



Thermosiphon Solar Water Heaters



Owner's Guide and Installation Instructions

This water heater must be installed and serviced by a qualified person.
Please leave this guide with the householder.

An electronic copy of these Owner's Guide and Installation Instructions can be downloaded from solahart.com.au.

PATENTS

This water heater may be protected by one or more patents or registered designs in the name of Solahart Industries Pty Ltd.

TRADE MARKS

® Registered trademark of Solahart Industries Pty Ltd.
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Note: Every care has been taken to ensure accuracy in preparation of this publication. No liability can be accepted for any consequences, which may arise as a result of its application.

CONTENTS

HOUSEHOLDER

This booklet contains important information about your new water heater, including terms of the Solahart warranty.

We recommend you read pages 6 to 19, and the terms of the Solahart warranty on pages 4 to 5.

The other pages are intended for the installer but may be of interest.

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SOLAHART THERMOSIPHON SOLAR WATER HEATER WARRANTY

1. THE SOLAHART WARRANTY – GENERAL

- 1.1 This warranty is given by Solahart Industries Pty Limited ABN 45 064 945 848 of 1 Alan Street, Rydalmere New South Wales.
- 1.2 Solahart offers national service through its Dealer network. Solahart will repair or replace components at the address of the water heater subject to the terms of the Solahart warranty. Solahart, in addition can provide preventative maintenance and advice on the operation of your water heater.
- 1.3 For details about this warranty, you can contact us on 1800 638 011 (Australia only). In other countries, contact your local Solahart Distributor.
- 1.4 The terms of this warranty and what is covered by it are set out in sections 2 and 3 and apply to water heaters manufactured after 1st May 2020.
- 1.5 If a subsequent version of this warranty is published, the terms of that warranty and what is covered by it will apply to water heaters manufactured after the date specified in the subsequent version.

2. TERMS OF THE SOLAHART WARRANTY AND EXCLUSIONS TO IT

- 2.1 The decision of whether to repair or replace a faulty component is at Solahart's sole discretion.
- 2.2 If you require a call out and we find that the fault is not covered by the Solahart warranty, you are responsible for our standard call out charge. If you wish to have the relevant component repaired or replaced by Solahart, that service will be at your cost.
- 2.3 Where a failed component or cylinder is replaced under this warranty, the balance of the original warranty period will remain effective. The replacement does not carry a new Solahart warranty.
- 2.4 Where the water heater is installed outside the boundaries of a metropolitan area as defined by Solahart or further than 30 km from a regional Solahart Dealer, the cost of transport, insurance and travelling between the nearest Solahart Dealer's premises and the installed site shall be the owner's responsibility.
- 2.5 Where the water heater is installed in a position that does not allow safe or ready access, the cost of that access, including the cost of additional materials handling and/or safety equipment, shall be the owner's responsibility. In other words, the cost of dismantling or removing cupboards, doors or walls and the cost of any special equipment to bring the water heater to floor or ground level or to a serviceable position is not covered by this warranty.
- 2.6 This warranty only applies to the original and genuine Solahart water heater in its original installed location and any genuine Solahart replacement parts.
- 2.7 The Solahart warranty does not cover faults that are a result of:
 - a) Accidental damage to the water heater or any component (for example: (i) Acts of God such as floods, storms, fires, lightning strikes and the like; and (ii) third party acts or omissions).
 - b) Misuse or abnormal use of the water heater.
 - c) Installation not in accordance with the Owner's Guide and Installation Instructions or with relevant statutory and local requirements in the State or Territory in which the water heater is installed.
 - d) Connection at any time to a water supply that does not comply with the water supply guidelines as outlined in the Owner's Guide and Installation Instructions.
 - e) Repairs, attempts to repair or modifications to the water heater by a person other than the Solahart Dealer or a Solahart Accredited Service Agent.
 - f) Faulty plumbing or faulty gas or power supply.
 - g) Failure to maintain the water heater in accordance with the Owner's Guide and Installation Instructions.
 - h) Transport damage.
 - i) Fair wear and tear from adverse conditions (for example, corrosion).
 - j) Cosmetic defects.
 - k) Breakage of collector glass for any reason including hail damage (we suggest that the collector glass be covered by your home insurance policy).
 - l) Ice formation in the waterways of a direct open circuit thermosiphon system or an indirect closed circuit thermosiphon system due to non Solahart approved or incorrectly mixed closed circuit fluid being used.
 - m) Non Solahart approved or incorrectly mixed closed circuit fluid being used or incorrect or insufficient filling of the closed circuit system with the closed circuit fluid.
- 2.8 Solahart may reject a claim under this warranty in its sole discretion if a third party solar diverter is connected to the water heater.
- 2.9 Subject to any statutory provisions to the contrary, this warranty excludes any and all claims for damage to furniture, carpet, walls, foundations or any other consequential loss either directly or indirectly due to leakage from the water heater, or due to leakage from fittings and/ or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.
- 2.10 The Solahart warranty applies to a Solahart thermosiphon solar water heater installed in either a "single-family domestic dwelling" or other than a "single-family domestic dwelling".

