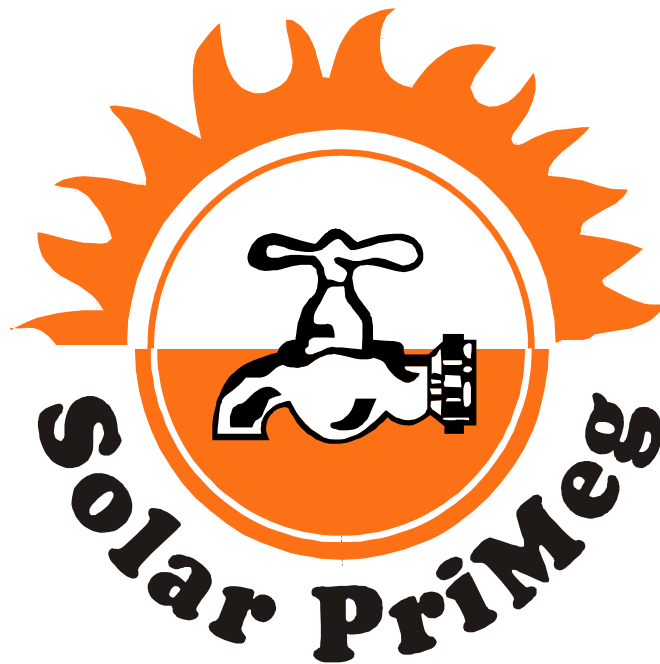


SOLAR PRIMEG cc



OWNER'S MANUAL DIRECT SYSTEMS

INTRODUCTION

Congratulations on the purchase of your Solar PriMeg Solar Water Heating System.

Solar PriMeg cc was established in 1992 and is situated in Rinaldo Industrial Park in Durban. Solar PriMeg are specialists in Alternative Energy. The main objective of Solar PriMeg is to inform and to educate the general public about alternative energy. Solar PriMeg strives to provide quality products with the best service excellence. This locally manufactured product is on par and compliant to the standards of the South African Bureau of Standards (SABS).

WHY SOLAR?

Solar energy is a primary energy source from which most of the earth's resources originates. This is natural solution to harness the energy of the sun for the vital needs of humankind. This is natural solution to harness the energy of the sun for the vital needs of humankind. This is a **GREEN PRODUCT**; hence it helps you save the environment by consuming less electrical energy.

HOW DOES IT FUNCTION?

The sun's rays shines onto the solar panels. The glass top, of the panel traps the sun's energy. This energy is absorbed by the absorber fin and transferred by conduction to the underlying copper tubes. Water within the copper tubes is heated again via conduction and the temperature increases accordingly. The heated water will naturally rise up the panel and into the storage tank by the process known as thermosyphon. Thermosyphon is created by the difference in liquid densities, when heated the lighter dense material/fluid displaces the colder denser material/fluid within the system. By the natural cycling of the fluid/water within the system, the entire storage tank is heated by the energy of the sun.

Your solar collector has a vast resource of energy trapped from the sun. The sun generates power in the form of radiant energy at the rate of 3.8×10 kilowatts, of which less than a billionth is intercepted by the earth. Of this only 60% reaches the earth's surface. This still represents a massive 110, 000,000,000,000 kilowatts arriving continuously on earth. This vast figure in simple terms is equivalent to 1kw of power per square meter (On a clear day).

By taking the square meter area of your solar collector (effective surface area not physical area) and multiplying it by 1 kilowatt/meter you will see how much power your collector can absorb per hour. This is at 100% efficiency. Nominal efficiency is 70%.

WHAT HAPPENS IN BAD WEATHER?

The solar systems uses the solar energy as it's primary energy source with the secondary or back-up source being the standard electrical element. This will ensure that the consumer will always have hot water.

BENEFITS OF A SOLAR PRIMEG SYSTEM

Solar PriMeg offers a technological and robust panel construction for usage in harsh climates. The solar collector is constructed of corrosive resistant materials such as Anodized Aluminium and Copper. Technologically advanced panels reflect absorbed waves back to the heating risers thus improving efficiency.

