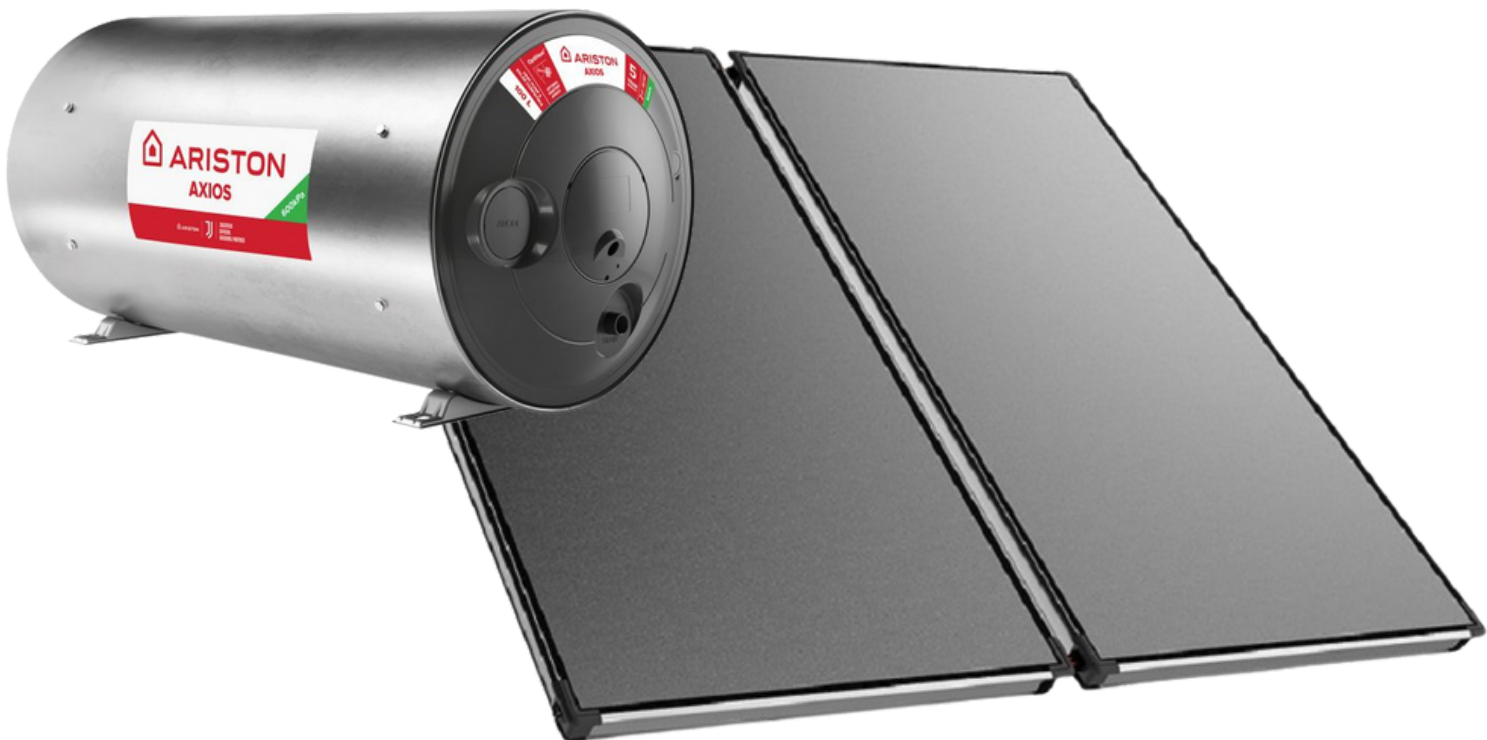




RETRO SPLIT SOLAR GEYSER SYSTEM 100 - 250 LITRES *PRODUCT MANUAL*



Introduction

Installation Guide for The Water Solar Company Solar Geyser System

Congratulations on purchasing The Water Solar Company solar geyser system.

Our state-of-the-art collectors combine advanced technology with sleek design, resulting in a high-quality product that you're sure to love.

Before beginning installation of any of The Water Solar Company's products, it is crucial that you read and understand this manual thoroughly. Please note that this manual pertains specifically to the system(s) displayed on the cover page and header. If you have any questions or concerns about the installation process after reading this manual, please contact a The Water Solar Company representative prior to beginning installation.

This manual is intended to serve as a guide to help you correctly install The Water Solar Company's components. However, it's important to note that it does not replace the knowledge and expertise of suitably trained installers.

Use discretion and seek professional assistance if needed.

The Water Solar Company Solar geyser components must be installed in compliance with the following regulations:

SANS 198

SANS 10252 -1

SANS 10254

SANS 10106

SANS 60335-2-21

SANS 10400 – parts A, B, L, XA SANS 10142-1

No modifications from these standards are allowed.

All local bylaws and estate laws must also be adhered to

Important Standards and Guidelines for The Water Solar Company Product Use

To ensure safety and retain warranty benefits, compliance with all standards is mandatory. Non-compliance may result in injury, death, or void warranty.

Any attachment, connection, integration, or association of parts that impacts The Water Solar Company product operation or performance may void the warranty. Only authorized parts supplied by The Water Solar Company will be covered under warranty, and written authorization is required for any non-supplied parts.

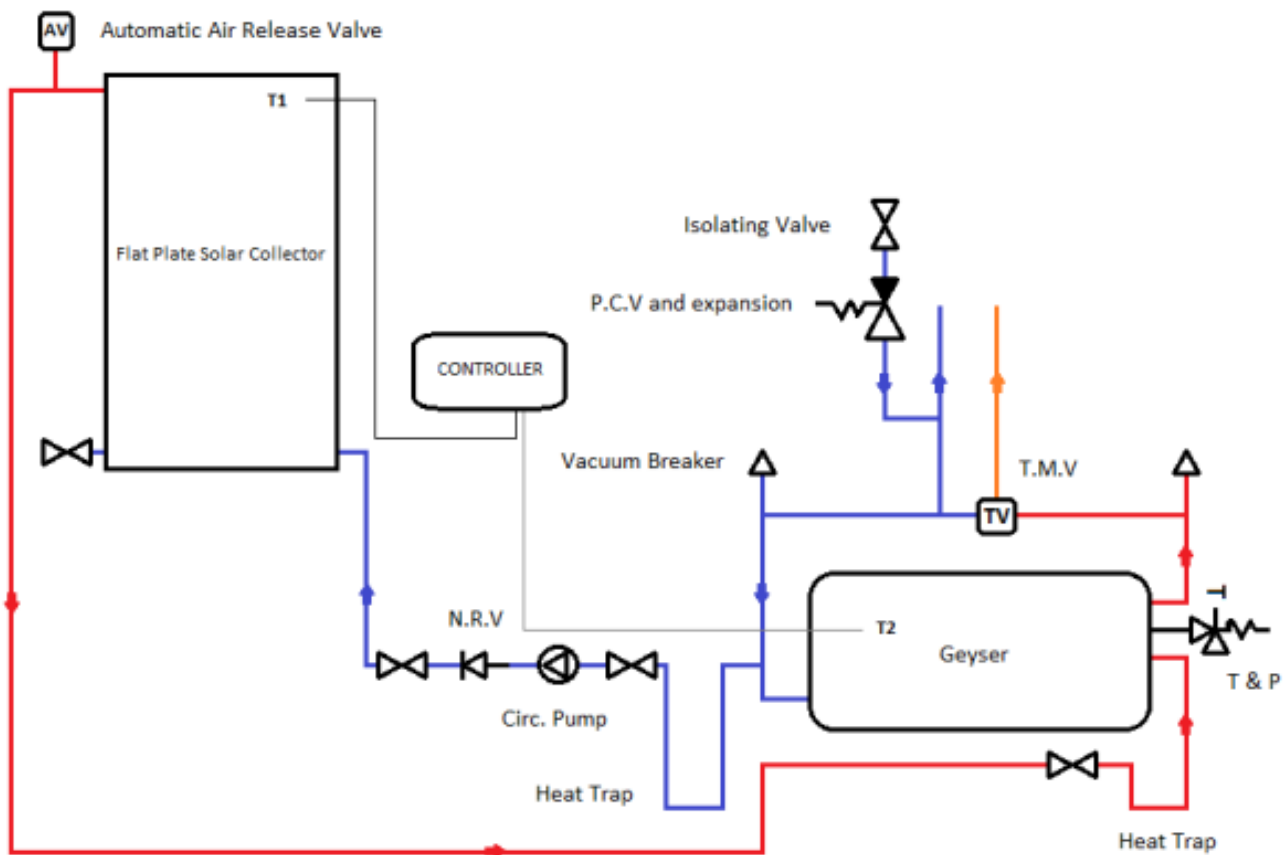
Please note that The Water Solar Company cannot guarantee the final fitness of water for consumption, as the system does not affect water quality.

