

INSTALLATION MANUAL THERMOSIPHON - DIRECT

Flat Plate type direct Thermosiphon system





INDEX:

Page:	2	Components.
	2	Thermal Properties.
	2	Technical Specifications.
	3	Freeze Resistance.
	3	Hail Resistance.
	3	Structural Safety.
	3	Optimal Direction of the Solar System (Orientation)
	3	Optimal Angle of the Solar Collector (Inclination)
	3	Safety Precautions.
	4	Securing to the roof (Appendix 1)
	5	Preparation.
	5	Decommissioning & Removal of existing Geyser.
	5	Installing & Securing the Collector and Geyser.
	6	System Diagram (Fig.1)
	6	Piping - Send Side (Solar Loop)
	6	Piping - Return Side (Solar Loop)
	7	Mains water supply - Geyser connection.
	7	Electrical Connection.
	8	Safe operation of the solar system
	8	Maintenance.

Components:

- 1 x ST or Eco Series collector (Kit Dependant)
- 1 X GAP direct solar geyser (Kit Dependant)
- 1 x Mounting Kit (Kit Dependant)
- 1 x TP Valve
- 1 x Drain Cock

Thermal Properties:

- Powerz-On Eco-1.5 Solar Collector - 2.77 Kw/m²/Day
- Powerz-On ST-2.2 Solar Collector - 4.5 Kw/m²/Day
- Powerz-On ST-2.5 Solar Collector - 5.2 Kw/m²/Day

Technical Specifications:

System Specifications							
No.:	System:	Collector:	Geyser:	Volume:	Circulation Type:	Transfer Type:	Freeze Resistance:
1.	G100DT-1.5	Eco-1.5	GAP	100Lt	Thermosiphon	Direct	NO
2.	G150DT-2.2	ST-2.2 BSC	GAP	150Lt	Thermosiphon	Direct	NO
3.	G200DT-2.5	ST-2.5 BSC	GAP	200Lt	Thermosiphon	Direct	NO

See Geyser and Collector spec sheets for full specifications



Freeze Resistance:

The GAP direct Thermosiphon systems, are rated as being non-freeze resistant. The systems is recommended for costal and other areas that do not experience freeze conditions.

Hail Resistance:

The Powerz-On Flat Plate collector has been tested by SABS and is rated as being hail resistant. Please note the Powerz-On flat plate collector is not hail proof.

Before You Begin

Site Assessment:

1. Check condition of roof structure.

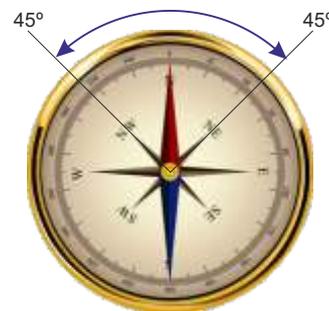
- 1.1 Is the roof strong enough. (Do not Install if in doubt.)
 - 1.1.1 Bare in mind the average 150L Thermosiphon System will weigh about 250Kg.
- 1.2 We recommend consulting a Structural Engineer before beginning.
- 1.2 What type of roof (Tile, Corrugated, Flat.)(Appendex A)
- 1.3 Is there any existing damage. **NB.: If yes, you must point this out to the client before you begin.** (it is advisable to photograph the damage)

3. Inclination:

- 3.1 The Solar collector should ideally be installed with an inclination of 36° (Gauteng), or as close as possible. (Inclination = Latitude + 10°)(Eg.: Gauteng = Latitude 26° + 10° = 36°)
- 3.2 For Tile roof types of 25° or more we recommend using the inclined roof stand.
- 3.3 For roof types with less than 20° we recommend using a flat roof stand.
- 3.4 For roof types with more than 36° we recommend installing the geyser inside the roof area with the collector on the roof below the geyser.

4. Direction:

- 4.1 The Solar collector should face North, but can be pointed up to 45° east or west from north is acceptable. Ideally the collector should face north with a slight bias towards the West. (this is so we can collect more Sun in the afternoon)
- 4.2 Is there a side of the roof structure that will be acceptable.



