor cables, and one **collector sensor cable goes with the controller box. The solar station controls the heat transfer from the collectors to the storage tank.** It is easily to plug the pump-circulating unit into the controller box.
- D. Expansion Vessel Safe control of the system (for closed loop system only).
- E. The filling and rinsing valves that fill the heat transmission liquid into the closed loop system are connected to the Solar station and are not separate connections

IV. Installation Instructions

Warning: You should not attempt to install or maintain an AHS Solar system unless you are a AHS (NZ) Ltd approved installer or experienced in dealing with Solar Water systems. The AHS Solar system components could cause you or other persons harm if not properly installed or handled generally.

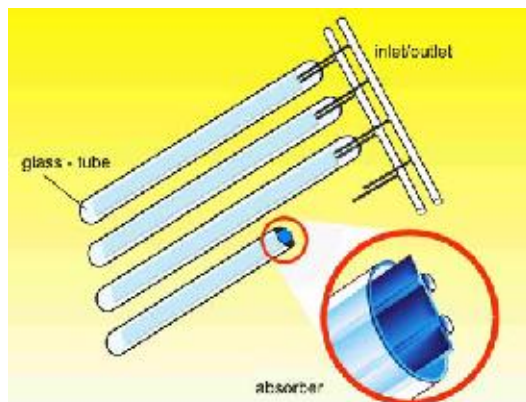
1. KT Solar Collectors

A. The KT Collector Outer Structure



AHS KT Collector comes fully assembled. It can be installed directly on to roofs or walls or onto frames to provide optimal orientation to the sun.

B. The KT Collector Inner Structure



The special inner copper pipe design of the AHS KT solar collector gives the best heat transmission compared to other collector designs.

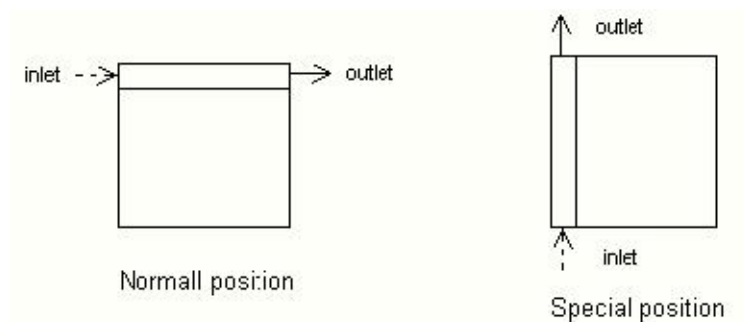
In an open loop application, potable water will be pumped through the collector pipes. In a closed loop application, a glycol/water or water heat transfer fluid will be pumped through the collector pipes.

Caution: DO NOT REMOVE the cardboard protection cover attached to the collector until installation is completed and commissioning has been done
To provide the most efficient system, please follow the instructions below:

Install collector facing towards the north if possible. Always use a compass to check orientation. The workable roof angle is 15°- 45°. Minimum roof angle is 10° for pitch installation.

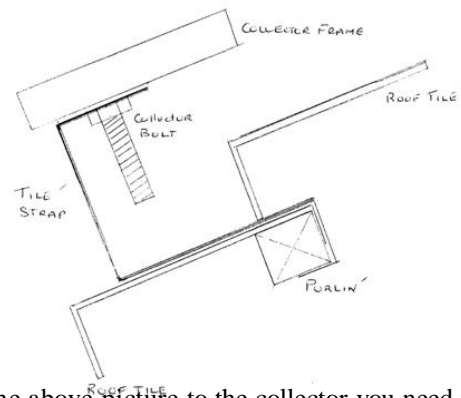
Watch out for trees and buildings, which can cast shadow on the collectors in particular seasons.

The collector manifold is always to be installed on top. In some case, it can be installed as follows.



With rooftop and flat roof construction, a minimum inclination of 15° is appropriate for self-cleaning reasons.

The maximum vertical height from the water tank to the top of KT collector array is 10 meters. The maximum horizontal distance is 20 meters. The total circuit distance from the water tank to KT collector must not exceed 40 meters. For installations out of above standard, please consult AHS Solar for revised pump sizes



FLAT ROOF INSTALLATION ONLY

To fix the aluminium adjustable stands shown at the top of the above picture to the collector you need to disconnect the footer from the adjustable leg stands by unscrewing the bolt and nut, the footer has a hole in the top it that slides into the bolt that is built into a sliding track within the KT collector frame, complete this with a loctite nut to fully secure, resecure footer to adjustable stand with the nut and bolt provided, the second step is to repeat the footer sequence at the bottom of the adjustable stand to fix to the roof, assuming a tin roof disconnect footer from the stand, use a 60MM tek screw to drill through footer and into the roof purlin noting to either silicone or use neoprene washer for water proofing between roof and footer

For a concrete tile roof please use TILE STRAP as shown in picture above, slide tile strap between the 2 tiles vertically up the roof and seal with a roof silicone sealant on top of the strap and to the under side of the tile then fix to roof truss if possible, on the hook at the left hand end of the strap as shown in the picture above is a 10mm hole the size of the bolt that is already integrated into the collector, slide the bolt from the collector into position to line up with the hole in the tile strap, use a loctite nut to secure the bolt to the strap.

