

# INSTALLATION / OWNER'S MANUAL DOMESTIC SOLAR SYSTEMS

GLOBAL LEADERS



Forced Circulation  
(Pumped) Open and Closed Loop Systems

Thermosiphon –  
Open and Closed Loop Systems

OUR SOLAR - GAS SYSTEMS NEVER RUN OUT OF HOT WATER



Australia wide service call:

 **1300 367 565**

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# Glossary

<b>Absorber Plate</b> .....	The part of the collector that collects the solar energy and transforms it to heat.
<b>Booster</b> .....	A supplementary heat source i.e. electricity, gas, wood stove.
<b>Close Coupled Solar</b> .....	Where the solar storage tank and solar collectors are connected close together.
<b>Closed Loop</b> .....	Using a heat exchange fluid to heat the potable water via a heat exchanger.
<b>Differential controller</b> .....	An electrical device that reads the difference between the Collector temperature and the stored water temperature and controls the solar input.
<b>Element</b> .....	A thermostatically controlled booster element heats the stored water in conjunction with the available solar energy.
<b>Continuous Water Heater</b> .....	A gas booster that only heats the water as it flows through it.
<b>Glycol (Heat Exchange Fluid)</b> .....	Transfers the solar energy to the stored potable water via a heat exchanger; prevents freezing or clogging of collectors in bad water areas.
<b>Non Return Valve</b> .....	Also known as a check valve; allows liquid to flow in only one direction.
<b>Off Peak</b> .....	Electrical power supplied at a prearranged time.
<b>Temperature Control Valve</b> .....	Ensures the system will not overheat.
<b>Pumped Solar System</b> .....	Utilises a pump to circulate the fluid from solar collectors to the storage tank.
<b>Pressure Limiting Valve</b> .....	A valve connected to the cold water inlet to the water tank to control the water pressure.
<b>Pressure/Temperature Relief Valve</b> .....	A valve installed in the water tank to relieve excessive pressure and temperature.
<b>Potable Water</b> .....	Drinking water
<b>Selective Surface</b> .....	The special treatment given to the surface of the absorber plate.
<b>Storage Tank</b> .....	A lined water tank for storing the heated water.
<b>Solar Collector</b> .....	Glazed flat-plate collector where the fluid passes through copper tubes and is heated by solar energy.
<b>Tempering Valve</b> .....	A valve used to control the delivery temperature of the stored water.
<b>Thermosiphon</b> .....	As fluid is heated it becomes less dense (lighter) and rises, as it becomes colder it becomes denser (heavier) and falls causing thermosiphoning.
<b>Thermostat</b> .....	Automatically switches the booster on and off to maintain the temperature in the storage tank.

# Use of this Manual

This manual contains easy to follow procedures for the correct installation and operation of CHROMAGEN 200 and 300 Litre, Open and Closed Loop Thermosiphon and Pumped Solar systems.

Please take your time to read and understand the operating guidelines provided to ensure successful and trouble-free operation of your Chromagen water heater. If you have any questions, contact your local CHROMAGEN customer service representative on 1300 367 565.

## Chromagen the Company

Chromagen has been manufacturing and installing solar water heaters throughout the world since 1962. Since then, we have developed a system of solar energy absorption, transfer and storage so advanced, that we are at the forefront of the solar water heating industry today. CHROMAGEN provide two basic configurations, in a range of sizes and models.



### Thermosiphon systems.

The traditional roof mounted thermosiphon solar hot water systems are available in 200 and 300 litre tank sizes with one, two, or three solar collectors. The solar system utilizes natural thermosiphon to maximize solar efficiency. In areas where there is the possibility of freezing, frost protection must be used. As the use of a 'closed loop' system may be required, always discuss your options with your local Chromagen expert.



### Active, pump forced systems.

When aesthetics are an important consideration, Chromagen's range of pumped solar water heaters are installed with the storage tank mounted at ground level, with one, two or three solar collectors mounted onto the roof. Chromagen's 'smart' solar controller monitors water temperature and uses available solar energy to ensure maximum solar savings. In areas where there is the possibility of freezing, frost protection must be used. As the use of a 'closed loop' system may be required, always discuss your options with your local Chromagen expert.

# Consumer Information

## General information and operating guidelines for Chromagen Water Heaters

The general performance and energy savings that you can expect from your Chromagen water heater will depend upon a number of factors, such as water usage patterns, daily temperatures, available solar energy and the cost and type of purchased energy being utilized.

Your Chromagen water heater is designed to utilize a combination of solar energy and purchased energy, operating simultaneously, to maintain a minimum operating temperature of 60°C. **To ensure that you always have an adequate supply of hot water, we recommend that the auxiliary booster is left switched ON at all times. The automatic thermostat will switch the auxiliary booster on and off automatically.**

Reliance on 'solar energy only', or minimizing auxiliary booster usage manually to unrealistic times, can and will result in inadequate water temperatures, particularly during times of cool and inclement weather. Overnight temperature stabilization is a reduction in water temperature, as the hot water at the top of the storage cylinder transfers some of its heat to the cooler water in the lower part of the cylinder. This effect is often perceived as 'heat loss' by consumers who control their boosting to minimal times, but is actually the redistribution of stored heat more evenly over the entire contents of the tank. Utilizing the auxiliary booster as recommended will ensure that the effects of overnight temperature stabilization have no effect on the water temperature in the home.

To ensure adequate hot water is available at all times, it is important to follow our simple operating guidelines.

## Standards and Regulatory Requirements

All Chromagen solar hot water systems must be installed by an authorized plumber. All installation work must meet local authority standards, Australian Standard (AS 3500.4) and the National Plumbing Code along with local electrical regulations. Where required, the relevant electrical and plumbing work will need to be certified to the satisfaction of local regulatory authorities.

## Solar Hot Water Storage Tank

To obtain maximum performance the solar tank/system should be positioned as close as possible to the most used outlets. The solar pumped storage tank can be installed internally (dependant upon local regulations) on an approved spill tray with drain or externally, on a level concrete plinth.

## Boosting

Average annual solar savings are calculated with the 'auxiliary booster' left in the 'ON' position at all times. It is important to understand that the system is not always consuming purchased energy when the 'booster' is on, as the system regulates purchased energy use via an inbuilt automatic thermostat. It is not necessary for consumers to manually turn the 'booster' switch on / off.

If your system is operating on a solar / electricity combination, Chromagen recommend that the electrical booster is connected to standard 'Day Rate' electricity to ensure an adequate supply of hot water at all times. To maximize the amount of solar savings available, a time clock can be fitted to supply electricity to the booster at selected times.

**Systems that use electrical boosting can be connected where available to "Off Peak" power, however to ensure that adequate hot water is available at all times a 'Day Rate' facility will need to be provided.**

If your system is operating on a solar / gas combination, utilizing a continuous flow gas water heater as the auxiliary booster, the gas water heater will need to be left with the power and gas switched 'ON' at all times. For operating and maintenance information, please refer to the separate gas manual provided.

When using gas boosting through a continuous hot water system, the gas system should be as close as possible to the most used outlets.

Solar systems can also be used for preheating to an existing hot water heater provided that –

- The existing water heater is thermostatically controlled, not flow controlled.
- The operating pressure of the two systems is compatible.
- The existing water heater is able to provide adequate hot water supplies during times of cooler or inclement weather.
- The warranty or lifespan of the existing water heater is not affected by the installation of a solar water heater as a pre heater.
- The electric element is removed from the solar water heater.



# Hot Water can be DANGEROUS

**WARNING – HOT WATER BURNS. As a safety precaution, young children should always be supervised around hot water fixtures.**

Hot water systems can store water at temperatures that can cause scalding. Water temperatures over 50°C can scald and care needs to be taken to ensure that injuries do not occur through incorrect use of your water heater.

As solar water heaters can generate water temperatures in excess of 85°C, regulations require that a tempering valve, or approved 'mixing valve' be fitted to the heater to prevent water temperatures going to the home exceeding a preset safe maximum. The tempering valve is connected to the hot water outlet lines. The valve must be fitted by an authorized plumber at the time of installation or in retrofitting to existing systems.

Care should be taken to avoid coming into contact with any pipe work or fixtures associated with the water heater collector flow and return lines. **Water from the solar collectors can be hot enough to create pressurized steam which can cause severe scalding - Under NO circumstances should any 'home handy man' type modifications be attempted.**

## How hot will the stored water be?

As a general rule of thumb, a correctly selected solar water heater can attain an average of twice the ambient day time temperature from solar energy alone. In simple terms, on a clear cloudless day of 25°C, solar energy will raise the stored water to roughly 50°C. The auxiliary booster will then boost the water to 60°C

During the warmer months, where daytime temperatures can exceed 40°C, temperatures can exceed 85°C. As thermosiphon systems have no ability to control temperature gained from solar input, **we recommend the use of a 'thermosiphon arrestor valve' in areas subject to high solar energy conditions in instances where more than one solar collector is installed, as the stored water can be heated to very high temperatures. Temperatures exceeding 95°C can result in the temperature relief valve activating, which can result in large volumes of wasted water.**

Chromagen's range of split pumped systems utilize a solar controller designed to automatically cease circulating water through the solar collector array once the stored water has reached a maximum of 85°C. It is important to ensure that the power supply to the control unit is NEVER switched off during normal 'day to day' operation.

## Frost Protection

Chromagen 'Open Loop' split pumped systems are not suitable for installation above 800 meters altitude – systems installed at these altitudes suffering frost damage, will not be covered under Chromagen's warranty program. **At heights of 800 meters and above a 'Closed Loop' model will need to be utilized.**

**Chromagen recommend the use of 'Closed Loop' Thermosiphon systems in areas of known frost.**

If a Chromagen 'Open Loop' split pumped system is to be installed in an area subject to freeze conditions, an approved freeze protection valve MUST be fitted to protect against frost damage. Systems not fitted with an approved freeze protection valve suffering frost damage will not be covered under Chromagen's warranty program.

Chromagen's range of 'Open Loop' split systems are fitted with an inbuilt frost protection mechanism in the solar control unit designed to automatically circulate a small amount of water through the solar collector array when freeze conditions occur. It is important to ensure that the power supply to the control unit is NEVER switched off during normal day to day operation.