5. Once you have decided on the location, it is advisable that you erect the unit in place **without** securing. Once you have done this, ask the client if they are satisfied with the location.

6. Safety Precautions:

- 6.1 Ensure that the Electrical supply to the Geyser is switched off.
- 6.2 Ensure that there is sufficient light to be able to clearly see what you are doing.
- 6.3 Check condition of the roof thoroughly before attempting any installation.
- 6.4 Ensure all Ladders or other forms of rigging are well secured.
- 6.5 Be careful of spills, surfaces may become slippery.
- 6.6 Wear appropriate clothing for the conditions.
- 6.7 Ensure all Plumbing and Electrical connections are well secured before continuing to the next operation.

Note: Please Ensure the Geyser Installation complies with SANS 10254 Regulations.

Once the location has been decided and approved by the client, you may begin.

Appendix 1. How to Secure to the Roof (Types)

1.1. **Tile.**

- With a tiled roof it will be more difficult to drill the holes for the tubing.
- Drill a small hole (10mm) then enlarge it to the size you require.
- Do not use the hammer function on your drill.
- Securely fix the mounting system to the branderling.
- When you arrive on site ask if the client has spare tiles, incase you break any while you are working on the roof.

1.2. **Corrugated Iron.**

- Corrugated iron is the easiest roof to work on, look out for rust or weak areas.
- Drill holes with a hole saw.
- To secure, use nuts & bolts.

1.3. **Slate.**

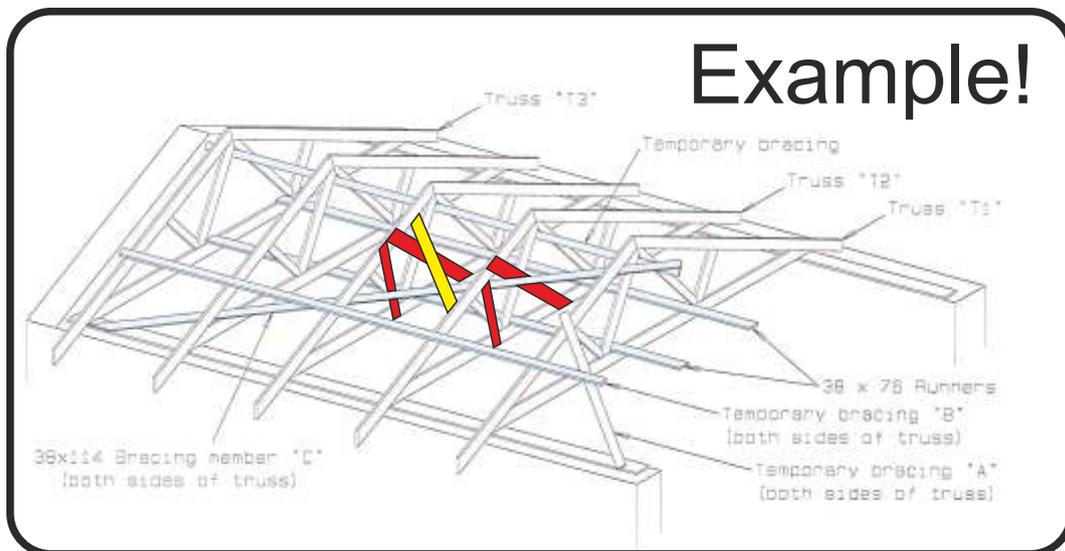
- With a Slate roof it is even more difficult to drill the holes for the tubing.
- Drill a small hole (10mm) then enlarge it to the size you require.
- Do not use the hammer function on your drill.
- Securely fix the mounting system to the branderling.
- When you arrive on site, ask if the client has spare Slate tiles, incase you break any while you are working on the roof.

1.4. **Flat Roof.**

- A frame for the collector will be required to raise the Solar Collector to the correct inclination.
- Make sure nothing punctures the water proofing on the roof while you are working.
- The frame will need to be secured to the side of a wall or parapit.
- All tubing will need to be run to the side of the building, NOT through the roof

1.5. **Thatch.**

- **NO GO!!**. You cannot install on thatch. Thatch needs to breathe, so anything directly on the thatch will cause rotting.
- You cannot float the Collector above the roof, any holes you make for the tubing or reinforcement will leak.
- The only way to do this is to mount the system on a wall on the side of the building, or on the ground.