System Description

How the system works

Retro-fit range involves active direct systems that utilize a circulation pump to transfer solar-heated water from a SunScan flat plate collector to a storage tank.

This process is regulated by a temperature differential controller, which compares the temperatures of the panel (T1) and the geyser (T2). The pump circulates water from the geyser through the panel when the controller detects an energy gain for the geyser. The controller also monitors the geyser's temperature (T2) and triggers the electrical element if the temperature drops below a set level within a specific timeframe.



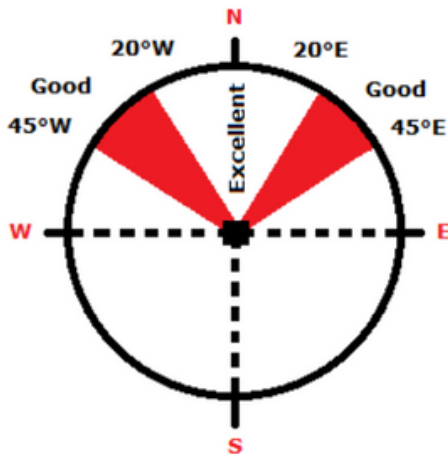
Thermal Performance

MODEL	Q-FACTOR	ENERGY RATING
150L The Water Solar Company Retro-fit	19.2mj	
200L The Water Solar Company Retro-fit	21.5mj	

The technical data above has been verified and confirmed by tests conducted by the South African Bureau of Standards in terms of SANS 6211, at an incoming radiation of 20MJ per m² per day, a temperature differential of 10°C at an inclination of latitude plus 10°

Orientation & Placement

In the southern hemisphere, installing solar panels facing true north is ideal. Deviations of up to 45° on either side of North are acceptable and have minimal impact on system performance. While The Water Solar Company suggests staying within this 45° range, exceptions can be considered if achieving this angle is not possible. For a customized design, reach out to a representative from The Water Solar Company.



The collector should be installed in an area that is free from shade all year round or one that does not experience shading between 9:00 am and 3:00 pm.

For optimal performance, The Water Solar Company suggests mounting the collector at an inclination or tilt angle ranging from 20° to 50°.

Prior to installation, ensure that the chosen roof area is structurally sound and can support the added weight. If there are concerns about the roof's capacity to handle the load, seek advice from a qualified professional before proceeding with the installation.

Freeze Protection

The retro-fit range from Water Solar Company includes direct systems with smart temperature differential controllers. When preset freeze protection temperatures are reached, the circulation pump is triggered to circulate warm water through the collector briefly to prevent freezing. To enhance safety and the durability of your system, especially in regions prone to frost or power outages, it is essential to install a UPS backup.

Hail Resistant

The flat plate collectors from The Water Solar Company are designed to be hail-resistant, featuring 3mm tempered glass that can endure hailstones up to 35mm in diameter.

Scale Resistance

In regions with low water quality, it's crucial to prevent scale and mineral build-up from impacting the efficiency and lifespan of your The Water Solar Company direct system.

If unsure about the water quality in your area, seek advice from your local municipality or a The Water Solar Company representative.

Typically, water quality is deemed acceptable when it has fewer than 600 parts per million total dissolved solids.

Safety Precautions

General Safety Information

WARNING! This appliance is capable of producing temperatures that exceed 50°C.

In certain circumstances safety valves could open to expel hot water and relieve pressure, Never obstruct these valves and always leave them open to the atmosphere.

This apparatus is intended for water heating only.

Any and all work carried out in regards to the installation, commissioning and maintenance of any The Water Solar Company Solar water heating system in its entirety is to be carried out by qualified and suitably trained professionals.

Safety Consideration for Installation & Operation

All installations are to be carried out in accordance with the Occupational Health and Safety Act (Act 85 of 1993) requirements and any relevant local authority prescriptions.

General Points to Consider

- Assess site specific risks and mitigate to an acceptable level prior to installation, if required consult a trained professional.
-
- Water temperature can reach boiling point and collectors can stagnate at temperatures that exceed 150°C. Cover collectors during installation to prevent heating, and limit the risk of scalding.
-
- Be aware of any overhead power lines outside and electrical wiring inside the ceiling space.
-
- Handle collectors with care to prevent glass breakage, damage to property and personal injury.
-
- All safety gear must be worn at all times where relevant; these include but are not limited to safety goggles, gloves, hard hats and safety shoes.
-
- Ensure installation personnel are competent and in suitable physical condition.
-
- Any scaffolding or specialized safety equipment must be installed by certified personnel.
-
- Installers must be trained and conversant with the assessment of height hazards, safety procedures at heights and relevant safety equipment.
-
- All personnel working on the installation of a solar water heater must be issued with the appropriate safety equipment.
-
- Ensure that occupants are aware of all health and safety implications relevant to them.
-
- Do not attempt to install a solar water heating system if weather conditions are not suitable i.e. high winds, Rain and lightning, etc.
-
- In the event of prolonged periods of non-usage .e.g. occupants on vacation, ensure that the controller is set to
-
- ‘Holiday Mode’ to regulate the high temperatures that may be achieved (See controller manual).

Installations

System Components

Main Components

1 x Geyser

1 x Flat plate collector

1 x Temperature differential controller

1 x Circulation pump

Storage Tank



Sometimes pre-installed (Solar component added afterwards)

Flat Plate Collector

The Water Solar Company 2m² / 2.4m² Flat plate collectors are manufactured from high quality materials which consist of:

3mm low iron ,refractive and tempered safety glass

0.5mm Aluminium complex anodised selective coated absorber

Copper headers and riser tubes

35mm glass wool insulation

Profiled aluminium 'smart design' casing



Temperature Differential Controller



The Geyserwise Max is a reliable and efficient solution, providing precise control and monitoring for your solar water heating system. Trust The Water Solar Company to deliver cutting-edge technology for an enhanced solar geyser experience.

Operating Voltage: 230VAC / 50HZ.

Main Relay Contact Rating: 30AMP (Max 4KW).

Secondary Relays: Pump and solenoid 5Amp.

Operating Voltage Range: 220V – 250V AC.

Earth Leakage Protection: 25MA action time = 0.1 second.

Temperature Display Range: 0 – 99°C (“-5” when below -5°C, “EA” when above 99°C).

High Temperature Warning: Above 84°C.

Temperature Setting Ranges: 30 – 75°C (for electric water heating).

Temperature Tolerance: ± 2%.

Temperature Differential Setting: 1°C.

Switching Differential: 6°C.

Collector Antifreeze Protection: At 0°C – 10°C, default is 5°C.

Circulation Pump



Introducing the Geyserwise Circulation Pump 220V by The Water Solar Company. Designed specifically for split solar geyser systems, this high-performance hot water circulation pump ensures optimal efficiency and convenience.

Additional Components may include

SR802 240v contact relay
Thermostatic mixing valve
Non-return valve
Ball stop shut off valves
Flat roof stand (On request)

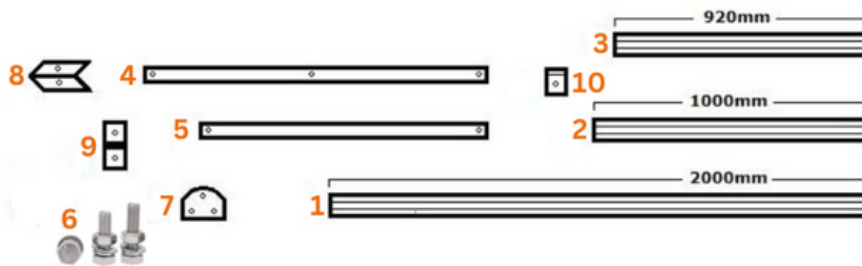
Components not supplied may include any and all relevant plumbing and electrical components required but not listed above, i.e. capillary fittings, Copper tubing, electrical cable etc.

Important Considerations and good practise

- All plumbing must conform to the relevant governing bodies, as this is a retro-fit system and the storage tank may have been installed prior to the addition of the solar component; ensure that the storage tank complies with SANS 10254.
- Ensure a minimum distance of 3m of copper tubing separates the collector from the tank.
- An isolating valve must be installed on the supply and return pipe to and from the collector as well as the bottom of the collector (side not being supplied by water) this is for maintenance and safety purposes, Always ensure that the collector is covered when carrying out any maintenance that may require these valves to be shut, ensure that after the maintenance is carried out that these valves are reopened to prevent any pressure build up that may cause damage to the collector and or pipe work.
- Only compression fittings shall be used on the collector and within 1m of these connections, for the rest of the circulation loop high temperature solder may be used.
- All Brass fittings and or valves, safety or otherwise will be DZR rated, and approved for use by SABS.
- All pipe work to and from the collector must be copper (Class 1 minimum).
- The pump shaft may only be installed as per the manufacturer's instruction (See pump Installation manual).
- All pipe work to and from the collector, and any pipe/s transporting hot water are to be insulated, insulation will be heat tolerant and made UV resistant.
- SABS approved plastic piping may only be used inside the building, downstream from the thermostatic mixing valve.
- The thermostatic mixing valve provided must be installed to ensure safe use of the system, and should be accessible for maintenance purposes.
- During installation ensure no debris e.g. Metal filings, packaging residue, saw dust etc. enters the system, if this does occur flush the system prior to filling.
- Cover collector while installing the pipe work to prevent stagnation and possible scalding.
- Exercise caution while lifting and installing the collector onto the roof, ensure that there are enough personnel present to bear the weight and that there are adequate lifting tethers and safety rigging as required.