SOLAHART THERMOSIPHON SOLAR WATER HEATER WARRANTY

3. WHAT IS COVERED BY THE SOLAHART WARRANTY FOR THE WATER HEATERS DETAILED IN THIS DOCUMENT

3.1 Solahart will repair or replace a faulty component of your water heater if it fails to operate in accordance with its specifications as follows:

What components are covered	The period from the date of installation in which the fault must appear in order to be covered	What coverage you receive
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J, L Tank Systems (from date of installation)

All components (only if a tank, collector(s) and components are purchased and installed as a complete new Solahart system)	Years 1 to 5	Repair and/or replacement of the faulty component, free of charge, including labour.
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F, LF, LX Tank Free Heat Systems (from date of installation)

All components (only if a tank, collector(s) and components are purchased and installed as a complete new Solahart system)	Years 1 to 5	Repair and/or replacement of the faulty component, free of charge, including labour.
The cylinder and solar collector(s) (only if a tank, collector(s) and components are purchased and installed as a complete new Solahart system)	Years 6 to 10	Replacement cylinder or solar collector, free of charge. Installation and repair labour costs are the responsibility of the owner.

Individual Cylinder, Collector, Component (from date of installation)

All components	Year 1	Repair and/or replacement of the faulty component, free of charge, including labour.
The cylinder and solar collector(s) (only if a tank, collector(s) and components are purchased and installed as part of an existing Solahart system)	Years 2 to 5	Replacement cylinder or solar collector, free of charge. Installation and repair labour costs are the responsibility of the owner.

4. ENTITLEMENT TO MAKE A CLAIM UNDER THIS WARRANTY

- 4.1 To be entitled to make a claim under this warranty you need to:
- a) Be the owner of the water heater or have consent of the owner to act on their behalf.
 - b) Contact Solahart without undue delay after detection of the defect and, in any event, within the applicable warranty period.
- 4.2 You are not entitled to make a claim under this warranty if your water heater:
- a) Does not have its original serial numbers or rating labels.

5. HOW TO MAKE A CLAIM UNDER THIS WARRANTY

- 5.1 If you wish to make a claim under this warranty, you need to:
- a) Contact Solahart on 1800 638 011 (Australia only) and provide owner's details, address of the water heater, a contact number and date of installation of the water heater or if that's unavailable, the date of manufacture and serial number (from the rating label on the water heater). In other countries, contact your local Solahart Distributor.
 - b) Solahart will arrange for the water heater to be tested and assessed on-site.
 - c) If Solahart determines that you have a valid warranty claim, Solahart will repair or replace the water heater in accordance with this warranty.
- 5.2 Any expenses incurred in the making of a claim under this warranty will be borne by you.

6. THE AUSTRALIAN CONSUMER LAW

- 6.1 In Australia, our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
- 6.2 The Solahart warranty (set out above) is in addition to any rights and remedies that you may have under the Australian Consumer Law.

SAFETY, WARNINGS, INSTALLATION NOTES

It is important you read the following [Safety and Warnings](#), and [Relief Valves](#) information.

If the solar water heater is installed with an in-series booster water heater, it is also important you read the Safety and Warnings, and Relief Valves information relating to the function and operation of the in-series water heater. Refer to the Owner's Guide and Installation Instructions supplied with the in-series water heater.

⚠ Safety and Warnings

- The water heater under normal use and summer solar conditions should heat the water in the solar storage tank to 60°C to 75°C. This water temperature can be exceeded and reach up to around 90°C during periods of high solar radiation conditions and reduced hot water usage.

During times of low solar energy gain or if boosting of the water temperature is required, an electric heating unit will heat the water temperature to 60°C or up to 70°C depending upon the thermostat setting. If this water heater is installed with an in-series booster water heater, then this temperature can be 70°C or higher if the booster water heater is a continuous flow gas booster or 60°C or higher if the booster water heater is a storage water heater.