Securing to the Roof.

1. Make sure the frame is situated across at least two roof trusses.
2. Follow the manufacturers instructions related to the specific system.
3. Ensure strengthening is added to the trusses carrying the weight. See example above.



Installation Procedure

1. Preparation: where applicable

1.1 Turn off the Electricity to the Geyser at the DB board and at the switch by the geyser

NB: Test with a multimeter before you work on the Electrical supply.

1.2 Turn off the cold water feed to the Geyser.

1.3 Drain the Geyser.

a: Open the drain-cock

b: Open the closest hot water tap to the Geyser.

c: Remove one Vacuum Break valve.

2. Decommissioning & Removing the existing Geyser: where applicable

2.1. Ensure that all copper tubing has been removed from the existing geyser and sealed properly. (This will prevent any potential leaks)

2.2 Remove all Electrical connections from the existing Geyser and from the breaker switch in the roof. (You will want to replace this wiring with new wiring to the new Geyser)

2.3 Once All Connections to the Geyser have been removed, and it is completely empty you will be able to remove the old Geyser.

2.4 You will need to open the roof for this action. Be careful not to cause any damage during this action.

2.5 Once the old Geyser has been removed, you will be able to begin the New Solar Geyser installation.

2.6 We recommend you place the new Geyser as close to the location of the old geyser as possible, taking shade, inclination and orientation into account. This will make the installation process faster.

Note: see "Before you begin".

Decommissioning Complete.

Positioning & securing the new geyser and solar collector:

3. Stand Installation.

Installation options:

3.1 For Flat roof installation use flat roof stand.

3.2 For Inclined roof installations use inclined roof stand.

Please refer to Installation manual of specific products available from www.gapholdings.co.za

4. Securing the Geyser & Collector:

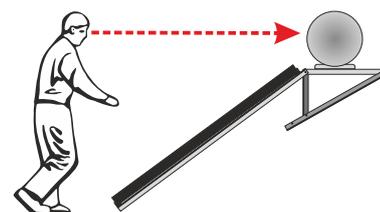
The Geyser:

4.1 Raise the Geyser to the roof and place on the Geyser Cradle.

a. Place the Geyser Correctly: if you are in the front of the System facing to the back the Electrical connection must be on the Left.

b. Rotate the Geyser in the Cradle until the T/P valve is at the highest point.

c. Secure the Geyser to the Cradle. (Please ensure all bolts are securely tightened)



The Collector:

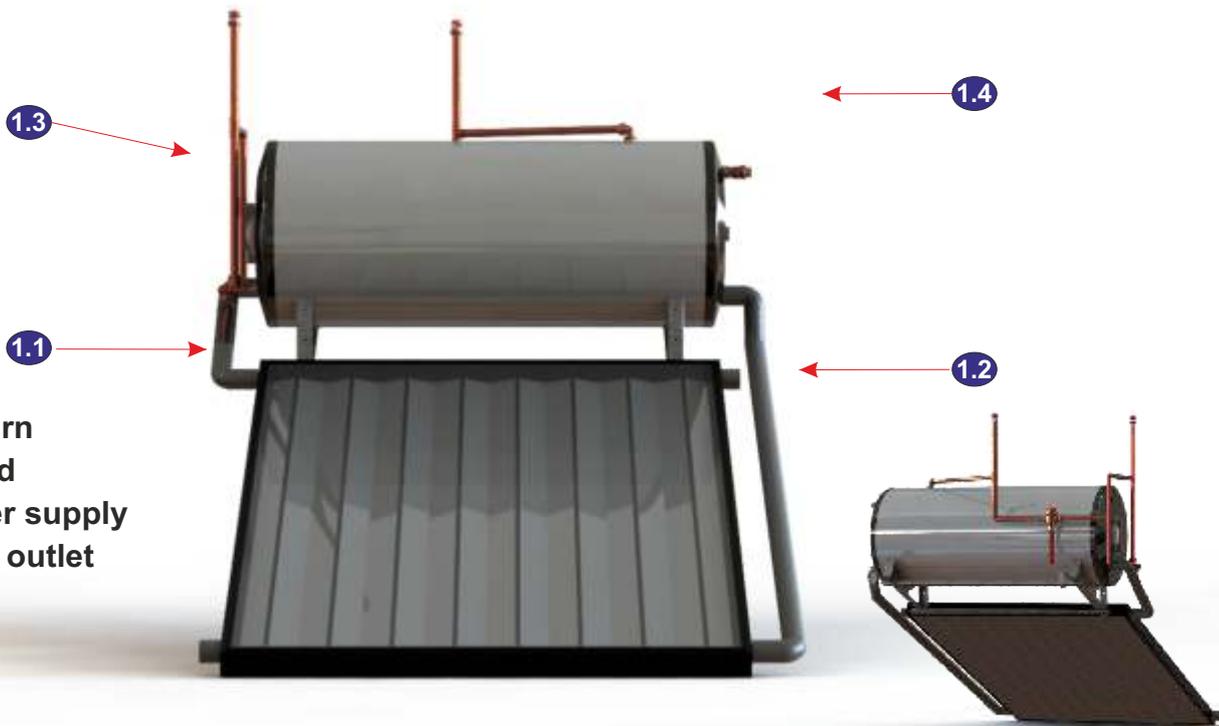
4.2 Raise the collector to the roof and secure to the Stand (see stand installation)