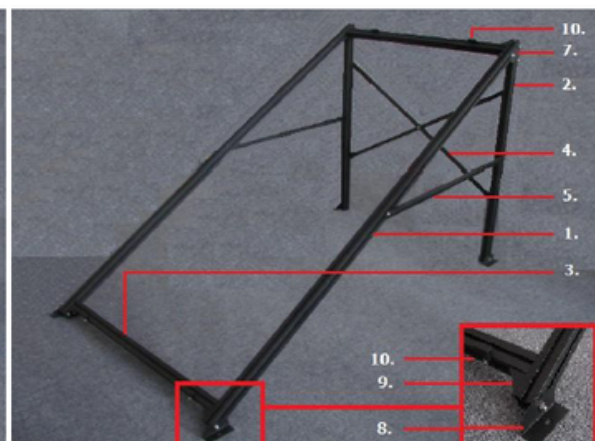
Flat Roof Stand Assembly and Installation

Components



A combination of powder coated aluminium and Marine grade stainless steel make up SunScan's adjustable Flat roof stand.

- 2 x Side supports (Aluminium)
- 2 x Vertical supports (Aluminium)
- 2 x Cross supports (Aluminium)
- 2 x Back cross braces (Aluminium)
- 2 x Side braces (Aluminium)
- 8mm Stainless Steel Nuts and Bolts (316 SAE Marine grade)
- 2 x Side angle plates (316 SAE Marine grade)
- 4 x Foot plates (316 SAE Marine grade)
- 4 x Corner brackets (Aluminium)
- 4 x Securing clips (316 SAE Marine grade)



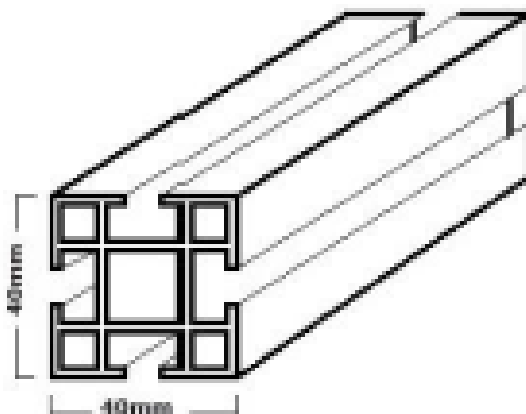
The standard vertical support is 1000mm, however upon request if required longer or shorter vertical supports may be provided in order to obtain the optimum inclination or tilt angle.

Inclination and tilt angle

The optimum angle is equal to the latitude of the location plus 10°.i.e. a location with latitude of 25° would indicate an optimum inclination of 35°, 15° either side of these figures will make very little difference in terms of performance.

Please note that a min 20° and max 50° tilt angle must be respected at all times.

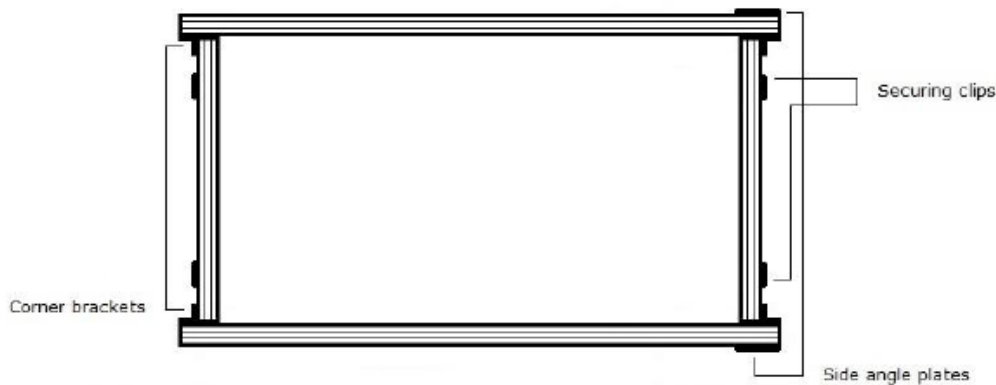
Assembly



The Water Solar Company unique powder coated aluminium profiled channel allows for easy assembly, slide the 13mm head of the 8mm bolts provided into the channel to assemble components

Step 1

Lay the two side supports (1) on a flat area roughly 1m apart, insert the two cross supports (3) at either end and between the side supports, place 2 bolts in the channel of each cross support that faces outward and attach two securing clips (10), using corner brackets (9) and nuts and bolts (6) secure the cross supports to the side supports.



Step 2

Using nuts and bolts attach each side angle plate (7) to either side of the side supports; attach each vertical support (2) to the side angle plate on either side.

Step 3

Using nuts and bolts attach each side brace to the vertical and side supports.

Step 4

Using a bolt through the centre holes attach the two back cross braces (4) together, attach the back cross bracing to the vertical supports. Attach a foot plate (8) to the end of each vertical support; attach a foot plate to the bottom end of each side support.

Step 5

Flip the structure 180° so that the foot plates are on the flat area.

Step 6

Adjust the inclination by loosening the side angle plates on the side supports and carefully sliding the vertical supports up or down the side supports, once a suitable tilt angle has been acquired make sure that all the nuts and bolts have been securely tightened.

Installation

Always ensure that materials used to fasten the collector and or frame to the roof do not accelerate corrosion, and that no galvanic action occurs, if required U.V. resistant insulators must be used.

Step 1

Lift the assembled frame onto the roof carefully using tethers and rigging as required.

Step 2

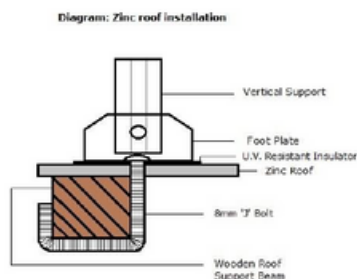
In the case of a zinc roof SunScan recommends that a minimum of 4 x 8mm 'J' Bolts are used to secure the flat roof stand, place the stand in the intended position, making sure to line up with the existing timber structure inside the ceiling space, if this is not possible additional timber support beams may be required, also ensure that these structures have been assessed and can bear the additional load weights.

Step 3

Using the foot plates and a pencil, mark out where the four 8mm holes (for 'J' Bolts) are to be drilled, remove the stand and drill the holes

Step 4

Place the stand and foot plates over the holes and insert the U.V. resistant insulator, from inside the roof space thread the 'J' Bolts through the holes, ensure that there are at least two personnel to achieve this goal, secure a nut to the end of the 'J' Bolt and tighten, repeat this process for all four foot plates.



Step 5

Waterproofing

Ensure that any holes or modifications to any roofing are adequately waterproofed.

The Water Solar Company recommends a UV resistant sealant.

Storage Tank

Usually pre-installed, if so ensure that the installation is SANS 10254 compliant, if this is not the case inform the relevant parties and discuss ways to resolve any non compliance issues, do not install the solar component if compliance cannot be achieved. (See Manufacturer's installation manual)

Note: Before installing or maintaining any plumbing or electrical component ensure that any water and or electricity supplied to the component is shut off upstream from where the intended work is to be carried out.

Mounting The Collector

Ensure that the thermal probe pocket located on the top left corner of the collector is always installed at the highest point, and that the collector is installed the right side up.

Mounting to a The Water Solar

Company flat roof stand:

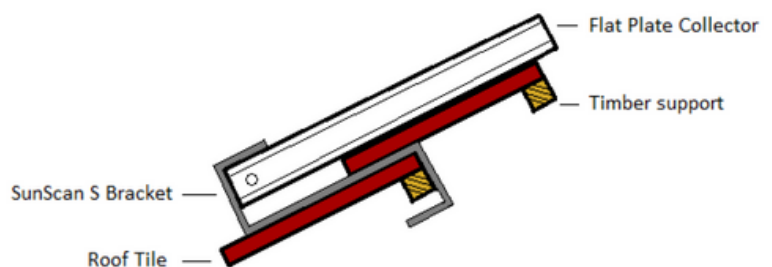
Mount the collector to the flat roof stand using the 4 securing clips provided, allow the two securing clips located on the bottom cross support to slot into the aluminium profile of the flat plate collector, attach two securing clips to the top cross support and repeat process, tighten the nuts to ensure the collector is fastened to the stand.