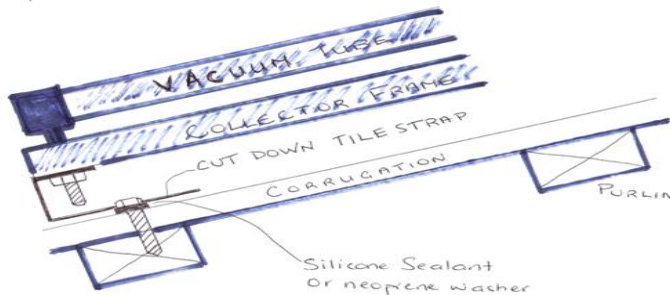
KT Collector	Bracket Amount	Bracket Spacing
CPC12	2	1.4m
CPC18 + 21	3	1.0m

D . INCLINED INSTALLATIONS

To install the KT Collector bracketing to a pitched Zincalume/Galvanised iron corrugated roof use the TILE STRAP , at the bottom end of the TILE strap where the long length of flat plate extends out from the hook trim this to about 25mm past the opposite short end , drill a hole in the 25mm extension sized to take a 60mm tek screw diameter , use an existing nail or screw hole for fixing if possible.

Screw the tek screw through the hole drilled in the strap and then into the roof purlin noting to either silicone or use neoprene washer for water proofing between the roof and the underside of the flat tile strap fixing , if you require a longer length than 25mm of strapping cut according to suitability , any strap length longer than 25mm will need membrane sheathing covering or a bead of silicone on the underbelly of the strap over the excess strapping to avoid reaction from 2 dissimilar metals

See figure 1 below for details



1

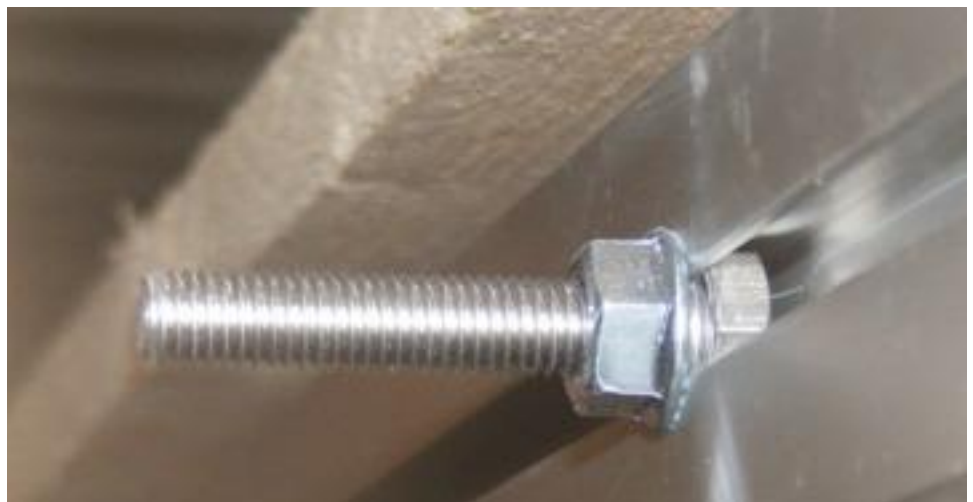
If plastic gutters are installed protection of the gutter from damage caused by ladder is needed A block of wood with some carpet or something similar nailed to it should be placed in the gutter before you lean the ladder up against it.

Any drilling into the roof generally results with metal filings being spread around over the work area , firstly pick up large pieces then hose down smaller debris to the gutter , once this is done detergent washing around the effected area is advisable



All tiled installations where pipe penetrations protrude are to be flashed with lead as per the picture

BACK OF COLLECTOR FRAME 6 SLIDING ADJUSTABLE BOLT AND NUT





Tek screw penetrations to be flashed as per the picture with a bead of silicone or the equivalent neoprene washer

Installers must follow Section 5.5.6 of The New Zealand Code of Practice for the

E. Hydraulic interconnection and Placement of Collectors

Caution: The Collector Sensor should always be located on the highest temperature side (solar return side) of collector arrays, and to be inserted into the sensor pocket.

There are two sensor pockets in each collector. They are below the collector inlet and outlet, refer to page 6, Picture "The KT Collector Outer Structure." The sensor pocket is 250mm in depth and slightly upward. The sensor needs to be pushed in all the way into the sensor pocket try to avoid damaging the sensor head. Remember push the sensor in as far as possible to give an accurate reading of the collector temperature.

The special inner structure design of the KT solar collector allows installers to choose any side of connects to be inlet or outlet, refer to page 6, Picture "The KT collector Inner Structure".

The cable to the sensor should be checked for possible damage during installation. Be careful when it is run around sharp edges such as roof flashings, nails or staples. A 10-meter collector sensor is normally supplied. If the sensor is too short, it can be extended by joining an extra length of cable.



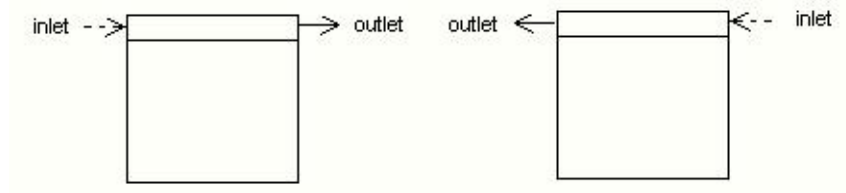
The Sensor must be inserted into the end of the Sensor Pocket of the KT Collector