a. Using a spirit level make sure the collector is level.



Connection Diagram for 100, 150 & 200 Lt. Geysers (Single Collector)

(FIG. 1)



- 1.1 - Solar return
- 1.2 - Solar send
- 1.3 - Cold water supply
- 1.4 - Hot water outlet

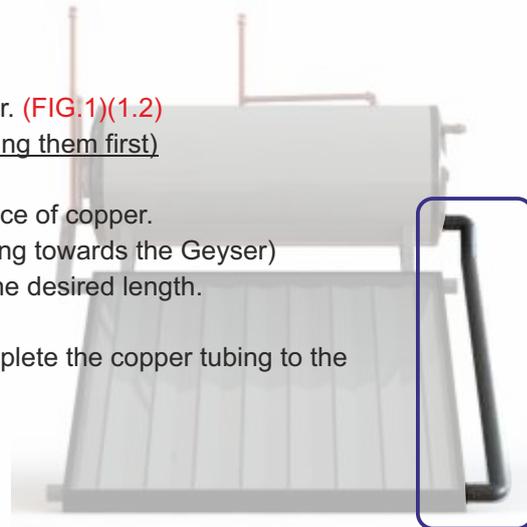
5. Connecting the Geyser & Collector:

Solar send side (cold water feed):

5.1 Connect the solar cold water supply to the bottom right of the Collector. (FIG.1)(1.2)
(Before you make all your connections secure, we recommend dry fitting them first)

- a. From the Collector connect a straight Conex coupler to a 50mm piece of copper.
- b. Connect a 90° solder elbow to the 50mm copper tube.(Elbow pointing towards the Geyser)
- c. Now connect a piece of copper tubing to the 90° elbow and cut to the desired length.
- d. Connect a 90° conex to male elbow to geyser send port.
- e. Add a 45° solder elbow to the copper tubing from the collector, complete the copper tubing to the geyser fitting.

NB: Before making everything secure, add your lagging.



Hot Water Return:

5.2 Connect the solar hot water return to the top left of the Collector. (FIG.1)(1.1)

- a. From the Collector connect a straight Conex coupler to a 50mm piece of copper.
- b. Connect a 90° solder elbow to the 50mm copper tube.(Elbow pointing towards the Geyser)
- c. Now connect a piece of copper tubing to the 90° elbow and cut to the desired length.
- d. Connect a 90° conex to male elbow to geyser send port, complete the piping to this fitting.

NB: Before making everything secure add your lagging.

Note: Additional posts on the solar collector should be sealed using a conex end cap, and lagged.