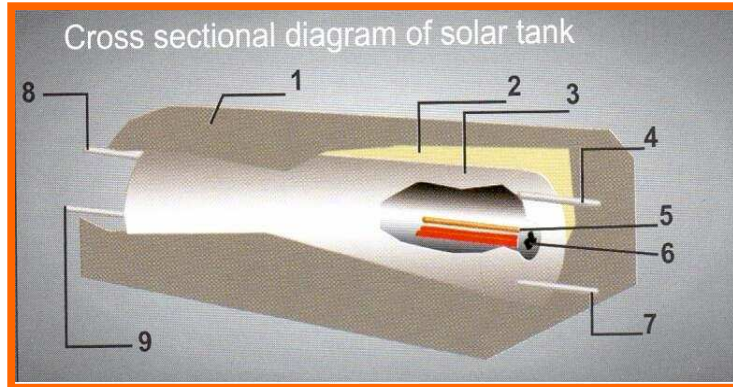
Superior Solar PriMeg Tanks are of world class technology, containing Molybdenum within the stainless Steel to prevent pitting and to ensure that the solar tank lasts longer.

- 35- 45% savings on the Electrical Bill
- Reliable Hot Water in any weather
- High Efficient Systems to Save More & Last longer
- Molybdenum ensures Superior Stainless Steel Solar Tanks that have anti pitting properties for a long lasting life.
- By reducing the electrical energy consumption, CO₂ emissions used to generate electrical energy is reduced.
- Clean, Pure, Sustainable Energy



SOLAR PRIMEG'S SYSTEM DESCRIPTION

a) TANK DESCRIPTION

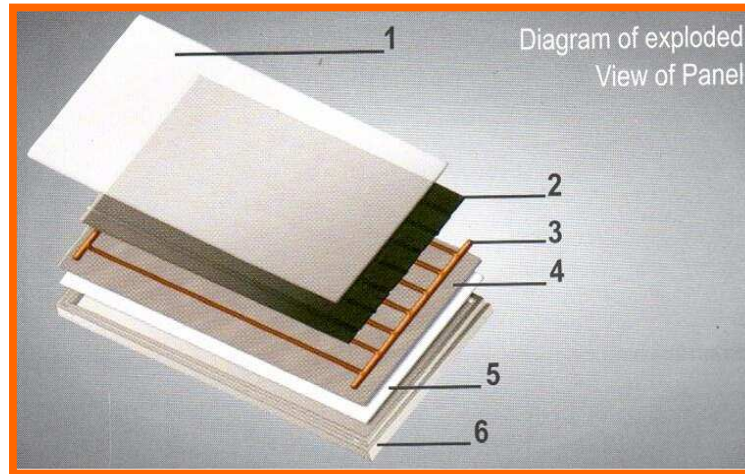


1. Outer Chromadek Casing
2. Polyurethane Insulation
3. Stainless Steel Inner Cylinder
4. Hot Water Outlet
5. Adjustable Thermostat
6. Electrical Element
7. Cold Water Inlet-Flow to Collector
8. Safety Temperature Valve
9. Hot Water Return from Collector

SOLAR TANKS

MODELS	UNITS	200l	300l
Dimensions (L x W x H)	Mm	1400 x 520 x 520	1850 x 520 x 520
Weight (Empty)	Kg	66	68
Weight (Full)	Kg	266	368
Working Pressures	kPa	100 - 600	100-600

b) PANEL DESCRIPTION



- 1) 5mm Armour Plated Glass (non reflective)
- 2) 0.5mm Fin Transferring Plate (Aluminium)
- 3) Copper Tube Fluid Channels
- 4) Reflective Sheet
- 5) Glass Wool Insulation
- 6) Extruded Aluminium Outer Frame

SOLAR COLLECTORS

MODELS	UNITS	SP 2.6	SP 2.9
Dimensions (L x W x H)	Mm	1980 x 1300 x 75	1980 x 1450 x 75
Weight (Empty)	Kg	42	45
Weight (Full)	Kg	46.5	52
Volume Water	L	4.5	7
Working Pressures	kPa	100 - 600	100-600

INSTALLATION:

a) INSTALLATION METHODS:

There are three installations methods:

1. Close Coupled System:

The solar storage vessel (the geyser) and the solar collectors are both mounted on the roof.