## Going away on holidays?

If the water heater is left unused for two weeks or more, a small quantity of hydrogen gas (which is highly flammable) may accumulate in the top of the water cylinder. To dissipate this gas safely it is recommended that a sink or bath hot tap be turned on to dispel a couple of litres of water. During this procedure there should be no smoking, open flames or any electrical appliances such as washing machines or dish washers operating nearby. If hydrogen is discharged through the tap, it will make a sound like air escaping.

# Installation Information

## Water Quality

Town water supplies are generally a controlled water source and should not cause any difficulty with the system. Some water may have elevated mineral content and require more frequent system maintenance. Chromagen 'Open Loop' systems are suitable for use with water supplies with a total dissolved solid content less than 1000 ppm and in which the total hardness does not exceed 200 ppm CaCO<sub>3</sub>. If the local water supplies have calcium hardness (CaCO<sub>3</sub>) exceeding 200 ppm, and an alkalinity in excess of 150 ppm, then a Chromagen 'Closed Loop' system should be selected. Your local water supply authority can supply a water analysis if required, or simply contact Chromagen's Customer Services on 1300 367 565.

## Water Pressure

The storage tank has a pressure/temperature relief valve set at 1,000 kPa. The cold water inlet pressure should not exceed 850 kPa (approximately 20% below the pressure relief valve setting). A pressure reduction valve must be installed if this is not the case. The relief valve will discharge a small amount of water when the system is heating and should be checked every six months.

**Please note: When the tempering valve is fitted,** it is important to remember that when a pressure limiting valve (PLV) is also fitted, that the cold water line to the tempering valve is run 'after' the PLV to ensure that there is equal pressure from both the hot and cold water lines going to the Tempering valve.

## Selecting System Location

The collectors should be installed facing the equator. South in the Northern Hemisphere, North in the Southern Hemisphere (systems should face North in Australia). A deviation of 45° to east or west has little effect on annual solar gain. The solar collector should be no more than 15 metres away from the storage tank (in pumped systems). The collector/s must be at a minimum pitch of 10°, with flat roof frames available if less than 10° roof pitch. 30° pitch and over requires extra fixings and frames. The solar system must be free from shade all year round and clear from obstructions.

## Roof Support Requirements

No extra roof supports are needed when installing a Chromagen pumped system in most cases, as a collector when full weighs between 32 kg and 51 kg and covers an area of between 1.7 and 2.8 square meters depending on the model. The collectors sit flat on the pitch of the roof.

Chromagen's thermosiphon systems can weigh in excess of 400kg and therefore the structural strength of the roof should be ascertained and its ability to support the weight prior to installation.

When installed in cyclonic areas, the use of an approved Chromagen cyclone frame will be required. If you have any queries regarding the requirements of your location please contact your local Chromagen Customer Services representative on 1300 367 565. For installation instructions, please refer to the instructional leaflet provided with the frame.

## Electric Connections

Local codes must be adhered to for all electrical work and be undertaken by a qualified electrician. Both thermosiphon and split pumped systems will need the element connected for auxiliary boosting (see data plate for power rating on hot water tank). All pumped solar hot water systems require a general power outlet to run the pump. When using the gas booster an additional general power outlet will be needed.

## Safety

Solar hot water systems can be heavy so always use approved lifting devices when installing solar systems at heights. All Occupational Health and Safety issues must be adhered to.

# Installation of Pumped Solar Systems

## Installing the Collectors

**WARNING – Solar collectors can generate temperatures that can scald. Exercise extreme care when handling systems, paying special attention to the inlet and outlet fittings. Chromagen advise covering the solar collector during installation.**

**WARNING - If solar collectors are not connected to the solar storage tank for extended periods (eg; on new home installations) it is important to ensure that collector flow and return lines are emptied of water after pressure testing has been completed. Failure to drain flow and return lines can lead to dangerous, scalding water temperatures being released during tank 'fit off', or damage to collectors due to over pressurization.**

After selecting the position of the tank and collectors (making sure they are generally no more than 15 metres apart), check the roof for broken or loose tiles and rusted or loose steel sheets and make good.

Position the collector rail on the front edge of a tile or over a batten and with the straps supplied, fix them to/through the roof. Tilt the collector rail slightly on the hot outlet side to allow any air to be bled from the highest point.

Before lifting the collector/s onto the roof, we recommend you install all brass fittings to the collectors. Due to the high temperatures generated, the use of standard Teflon is unsuitable. Only use a jointing system that is rated for high temperatures .i.e. Hemp and TOT thread sealant, High Density Teflon used with Loctite 569 (Hydraulic Sealant), or Loctite 55 pipe sealing cord.

## Solar Collector Connections TWO/THREE COLLECTORS

Fit a  $\frac{3}{4}$  x  $\frac{1}{2}$  inch Conetite union on the cold water flow inlet fitting (bottom of collector).

Fit  $\frac{3}{4}$  inch brass plug in opposite fitting on collector array (non frost areas)

Fit  $\frac{3}{4}$  x  $\frac{1}{2}$  inch hex nipple and frost valve in opposite fitting on collector array (frost areas)

Fit a  $\frac{3}{4}$  x  $\frac{1}{2}$  inch Conetite union on the hot water return outlet fitting (top of collector opposite side to cold)

Fit the  $\frac{3}{4}$  x  $\frac{1}{2}$  inch reducing bush into the opposite fitting on the collector array

Fit the  $\frac{1}{2}$  inch brass sensor fitting into the brass bush.

Using the brass barrel unions connect the collectors together (if more than 1 collector).

- ☐ In areas of frost, a freeze protection valve will need to be connected to the collector array. Ask your Chromagen solar specialist on 1300 367 565 when you need to include these valves.

The connection of the solar flow and return lines must be diagonal to each other with the flow in the bottom and the return from the top on the opposite side.

## Connecting the Collectors

Position the collector/s on the collector rail and tighten the collector barrel unions. Fix the collector/s onto the collector rail using the screws supplied. Attach the top collector strap and fix to/through roof.

## Solar Flow and Return Lines

Run the solar flow and return lines from collector/s to tank using insulated copper with a gradual fall to the storage tank. Approved flashing must be used when penetrating the roof.

**WARNING - Under no circumstances should plastic piping be used.**

## Sensor Wire

The solar sensor wire will need to be run with the flow and return lines from collectors to tank. Make sure the sensor wire is inserted into the sensor fitting and sealed. Make sure the sensor wire is protected from damage. If this wire is cut or broken it will need to be rejoined, soldered and shrink sealed. **Ensure the sensor wire does not come into contact with the collector or tank flow and return line, as very high temperatures can interfere with the sensor wire and cause the solar controller to malfunction.**

**Care should be taken to ensure that the sensor wire is protected from damage by external fixtures. The use of protective conduit is advised for all external areas.**



## Solar Tank Connections (see system diagrams page)

### Position

The solar tank will need to be positioned on an approved base i.e. a concrete plinth and as close as possible to the most used outlet or the gas booster if used.

### Solar Tank Connection Flow / Return.

Please refer to the system diagrams on page (11-12) for the correct installation.

### Solar Differential Controller Installation

- ☐ The controller must be fixed to the storage tank or the wall close to the tank using the fixing lugs.
- ☐ Fit the tank sensor fitting on the tank
- ☐ Connect the collector sensor wire to the fitting provided on the bottom of the controller.
- ☐ Plug the pump into the power outlet under the controller
- ☐ Plug the controller into the GPO
- ☐ Once tank is full of water, turn GPO on.

### Hot and Cold Water Connections

All plumbing connections must be done by a licensed plumber and in accordance with local authority regulations.

### Cold Water Connection

The cold water inlet connection to the solar storage tank is ¾ inch FI. The cold water inlet requires an approved isolating/non return valve. In some locations regulations require a pressure relief valve be fitted to the cold water supply.

### Hot water connection

The hot water outlet from the solar tank is ¾ inch FI. All hot water pipes need to be insulated.

### Installations on Flat Roof Stands

Flat roof stands are available for systems where the pitch of the roof is below 10°. Please refer to the separate roof stand information sheet.

### Filling and commissioning the solar system

1. Turn on the cold water supply to the tank and open a hot water tap
2. Turn on the solar controller
3. **DO NOT TURN ON THE GAS BOOSTER**
4. Wait till water starts to come out for the hot water tap
5. Leave water running until air is bled, then turn off the hot water tap
6. Switch on the power and the gas supply to the gas booster
7. Turn on the hot water tap inside the house to check if the booster is working and test the water temperature.

**WARNING – Do not turn power on to the electrical element until the following procedure is undertaken.**

### Caution:

Ensure the storage tank is completely full of water by bleeding the hot water lines via an internal hot water tap before switching power on to the electrical element or plugging in and operating the continuous flow gas water heater. Failure to properly bleed the storage tank can in some cases cause damage not covered by Chromagen's warranty policy.

### **Open Loop Commissioning Procedure (See diagram page 11)**

Turn on the mains cold water to the storage tank making sure there is a hot tap turned on in the home to bleed all the air from the tank. When water begins to flow from the open tap, turn off.

When tank full, manually turn solar pump on to remove any air in solar collectors. Re-open internal hot water tap to ensure all air is purged from the storage tank, then turn tap off. Once system is fully bled, plug in and turn on the solar controller.

### **Closed Loop Commissioning Procedure (See diagram page 11)**

1. Fill the closed loop by connecting an easy hook hose from the PTR valve to the fill valve located on the storage tank.
2. Open the fill valve positioned on the tank and open air bleed valve positioned on collector and fill with potable water via the PTR valve connection.
3. Once all the air is bled from the closed loop system and collector, close PTR valve and fill valve.
4. Close air bleed valve on collector and manually operate pump to check for leaks.
5. Introduce the anti-freeze via the fill valve. Disconnect easy hook connector from PTR valve and connect to test pump or test pump bucket. Fill the test pump with 1L of Glycol supplied and 1L of water. Disconnect hose from fill valve and pump a small amount of Glycol through the hose to remove any air. Reconnect the easy hook hose to fill valve. Open the fill valve and air bleed valve and pump Glycol into closed loop via the fill valve.
6. Pump as much of the anti-freeze into the system, taking care not to introduce air from the test pump into the system as possible.
7. When the anti-freeze has been introduced, close off the fill valve and the air bleed valve. The system should be free from air and the solar system ready for use.
8. Turn on solar controller.