6. Connecting the hot and cold water piping:

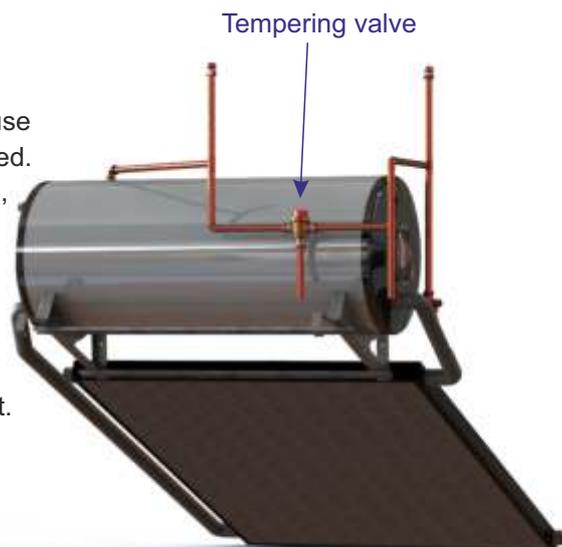
- a. Connect the cold water supply to the cold water piping of the house make sure the anti-syphon loop and vacuum breakers are installed.
- b. connect the hot water supply to the hot water piping of the house, make sure the vacuum breaker is correctly installed.

NB.: this type of system requires a tempering valve be installed.
Please see installation guidelines for correct installation.

NB.: The installation must comply with SANS 10254.

We recommend all piping be lagged if exposed to the environment.

Please inspect the entire installation for any leaks.



7. Connecting the Electricity:

(Please note this section needs to be completed by a certified Electrician)

Please Ensure an Isolator Switch is installed within 1m of the geyser in a weather proof enclosure.

7.1 Option 1: DB board type digital timer.

- a. Replace the existing breaker for the geyser with a digital timer.
- b. Install the new Digital timer switch as per Instructions Supplied.

(Instructions are supplied with the digital timer switch for installation and commissioning)

Note. A minimum of 4mm shielded 3 core wiring should be used for the new geyser.

7.2 Option 2: Geyser management system:

(Please consult the supplied instructions for full installation and programming requirements)

- a. By installing a geyser management system you will be able to better determine the efficiency of the solar system.
- b. Geyser management systems must be installed under roof, with power coming from the existing breaker switch for the geyser.
- c. Program the geyser management system according to the supplied instructions.

Note. A minimum of 4mm shielded 3 core wiring should be used for the new geyser.

Once your connections are secure and correct, and the geyser is full, you may commission the system.

Congratulations the installation is complete.

All warranty documents are available at www.gapholdings.co.za

Solar installation must comply with SANS 10106

Geyser installation must comply with SANS 10254



Safe Operation of the System:

1. The system being a thermosiphon system relies on the natural process of water being heated by the Sun natural rises to the highest point of the system and is replaced by the cooler water in the same system.
2. This being a natural process, it will continue as long as the sun supplies sufficient energy to heat the water. No mechanical assistance is required.
3. Should the system be left for 4 or more consecutive days in high summer, it is possible that the system could over heat and become unstable, it is recommended that should the system not be used for 3 or more days, the collector be covered, to reduce the likelihood of the system over heating.
4. The system may produce excessively hot water (above 70°) to prevent scolding we recommend having a Tempering valve install on the system to prevent scolding.
5. The system typically takes a full day to heat the water in the geyser to a decent temperature. This is not an instant process but rather requires the full day on average. The ultimate temperature is determined by Usage and the energy of the Sun.
6. Once the water has been heated by the Sun, and once you have depleted such water, either you will have to wait for the Sun to reheat the system, or you will need to activate the electrical element if more hot water is needed urgently.
7. It is recommended you take this into account when using hot water, do not let the hot water simply run for no reason, showering using a low flow shower head can reduce your hot water usage by up to 50%
8. The electrical element consumes a large amount of electricity when it is active, it is recommended the use of the element be kept to the absolute minimum, by doing this your potential energy saving will be maximised. We recommend activating the element in the early hours of the morning, which would allow for normal early morning requirements, thereafter allow the Sun to provide the rest of the heating during the day.
9. For maintenance and other safety information please refer to the section on Maintenance.