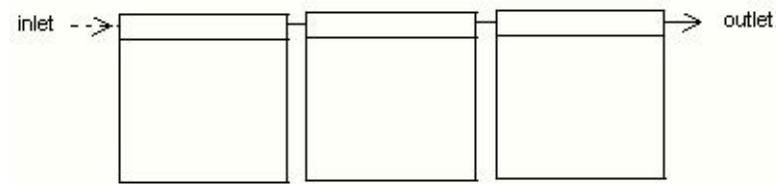
The Sensor Pocket must be sealed
Make sure the sensor is working before you seal

To install a group of collectors, please follow the drawings below:

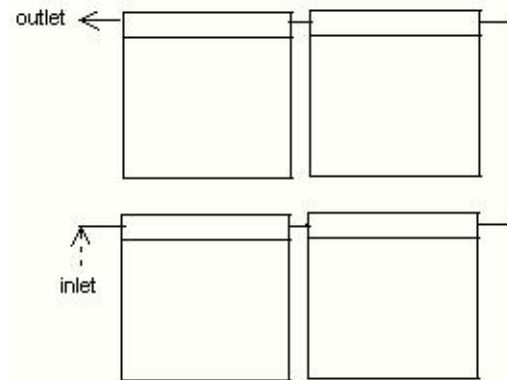
Connection of a single collector



Connection of 2 or more collectors one beside another

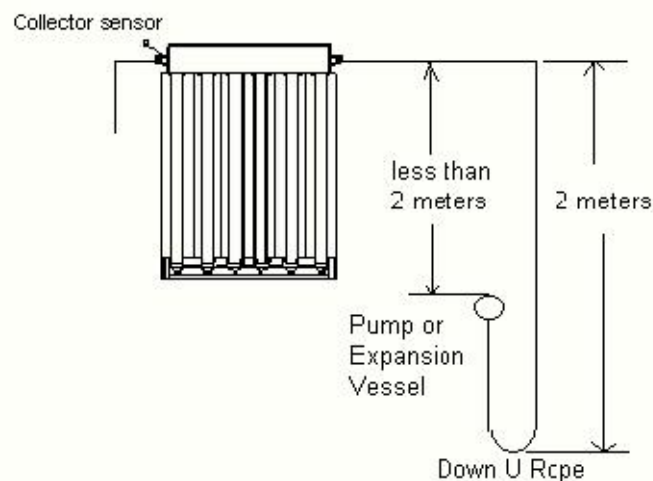


Connection of 2 or more collectors one above the others



2. Solar Station

Caution: The vertical distance between the Pump and the manifold must be not less than 2 meters to avoid steam damage. If the distance is less than 2 meters, the installer needs to use copper pipe to make a down U rope to create the vertical distance to 2 meters, refer to picture below:



The Solar Station includes the Pump-circulating unit and Controller Box.

The installation of the pump-circulating unit needs 4 restraining lugs, 4 expansion bolts and 4 screw nails. Firstly, make sure the placement of the pump-circulating unit meets the installation Demand, for example distance of circuit loop, Refer to section C. FLOWRATES, always use approved AHS pump components otherwise warranty will be deemed null and void

Secondly, according to the distance between the hanging holes at the back of the pump-circulating unit, fix the restraining lugs on the wall using the plastic expansion bolts and screw nails, then hang the pump-circulating unit on the restraining lugs. Please note the placement of the restraining lugs on the wall must be accurate.

There is a fixing board with the controller box. Fix the fixing board on the wall, then hang the controller box onto the fixing board, leave it for wiring.

3. Expansion Vessel (Closed Loop System)

Caution: The vertical distance between the Expansion Vessel and the manifold of the KT Collector must be not less than 2 meters to avoid steam damage. If the distance is less than 2 meters, the installer needs to use copper pipe to make a down U rope to create the vertical distance to 2 meters, refer to the picture on page 10, ð Down U Ropeö.

4. Water Tank/Cylinder

Caution: The distance between the Solar Station and Cylinder should not be more than 5 meters if not, the installer needs to contact AHS for further instruction

Always use the vertical cylinder for the system. Place the cylinder in the position selected.

Leave the cylinder joints facing the Solar Station, and then adjust the cylinder until it sits properly. See the following picture for the cylinder connections:



5. Pipe Connections and Insulation

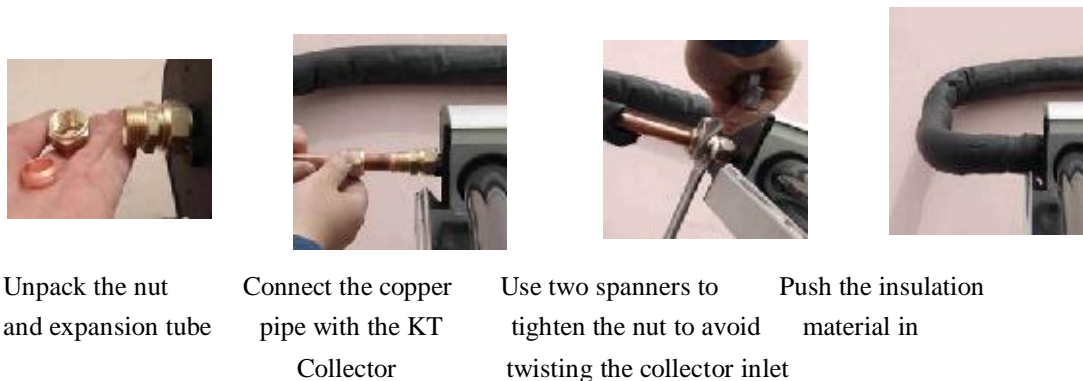
Caution: Always use Copper Pipe or Corrugated Stainless steel piping , do not use hemp at Collector connection , always use heat quality Loctite brand or something similar , piping must Have a rise and fall gradient on flow and return lines

Connect the pipes tightly to make sure there is no water or air leakage.