**WARNING – The closed circuit fluid operates at both high temperature and pressure. Inadvertent opening of the circuit by householders could lead to severe injury. Once the closed circuit is fully charged with the Glycol solution and the circuit has been sealed by closing the ball valve located at the storage tank, remove handle from ball valve and seal off with brass fitting supplied.**

## **Installation of Thermosiphon Solar Systems**

### **(Open and Closed)**

After selecting the position of the system, check the roof for broken or loose tiles and rusted or loose steel sheets and make good. The roof needs to be able to hold the weight of the solar system. Measure down the required distance (which varies with different collectors) from where the front leg of the tank will be positioned. It needs to be located on the front edge of a tile for support via the tile batten below, or over the roof batten on a steel roof. Using the collector rail straps fix them to the roof rafter by running them between the tiles or screwed through the roof into a batten on a steel roof. Tilt the collector rail up slightly (10mm) on the collector hot return side to ensure thermosiphon occurs.

Before lifting the collector/s onto the roof, fit the connecting barrel unions to the collectors. Due to the high temperatures the use of standard Teflon is unsuitable. Only use a jointing system that is rated for high temperatures i.e. Hemp and TOT thread sealant, High Density Teflon used with Loctite 569 (Hydraulic Sealant), or Loctite 55 pipe sealing cord.

Lift the collector/s into position and connect together. Fix the collectors to the collector rail using the screws supplied. Now lift the storage tank into position and centralize it on the top of the collectors, fixing the rear tank straps to the roof rafters/battens. Using the connecting fittings and pipes, connect the tank and collector/s together. (See system diagram page 13-14). For closed loop systems the installation of an expansion tank and bleed/fill valve is needed. (See system diagram).

In areas of frost, freeze protection valves can be connected to the collector array on the side opposite to the cold water flow line, via a  $\frac{3}{4} \times \frac{1}{2}$  inch brass hex nipple in place of the bottom collector plug. Ask your Chromagen solar specialist when you need to include these valves.

## Filling and commissioning

### Open Loop

**WARNING – Do not turn power on to the electrical element until the following procedure is undertaken.**

Turn on the mains cold water to the system making sure the pressure / temperature valve is open. When water flows from the pressure / temperature valve, close valve. Turn on a hot tap in the home to bleed all remaining air from the tank and the hot water lines.

Check system for leakage by pressure testing all fittings to a minimum of 800 kpa. Once any leaks are rectified, the system is ready for use.

### Closed Loop Tank

Turn on the mains cold water to the system making sure the pressure / temperature valve is open. When water flows from the pressure / temperature valve, close valve. Turn on a hot tap in the home to bleed all remaining air from the tank and the hot water lines.

Check storage tank for leakage by pressure testing all fittings to a minimum of 800 kpa. Once any leaks are rectified, the system is ready for use.

### Jacket and Collectors

- ☐ Connect a half inch hose to the fill valve located at the bottom right hand corner of the solar collector.
- ☐ Ensure that the test fitting located on the top of the tank is 'unplugged'.
- ☐ Fill the collectors and tank jacket with potable water via the fill valve located at the bottom of the collector/s until water flows from the test fitting located on the top of the tank making sure to bleed all air from the jacket.
- ☐ Close fill valve and fit test fitting brass plug.
- ☐ Check all connections for leaks by pressurizing the system to 500 kPa.
- ☐ After testing the system, release the pressure from the jacket and introduce the antifreeze via the fill valve located at the bottom of the collectors.
- ☐ Once full, close the fill valve and plug both the test fitting and the fill valve. The system should be now free from air and ready for use.

### Propylene Glycol

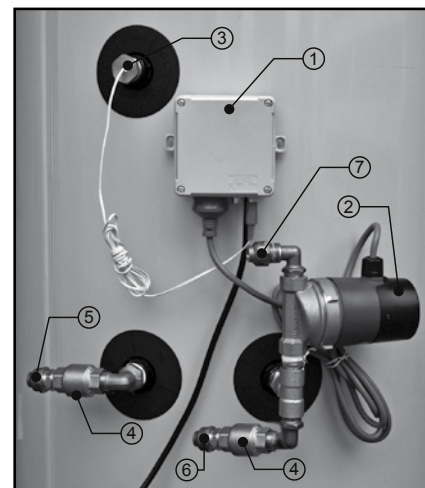
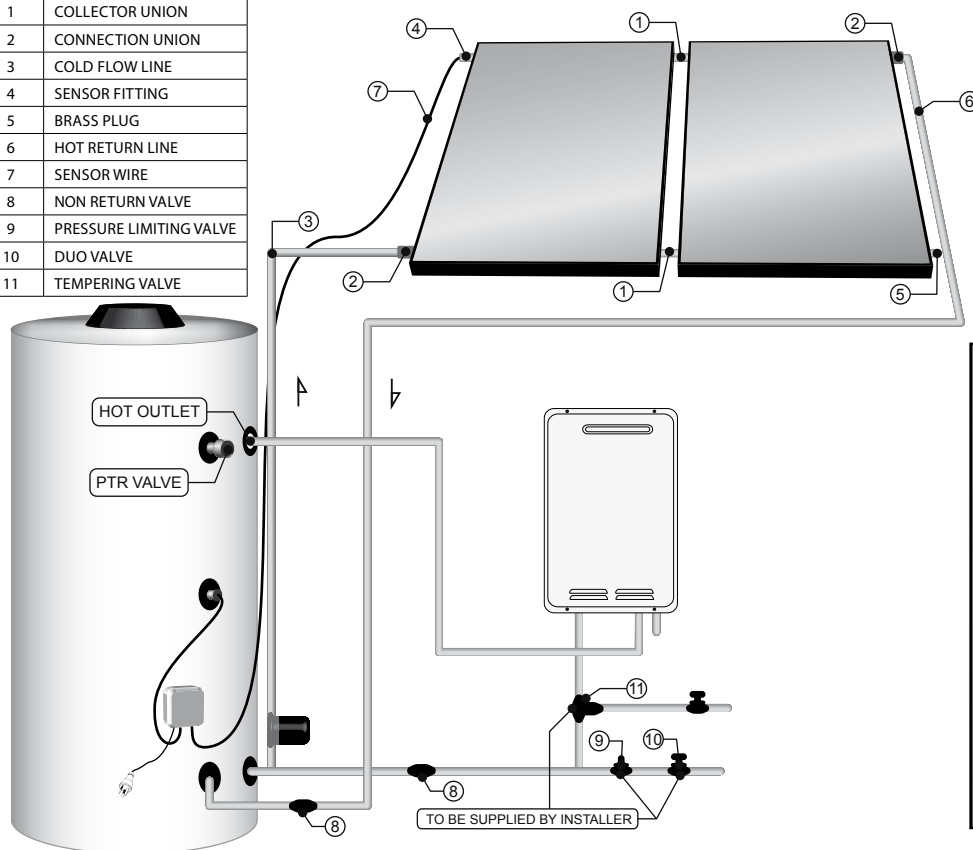
Chromagen's Glycol solution is blue in colour. Although unlikely, if the water from your closed loop water heater appears blue, then this may indicate a leak of the fluid from the heat exchanger into the stored hot water. Chromagen Glycol is a food-grade fluid, and does not present a health hazard. However, the blue colour in the water indicates that a service call is required, and your local Chromagen service office should be contacted. Call 1300 367 565

**WARNING – Although non toxic, Propylene Glycol MUST NOT be allowed to enter rain water storage tanks.**

# Installation Diagram of Pumped Open Loop System

Part	Collector Connecting KIT
1	COLLECTOR UNION
2	CONNECTION UNION
3	COLD FLOW LINE
4	SENSOR FITTING
5	BRASS PLUG
6	HOT RETURN LINE
7	SENSOR WIRE
8	NON RETURN VALVE
9	PRESSURE LIMITING VALVE
10	DUO VALVE
11	TEMPERING VALVE

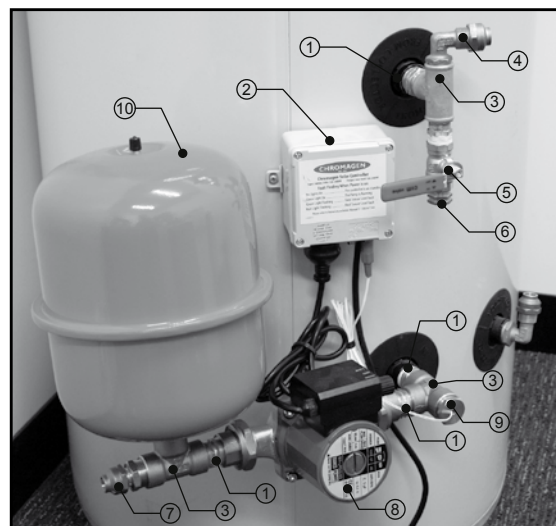
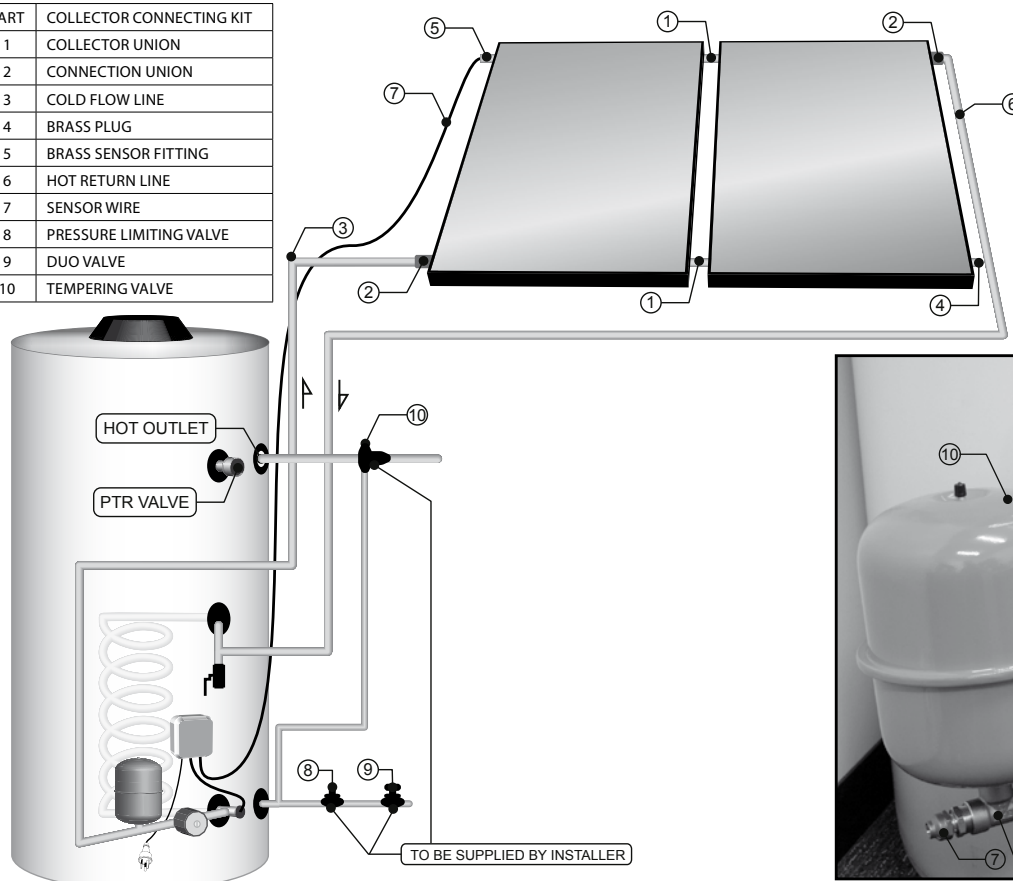
Part	Tank Connecting KIT
1	SOLAR CONTROLLER
2	SOLAR PUMP
3	SENSOR FITTING
4	NON RETURN VALVE
5	SOLAR RETURN FROM COLLECTOR
6	COLD SUPPLY TO TANK (850KPA MAX)
7	SOLAR FLOW TO COLLECTORS