Maintenance:

1. If at any time you suspect a leak or problem with the system please call your Installer immediately.
2. In-Land Areas: The Solar Collector should be kept free from dust or pollen.
3. Coastal Areas: The Solar Collector should be kept free from salt crystallization.
4. The anti-freeze fluid (Glycol) will degrade over time. The Collector and piping should be drained and refilled every (3) three years.
5. The entire system should be checked periodically for any leaks or problems. If you suspect a problem the Installer should be contacted immediately.
6. We recommend the thermostat in the Geyser be set to 55°C.
7. Never allow trees, shrubs or other large obstacles to cast a shadow on the solar collector. Please check during summer and winter.
8. Please Refer to Geyser Manufacturer of Anode Replacement (on Average replace every 18 Months)
9. Winter Time:
 - 9.1 Active Systems: Make sure the Frost protection system is activated.
 - 9.2 Make sure all Piping is Insulated.

Away Periods

When in summer, hot water is not going to be used for weeks, it is advisable to cover the panel(s) with a canvas or an old blanket (NOT WITH BLACK PVC!). This will prevent the system from over-heating.

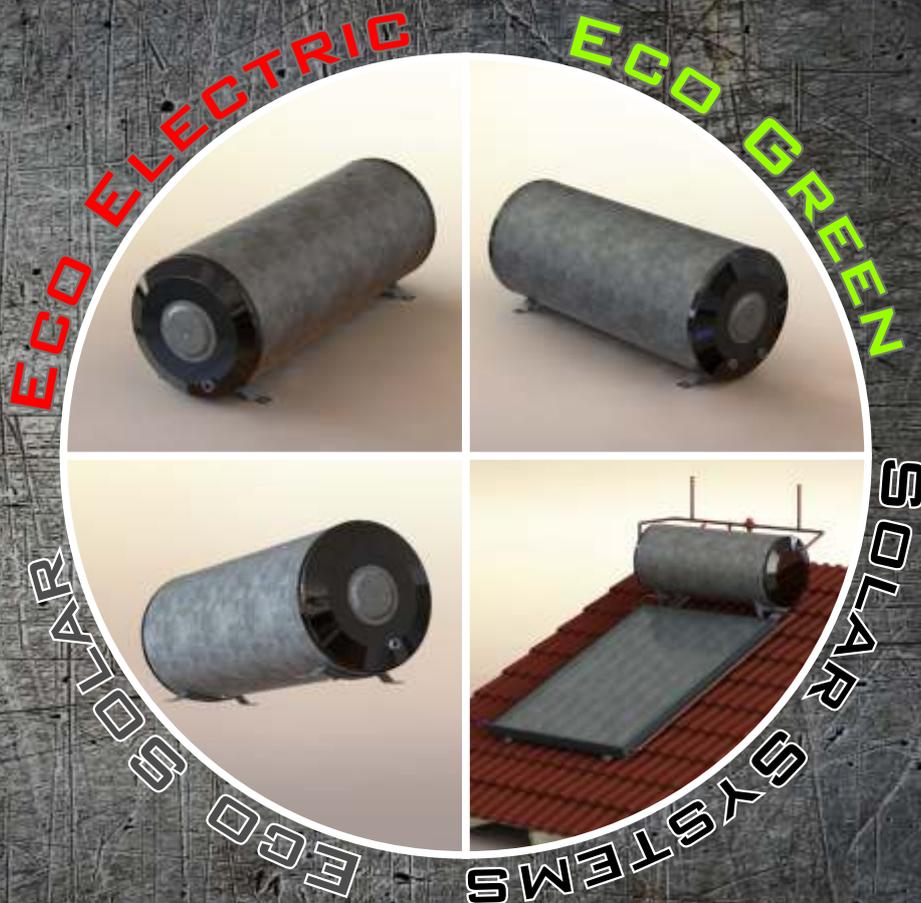
Once a Year

The temperature and pressure valve(s) should be checked for proper operation. **This should be done by an accredited technician.**

NB.: It is also recommended that a Qualified Installer performs a full system check-up once a year, this will allow the system to perform at its fullest at all times.



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