2. Split Coupled System:

The solar collectors are mounted on the roof, and the solar storage vessel (the geyser) is mounted in the roof space (above the ceiling). The geyser must always be higher than the solar panel outlet connection, to make use of the thermosyphon principle.

3. On stands

In the cases of flat roofs, custom designed stands are required to meet the needs of the required pitch i.e. 30°.

General Comments:

- If the distance between the geyser and the panel is more than a meter, the efficiency of the system is affected. Insulation of the hot water outlet pipe from the panel is recommended.
- It is also recommended that a drip tray be installed under the geyser to reduce damage or leaks.

b) LOCATION & ORIENTATION

South Africa has one of the highest solar isolations in the world. Conditions are very similar to that of the Sahara and Australian deserts.

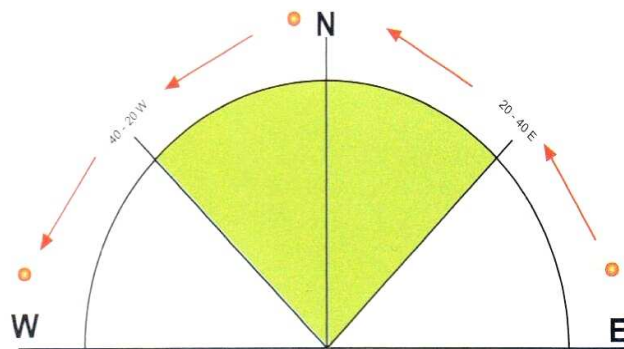
Climatic conditions in South Africa can vary daily. Temperatures may vary between 15°C and 40°C. Temperature changes in winter calls for protection on your solar collector. Hail protection is provided with 5mm amour plated glass on the solar panels.

To obtain maximum benefit of the solar energy input into the system, the solar panels must be exposed to the sun during the entire day, throughout the year.

Trees and large buildings may cause unwanted shadows.

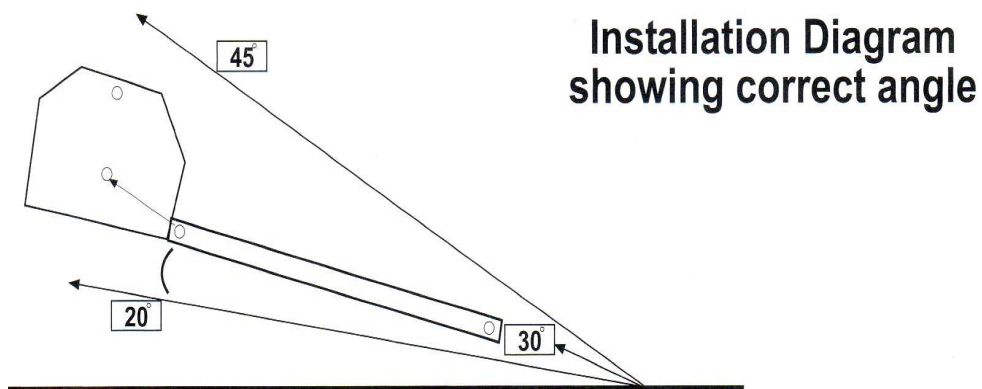
To ensure maximum benefits, the system must be positioned correctly. The optimum position for your Solar PriMeg Solar Water Heater should be **TRUE NORTH**. However a deviation angle of **20 - 40 °** to the **WEST** or **EAST** of True North is also acceptable without a marked drop in performance.