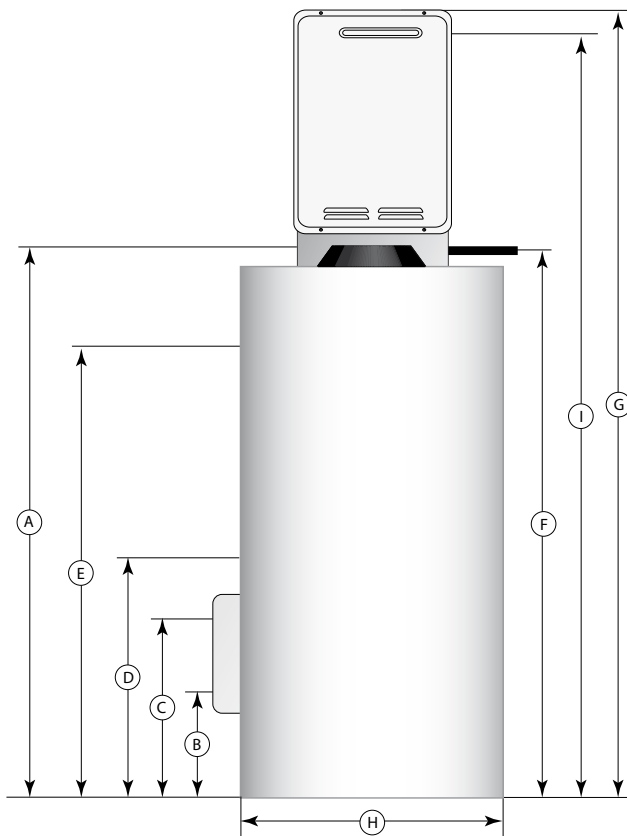
# Installation Diagram of Pumped Closed Loop System

PART	COLLECTOR CONNECTING KIT
1	COLLECTOR UNION
2	CONNECTION UNION
3	COLD FLOW LINE
4	BRASS PLUG
5	BRASS SENSOR FITTING
6	HOT RETURN LINE
7	SENSOR WIRE
8	PRESSURE LIMITING VALVE
9	DUO VALVE
10	TEMPERING VALVE

PART	TANK CONNECTING KIT
1	HEX NIPPLE
2	SOLAR CONTROLLER
3	BRASS TEE
4	MIX C ELBOW
5	FILL VALVE
6	BRASS PLUG
7	MIX C UNION
8	SOLAR PUMP
9	SENSOR FITTING
10	EXPANSION TANK



# Solar Smart 200 Litre Gas - Solar Open Loop System



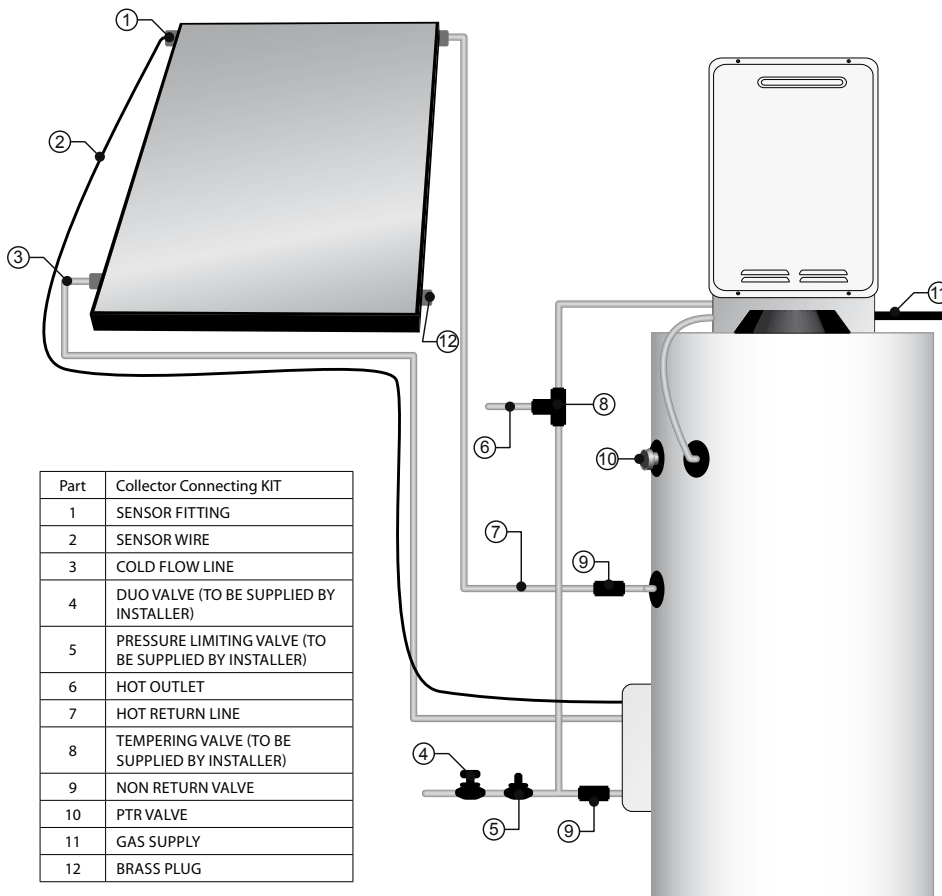
SPECIFICATIONS		
A	1260MM	HOT WATER OUTLET
B	290MM	COLD WATER INLET
C	415MM	COLLECTOR COLD FLOW LINE
D	615MM	COLLECTOR HOT RETURN LINE
E	940MM	PRESSURE/TEMPERATURE VALVE
F	1255MM	20MM GAS LINE
G	1870MM	HEIGHT
H	600MM	WIDTH
I	1810MM	FLUE TERMINAL
WEIGHT	95	KILOGRAMS (EMPTY)

## FILLING AND COMMISSIONING THE SOLAR SYSTEM

1. DO NOT TURN ON THE GAS BOOSTER UNTIL SYSTEM IS FULL
2. Connect the various water pipes as per the adjoining diagram
3. Open a hot water tap in the house and Turn on the cold water supply to the tank
4. Wait until water starts to come out of the hot water tap
5. Leave Cold water running until air is bled, then turn off the hot water tap in the house
8. After no further air can be detected, plug the pump power lead into the solar controller
9. Connect the solar controller to GPO

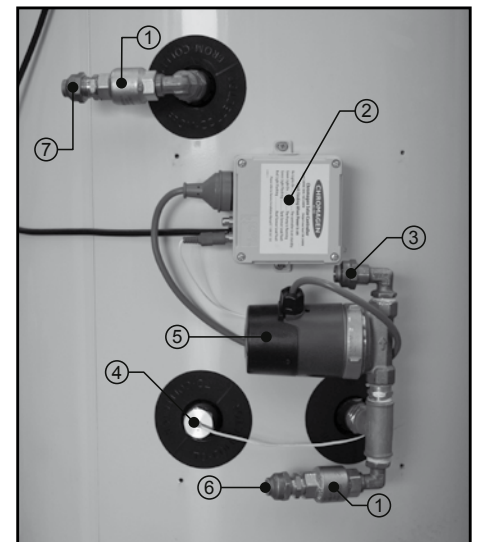
## DOUBLE Check that all air has been purged from the system

10. Loosen the nut immediately before the non return valve on the collector return line
11. Allow water to flow until no further air is detected.
12. Re-tighten the nut and check for leaks
13. Switch on the power and the gas supply to the gas booster
14. Turn on the hot water tap inside the house to check if the booster is working and test the water temperature.