- A. Please cover all piping with at minimal 13mm thick UV- 120 degree heat resistant insulation
Pipe sizing varies upon solar bank size, if in doubt ask your local AHS agent , you will be contacted
For information of the project and advised accordingly to pipe sizing and/or any other installation tips
Required for the particular installation
- B. After installing all the components in the right positions, connect the pipelines.
- C. Cut the copper pipes according to the distance between the KT collector and the Pump-circulating Unit, the Pump-circulating Unit and the Water Tank, and the Pump-circulating Unit and the Expansion Vessel, and then insert them into the insulation wrapping. For reference, please see the pictures below.



- D. Connect the copper pipe with the KT Collector. For the installation method, see the following pictures:



After finishing the above procedures, insert the sensor into the sensor pocket of the KT Collector. Please refer to the picture on pages 9.

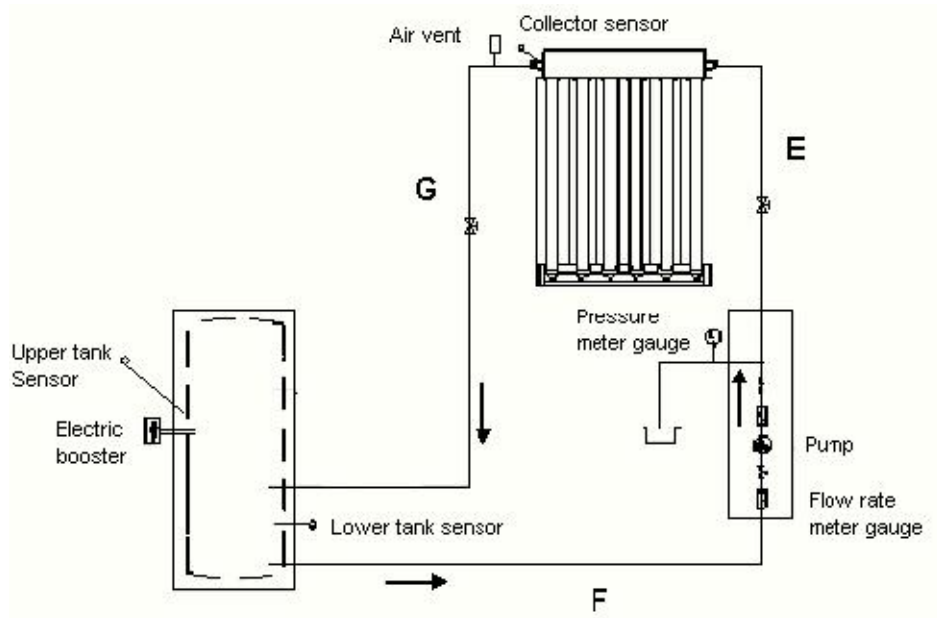
- E. Connect the pipeline between the KT Collector and the Pump-circulating Unit.
The cold solar water pipe should always be connected with the pump. This part pipeline is indicated as øEö on the Pipeline Connection drawing on page 14.
- F. Connect the Pipeline between the Pump-circulating Unit and the Cylinder. This part pipeline is indicated as øFö on the Pipeline Connection Drawing on page 14.
- G. Connect the solar hot return pipeline between the KT Collector and the Cylinder.
This pipeline is indicated as øGö on the Pipeline Connection Drawing on page 14.
- H. Connect the pipeline between the Pump-circulating Unit and the Expansion Vessel.
(Closed Loop Only) This part pipeline is indicated as øHö on the Pipeline Connection Drawing on page 14.
- I. Insert the sensor into the sensor pocket of the Cylinder. See the following pictures:



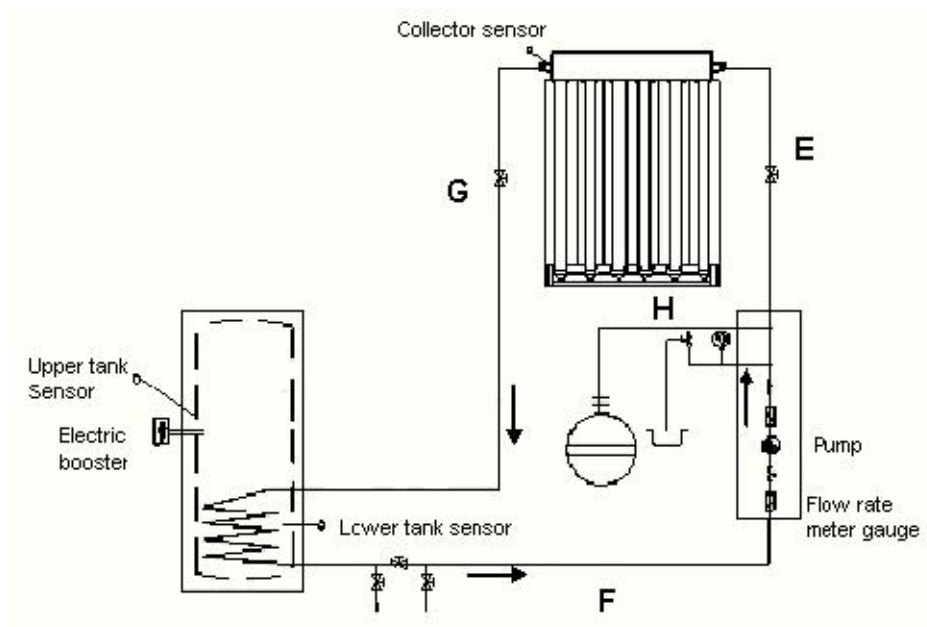
- J. The Expansion Vessel is supplied with a wall bracket that has a double check valve system on it so if servicing Or replacing the vessel is required there is no need to re pressurize the system , a stainless steel connecting hose From the pump station to the expansion vessel is also provided , no connecting copper pipe required



Connect the expansion vessel to the solar station with the stainless steel pipe provided , remember to fit heat retardant fibre washer to the hose



Open Loop System Pipeline Connection



Closed Loop System Pipeline Connection

Apart from the procedures previously mentioned, installers must follow Section 5.5.8 - Pipework Insulation in the Code of Practice when connecting and insulating the pipes.