In a situation where the roof facings are direct EAST / WEST, the WEST facing roof would be selected. This would allow for a shorter storage time between the end of the day and the consumption of the solar heated water. On average the Solar Primeg Water Heating System requires ± 6 hours to heat the storage cylinder contents.



c) GRADIENT

The optimum gradient best suited for your Solar PriMeg Solar Water Heating System is anything between 35 - 45°.



d) INSTALLATION REQUIREMENTS:

200lt Direct Solar System:

- 22mm copper pipe (3m)

- 3 x 22mm conex elbows
- 3 x 22mm conex tees
- 2 x 22mm vacuum breakers
- 1 x 400kPa pressure control valve
- 2 x 22mm conex stoppers
- Non-Return Valve

300lt Direct Solar System:

- 22mm copper pipe (3m)
- 3 x 22mm conex elbows
- 3 x 22mm conex tees
- 2 x 22mm vacuum breakers
- 1 x 400kPa pressure control valve
- 2 x 22mm conex stoppers
- 3 x 22mm straight couplers
- Non Return Valve

NB: SABS components are used by Solar PriMeg and are recommended when installing

e) **PANEL INSTALLATION**

Strapping of the panels:

- Align panels on the roof using a level
- Remove tiles from the top corners of the panels
- Secure the strap firmly by nailing the strap to the batten (ensuring a flat surface)
- Thereafter replace all tiles that were removed to it's original position.

f) **TANK INSTALLATION**

- Centralize tank above the panel(s)

Tank to Panel Connection:-

- Secure Stop end on the top right corner of the panel

FLOW

- At the bottom right of the panel, fasten a Delcop elbow to a 22m Copper Pipe($\pm 2.3\text{m}$). Secure these using flux and solder.
- Lag the 22mm Copper pipe using the black armo flex insulation.
- Fasten the end of the Copper Pipe length with a Delcop elbow
- Plumb a Connex Tee to the Inlet of the Tank.
- Fasten a shorter length of pipe ($\pm 300\text{mm}$) to the Connex Tee as well as the Delcop Elbow.
- From the recently connected Connex Tee, a short length of Copper Pipe ($\pm 100\text{mm}$) must be connected.

A Delcop elbow must be fastened to the ($\pm 100\text{mm}$) Copper Pipe. Please note the Delcop elbow should be facing upwards

- A copper pipe of 520mm length should be attached to the Delcop Elbow to the top of the tank.
- A Delcop Tee should be introduced at the top end of the 520mm Copper length.
- Continuous from the 1st Tee (vertical plane), a 325mm Copper Pipe should be added together with the first vacuum breaker.
- A Copper Pipe should be plumbed to the 1st Tee (horizontal plane) allowing to couple the 2nd Tee, attach a copper pipe to the vertical plane of the 2nd Tee (facing downwards) for the option to balance the cold water feed to the household.
- From the 2nd Tee a copper pipe should be fastened (horizontal plane) followed by a Delcop elbow. (facing downwards).
- A PRV followed by a non return valve should be plumbed in this line. (NB this is your main water supply).