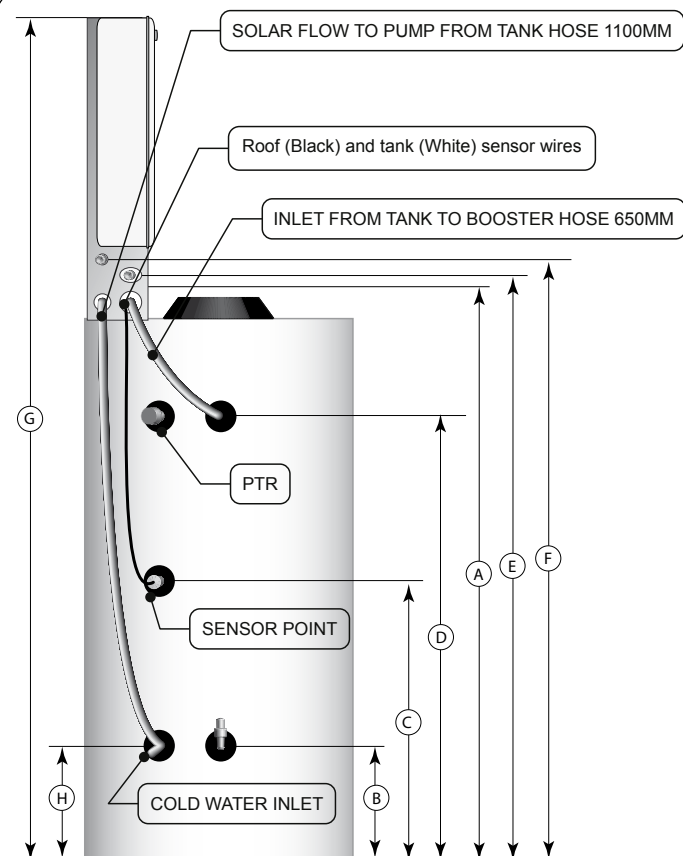


Part	Collector Connecting KIT
1	SENSOR FITTING
2	SENSOR WIRE
3	COLD FLOW LINE
4	DUO VALVE (TO BE SUPPLIED BY INSTALLER)
5	PRESSURE LIMITING VALVE (TO BE SUPPLIED BY INSTALLER)
6	HOT OUTLET
7	HOT RETURN LINE
8	TEMPERING VALVE (TO BE SUPPLIED BY INSTALLER)
9	NON RETURN VALVE
10	PTR VALVE
11	GAS SUPPLY
12	BRASS PLUG

Part	Tank Connecting KIT
1	NON RETURN VALVE
2	SOLAR CONTROLLER
3	SOLAR FLOW TO COLLECTOR
4	SENSOR FITTING
5	SOLAR PUMP
6	COLD SUPPLY TO TANK (850KPA MAX)
7	SOLAR RETURN FROM COLLECTOR



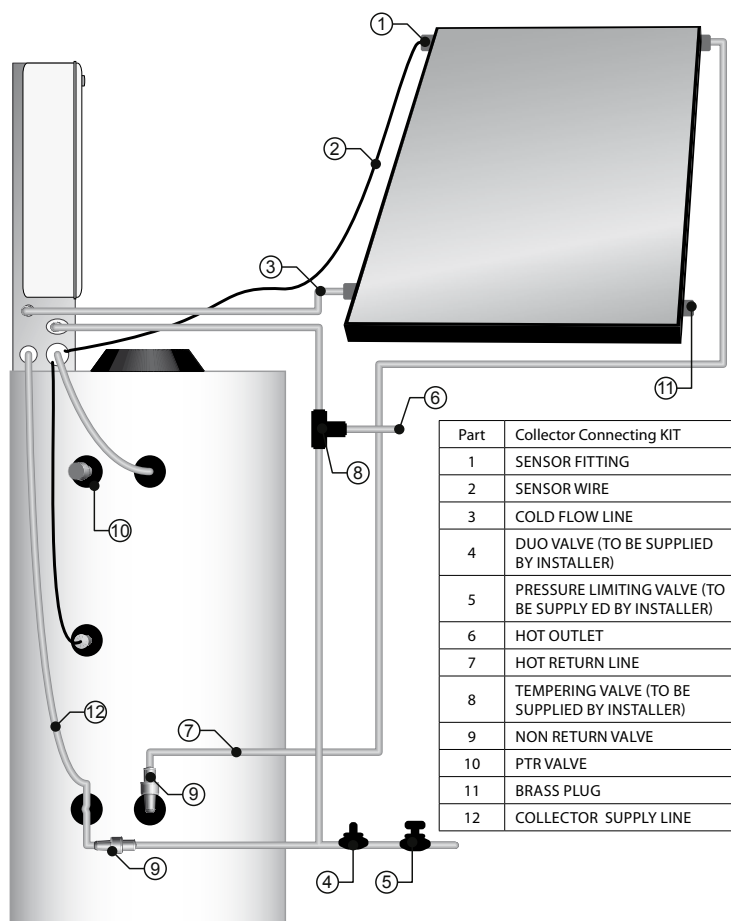
# Solar Easy 200 Litre Gas - Solar System



SPECIFICATIONS		
A	1370MM	GAS 19MM CONNECTION ON RIGHT SIDE
B	280MM	SOLAR RETURN FROM COLLECTOR/S 19MM X 12MM ELBOW, 12MM NON RETURN VALVE, 12MM MI X C/T ELBOW
C	610MM	SENSOR POINT 19MM SENSOR PLUG. CONNECT WHITE SENSOR WIRE HERE
D	940MM	PTR & TANK OUTLET TO BOOSTER 19MM MI X 12MM ELBOW
E	1380MM	HOT WATER OUTLET 12MM C/T CONNECTION
F	1405MM	SOLAR FLOW TO COLLECTOR/S 12MM C/T CONNECTION
G	2000MM	HEIGHT OF SYSTEM
H	280MM	COLD WATER INLET & FROM TANK TO SOLAR PUMP IN. 19MM X 12MM HEX NIPPLE. 12MM TEE. 12MM HEX NIPPLE. 12MM MI X 12MM C/T ELBOW

## INSTALLATION PROCEDURE

1. POSITION THE TANK WITH CONNECTIONS ON THE LEFT HAND.
2. POP RIVET (X 4) THE TOP BOX TO THE TANK.
3. FIX THE TOP BOX TO THE WALL.
4. CONNECT ALL TANK FITTINGS AS SHOWN.
5. CONNECT THE TANK TO BOOSTER HOSE.(650MM)
6. CONNECT THE SOLAR FLOW FROM THE TANK TO THE 'SOLAR IN' ON THE BOX.(1100MM)
7. CONNECT SOLAR FLOW TO COLLECTORS.
8. CONNECT SOLAR RETURN AT TANK.
9. CONNECT COLD WATER INLET AND HOT OUTLET.
10. CONNECT GAS
11. FILL TANK AND TEST.
12. CONNECT TANK SENSOR WHITE WIRE INTO SENSOR PLUG WITH SILICON.
13. CONNECT COLLECTOR LEAD INTO BLACK ADAPTOR FROM BOX.
14. PLUG IN POWER.
15. COMMISSION THE SOLAR AND GAS BOOSTER.
16. THE SYSTEM IS READY FOR USE



## FILLING AND COMMISSIONING THE SOLAR SYSTEM

1. DO NOT TURN ON THE GAS BOOSTER UNTIL SYSTEM IS FULL
2. Connect the various water pipes as per the adjoining diagram
3. Open a hot water tap in the house and Turn on the cold water supply to the tank
4. Wait until water starts to come out of the hot water tap
5. Leave Cold water running until air is bled, then turn off the hot water tap in the house
8. After no further air can be detected, plug the pump power lead into the solar controller
9. Connect the solar controller to GPO

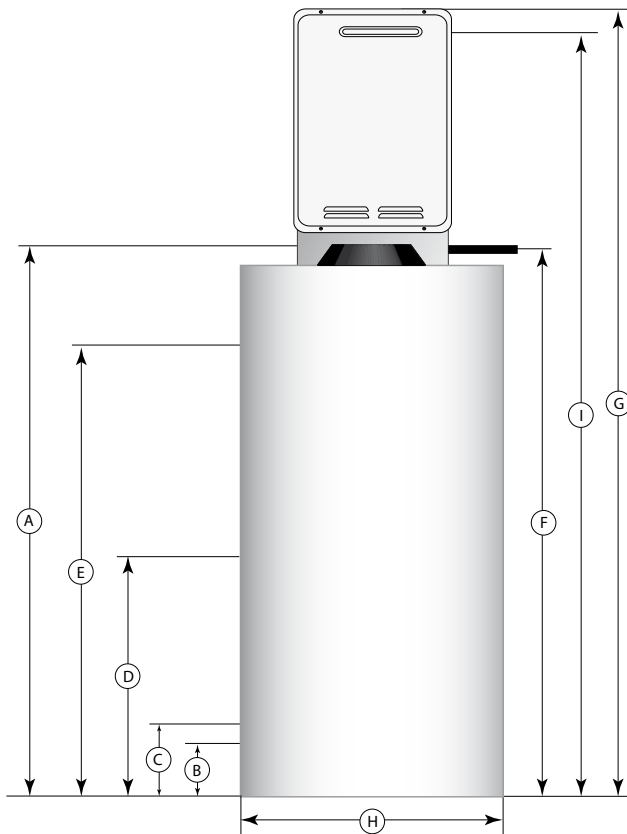
## DOUBLE Check that all air has been purged from the system

10. Loosen the nut immediately before the non return valve on the collector return line
11. Allow water to flow until no further air is detected.
12. Re-tighten the nut and check for leaks
13. Switch on the power and the gas supply to the gas booster
14. Turn on the hot water tap inside the house to check if the booster is working and test the water temperature.