6. Filling the System

Check each joint before filling the system!

Open Loop System

A. Filling Water Tank/Cylinder

Do Not turn on electrical supply until the cylinder has been filled with water.

Turn on at least one hot water outlet tap, preferably over a bath or laundry trough. Turn on mains water supply tap in the line to the cylinder and allow the water to fill the water cylinder discharging air out of the top of the cylinder through the open tap. As soon as **water flows freely (without air bursts) from the tap, close the tap and allow the cylinder** to pressurize.

B. Bleeding Air from KT Collectors

It is very important to bleed air from KT collectors to avoid air locks inside the system that would cause system banging.

After filling the cylinder, turn off isolating valve on the returning line, open the air vent on the top of the collector and the isolating valve on the flow line, then turn on the mains water supply, allow the water to go through the KT collectors, bleeding the air from the collectors completely, until there is no air bubbles coming out from the air vent. To avoid trapping air in the inner collector pipes, installers must follow this process carefully for 15 minutes

C. Bleeding Air from Water Tank/Cylinder again.

Turn on the isolating valve on the return line to let the rest of the air come down to the cylinder. Open the PTR valve, to release some of the air coming from the pipe and repeat the process of filling the cylinder until the air is completely bled out of the system.

Closed Loop System

A. Filling Water Tank/Cylinder

Do not turn on electrical supply until the tank has been filled with water.

Turn on at least one hot water outlet tap, preferably over a bath or laundry trough. Turn on mains water supply tap in the line to the cylinder and allow the water to fill the water cylinder discharging air out of the top of the cylinder through the open tap. As soon as **water flows freely (without air bursts) from the tap, close the tap and allow the cylinder** to pressurize.

B. Filling the Closed Circuit.

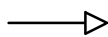
Filling and commissioning the Closed Loop Circuit with the KT solar pump station pictured directly below

Refer to picture Closed Loop System Pipeline Connection on page 14 for component location



Filling valve 1

Filling valve 2



Commissioning system

With the filling station fill it with good quality water or glycol ,connect 20mm pipe end from filling station pump connection to the top of the right side of the solar station ball valve underneath the RELIEF valve (see filling valve 1)

Turn the BLUE handle ¼ turn clockwise.

With the remaining pipe from the top of the filling station connect this to the ball valve at the bottom right of the solar station , its just below the flow valve (see filling valve 2)

Connect the supplied stainless steel pipe connector to 20mm connection next to the Relief valve and attach the bracket for the expansion vessel assembly.

Remember at this point the collector(s) should still be covered , next turn the pump filling station on , the water/glycol will be pumped to the top filling valve,then upto the panel and back down through the solar station then to the heat exchanger and back to the ball valve at the bottom of the solar station and return to the (tank return) top of the filling station .

Watch carefully in the tank return pipe that the water/glycol coming out has no aeration or bubbles in it , this is the **key point to the exercise-run for 20 minutes to be sure**

When you are satisfied there is no air bubbles in the system turn of the bottom ball valve on the solar station first(keep pump filling station running) look up at the pressure gauge on the solar pump station when that reads between 300-350kpa turn off the top valve on the solar station at this point turn off the pump also.

If you have overpressurized the system to say 400kpa use the relief valve to bleed the excess from the solar station until the gauge reads 250-300kpa

CHECK FOR LEAKS CHECK FOR LEAKS CHECK FOR LEAKS The leaks if any may take awhile to come through í í í í í í í í í í

If the system loop has any leaks in it the pressure will drop below the specified pressure range , you will need to fix the leak and



C. Set Flow Rate

The pump has specific flow rate for each collector area. This needs to be set before the system is operated.

The table below specifies the proper flow rate for different systems by using **Pure Water as the heat transmission liquid.**

System	Collector Area	Flow Rate
I	2.0 m ²	1.3 L/min
II	3.0 m ²	2.0 L/min
III	4.0 m ²	2.6 L/min
IV	5.0 m ²	3.3 L/min
V	6.0 m ²	4.0L/min

Flow rate meter gauge

To adjust the flow rate, please follow these steps:

- 1) Set the pump speed to the second speed
- 2) Read the flow rate, and match it with the flow rate table;
- 3) If the flow rate is too high, adjust the speed to the first speed
- 4) If the flow rate is too low, adjust the speed to the third speed.

D. Fill the Propylene Glycol/Water mix liquid for Closed Loop System.

In some areas where the temperatures are lower than + 1-2 or freezing temperatures , we could use 30% propylene Glycol (Food Grade) and 70% water mix liquid (by volume) as the heat transmission method for the Closed Loop System. The freezing point of this solution is -28⁰ C

Use good quality water to mix with the Propylene Glycol to avoid damaging system by depleting the corrosion inhibitor and promoting a number of corrossions including general and acidic attack corrosion. Good quality water contains: please see next page

Less than 50 ppm of calcium
Less than 50 ppm of magnesium
Less than 100ppm (5 grains) of total hardness
Less than 25 ppm of chloride
Less than 25 ppm of sulfate

Please check with the relevant city water department to determine the chemical properties of the local water.