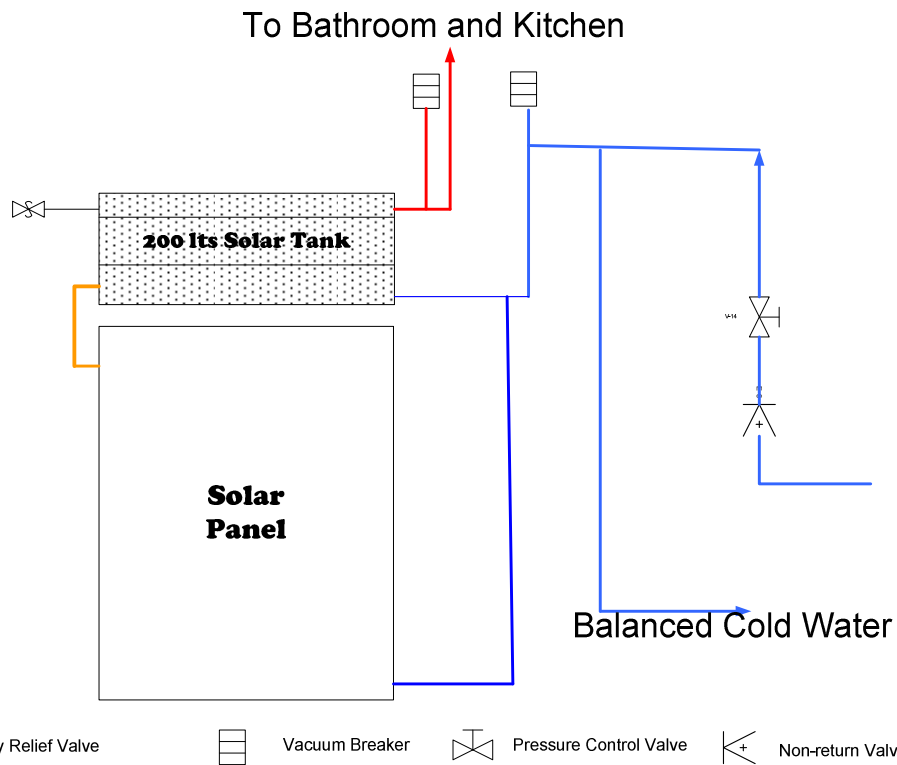
OUTLET

- Plumb a Connex Tee the the outlet pipe facing upwards.
- A Copper pipe of 325mm ending with the 2nd vacuum breaker should be attached to the vertical plane of the Connex Tee.

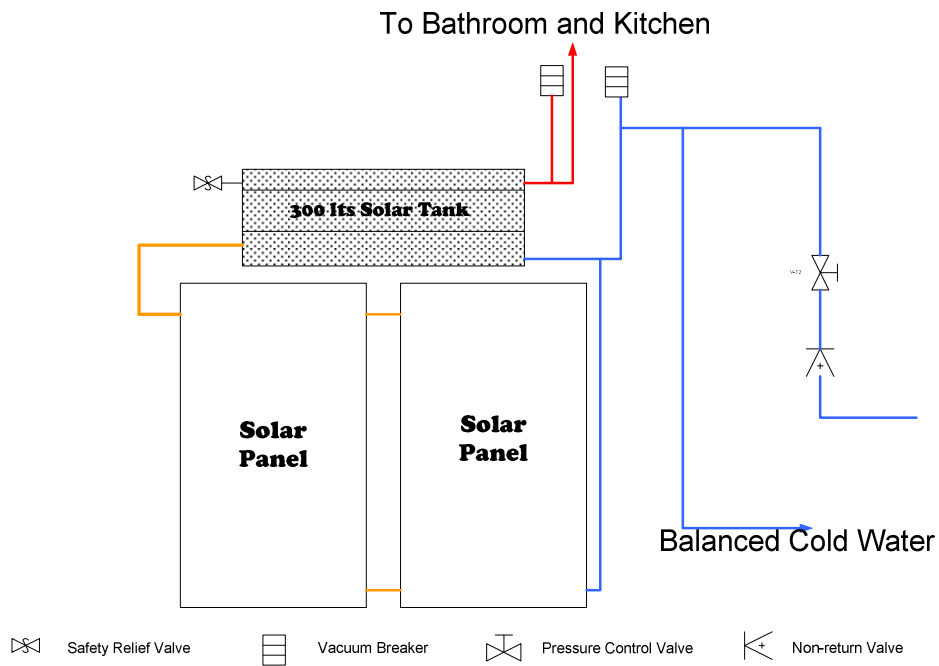
- Attach a Copper pipe to the horizontal plane of the Tee, this is the hot water supply to the household.

RETURN

- Secure a stop end on the bottom left corner of the panel.
- Attach a Connex straight coupler to the return pipe on the tank.
- On the top left corner of the panel fasten a Delcop elbow followed by a 300mm Copper pipe.
- Attach a 2nd Delcop elbow to the end of this Copper pipe. (ensure that the elbow end points towards the tanks return pipe).
- Now attach a Copper pipe to link the straight coupler to the 2nd Delcop elbow
- Fasten the safety probe using shifting spanners.