Typical flush mounting:

Loosen the roof tile and slide up, place one hooked end of the 'S' Bracket over the timber support and tile beneath, ensure that the waterways are kept free from obstruction, repeat this process on the same tile line between 800mm and 1000mm apart, slide the tiles that were moved back into place, place the flat plate collector into the hooked end of the 'S' Brackets.(at least two 'S' Brackets should be used)

Waterproofing

Ensure that any holes or modifications to any roofing are adequately waterproofed. The Water Solar Company recommends a UV resistant sealant



Plumbing Installation

Note:

When tightening compression fittings, use one spanner to hold the weld nut and another to tighten the compression nut. Do not grip any pipe work and take care not to over tighten.

Note:

Unless otherwise specified all solar loops (pipe runs between collector and tank) in a The Water Solar Company Pumped Solar thermal system are to be installed using 15mm copper tubing with a rating not less than class 1

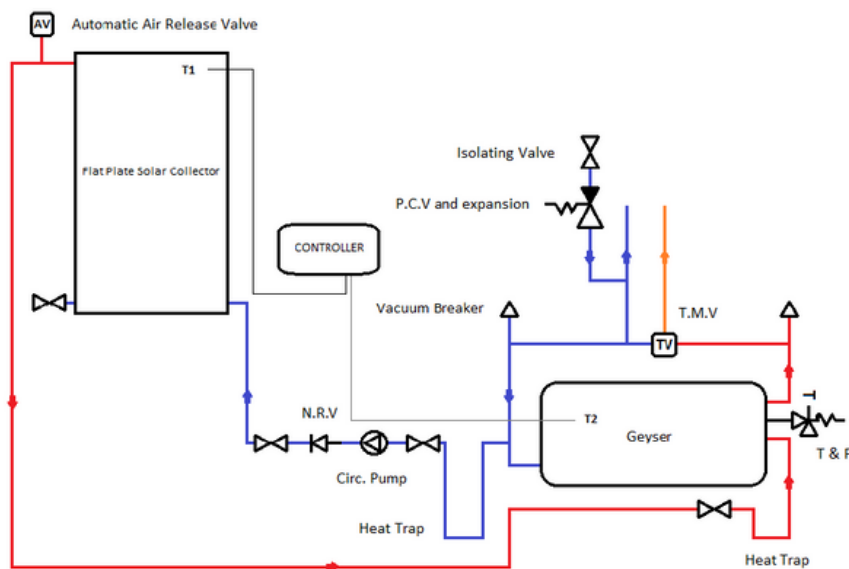


Diagram A

Installation of the cold supply to the collector

In a The Water Solar Company Retro-fit system the cold supply to the collector is 'tee'd' off of the cold supply to the storage tank within 500mm from the drain cock, this must be done downstream from the Pressure reducing valve to ensure a balanced pressure is maintained and that the storage tank does not exceed its pressure rating.

Installation of the hot return from collector

“Solar Ready Geysers” provide an additional port for alternative heating; connect the pipe returning from the collector to this port.

If the Geyser is not “Solar Ready” Remove the existing Temperature and pressure relief valve from the geyser, use this port for the solar hot return, and install an approved “Banjo” type temperature and pressure relief valve on the hot supply to the house.

IMPORTANT!!!

DO NOT CONNECT THE SOLAR HOT RETURN TO THE BANJO VALVE!

Installation of the pump

The pump must be installed according to the manufacturer's instruction manual. To assist with priming, the level of the pump must always be below the water level of the geyser, failure to comply may result in pump failure and any warranty may be forfeit

Note:

- The pump must be mounted with the shaft in the horizontal position. (See pump instruction manual for variations)
- The pump must be mounted on the cold side of the solar circulation loop.
- Take note of the arrow on the pump and ensure that the water will circulate in the correct direction through the solar loop.
- An isolating Valve shall be installed on either side of the pump.
- The pump is not designed to withstand weather elements, in the event of the pump being installed outside; it shall be placed in a suitable weather resistant box.

Installation of the non-return valve

The non-return valve must be of the spring type
The nrv must be installed in after the pump between the isolating valve and collector. (See diagram A)

Installation of Heat traps

Heat traps reduce the occurrence of thermosiphon between the collector and storage tank and are an important part of a pumped Solar System, they should be no less than 400mm vertically and 300mm at the horizontal part of their loop, they shall also exceed the bottom of the storage tank by at least 200mm.

Installation of Anti-Scalding/Thermostatic Mixing Valve

Ensure that both hot and cold water supplied to the valve are of equal pressure, and that any markings directing or depicting the flow of water are adhered to.

For safety reasons, it is essential to install a thermostatic mixing valve. This valve controls the temperature of the water at the point of use. Make sure that the valve has been set to allow a suitable maximum temperature and has not been set to by-pass. The temperature ranges from 38°C – 65°C.

We recommend a setting that will achieve 55°C at the point of use, but may not exceed 60°C.

Installation of pipe work to and from the collector

Always ensure that the hot return from the collector is connected to the highest connection point on the collector. Ensure that the cold supply to the collector is connected to the lowest connection point on the collector, opposite to the hot return from collector connection. (See diagram A)

The pipe runs to and from the collector 'hot and cold return and supply' must measure a minimum distance of three meters each and should not exceed ten meters each, if this cannot be achieved contact a SunScan representative for rational design.

Controller Installation

Application

GeyserWise is suitable for installation on electric geysers and thermosiphon and pumped solar hot water heaters.

When installing the GeyserWise be sure to follow the appropriate instructions of each particular manufacturer for all other components as well:

- Installation of geyser.
- Installation of solar collectors.
- Installation of pumps.

Installation

Installation, maintenance and dismantling may only be performed by trained personnel in accordance with this instruction manual and safety instructions.

Use the GeyserWise only after first thoroughly reading and understanding this instruction manual and the safety instructions. In the event of any ambiguities regarding the installation and operation, consult trained personnel or contact our offices.

Technical Information

- Operating voltage 230VAC / 50HZ.
- Main relay contact rating 30AMP (Max 4kW element).
- Secondary relays pump and solenoid 5Amp.
- Operating voltage range 160V - 250V AC.
- Control circuit 5.5 - 12VDC.
- Earth leakage protection at 25mA action time $\leq 0,1$ second.
- Recommended ambient temperatures: -20 to 55°C; Max 75°C
- Temperature display range 0 - 99°C (“-5” when below -5°C “EA” when above 99°C).
- Temperature setting ranges 30 - 65°C.
- Heat failure - when increase at a rate of 4°C or less per hour.
- Mechanical thermal cut-out 90°C (300 manual resets) - Please note this temperature for solar systems expected to reach temperatures higher than 90°C.
- Thermal cut-out - Isolate live.
- Dry heat detection - empty cylinder.
- Temperature tolerance $\pm 5^\circ\text{C}$ and manufacturing drift is less than 6°C.
- Temperature differential setting 1°C.
- Switching differential for the element 6°C.
- 2nd temperature probe for solar.
- Solar differential 7°C (default) - standard system.
- Temperature probe failure detection for both collector and tank.
- Temperature probe range for geyser is -30 to +130°C.
- Temperature probe range for collector is -30 to +260°C
- Isolate both L + N when element in an off state.
- Collector anti-freeze protection at 5°C (default) - Please be sure to use the correct solar systems for frost prone areas. More details can be found on the ESKOM website:
<http://www.eskomidm.co.za/residential/residential-technologies/step-by-step-guide-to-choosing-a-solar-water-heating-system>
- Control box insulated - Class 1.
- Operating life - 50 000 cycles.

Improper usage

The GeyserWise must not be operated in the following environments:

- Outdoors.
- In damp rooms.
- In rooms in which the operation of electrical and electronic components may be dangerous.

Dangers during installation

Risk of death by electrocution.

Risk of fire due to short circuit.

Be sure to follow the below instructions:

- All work on an open GeyserWise must be performed with the mains supply disconnected.
- All safety regulations apply when working on the mains supply.
- Before connecting the GeyserWise, make sure that the power supply matches the specifications on the type plate.
- Factory labels and markings may not be altered, removed or rendered unreadable.
- Make sure that all devices which are connected to the GeyserWise conform to the technical specifications of the GeyserWise.