A simple test to ensure that water contains less than 100 ppm of hardness is to fill a small sample bottle with 50% glycol and 50% water. Let the solution stand for 8-12 hours, shaking it occasionally. If any whitish sediment forms, the water is too hard and should not be used to dilute the glycol.

To fill the system with glycol / water liquid, it is necessary to follow the instructions below:

Make sure the system is clean before filling. Pre-fill flushing is highly recommended.

Mix the solution at room temperature.

Never use a chromate treated joints or components. The chromate will damage the glycol and can lead to severe system degradation.

Do not use an automotive type glycol.

Do not use in a system that may have a solution temperature over 148°C.

Do not use check valve or closed zone valves that would isolate a part of the system preventing proper expansion and resulting in freeze damage.

Adjust the flow rate by 10% faster then the flow rate of using pure water as a heat transmission; refer to the page 17 for Set Flow Rate.

Check the anti-freeze solution once every two years to avoid the solution sediment from possibly overheating in the collector.

Contact your chemical supplier for additional information on proper disposal or recycling procedures.

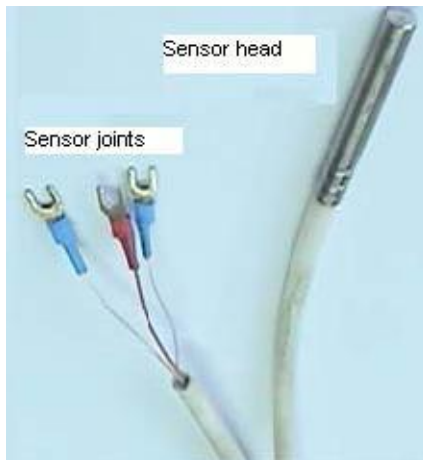
Check Code of Practice for more details.

7. Controller Connection

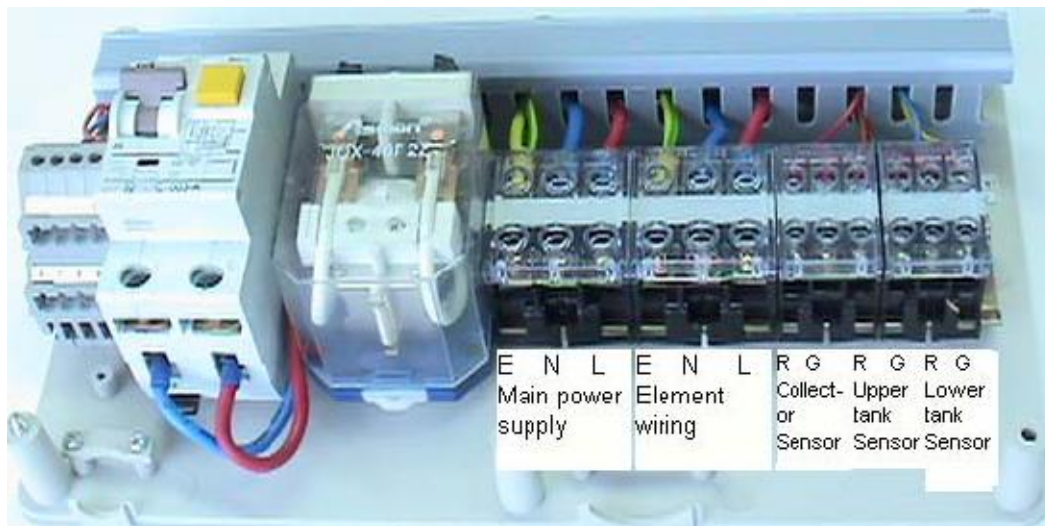
A. Controller Wiring

Connect the wire strictly in accordance with the wiring diagram of the controller box.

There needs to be a 240v power outlet nearby to supply the controller box.



Caution: The sensor has three joints, connect the RED (R) and one of GREEN (G) in the controller box, and leave the other GREEN joint inside the controller unconnected.



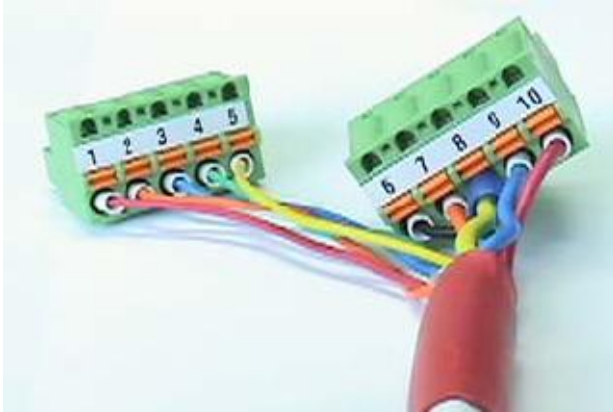
Controller Box wiring diagram

B) Connect Pump-circulating Unit with Controller Box.

On the pump-circulating unit, there is a wiring plug which needs to be inserted into the controller box. To insert this plug simply match the numbers on the plug with the corresponding numbers in the controller box.