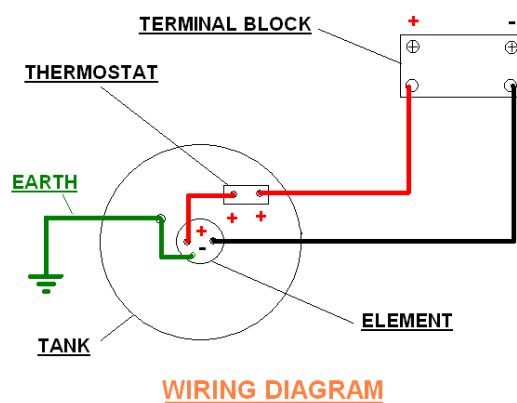
Piping Diagram for 200 Lts Direct System



Piping Diagram for 300 Lts Direct System

g) ELECTRICAL

- Electrical connection to be completed by an electrician.
- Recommended thermostat setting should be between 50 -55 °C
- Standard Wiring:
 - i) Earth – **Green**
 - ii) Positive – **Red**
 - iii) Neutral – **Black**



Electrical Diagram showing connections

OPERATIONAL INSTRUCTIONS

Besides a few minor operations observed from the solar system when active, the following routine operations were noted:

- Water dripping from the pressure valve. This indicates normal operation of the system. Please note continuous leak from the valve indicates a defective valve.

- When the temperature within the tank exceeds normal operating conditions, water could be discarded from the safety valve. This can occur on very hot days or when the system has an electrical fault causing overheating of the water.

SAFETY ON THE HOT WATER STORAGE VESSEL

The safety valve (TP valve) must be mounted on the solar water cylinder before used. The function of the safety valve is to protect the solar geyser from overheating and over pressurizing. The valve will become operational at a pressure of 1.5 times the normal working pressure of the valve. The 400kPa valve will open up at 600kPa.

Overheating of the geyser can occur when the thermostat or thermal cut-out overrides and continuously feeding electrical current to the element. This causes the hot water cylinder to heat up beyond the thermostat or thermal cut-out settings, which is above 75 degrees. Overheating can also occur if the solar geyser is incorrectly wired, by bypassing the thermostat or thermal cut-out. This will cause the water to heat up to extremely high temperatures where the safety valve will open up between 93°C and 98°C.

The safety valve must be installed as high up as possible on the solar water cylinder. The reason being, heated water always rises and in this way it will protect the solar water cylinder from overheating. Over pressurizing only occurs when the solar geyser is incorrectly plumbed. The other reasons being:

1. No expansion relief valve fitted or plugged
2. No pressure-reducing valve fitted, mains pressure plumbed into geyser.
3. Incorrect rating of valve installed.
4. Pressure reducing valve incorrectly reassembled when serviced
5. Stopcock or non-return valve fitted between the hot water cylinder and the expansion relief valve.

The pressure control valve is used to reduce the incoming water mains supply pressure. With the valve correctly installed into the plumbing system (400kPa), no terminal fittings are opened and the system is filled with water and the pressure control valve is in the closed position.

When the terminal fitting is opened on the outlet side, the downstream of the pressure control valve can fill a bath or washing machine. The water pressure drops on the outlet side causing a pressure drop under the diaphragm. The regulating spring defeats the lower pressure and forces the valve to open. This allows water to flow through the regulating seat,

regulating the income mains from 700kPa to 300kPa while the water flows through the valve. When the terminal fitting is closed the water pressure under the diaphragm builds up, forcing the regulating spring back. The regulating seat shuts off.

A pressure control valve basically uses two components to operate:

1. The big regulating spring to open the valve and regulate the pressure through it.
2. The diaphragm to close the valve.

The expansion control valve must be fitted in the installation, if the water supply pressure exceeds the rated pressure of the geyser. The pressure control valve is to be plumbed with the arrow on the body in the direction of the water flow. The pressure control valve must be of the same pressure rating as the hot water cylinder (400kPa). The pressure control valve (SYR Mono valve) with integral expansion relief valve (combined in one unit) has a pressure of 400kPa. Water may drip from the expansion control valve and this pipe must be left open to the atmosphere.