# Solar Smart 200 Litre Gas - Solar Closed Loop System



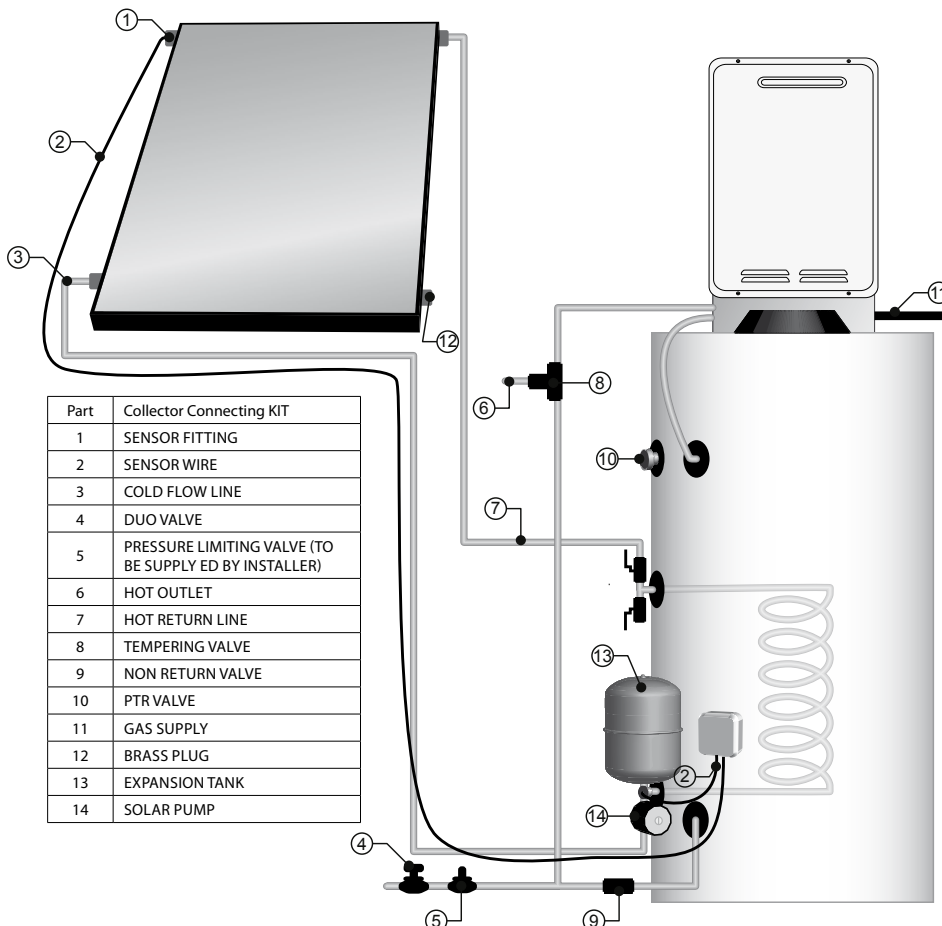
SPECIFICATIONS		
A	1260MM	HOT WATER OUTLET
B	180MM	COLLECTOR COLD FLOW LINE
C	290MM	COLD WATER INLET
D	615MM	COLLECTOR HOT RETURN LINE
E	940MM	PRESSURE/TEMPERATURE VALVE
F	1255MM	20MM GAS LINE
G	1870MM	HEIGHT
H	600MM	WIDTH
I	1810MM	FLUE TERMINAL
WEIGHT	95	KILOGRAMS (EMPTY)

## FILLING AND COMMISSIONING THE SOLAR SYSTEM

### Closed Loop Commissioning Procedure

1. Fill the closed loop by connecting an easy hook hose from the PTR valve to the fill valve located on the storage tank.
2. Close the ball valve located on the collector return line and Open the fill valve positioned on the tank. Open air bleed valve positioned on collector return port on the tank and fill with potable water via the PTR valve connection.
3. Once all the air is bled from the closed loop system and collector, close PTR valve and fill valve.
4. Close air bleed valve on collector return port and open the ball valve on the collector return line then manually operate pump to check for leaks.
5. Introduce the anti-freeze via the fill valve. Disconnect easy hook connector from PTR valve and connect to test pump or test pump bucket. Fill the test pump with 1L of Glycol supplied and 1L of water. Disconnect hose from fill valve and pump a small amount of Glycol through the hose to remove any air. Reconnect the easy hook hose to fill valve. Open the fill valve and air bleed valve and pump Glycol into closed loop via the fill valve.
6. Pump as much of the anti-freeze into the system, taking care not to introduce air from the test pump into the system as possible.
7. When the anti-freeze has been introduced, close off the fill valve and the air bleed valve. The system should be free from air and the solar system ready for use.
8. Turn on solar controller.

**WARNING – The closed circuit fluid operates at both high temperature and pressure. Inadvertent opening of the circuit by householders could lead to severe injury. Once the closed circuit is fully charged with the Glycol solution and the circuit has been sealed by closing the ball valve located at the storage tank, remove handle from ball valve and seal off with brass fitting supplied.**



Part	Collector Connecting KIT
1	SENSOR FITTING
2	SENSOR WIRE
3	COLD FLOW LINE
4	DUO VALVE
5	PRESSURE LIMITING VALVE (TO BE SUPPLIED BY INSTALLER)
6	HOT OUTLET
7	HOT RETURN LINE
8	TEMPERING VALVE
9	NON RETURN VALVE
10	PTR VALVE
11	GAS SUPPLY
12	BRASS PLUG
13	EXPANSION TANK
14	SOLAR PUMP



# Installation Diagram of a Thermosiphon Open Loop System

Read individual instructions included with each system.

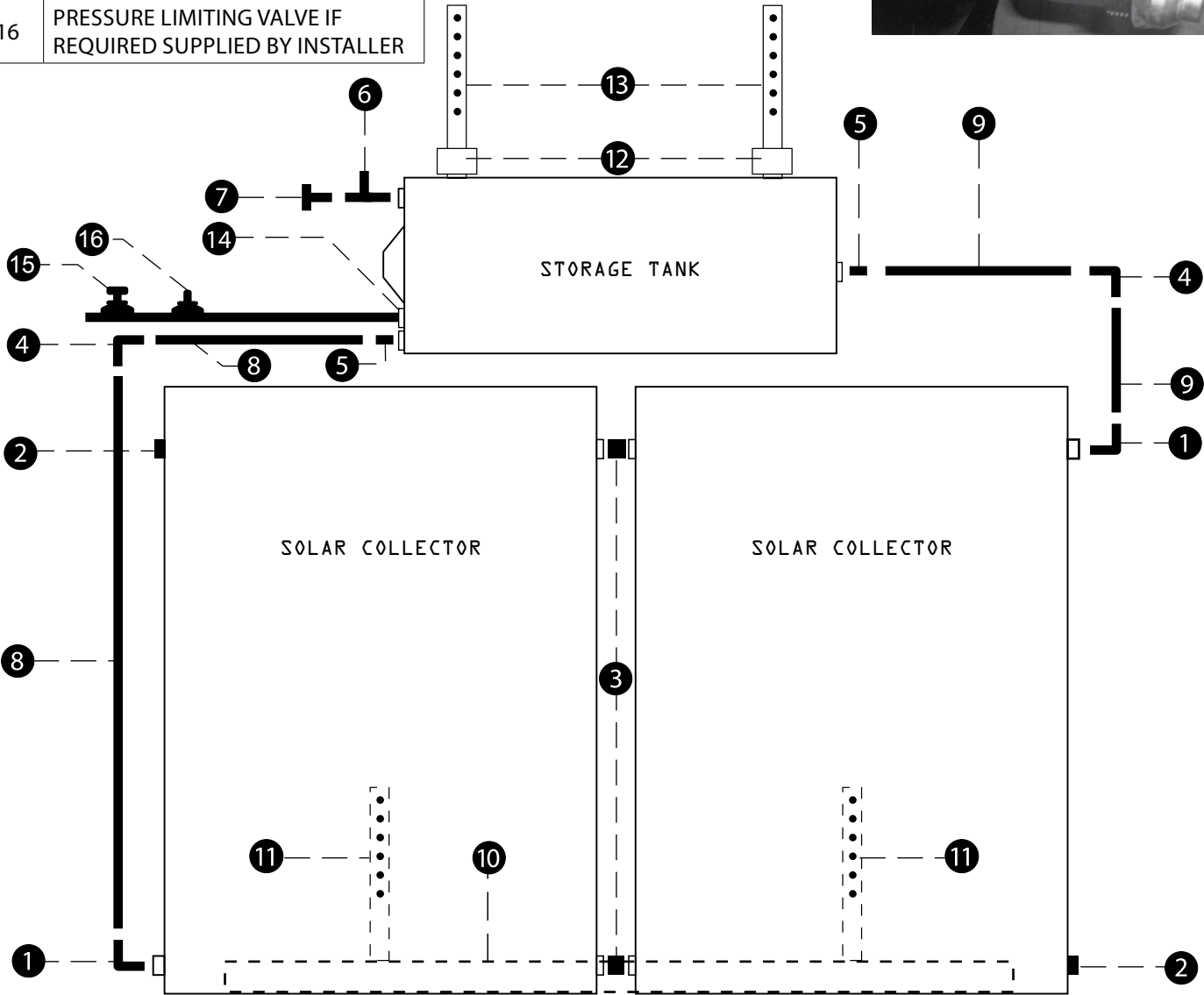
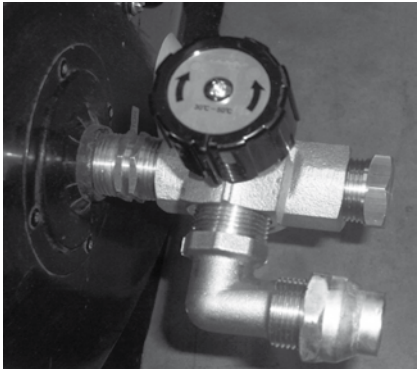
PART	CONNECTING KIT
1	20MM MIxC ELBOW
2	20MM PLUG
3	20MM COLLECTOR UNION
4	20MM C x 20MM C ELBOW
5	20MM MI x 20MM C UNION
6	15MM HOT WATER TEE
7	PTR VALVE
8	20MM COLD PIPE (CUT TO SIZE)
9	20MM HOT PIPE (CUT TO SIZE)
10	COLLECTOR RAIL
11	COLLECTOR STRAPS
12	TANK BRACKETS
13	TANK STRAPS
14	COLD INLET
15	DUO VALVE IF REQUIRED SUPPLIED BY INSTALLER
16	PRESSURE LIMITING VALVE IF REQUIRED SUPPLIED BY INSTALLER

### Thermosiphon Arrestor Valve

**\*\*To be installed on systems that experience excessive temperatures or Water Dumping.**

Fit the valve to the cold pipe from the solar tank to the solar collector. The pipe from the tank is fitted to the hot connection on the valve. The plug is connected to the cold inlet to the valve.