Make sure the plugs marked (1)(2)(3)(4)(5) from the pump-circulating unit are inserted into the (1)(2)(3)(4)(5) of the controller box, and the (6)(7)(8)(9)(10) from the pump-circulating

are inserted into (6)(7)(8)(9)(10) of the controller box as the picture below:



Plugs from pump-circulating unit



Connections in the controller box

C. Check the solar station.

After finishing the above connection, turn the power on, and start the system. The solar station display will show the collector temperature and tank temperature even without the water in the tank. This shows the solar station is working properly.

D. Check all the pipe connections and wire connections to make sure each connection joins properly.

8. Commissioning the System

1) Pre-commissioning Check

Before starting the commissioning process, check that the following actions have been completed:

Water tank is full and pressurized ready for heating.

Collector temperature sensor connected.

Air vent fitted to the Collector. (Open Loop System)

Collector flow and return line connections completed to the Collector array.

Expansion Vessel connected (Closed Loop System)

Closed loop filled with Water or Glycol/Water solution. (Closed Loop System)

Collector interconnection pipe work has a gentle and continuous fall from the collector array to water tank.

Hot water circuit connections connected at water tank.

Two water tank sensors connected at water tank.

Final connection of the hot water pipe work at the storage system end completed.

Check the pressure meter gauge to confirm that no change has occurred.

2) System Operation Test

Switch the system on. The display unit will show the collector temperature and the water tank temperature.

Push the function button, and choose the function 007 to set the hour (local time), i.e., if the right time is 15: 35, set the hour as 0150.

Push the function button, and choose the function 006 to set the minute (local time), i.e., if the right time is 15: 35, set the minute as 0350.

Push the function button and choose the function 005. The tank temperature display shows the lower tank temperature.

Push the function button and choose the function 004. This function turns the **element off**.

Push the function button and choose the function 003. This function allows the **element to work at any time if the water temperature is lower than 55°C and the element to turn off if water temperature reaches 65°C. Check whether the element works, and the pump circulates.**

Push the function button and choose the function 002. This function allows the **element to work at 5:00 and 16:00 if the water temperature is lower than 55°C** and the element to turn off when water temperature reaches 65°C. Check whether the element works, and the pump circulates.

Push the function button and choose the function 001. This function allows the element to work at 16:00 if the water temperature is lower than 55° C and the **element to turn off if water temperature reaches 65°C. Check whether the element works, and the pump circulates.**

With the functions 004, 003, 002, 001, the pump is controlled by the temperature difference. If the collector temperature is 8°C higher than the lower tank temperature, the pump will start working, and the "circulating" light will come on. When this difference drops to 4° C, the pump will turn off.

The system has a freeze protection function. If the collector temperature is less than 4°C, the pump will start pumping hot water back to the collector to protect the collector from freezing. The pump will stop when the collector temperature reaches 7°C.

The system has an overheating protection function. If the water tank temperature reaches 80° C, the pump will switch off to protect the water tank from over heating.

To achieve above checking, installers could attach the sensor to a cup that contains ice or boiling water to make the temperature difference. Make sure the sensor does not touch the water.

After the system is fully functional and fitted to the customer's requirement, show the customer how to use the system according to the User Instruction, tidy up the work site and leave the Owner's Manual with the customer.

If the pump does not start as the function required, the installer must check the sensor cables. Refer to the Sensor Operation Test.

3) Sensor Operation Test

To perform the sensor cables check, you will require a multi-meter set to check the resistance or ohm setting to perform resistance measurements.

Disconnect the sensor cable from the control box.

Connect the multi-meter leads across the sensor cable and read the multi-meter.

If the multi-meter shows an infinite reading (ie, a 1 in the display for a digital meter or no deflection for a meter type multi-meter) this indicates an open circuit (or break in the cable or bad connections at the sensor). The cable to the sensor should be checked for possible damage during installation. This would normally be found around sharp edges such as roof flashing etc.

If the multi-meter shows a short circuit reading (ie, 0 in the display for a digital meter), this indicates a short circuit. The cable to the sensor should be checked for possible damage during installation. This would normally be found around sharp edges such as roof flashing etc or a nail or staple through the cable.

If the cabling is correct the multi meter should indicate a resistance reading, which reflects the temperature at the sensor location. We are using PT1000 sensor in this control box, the resistance value of PT1000 at 0°C is 27.25 . We use different sensor cables for different controllers. For more information, installers need to consult AHS Solar

V. User Instruction

1. Main Technical Data:

- 1) Power Supply: 220-250 VAC
- 2) Temperature-measuring tolerance: $\pm 2^{\circ}\text{C}$
- 3) Temperature-measuring Range: $0\sim 255^{\circ}\text{C}$
- 4) Temperature-controlling tolerance: $\pm 2^{\circ}\text{C}$

2. Introduction of the Control Panel.



- 1) Display 1
It shows the temperature of the collector and the function number chosen.
- 2) Display 2
It shows the temperature of the water tank and displays the time when making time setting.
- 3) Start / Stop Button
It controls the element and switching the pump on or off manually.
- 4) Menu Button
This is the Function-selecting Button. By pressing this button will allow you To see the respective function that this controller offers that suits your system. Keep pressing the button until the desired function number is displayed.
- 5) Adjusting Button
This button is used for time setting.
- 6) System On / Off Button
This button controls the whole system, including the pump circulation and the electric element heating.

7) Heating Light

If the heating light is on, it means the electric heating is boosting. If the light is off, it means the electric heating is shut off.

8) Circulating Light

If the circulating light is on, it means the circulating pump is working. If the light is off, it means the circulating pump has stopped.