- Vacuum breakers are used in the hot water cylinder to prevent collapsing and syphonage. These are fitted on the inlet and outlet of the solar water cylinder, at a minimum of 300mm higher than the top of the solar geyser.
- The discharge pipe connected to the expansion control valve and the safety valve (TP valve) must be of metal and installed in a continuously downward direction and in a frost-free ambient with the outlets being left open to the atmosphere.
- The solar geyser must be electrically connected as per requirements of SANS 10142 (220/250 Volts – single phase circuit). All solar water heaters shall be bonded in accordance with SANS 10142 clause 6.13. Hot and cold water systems shall be bonded together and also be bonded to the earth continuity conductor system.
- The solar geyser must be plumbed as per requirements of SANS 10254 (as a closed water heater with combined pressure control and expansion control valves).

SAFETY INSTRUCTIONS

- Do not attempt to interfere with the electrical components within the system, without a qualified person. The system contains high voltage.
- Do not touch the solar glass or pipes in the system as they are linked to the panel and these surfaces are hot.
- Do not wash the solar glass whilst the surface is hot. This might cause contraction and breakage of the solar glass due to thermal shock.
- Care should be taken while on the roof and around the solar system, especially when surfaces are wet.
-

MAINTENANCE

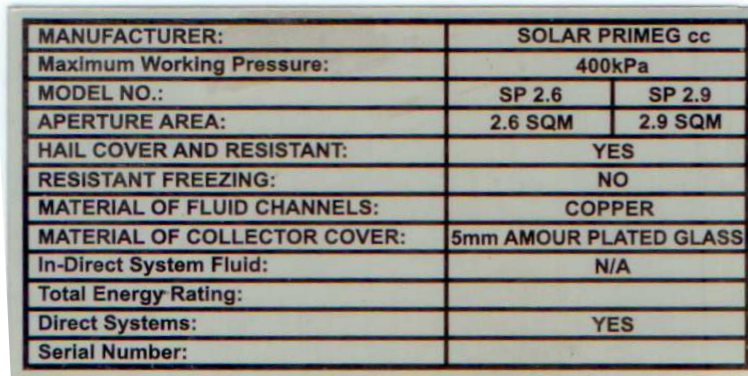
The following maintenance should be done on a solar system to ensure maximum efficiency,

	6 MONTHS	12 MONTHS
CLEAN SOLAR COLLECTOR GLASS	X	
CHECK FOR LEAKS	X	
CHECK STRUCTURE		X
CHECK ELECTRICAL BACK UP AND PRV		X

- Visual observation to checks for leaks.
- Always wash collector glass when it is cool with water and remove excess dust by wiping the glass.
- Kindly contact Solar PriMeg cc to complete these tasks.

Marking and Identification

Marking on the Solar Panel



MANUFACTURER:	SOLAR PRIMEG cc	
Maximum Working Pressure:	400kPa	
MODEL NO.:	SP 2.6	SP 2.9
APERTURE AREA:	2.6 SQM	2.9 SQM
HAIL COVER AND RESISTANT:	YES	
RESISTANT FREEZING:	NO	
MATERIAL OF FLUID CHANNELS:	COPPER	
MATERIAL OF COLLECTOR COVER:	5mm AMOUR PLATED GLASS	
In-Direct System Fluid:	N/A	
Total Energy Rating:		
Direct Systems:	YES	
Serial Number:		

The picture above depicts the markings on a Solar Panel serial Plate. A description of each line is given below:

Manufacturer: The manufacturer's name, trade name or trade mark;

Maximum Working Pressure: The maximum working pressure that should not be exceeded within the system.

Model No: The model number of the system

Aperture Area: The aperture area of the panel.