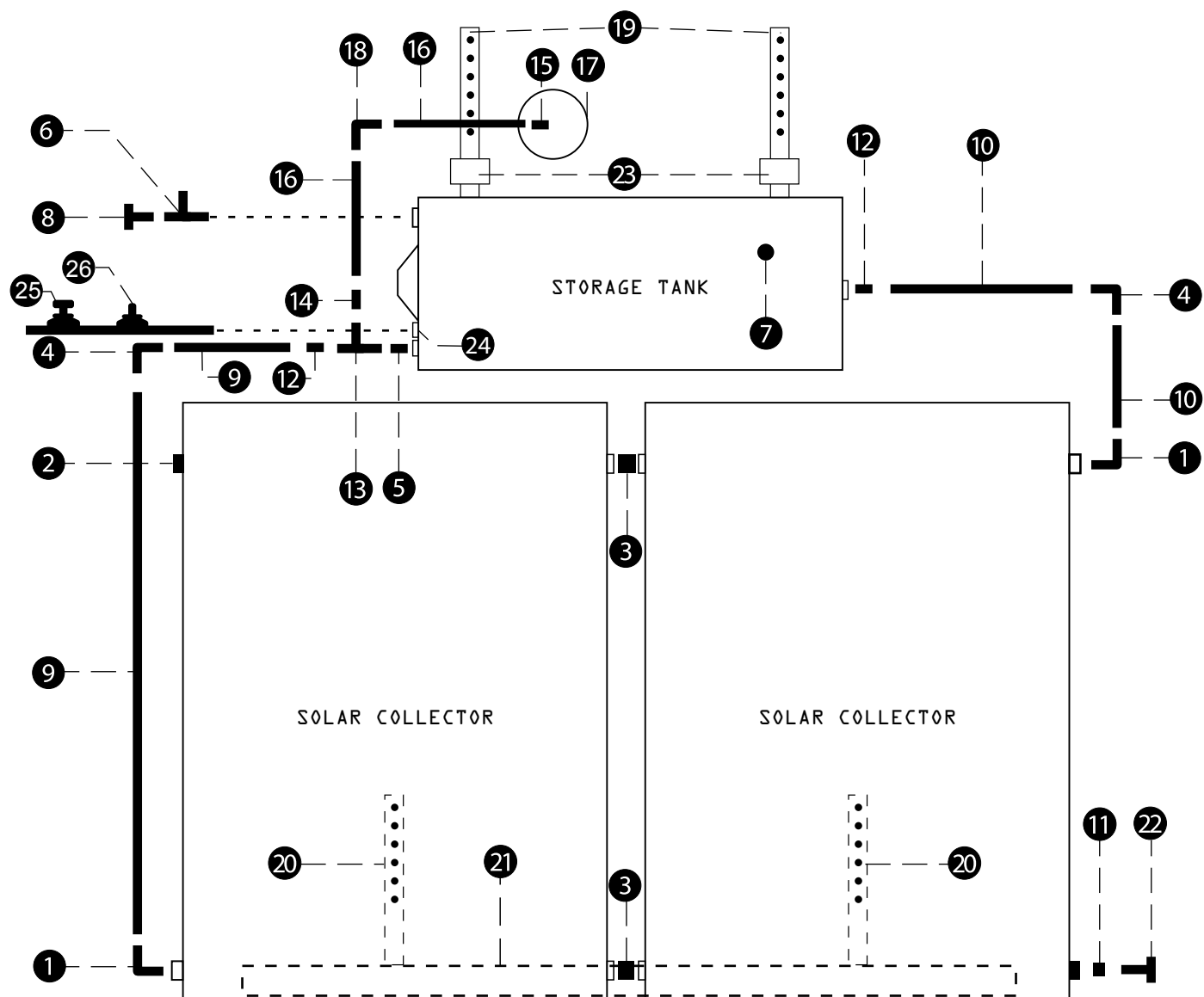
The pipe to the collector is fitted to the mixed connection on the valve. The valve can be installed upside down if needed. Set the valve to 50°C for two collector systems. Adjust the vale temperature down for systems that continue to overheat.



# Installation Diagram of a Thermosiphon Closed Loop System

Read individual instructions included with each system.

Part	Connecting KIT	Part	Connecting KIT
1	20mm MlxC ELBOW	16	Expansion PIPE
2	20mm PLUG	17	Expansion TANK
3	20mm Collector Union	18	15mm C x 15mm C ELBOW
4	20mm C x 20mm C ELBOW	19	Tank Straps
5	20mm HEX NIPPLE	20	Collector Straps
6	15mm Hot Water Tee	21	Collector Rail
7	15mm Plug (Jacket Fill Port)	22	15mm Ball Valve
8	PTR VALVE	23	TANK BRACKETS
9	20mm COLD PIPE (cut to size)	24	COLD INLET
10	20mm HOT PIPE (cut to size)	25	DUO VALVE IF REQUIRED SUPPLIED BY INSTALLER
11	20mm x 15mm HEX NIPPLE	26	PRESSURE LIMITING VALVE IF REQUIRED SUPPLIED BY INSTALLER
12	20mm Mix 20mm C UNION	Thermosiphon arrestor valve to be fitted as needed to tank (solar outlet).	
13	20mm Brass Tee		
14	20mm Mix 15mm C UNION		
15	20mm Flx 15mm C ELBOW		



# MAINTENANCE AND SERVICE CALLS

Should your Chromagen water heater not provide sufficient hot water please undertake the following quick checks before requesting a service visit:

1. Check to ensure that shading from trees is not excessive and is not covering the collectors for all or part of the day.
2. Have you used more hot water than normal?
3. Can you detect water leaking from within the plumbing system?
4. Is the booster or time-clock switched ON?
5. Is the fuse for the booster intact?
6. Does the electric or gas meter speed up when the booster switch is turned ON?
7. Is the system installed on a NEW home? – if so, there may be a problem external to the water heater. Check with your builder first.

If the system is still not operating correctly, call your local Chromagen Service Office on 1300 367 565 for further advice. Under no circumstances should unqualified people attempt to undertake service work.

## Six Monthly Service

Most water supply authorities require both the hot and cold water relief valves to be flushed every six months. To operate the valve easing gear on the pressure/temperature operated relief valves, simply hold the relief arm lever open. Note that unqualified people should not climb on rooftops. Occupational Health and Safety Regulations must be adhered to.

## Major Service (Usually Every seven Years)

This service should be performed every Seven years, or more often in poor water quality areas.

1. Replace anode.
2. Replace the pressure/temperature relief valve.
3. Check Glycol liquid level (Closed Loop systems only).
4. Undertake a visual check of the unit for any potential problems, eg. broken glass, shading, booster and pump operation etc.
5. Carefully inspect all connections.

## Anode Replacement.

The following table is a guide to anode replacement intervals.

Total Dissolved Solids (ppm) - Recommended anode replacement interval

0 - 1000 - 7 years

1,000 or more - 5 years.

We recommend the installation of a water filter when using water heaters in areas with high levels of total dissolved solids, to maximize the efficiency of the water heater. Please contact your local Chromagen expert for our recommended filters on 1300 36 75 65

## Collector Glass

It is recommended that your household insurance policy cover the collector glass and/or damage to the water heater, especially in cyclonic areas and in locations where hail in excess of 25 mm diameter is likely to occur. Damage such as this is not covered by warranty.

# Chromagen Electrical Water Heater Information

The Chromagen range of electric mains water pressure storage water heaters are made up of high quality enamel lined steel storage cylinders housed in weatherproof cabinets and insulated with high efficiency foam insulation.

At the time of writing all models are of the single element type controlled by an adjustable thermostat which is factory set at 70 degrees Celsius. The thermostat has a double-pole energy cut-out (ECO) which isolates the element from the power supply to prevent boiling.

Thermostat adjustments must only be carried out by an appropriately qualified tradesman.

There are no user adjustments provided on these appliances.

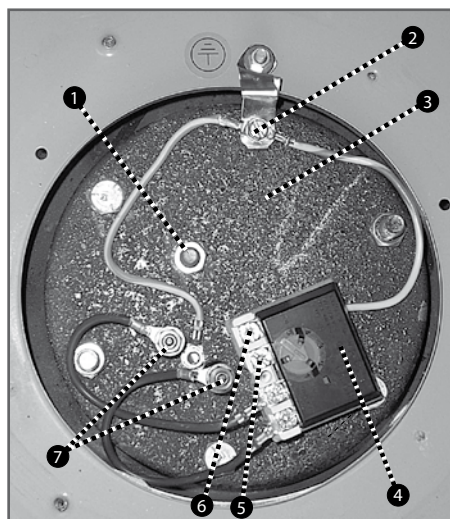
Electrical loadings must not be exceeded.

The electrical cover is at the top/end of the unit.