These temperatures are sufficiently hot to cause severe scalding. Water at this temperature may have been plumbed to fixtures where water hotter than 50°C is allowed, such as the kitchen and laundry.

Refer to "[Hotter Water Increases the Risk of Scald Injury](#)" on page 10.

- This water heater is only intended to be operated by persons who have the experience or the knowledge and the capabilities to do so.
- This water heater is not intended to be operated by persons with reduced physical, sensory or mental capabilities i.e. the infirm, or by children. Children should be supervised to ensure they do not interfere with or play with or at the water heater.
- Do not touch any exposed pipe work or fittings connecting the solar storage tank and the solar collectors, as this may result in a burn injury. Very high temperature hot water and in some circumstances high temperature steam can be generated by the solar collectors under certain conditions and this flows through the pipe work from the solar collectors to the solar storage tank.

Note: Any exposed pipe work or fittings in the collector circuit where the installation is in a trafficable area, such as on an accessible roof, should be attended to and covered with insulation. Phone your nearest Solahart Dealer to arrange for an inspection.

- If the electrical conduit to the solar storage tank is damaged, it must be replaced by a qualified person in order to avoid a hazard. Phone your nearest Solahart Dealer to arrange for an inspection.
- This water heater uses 220 V - 240 V a.c. electrical power for operation of the electrically operated components. The removal of the side cover will expose 220 V - 240 V a.c. wiring. It must only be removed by a qualified person. Do not operate the water heater with the cover removed.
- This water heater is supplied with a thermostat, over-temperature cut-out, a combination temperature pressure relief valve and an expansion control valve. These devices must not be tampered with or removed. The water heater must not be operated unless each of these devices is fitted and is in working order.

The Solahart warranty may not cover faults if relief valves or other safety devices are tampered with or if the installation is not in accordance with these instructions.

- **DANGER:** The operation of the over-temperature cut-out on a thermostat indicates a possibly dangerous situation. If the over-temperature cut-out operates, it must not be reset, and the water heater must be serviced by a qualified person.
- Do not remove the closed circuit relief valve on a closed circuit model as there may be a very high scalding risk present. When operating in daylight, the heat exchange circuit will be pressurised and can contain superheated fluid and may contain steam. At other times, the circuit may be pressurised and contain high temperature fluid.
- Should the water from a closed circuit model appear blue or if blue closed circuit fluid is noticed around the base of the water heater or solar collectors, this indicates a leak of the closed circuit fluid from the heat exchanger or the solar collectors. The closed circuit fluid is non-toxic and not hazardous to health. Phone your nearest Solahart Dealer to arrange for an inspection.
- An open circuit system with an L, LF or LX tank does not have freeze protection. The system is not suitable for installation in areas subject to frost or freeze conditions.
- A closed circuit system with a J or F tank has protection against freezing and harsh water conditions.

Refer to "[Hartgard' Solution – Freeze Protection](#)" on page 10.

- For continued safety of this water heater, it must be installed, operated, and maintained in accordance with the Owner's Guide and Installation Instructions.
- The lever on the temperature pressure relief valve and expansion control valve requires to be operated every six (6) months to clear any deposits and to ensure the valve and its drain line are not blocked.

Refer to:

- [“Relief Valves”](#) on page 7, and
- [“Minor Maintenance Every Six Months”](#) on page 18.
- Servicing of a water heater must only be carried out by qualified personnel. Phone your nearest Solahart Dealer.
- Only a person qualified to install or service a water heater can drain the water heater if this is required.
- Do not modify this water heater.

Relief Valves

TEMPERATURE PRESSURE RELIEF VALVE

This water heater incorporates a temperature pressure relief valve located near the top of the solar storage tank. This valve is essential for the water heater's safe operation.

It is possible for the valve to discharge a quantity of water through the drain line during each heating period. This quantity should be equal to approximately 1/50 of the hot water used, as water expands by this volume when heated.

EXPANSION CONTROL VALVE

Solahart supply an expansion control valve with each thermosiphon water heater system and this is fitted to the cold water line to the water heater. In many areas, including scaling water areas, it is mandatory an expansion control valve is fitted to the cold water line to the water heater.

The expansion control valve will discharge the quantity of water from its drain line during the heating period instead of the temperature pressure relief valve as it has a lower pressure rating.