3. Introduction of System Functions

1) Self-testing when starting the system.

When starting the system, the temperature of the collector and the top tank appears 000. The Circulating light is on for about 5 second, then it should return to its normal working status.

2) Automatic switch for the solar pump on and off

When the collector temperature and is 12°C higher than the lower tank temperature, the circulating light comes on, and pump starts to work. When this difference drops to 6°C, the circling light is off and the solar pump stops working.

3) Overheating Protection

If the collector temperature is higher than 110°C or the upper tank temperature is higher than 80°C, the pump stops circulating.

4) Freeze Protection for the Collector

If the temperature of the collector is lower than 4°C, the pump starts working until the collector temperature reaches 7°C.

5) Auto Reset Function after a power cut

If the power is shut off abruptly, the system will memories the last setup automatically.

6) Manual element Control Function

When system is under Functions by pressing the Start/Stop Button you can manually switch the element on/off.

There is a manual pump startup by pressing Start / Stop Button, you can switch the pump circulation on/off.

4. Operating Instructions

1) **Start the System**

Plug the power lead into the power socket to start up the controller, there is no ON/OFF button

2) The solar controller is totally automated , all functions are preset

The functions are as follows:

- 1) Pump on/off differential 6
- 2) Pump on 12 degrees
- 3) Pump off 4 degrees
- 4) Hold off element timer (4 hours)
- 5) Reheat Lower 40 deg C
- 6) Reheat Upper 55 deg C
- 7) Biosafe 60 deg C
- 8) Solar TOP out heat input to HWC 80 deg C
- 9) Frost function (OFF) adjust to max 4 deg C

Setting changes :

To make changes to preset default settings you must first enter the software code to access these settings.

Code access :

Press **TEST** all display lights will begin to flash immediately once the lights stop flashing Press **HWC**- **NEXT** then **PUMP** in that precise order.

The first default setting you see is **12** this is the **PUMP ON** setting, to adjust this setting use the **+** button for increasing value and the **-** button to decrease set value.

The **+** button is marked under **PUMP** The **-** button is marked under **HWC**

You must be a accredited installer to change these settings , if settings are changed without the expressed permission from AHS makes the warranty null and void

PT1000 Sensor settings :

Maximum temperature of sensor before damaging is 250 degree , the AHS controller uses the Silicone sensor cable with stainless steel sensor head
Basic PT1000 sensors max temperature is generally 105 degree

5. System Maintenance.

- A. Always keep the solar controller dry. Do not change the setting if is not necessary, as the installer has set the optimal function for the users.
- B. When power cuts off, make sure the controller is set back to the normal setting.

- C. Do not re-start the system when the collector temperature is too hot. It is better to re-start system in the early morning or evening when collector temp is below +25 deg.
- D. Regularly rinse with water the CPC reflector board and Evacuated Tubes carefully.
This will extend the life of the collector and keep the system efficient.
- E. Contact the installer or AHS if the pressure meter gauge shows a continual drop
water leakage has occurred , the solar station pump will become noisy

VI. Maintenance

Basically, the AHS water heating system is a maintenance free system.

1. Due to the shape of the evacuated tube and the design of the CPC reflect board, the collector has a self-cleaning function, but a regular water rinsing once or twice a year will help the CPC reflect board last longer and be more efficient.
2. Check the pressure meter gauge regularly for Closed Loop System. If the system pressure continues dropping, then check the system. It will be caused by air or water leakage. In most situations, it might be necessary to refill the closed loop circuits.
3. Different system function are based on different seasons and different hot water requirements.
4. To check the system, the KT collector must be covered by cardboards or blankets. It is necessary to wait until the collector temperature falls back to a safe range, lower than 25°C.
5. The evacuated tube lasts for more than 20 years. In case the tube is broken, it is very easy to be replaced. To replace the broken tube, rotate the top half of the tube holder and lift the tube upwards and pull the broken tube away from the manifold situated at the top of the collector , when you replace the new tube slide it over the copper piping and aluminium fin , rotate the tube as you do this right up into the connection at the manifold then lower the tube into the holder and rotate top half of the holder to lock the tube in place.
6. If glycol is used in a closed loop installation it will need to be checked and or replaced every 5 years without fail , a check schedule needs to be put in place to monitor this service

VII. Technical Data

Items	Measurement (mm)	Net Weight	Other
CPC12 Collector	1350 x 1605 x 140	38 kg	
CPC18 Collector	2010 x 1605 x 140	58 kg	
180L S/S Water Tank	510 x 1700		
270L S/S Water Tank	560 x 1500		
300L S/S Water Tank	560 x 1725		
18L Expansion Vessel	300 x 430	5 kg	
24L Expansion Vessel	340 x 470	6 kg	
Solar Station	390 x 370 x 150	12 kg	
PT1000 Collector Sensor	10 Meter		
PT1000 Upper Tank Sensor	2 Meter		
PT1000 Lower Tank Sensor	2 Meter		
Stainless Steel Fix Straps	30 x 560		

All installation work must follow the Code of Practice for Manufacturing and Installation of Solar Hot Water Systems in New Zealand.

For any other enquiries concerning the AHS Solar Hot Water system please contact your installer for assistance.

Installer:	
Phone:	

The ALPHA HEATING AND SOLAR Solar Hot Water system is designed and manufactured to meet the Code of Practice for Manufacturing and Installation of Solar Hot Water Systems in New Zealand. It is also designed and manufactured according to Europe EN12975 Standard. Test Report 07COL623 November 23rd 2007