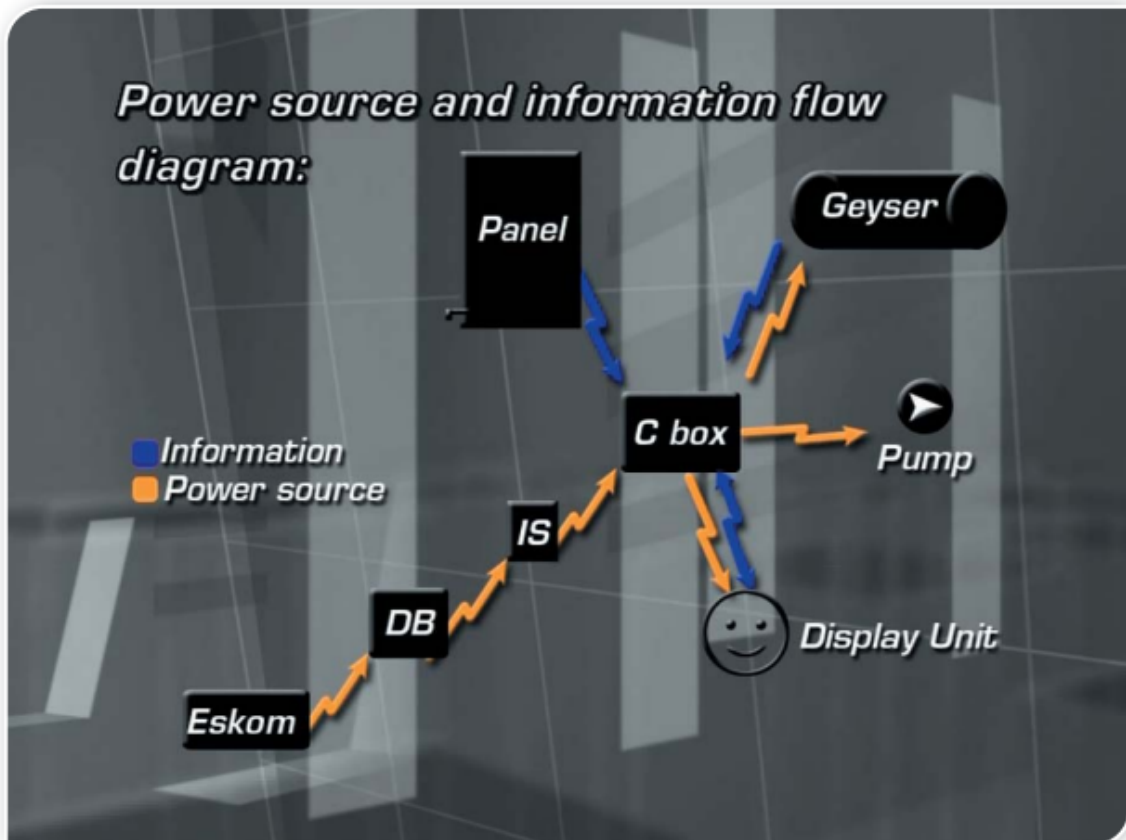
Exclusion of liability

The manufacturer cannot monitor the compliance to this manual as well as the conditions and methods during installation and operation. Improper installation of the system may result in damage to the property and, as a result, in bodily injury.

Therefore, we assume no responsibility for loss, damage or costs which result from or are in any way related to incorrect installation, improper operation, incorrect execution of installation work and incorrect usage and maintenance.

The manufacturer reserves the right to make changes to the product, technical data or assembly and operating instructions without prior notice.

220V Pumped Solar System



Installation Procedure Steps

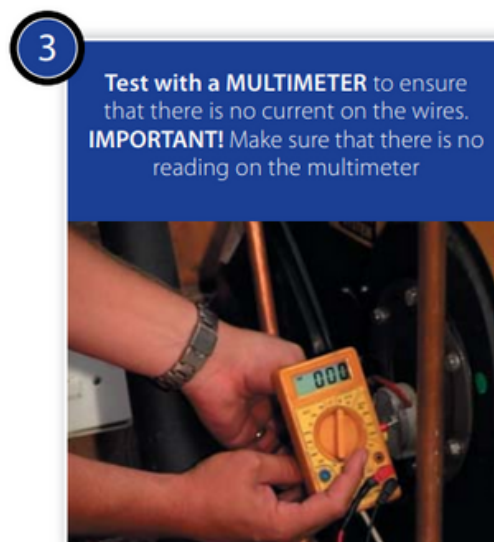
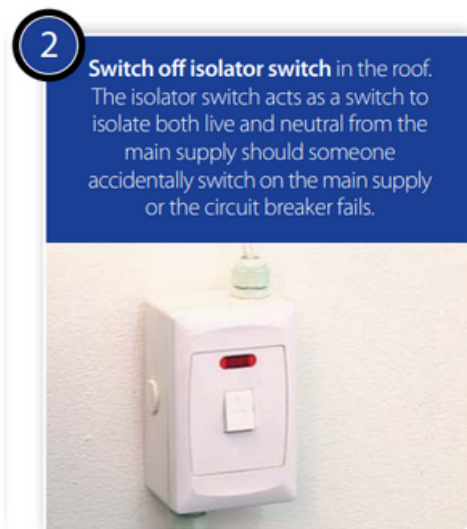
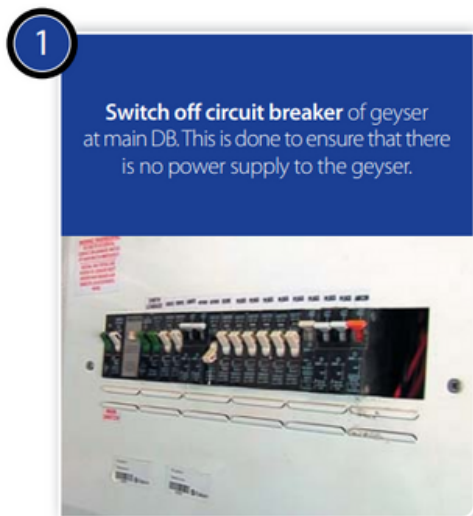
A summary of the installation steps are as follows:

1. Apply all safety measures.
2. Install the control box.
3. Install the display unit.
4. Remove existing thermostat and replace with new supplied thermostat.
5. Install the collector probe.
6. Complete all electrical connections.
7. Set up the controller and all settings.

Step 1: Apply all safety measures

An installer should always take precautions when working with electricity.

The most important safety precautions to perform **BEFORE** doing any maintenance on a geyser are:



Step 2: Install Control Box

Find a dry place near the isolator switch.

The control box must not be exposed to the elements!

Step 3: Install the display unit

The display unit must be installed in a location that is accessible to the end user, but not in reach of children that might want to play with it.

The display unit provides valuable information on the functionality and status of your solar system.

Draw the display unit cable from the unit to the control box. Plug it into the three pin plug as provided on the control box. It can only fit into one plug.

The standard display cable of 5m is supplied.

Extension cables are available on request from our offices. A maximum extension of 20m is recommended.

Only use GeyserWise extension cables for extensions!!!



Step 4: Remove thermostat and replace with supplied geyser temperature probe

The geyser's thermostat needs to be removed. The geyser temperature probe provided by GeyserWise has a built in probe that measures the temperature in the geyser. It also supplies information to the element whether it should switch on or not.

The GeyserWise geyser temperature probe incorporates a thermal cut out to prevent electrical overheating. The live feed to the element will be broken at temperatures above 90°C. Please note this temperature when designing a solar system. When the cut out switches off, it needs to be reset manually by pressing the red button on the thermal cut out.

1

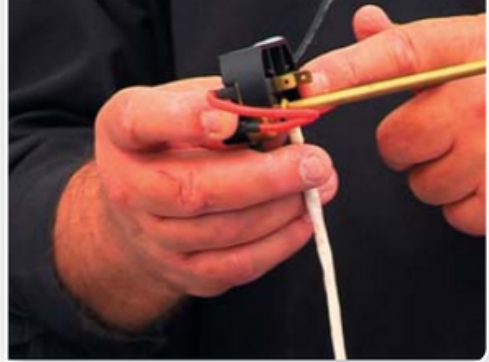
Remove the existing thermostat by disconnecting all the wires on the connector terminal block of the thermostat.



2

Pull the thermostat out of the pocket.

Please note that certain types of geysers require the user to remove the front part of the geyser temperature probe as provided.



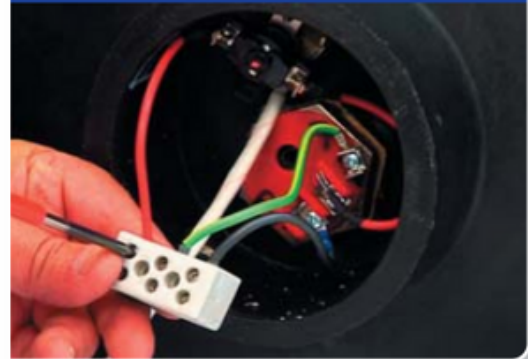
3

Ensure that you insert the geyser temperature probe into the correct pocket.



4

Insert the new geyser temperature probe and connect the live wires once again on the connector terminal block



5

Push the plug connected to the geyser temperature probe through the hole as provided on the geyser.

Plug it into the dedicated plug as provided on the control unit.