VALVE OPERATION

Continuous leakage of water from either valve and its drain line may indicate a problem with the water heater. Refer to [“Temperature Pressure Relief Valve or Expansion Control Valve Running”](#) on page 15.

⚠ Warning: Never block the outlet of either valve or their drain lines for any reason. A relief valve drain must be left open to atmosphere and be installed in a continuously downward direction.

In locations where water pipes are prone to freezing, the relief valve drain line must be insulated and not exceed 300 mm in length before discharging into a tundish through an air gap.

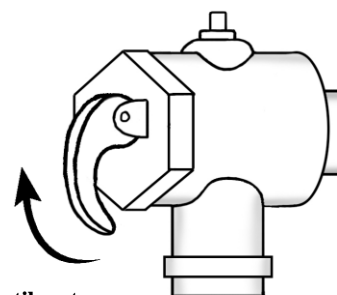
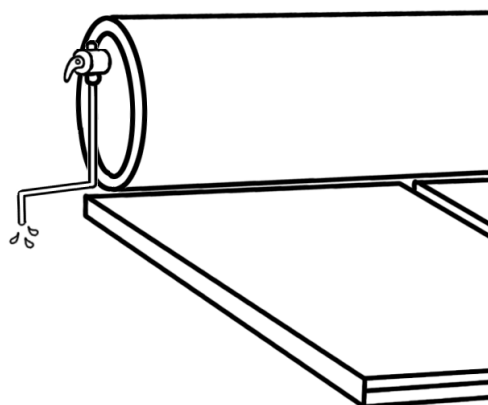
The easing lever on the temperature pressure relief valve and expansion control valve should be operated once every six (6) months to clear any deposits and ensure the valve and its drain line are not blocked. **It is very important the lever is raised and lowered gently.** Refer to [“Minor Maintenance Every Six Months”](#) on page 18.

If the relief valve easing lever is not readily and safely accessible, contact your nearest Solahart Dealer. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

⚠ Warning: Water discharged from the temperature pressure relief valve drain line will be hot. Exercise care to avoid any splashing of water by standing clear of the drain line's point of discharge when operating either valve's easing lever.

⚠ DANGER: Failure to operate the easing lever on the relief valve once every six (6) months may result in the solar storage tank cylinder failing, or under certain circumstances, exploding.

If water does not flow freely from the drain line when the lever is lifted, then the water heater must be checked. Phone your nearest Solahart Dealer to arrange for an inspection.



lift until water
flows from the
drain line –
lower gently

outlet /
drain
line

The temperature pressure relief valve should be replaced at intervals not exceeding five (5) years and the expansion control valve should be checked for performance or replaced at intervals not exceeding five (5) years. The checking of the valves performance or replacement should occur more frequently in areas where there is a high incidence of water deposits. Refer to “[Water Supplies](#)” on page 16.

Installation Notes

This water heater must be installed:

- by a qualified person,
- in accordance with the installation instructions,
- in Australia in compliance with the Plumbing Code of Australia (PCA) and Plumbing Standard AS/NZS 3500.4, and in other countries in compliance with their national plumbing Standards,
 - This water heater is designed for outdoor installation.
 - This water heater is intended to be permanently connected to the water mains and not connected by a hose-set. A braided flexible hose or semi-flexible connector may be used for connection to the water heater, where permitted by AS/NZS 3500.4.
- in Australia and New Zealand in compliance with the Australian / New Zealand Wiring Rules AS/NZS 3000, and in other countries in compliance with their national electrical Standards,
 - An isolation switch must be installed at the switchboard in the electrical circuit to the water heater in accordance with the Wiring Rules, so the water heater can be switched off. Refer to “[Electrical](#)” on page 22.
 - The power supply wires are to be directly connected to the terminal block and earth tab connection, with no excess wire loops inside the front cover. The temperature rating of the power supply wires insulation must suit this application, or the wiring protected by insulating sleeving with an appropriate temperature rating if it can make contact with the internal storage cylinder. The temperature of the internal storage cylinder can reach 95°C during its operation.
- in compliance with all local codes and regulatory authority requirements,
- in New Zealand also conforming to Clauses G12 and H1 of the New Zealand Building Code.

Installation and commissioning requirements and details for the installing plumber and licensed electrical worker are contained on pages 20 to 52.

Mains pressure water supply

The water heater is designed to operate at mains pressure by connecting directly to the mains water supply.