Hail Cover and Resistant: Whether fitted with hail cover or not;

Resistant Freezing: Whether resistant to freezing or not;

Material of Fluid Channels: The material of the fluid channels;

Material of Collector Cover: The material of the collector cover;

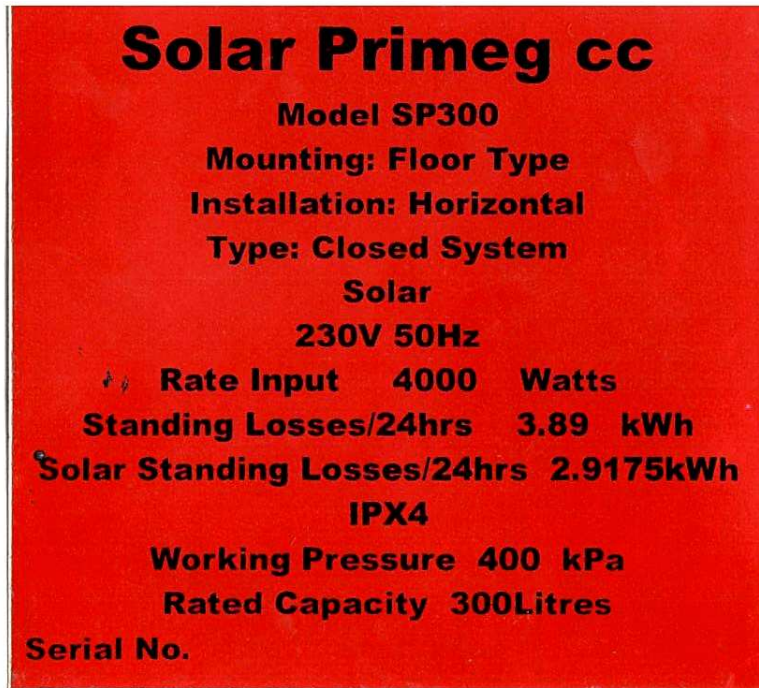
In-Direct System Fluid: The type, mixing ratio and grade of transfer fluid (for indirect systems);

Total Energy Rating: The total and useful energy rating, in kilo Watt hours per square metre per day; and

Direct System: Whether the system is direct or not.

Serial Number: Date of manufacture and or serial number.

Marking on the Solar Tank



Model: Indicates the model number.

Installation : Indicates the orientation of the storage vessel.

Type: Configuration of the Solar System

Rate Input: Indicates the power rating input of the electrical element.

Standing Looses/24 hrs: Indicates the thermal losses from hot water storage system.

Solar standing Looses/24 hrs: Indicates the thermal losses from the solar equipment;

Material of Collector Cover: The material of the collector cover;

IPX Rating: IPX 4 indicates system may be used externally

Maximum Working Pressure: The maximum working pressure that should not be exceeded within the system.

Serial Number: Date of manufacture and or serial number.

MAINTENANCE

Service Calls

If you are not receiving hot water from your solar system please check the following:

- That your hot water usage is not exceeding your average consumption.
- That the main geyser switches on the electrical board is operational is in the active position.
- That you are not losing hot water from a leak within your plumbing system.
- The geyser timer on the electrical board is operational and set to the correct timings.
- Shading from nearby trees and or building are obstructing direct sunlight to your solar panels.

Please contact your Solar PriMeg Agents if you are still not receiving hot water having checked the above items.

Corrosion Prevention and Detection

Solar PriMeg systems are designed to be withstanding the harsh environment and offer superior service. The normal lifespan of a solar system is in-between 10-15 years and the system offers a 5 year guarantee.

Solar Collector

Please ensure that the solar collector glass is intact.

If the solar collector frame discolours in shades of white, this is an indication that the aluminum is forming rust.

Solar Tank

The outer casing should not have any discolouration or distortion from the standard shape.

Any indication that the solar tank has erupted is the constant flow of water from the tank.

Please contact your local Solar PriMeg Service Agent as soon as possible if the above occurs.

Note: the pressure valve always releases water as part of its normal operation.

YOU CAN CONTACT US ON

+27 31 5691044

FOR MORE INFORMATION