**Specifications can change without notice.**

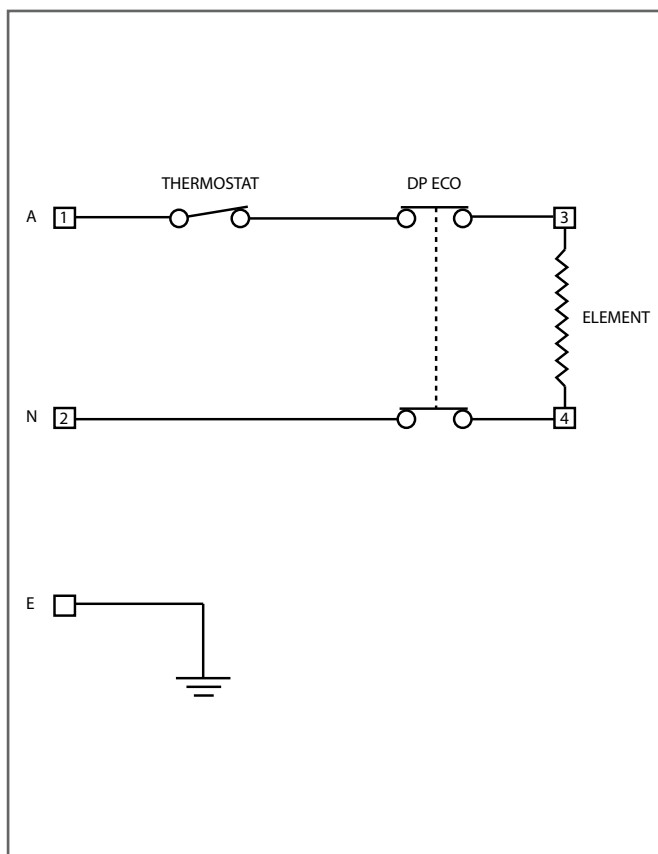


Tank Flange Assembly

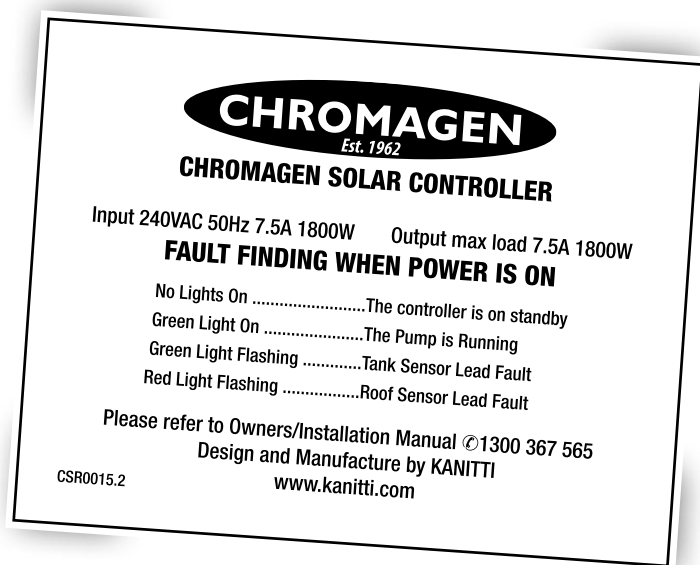
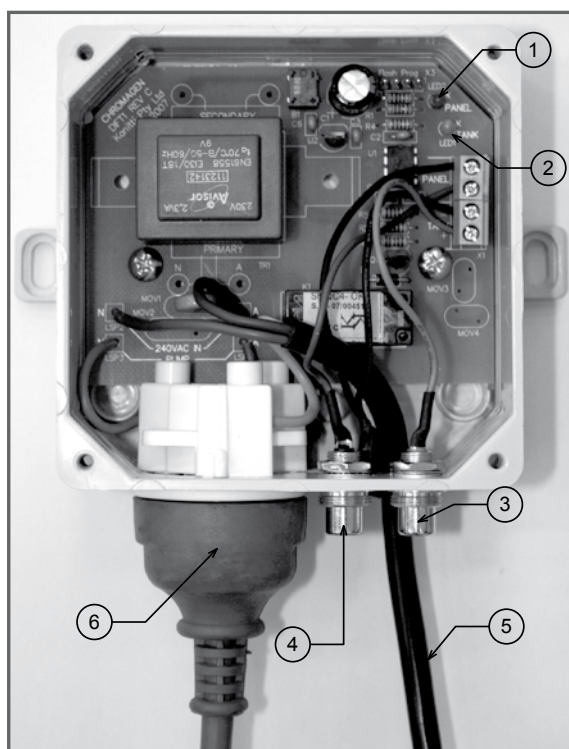


Part	Tank Flange Assembly
1	ANODE
2	EARTH
3	FLANGE
4	THERMOSTAT
5	N
6	A
7	ELEMENT

Wiring Schematic (240 VAC Phase 1)



# Chromagen Solar Controller



Part	Solar Controller
1	COLLECTOR LIGHT RED
2	TANK LIGHT GREEN
3	TANK SENSOR LEAD
4	COLLECTOR SENSOR CONNECTION
5	CONTROLLER POWER LEAD
6	PUMP POWER LEAD

## Installation

- ☐ The controller must be fixed to the storage tank or wall close to the tank using the fixing lugs.
- ☐ After fixing the controller take the front cover of using a Phillips head screw driver.
- ☐ Fit the tank sensor point on the tank.
- ☐ Connect the collector sensor wire to the connection point from controller (no right or wrong way).
- ☐ Plug the solar pump into the controller.
- ☐ Plug the controller in to the mains power and turn it on.
- ☐ If the temperature at the collector is 7 deg and above the tank light (green) will be on.
- ☐ If the temperature of the collector and tank is the same no lights will be on but the system is connected.
- ☐ Replace the front cover.

## Normal Running Codes

NO LIGHTS: Pump not activated, Tank-Panel difference smaller than 7 deg.

GREEN LIGHT: Pump activated, normal operation and difference >7 deg.

RED LIGHT: boil protect, Tank has reached 80 degrees, pump not activated

RED+GREEN: Freeze protect, Panel Temp<=5 degrees, pump activated

## Fault Codes

RED flashing, slow - panel sensor disconnected

GREEN flashing, slow - tank sensor disconnected

RED flashing, fast - panel sensor is shorted

GREEN flashing, fast - tank sensor is shorted

Most errors are caused by damage to the sensor leads. If you need to extend or repair the roof lead you must solder and shrink seal the join or use a waterproof connector.



# Warranty

## 7 Year Warranty

This warranty applies to water heaters installed in a single family dwelling only. A separate warranty policy applies for water heaters installed in commercial, industrial or multi - family dwellings.

Chromagen Pty Ltd warrants to and for the sole benefit of the original purchaser of water heaters sold by Chromagen will remain free from defects in material and workmanship under normal usage in accordance with the guidelines set out in Chromagen solar water heater literature. This warranty shall remain in effect for seven (7) years after installation of the system with respect to:

- **Storage Tanks**
- **Solar Collectors**

The Chromagen warranty will remain in effect to all other parts (including valves, elements and thermostats) for a period of one (1) year after such installation.

Chromagen shall provide both the labour and the parts required to repair, or at Chromagen's option, Chromagen shall replace any part of the system which upon examination by Chromagen is determined by Chromagen to have been defective during the applicable warranty period. The replacement component shall carry the balance of the original warranty period.

The water heater must be installed in accordance with Chromagen's installation instructions along with relevant local and statutory requirements. Damage to buildings, chattels or any other consequential damage caused either directly or indirectly due to leakage of the water heater and breakage of collector glass due to vandalism or storms including hail are not within the scope of this warranty.

Except as otherwise provided by law, the warranty set forth herein is the complete and entire warranty made by Chromagen and there are no other warranties, expressed or implied, whether of merchantability, fitness for particular purpose, or otherwise made by Chromagen. In addition to this warranty the original purchaser is a consumer as defined by any relevant law such as the Trade Practices Act 1974 or similar State laws, then certain terms and rights will be implied for the benefit of the consumer which terms and rights and any liability of the supplier flowing from them, cannot be excluded, restricted or modified by any provision of this warranty.

## Chromagen Pty Ltd

Conditions – All models

The above is subject to an area within a 30 kilometre radius of the Chromagen Distributor or Branch from where the unit was purchased. Customers outside this area will be subject to any freight costs and any travelling charges incurred by the Chromagen representative carrying out rectification work.

An 'after hours' service fee will apply to warranty calls made outside of normal business hours. For warranty purposes, typical business hours are classified as the hours from 8.00AM to 5.00PM Monday to Friday (excluding public holidays).

## Exclusions

1. Collector glass is not covered by this warranty.
2. Where corrosion has occurred when the anode has not been changed in accordance with the owner's manual.
3. Where a cold water expansion valve, check valve and strainer is not fitted in areas where mains pressure is likely to exceed 500 kPa
4. The manufacturer shall be under no obligation under this warranty in the case of accident, Acts of God, installation/repairs carried out by persons outside Chromagen installation and maintenance instructions.
5. No responsibility is accepted for any consequential loss or damage caused by a defect.
6. \*Where the closed circuit is not filled with Chromagen approved heat transfer or antifreeze fluid in accordance with instructions.
7. \*In the case of collapse of the inner cylinder due to an incorrect filling and commissioning procedure.
8. \*Where the closed circuit has had water addition not in accordance with the water quality specifications (page 6 Water Quality) .
9. Frost damage to Chromagen Open Loop solar heaters when installed in a frost prone area without approved frost protection valve/s.
10. Components utilized in the installation of Chromagen water heaters not supplied by Chromagen Pty Ltd. eg: tempering valves, cold water valve assemblies, etc.
11. Extended, or implied warranties not formally provided by Chromagen Pty Ltd.
12. Extra costs incurred for hiring of labour and/or equipment required to effect repairs. Eg: Cranes / Lifting devices, etc.
13. Costs incurred for rectifying faults (or perceived faults) not directly attributed to the Chromagen water heater.
14. If the service agent has to travel more than 30km to service your hot water system you may have to pay for travel costs.

\*Applicable only to Closed Loop models.

## Non Warrantable items.

It is important to understand that Chromagen's warranty policy only applies to items that are covered under Chromagen Pty Ltd's warranty program. The exclusions outlined previously need to be understood, as Chromagen Pty Ltd will not accept charges for repairs or component replacement that are not directly attributable to the Chromagen water heater. As a general rule the following examples are some complaints that Chromagen Pty Ltd will not accept as warranty claims –

- Insufficient hot water caused by reluctance from the consumer to utilize the auxiliary booster.
- Insufficient hot water caused by an incorrectly set or faulty tempering or mixing valve.
- Insufficient hot water caused by faulty or incomplete installation.
- Damage to electrical components caused by incorrect commissioning of water heater.
- Damage to gas water heater caused by incorrect commissioning of water heater.
- Insufficient hot water caused by 'undersized' systems.
- Excessive leakage from valves not supplied with the Chromagen water heater.
- Excessive leakage from the Pressure Temperature relief valve in instances where water pressure or temperature exceeds specified limits.
- Insufficient or fluctuating water temperature caused by insufficient water flow that may occur with 'water saving' tap-ware or appliances. (gas water heaters)
- Insufficient hot water caused by undersized gas lines. (gas water heaters)
- Insufficient hot water caused by blown fuses, 'tripped' electrical switches, or inadequate household electrical wiring.
- Insufficient hot water caused by incorrect selection of gas type (gas water heaters)
- Insufficient water flow caused by debris accumulating in water strainer (gas water heater)
- Water hammer

**The terms of Chromagen's Warranty are effective from date of installation of the solar hot water system. Chromagen Reserves the right to verify this date by requesting a copy of the compliance certificate, whose issue is mandatory in all the states and territories of Australia. For more detail information on Chromagen's Terms and conditions please refer to the installation manual supplied with your Chromagen appliance or download the manual from [www.chromagen.com.au](http://www.chromagen.com.au)**  
**Chromagen reserves the right to make modifications and changes to specifications without notice.**

## Chromagen Pty Ltd

**Head office: 90-92 Woodlands Drive,  
Braeside VIC 3195  
Phone: 1300 367 565**

## Notes:

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## Notes:

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**Chromagen Pty Ltd**  
Australia wide service call:  
**1300 367 565**