The water heater is supplied with a temperature pressure relief valve with a pressure rating of 1000 kPa and an expansion control valve with a pressure rating of 850 kPa.

The maximum mains water supply pressure for the water heater is 680 kPa when an expansion control valve is installed. If the mains supply pressure in your area exceeds this value, a pressure limiting valve must be installed.

The supply pressure should be greater than 350 kPa for true mains pressure operation to be achieved.

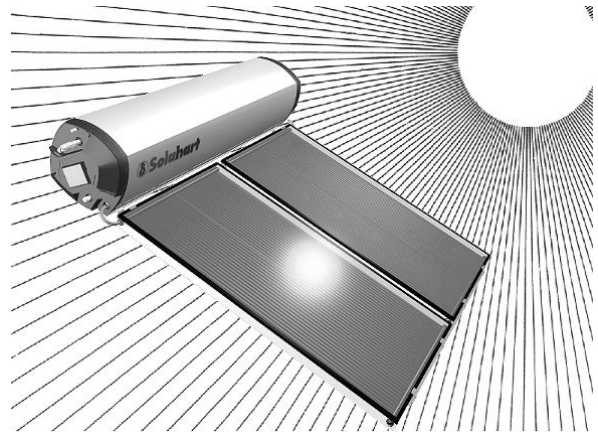
HERE'S HOW IT WORKS

Solahart thermosiphon solar water heaters are available in two series:

- Open circuit models – with either an L, LF or LX tank
- Closed circuit models – with either a J or F tank

An open circuit series system does not have freeze protection. The system is not suitable for installation in areas subject to frost or freeze conditions, nor areas with poor water chemistry. The system has **NO WARRANTY** for freeze damage or damage caused by poor water chemistry.

A closed circuit series system is suitable for installation in areas subject to frost or freeze conditions, or areas with poor water chemistry. This system has **NO WARRANTY** for freeze damage if non Solahart approved closed circuit fluid has been used or if the closed circuit fluid has been incorrectly mixed.



Refer to “[Terms of the Solahart Warranty](#)” on page 4 and “[Water Supplies](#)” on page 16.

This water heater is designed to be installed as an electric boosted solar water heater with its booster heating unit connected to a power supply, however it may be installed with an in-series continuous flow or storage booster water heater.

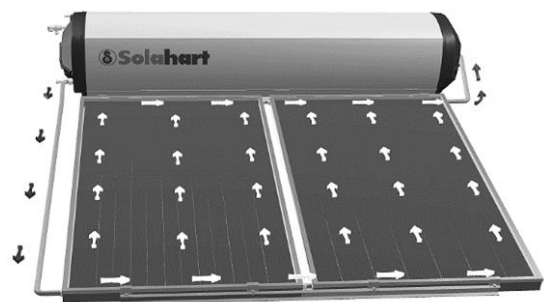
Solar Operation

The solar water heater uses the thermosiphon principle, without the need for a pump, circulator or sensors. It works on the simple scientific fact that hot fluid rises. The solar collector’s low-iron content solar glass allows more solar energy from the sun to pass through and be used to heat the collector’s absorber plate than conventional glass. This solar energy heats the fluid in the absorber plate which is then transferred to the water in the storage tank.

OPEN CIRCUIT SERIES

An open circuit system has a collector circuit which is directly connected to the potable water in the solar storage tank by copper pipe work. As the water in the solar collector gains the solar energy from the absorber, the increase in temperature causes the water to rise through the collector and the solar hot pipe into the solar storage tank.

As the heated water enters the storage tank, cooler water from the bottom of the solar storage tank flows down the solar cold pipe into the solar collectors to be heated by the solar energy. This process continues while solar energy is available and the water in the solar storage tank requires heating.



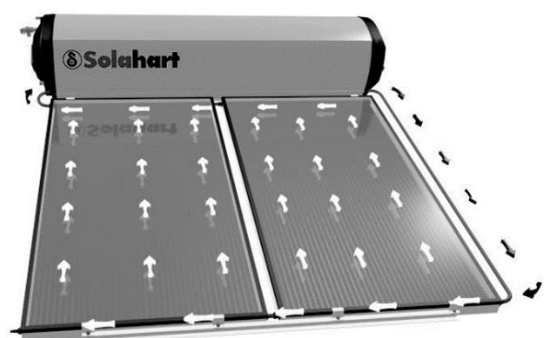
open circuit series operation

CLOSED CIRCUIT SERIES

A closed circuit solar water heater has a heat exchanger jacket wrapped around the inner cylinder as part of the solar storage tank design. The heat exchanger and solar collectors are connected by copper pipe work and form a closed circuit which is filled with closed circuit fluid. The closed circuit fluid is a solution of Hartgard concentrate and water. Hartgard is a blue, non-toxic food grade propylene glycol heat transfer fluid. The Hartgard concentrate is used to lower the freezing temperature of the closed circuit fluid providing protection against freezing. The closed circuit also provides protection to the solar collectors and solar pipe work against harsh water chemistry.