Step 5: Install the collector probe

The function of the collector probe is to measure the temperature of the panel. A critical concept to understand is that heat rises and therefore the warmest part of the collector is at its highest point.



On a flat plate the collector probe must be installed on the return side of the panel at the highest possible point.

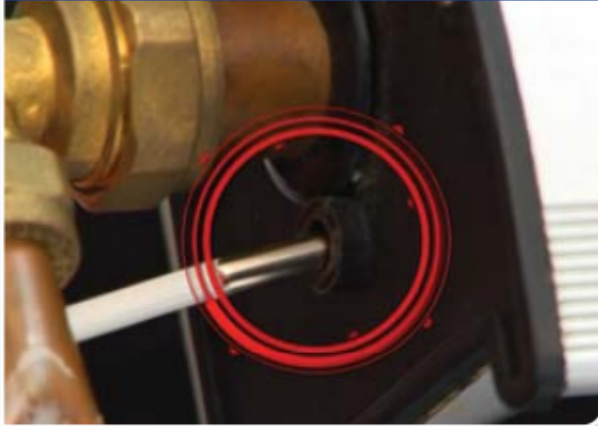


Please note the position of the probe when using a pump for anti-freeze, as the temperature at the top of the panel is higher than at the bottom. Always make sure the correct panel for frost prone areas is used and that anti-freeze valves are installed. ESKOM also recommends an indirect system for frost prone areas.

The measurement on a lower point will result in an incorrect reading (lower temperature). This implication is that the panel will be warmer than the indicated temperature and therefore stop the pump too soon. **The solar system will not be functioning optimally!**



On an evacuated tube collector a sleeve is normally provided on the **return** side to install the probe.



You will be supplied with an extension cable. Do not use any other extension than the extension cable provided.

Plug the probe connection into the control box at the dedicated port.



Connections on control box summary



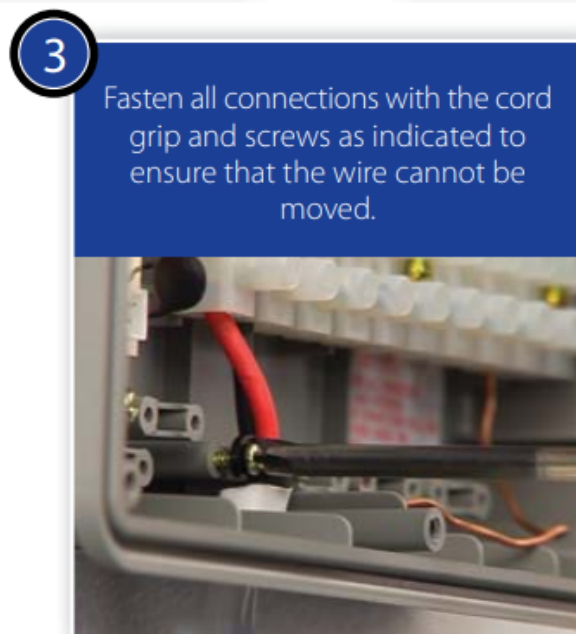
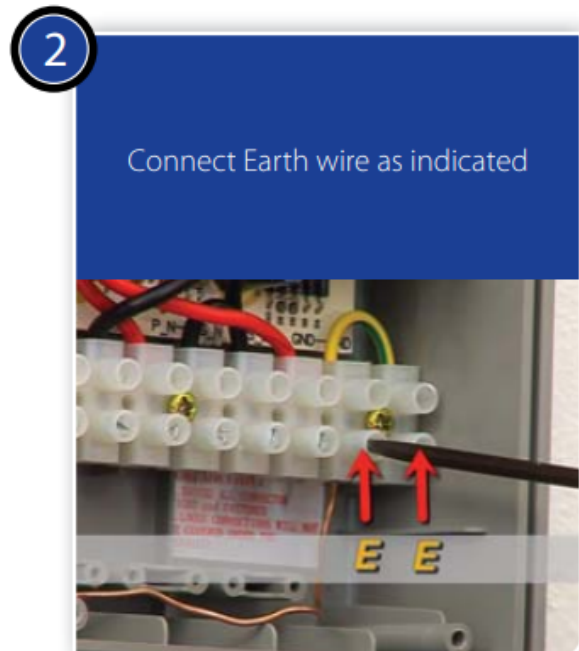
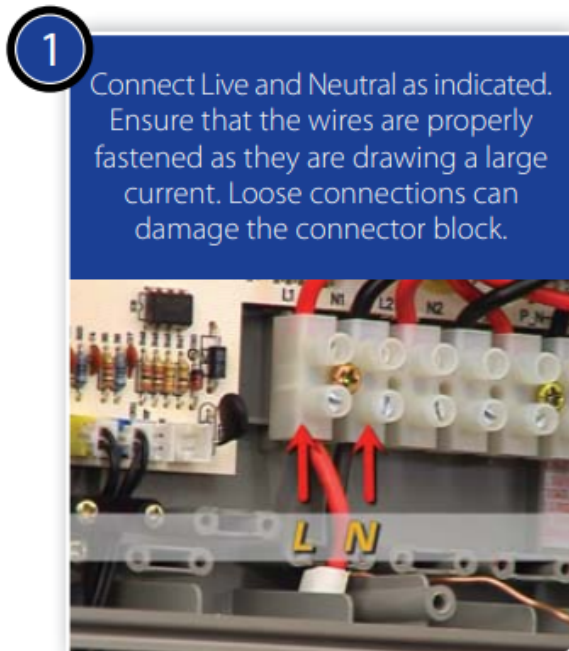
Step 6: Complete all electrical connections

The hard wiring of a controller is critical.
Main power supply

The main power supply is provided from the isolator switch.

The **Red** wire is your **Live** wire.
The **Black** wire is your **Neutral**.
The other wire provided is your **Earth**.

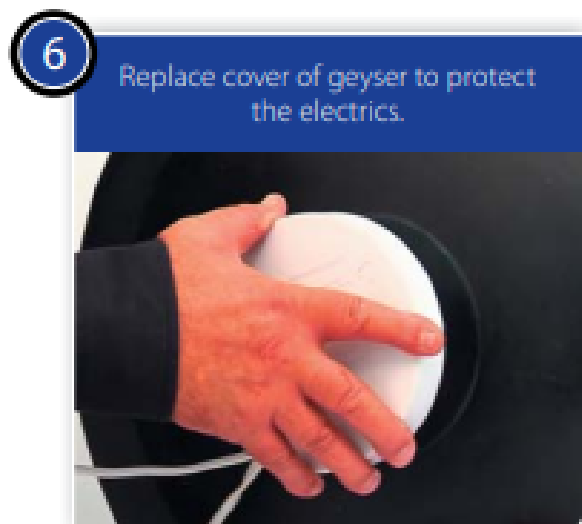
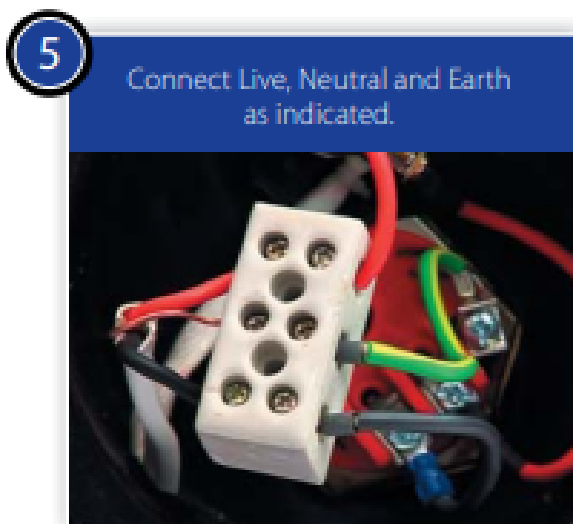
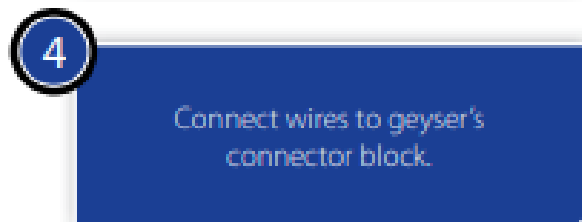
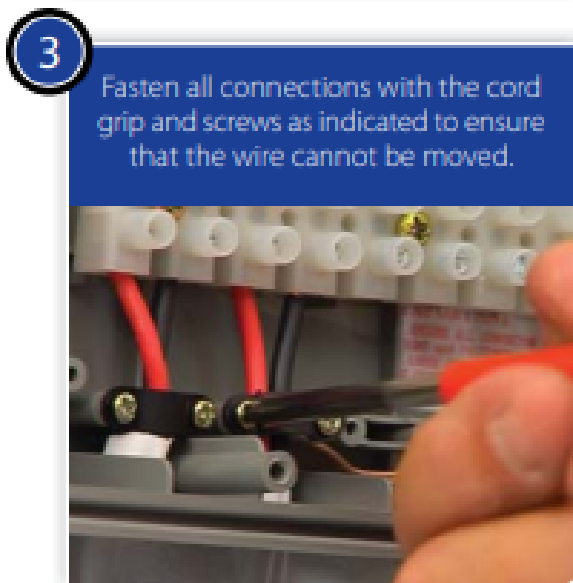
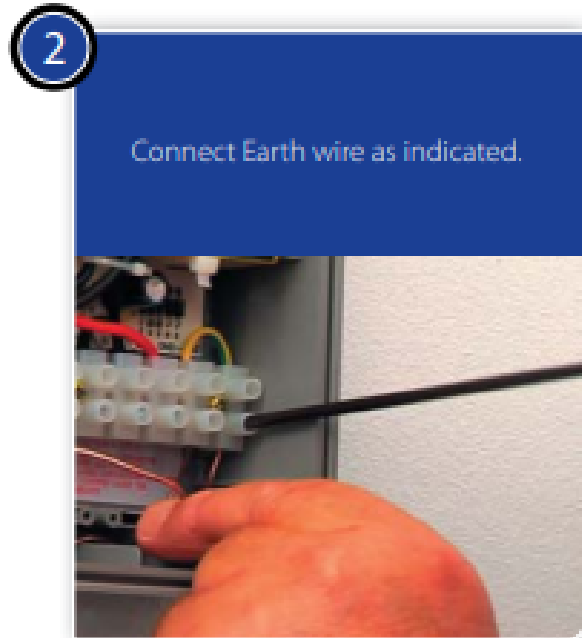
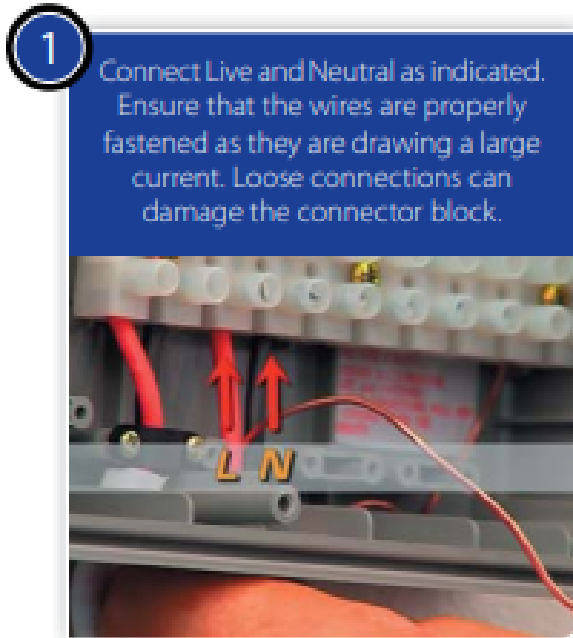
Each control box has knock outs at the bottom of the unit. To make an entry into the control box, just remove the knock out.



Connect wire between controller and geyser

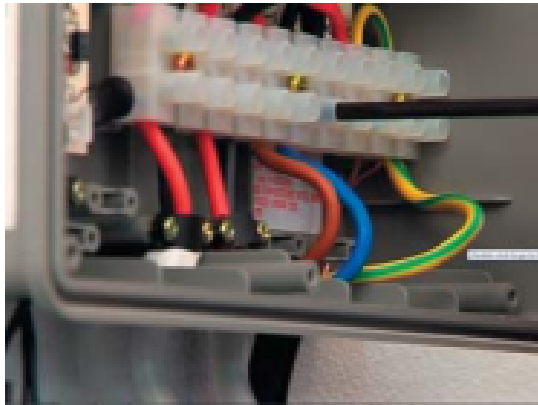
Note:

Ensure that a wire is used that complies with the requirements of SANS 10142



Connect wire between controller and pump

1. Connect Live (Brown) and Neutral (Blue) as indicated. Ensure that the wires are properly fastened both sides of the terminal block as they are drawing a large current. Loose connections can damage the connector block.



2. Connect Earth (Green/Yellow) wire as indicated.
3. Fasten all connections with the cord grip and screws as indicated to ensure that the wire cannot be moved.

Connect leak detector (optional)

1. Push wire through the hole as provided.
2. Plug into green socket as provided on control box.



3. Plug leak detector onto lead wire.
4. Place detector in drip tray of the geyser.
5. An alarm will sound to indicate that there is water in the drip tray of the geyser.

Replace lid on control box and fasten properly.

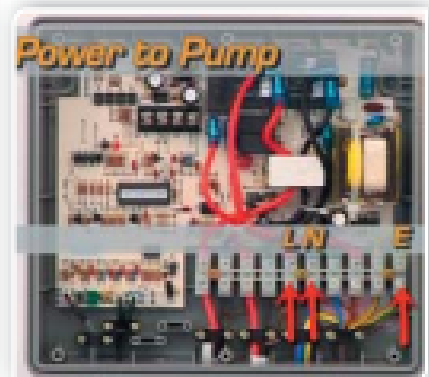
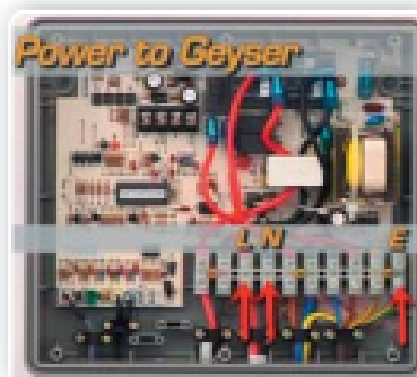
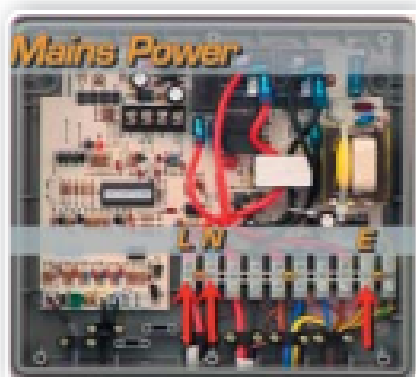
Before you replace the lid it is important to do a final check on the electrics by comparing it to the wiring as indicated on the lid.

Power up system

1. Switch on main supply at DB board

2. Then switch on power at isolator switch

Summary



Commissioning

- Check that all nuts and bolts securing the collector to the stand are tight and that all anchoring points to the roof are secure.
- Make sure that all plumbing connections have been tightened, all pipe work has been secured, the isolating valves on the solar loop are open (two either side of the pump, one on the hot return), and the isolating valve on the collector is closed.
- Check that the drain cock is closed
- Ensure that all electrical connections are secure and covered.

Step 1

Ensure that there is water supplied to the property and that at least one hot water point of use that will be supplied by the, The Water Solar Company system is open, this will allow any air trapped in the system to be expelled, at the hot water tank open the valve that isolates the water from the tank, allow the tank to fill, at the point of use opened prior to filling ensure that all of the air has been expelled, this may take several minutes, once a steady stream of water appears ensure that all points of use are closed so that the system may pressurise.

Step 5

Remove any covering from the collector and allow the system to heat, ensure that the temperature in the collector (T1) on the display rises and that the temperature in the tank (T2) is displayed accurately, at a factory preset of 8°C difference in temperature between T1 and T2 ensure that the pump switches on.

Use a multi-meter to test that the heating element and SR802 relay (if in use) function correctly.

Step 2

Check for any water leaks at all plumbing joints.

Step 3

Shut off the mains water supply to the system and open any inline strainers and clean any debris that might have accumulated, this is particularly important if the dwelling is new as there is often debris in the mains water supply. Re-open the supply after.

Step 4

Switch the SR868C8 controller and any electrical isolators/circuit breakers that control power supply to the element on.

Step 6

Re-check the system for leaks after it has heated.

Check list

The following check list must be observed before handing the system over.

- **All air has been removed from the system (See step 1 of 4.8 commissioning)**
-
- **There are no water leaks on the system and or any pipes carrying water to points of use.**
-
- **Roof tiles have been placed back in position**
-
- **Roof flashing and any waterproofing is water tight.**
-
- **All drain pipes are free of obstruction**
-
- **All hot water pipe work and piping to and from the collector is insulated.**
-
- **The end user has been instructed on the use of the controller.**



Operating Instructions

Start up procedure

If for any reason the water supply to the property and or solar system is interrupted e.g. municipal works or maintenance, and the system requires re-commissioning, follow steps 1-6 of 4.8 Commissioning, always ensure that the relevant safety procedures are adhered to.

Emergency shutdown procedure

Should the need arise and the system is damaged or leaking hot or cold water, the water supply shut off valve must be closed immediately and power to the controller and heating element turned off.

System performance

The amount of hot water generated and available is dependent on usage patterns and the weather experienced. Solar radiation is greater on clear, sunny days, between 9am and 3pm, during periods of use the system can operate at roughly twice the maximum ambient temperature and during periods of non use is capable of achieving well over 70°C.

Ensure that any trees that may cause shading during the aforementioned times are regularly pruned. To get the most out of your solar water heating system we suggest the following:

Take showers instead of baths as generally they use less hot water.

Use the bulk of your hot water requirements in the evening instead of the morning, this will maximize the usage of free energy harvested during the day.

High water temperatures

The Water Solar Company retro-fit system is capable of reaching temperatures that exceed 50°C. This may occur during prolonged periods of direct sunlight and particularly in summer, and or long periods of reduced water usage. Extreme care should always be taken. periods of reduced water usage. Extreme care should always be taken.

Although every system is fitted with a thermostatic mixing valve that regulates temperature at the point of use, always check the water before use to ensure it is suitable for its intended purpose and to prevent scalding

Over-heat protection

The Water Solar Company Retro-fit system is equipped with an over-heat protection function, this is to ensure that excessive temperatures are not stored in the tank and that damage is not caused to other working parts.

Please note that these are factory presets and do not require any adjustment unless deemed so by a suitably competent person

On the SR868C8 we recommend the following settings

EMOF	120 °C
EMON	110 °C
CMX	100 °C
CFR	5 °C
SMX	65 °C
REC	On

These settings allow for a maximum temperature in the cylinder to be set. 65°C (SMX). If for some reason the power source to the controller is interrupted, the system will turn off completely. During this time, the collector temp will rise towards its stagnation temp (153°C). If the temperature of the collector is below 120°C (EMOF) when the power is reinstated, the controller will revert to the cycle that it had taken previously. However, if the temperature of the collector is above 120°C (EMOF), then the system will remain in an off position. At night when the collector temperature drops below 110°C (EMON) and geyser temp (T2) is below 68°C (SMX-2), the pump will start and the system will recover and be ready for the next day's heating

Holiday mode

The Water Solar Company strongly recommends that the holiday function be set:

**When occupants are absent for extended periods of time
e.g. holiday.**

No hot water is required for extended periods of time.

This is to prevent extended periods of high temperatures that may affect the longevity and lifespan of your solar water heating system.

This function activates the circulation pump at night between the hours of 10:00pm and 6:00am when the collector (T1) temperature has dropped 8°C lower than that of the tank temperature (T2) once a 2°C temperature difference is reached, the circulation pump ceases, this continues for the duration of the afore mentioned times until the tank temperature reaches 35°C.

Always remember to switch holiday mode off when hot water is required



Maintenance

Routine maintenance

Note: These are suggested schedules and may need to be carried out more frequently depending on water quality .e.g. areas with high incidents of water deposits such as magnesium and or calcium.

If any maintenance carried out requires the collector to be isolated by means of the two isolating valves located on the hot and cold return and supply pipes to and from the collector, always ensure that the collector is covered during this time and that the valves are re-opened after the maintenance procedure has been carried out.

- Always ensure that the collector is clean and that no dirt has collected on the surface as this will affect performance, if required use a soft cloth and fresh water to carefully wipe the glass clean, ensure that this is carried out early in the morning before the collector has had a chance to heat.
- Regular checks should be done to see that no damage has occurred to the system and that the system and pipe work are free of any leaks.
- Circulation pumps should be checked and cleaned by qualified personnel regularly, to ensure that they are operating correctly see 'Hand' function in the controller manual to force pump activation.
- The system should be drained and flushed Bi-annually if required to remove any scale build up that might have occurred.
- A periodic inspection of all valves should be carried out, this includes but is not limited to temperature and pressure relief valves, pressure reducing valves, expansion valves, vacuum breakers and thermostatic mixing valves, these valves allow for the safe operation of the storage tank and should be inspected twice annually by a trained professional.
- Temperature and pressure relief valves as well as expansion valves may release small amounts of water each day whilst heating, this is a normal function, as heated water expands by approximately 1L out of 50L of its volume, if these valves leak continuously however, this may indicate failure and may need replacement. if unsure contact a authorised installer.
- It is important that the discharge from these valves are not sealed off, and are left open to the atmosphere, these valves must discharge safely without harm to persons or property

- All filters and strainers are to be checked and cleaned regularly by suitably qualified personnel.
- Check mountings on collector for weathering and or fatigue.
- Pipe insulation should be checked for degradation and damage and replaced if necessary, always be aware of high temperatures emitted from the collector and pipe work when carrying out any maintenance that might put you at risk of scalding.(ensure the correct safety precautions are taken)
- If at any time the temperature at the point of use seems to be increasing or decreasing contact an authorised Installer as the thermostatic mixing valve may need adjustment or repair.
- Any repairs or replacements of any parts must be performed by an authorised installer.
- In case of emergency, for example, damage to the collector, tank or pipe work is evident, shut off the water supply to the system ,switch off the power to the controller and heating element immediately and contact an authorised installer.
- Any inspections, visual or otherwise carried out by any person or persons that are not suitably qualified and result in injury or death and or damage to property, shall not hold The Water Solar Company or any of their affiliates liable.

Trouble shooting

Before applying any of the trouble shooting techniques listed below:

Ensure that the power to the controller and heating element has not been interrupted i.e. all relevant circuit Breakers and or isolator switches are in the on position.

Ensure that the water supply to the storage tank has not been interrupted and inadvertently drained for example ,municipality working on water mains.

Problem	Possible cause	Corrective action
Back up heating element switches on outside of pre-set heating times	Clock on the display panel was not set or has lost time	Reset the clock and ensure that pre-set electrical heating timers are set according to hot water requirements, If the clock continues to lose time contact your dealer
Tank not heating during pre-set times	Holiday mode may be on, T2 sensor probe may not be inserted correctly, heating element failure	Ensure holiday mode is turned off, carefully re-insert T2 sensor probe into thermal pocket(all the way in), Contact authorised installer if element failure is suspected
No solar heat contribution	Low solar radiation, T1 sensor probe or T2 sensor probe may not be inserted correctly, Circulation pump failure or one or more isolating valves have been shut	On days with low solar radiation ensure that the backup heating element times are adjusted according to hot water requirements, Carefully re-insert T1 and or T2 sensor probe/s into its/their relevant thermal pocket/s(all the way in), Contact authorised installer if circulation pump failure is suspected, ensure both isolating valves either side of the pump are open.

Technical Specifications

2 m² The Water Solar Company Flat plate collector specification

Suitable for a 150L The Water Solar Company Retro-fit system

SS-FP Range

Collector Type	SS-FP-2.0
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General Information	
Standard Dimensions	2.005m x 1.003m
Gross Area	2.01
Aperture Area	1.86
Absorber Area	1.745 m ²
Number of Covers	1
Cover Material	tempered glass
Cover Thickness	3mm
Cover Transmission	88%
Weight	32kg
Power output at 1000W/m ² ($t_m - t_a$) = 30 °C	1029 W

Casing	
Frame Material	Aluminium
Frame Colour	Bronze Brown
Back Plate Material	Aluminium
Sealing Gasket	Ethylene-Propylene Diene Monomer

Absorber	
Material	Aluminium
Thickness of Absorber Plate	0.5mm
Surface Treatment	Cu and Al complex
Volume of Absorber	1.66 L
Header Material	Copper
Header Tube Size	22mm
Riser Material	Copper
Riser Tube Size	12mm
Operational Pressure	600kPa
Test Pressure	1500 kPa
Stagnation temperature	153 °C

Thermal Insulation	
Insulation Material	Glass Wool
Back Insulation Thickness	35mm
Side Insulation Thickness	25mm

2 m² The Water Solar Company Flat plate collector specification Suitable for a 200L The Water Solar Company Retro-fit system

Collector Type	SS-FP-2.4
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General Information	
Standard Dimensions	2.005m x 1.200m
Gross Area	2.40
Aperture Area	2.24
Absorber Area	2.210m ²
Number of Covers	1
Cover Material	tempered glass
Cover Thickness	3mm
Cover Transmission	88%
Weight	38kg
Power output at 1000W/m ² (t _m -t _a) = 30 °C	1244 W

Casing	
Frame Material	Aluminium
Frame Colour	Bronze Brown
Back Plate Material	Aluminium
Sealing Gasket	Ethylene-Propylene Diene Monomer

Absorber	
Material	Aluminium
Thickness of Absorber Plate	0.5mm
Surface Treatment	Cu and Al complex
Volume of Absorber	1.99 L
Header Material	Copper
Header Tube Size	22mm
Riser Material	Copper
Riser Tube Size	12mm
Operational Pressure	600kPa
Test Pressure	1500 kPa
Stagnation temperature	153 °C

Thermal Insulation	
Insulation Material	Glass Wool
Back Insulation Thickness	35mm
Side Insulation Thickness	25mm



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