As the Hartgard fluid in the solar collector gains the solar energy from the absorber, the increase in temperature causes the fluid to rise through the fluid ways in the collector into the solar hot pipe and up into the heat exchanger jacket around the inner cylinder, where it transfers its heat into the water in the solar storage tank.

As the heated Hartgard fluid enters the heat exchanger, the cooler Hartgard fluid from the bottom of the heat exchanger flows down the solar cold pipe into the solar collectors to be heated by the solar energy. This process continues while solar energy is available and the water in the solar storage tank requires heating.



closed circuit series operation

FACTS YOU SHOULD KNOW ABOUT YOUR WATER HEATER

Water Heater Application

This water heater is designed for the purpose of heating potable water. Its use in an application other than this may shorten its life. This water heater complies with the Lead Free requirements of the National Construction Code Volume Three.

Hotter Water Increases the Risk of Scald Injury

The temperature the system will achieve under solar heating depends on many factors, including the level of solar radiation available, orientation and inclination of the solar collectors, incoming cold water temperature and volume of hot water used.

⚠ Warning: This water heater can deliver water at temperatures which can cause severe scalding.

Under normal household use and average operating conditions, the system may achieve a water temperature of approximately twice the maximum daily outside air temperature. In summer solar conditions this can be up to 60°C to 75°C. This water temperature can be exceeded and reach up to around 90°C (see recommendation below). This can occur during periods of higher solar radiation and reduced hot water usage. Extreme care should be taken in these circumstances. These temperatures are sufficiently hot to cause severe scalding. Water at this temperature may have been plumbed to fixtures where water hotter than 50°C is allowed, such as the kitchen and laundry.

Check the water temperature before use, such as when entering a shower or filling a bath or basin, to ensure it is suitable for the application and will not cause scald injury.

We recommend, and it may also be required by regulations, that an approved temperature limiting device be fitted into the hot water pipe work to the bathroom and ensuite when this water heater is installed. This will keep the water temperature below 50°C at the bathroom and ensuite. The risk of scald injury will be reduced and still allow hotter water to the kitchen and laundry.

Precautions

The water heater must be maintained in accordance with the Owner's Manual. Refer to [“Water Supplies”](#) on page 16 and [“Maintenance Requirements”](#) on page 18.

If this water heater is to be used where an uninterrupted hot water supply is necessary for your application or business you should ensure that you have back-up redundancy within the hot water system design. This should ensure the continuity of hot water supply in the event that this water heater were to become inoperable for any reason. We recommend you seek advice from your plumber or specifier about your needs and building back-up redundancy into your hot water supply system.

Victorian Customers

Notice to Victorian Customers from the Victorian Plumbing Industry Commission. This water heater must be installed by a licensed person as required by the Victorian Building Act 1993. Only a licensed person will give you a Compliance Certificate, showing that the work complies with all the relevant Standards. Only a licensed person will have insurance protecting their workmanship for 6 years. Make sure you use a licensed person to install this water heater and ask for your Compliance Certificate.

‘Hartgard’ Solution – Freeze Protection

Solahart Closed Circuit Systems are protected against freezing or harsh water conditions by our exclusive ‘Hartgard’ fluid. ‘Hartgard’ is a blue, non-toxic, propylene glycol fluid which, when mixed with water, provides the Heat Transfer Fluid contained in the solar collectors and the heat exchanger jacket around the tank. ‘Hartgard’ is used to lower the freezing temperature of the Heat Transfer Fluid and so provides protection against freezing (Note: for the correct % of Hartgard in the Heat Transfer Fluid, refer to the section on Frost / Freeze Protection). ‘Hartgard’ is a special food grade solution and is the only solution permitted to be used in the closed circuit systems. Hartgard has been approved by the National Health and Medical Research Council of Australia.

⚠ Warning: Should the water from your closed circuit series water heater appear blue, then this may indicate a leak of ‘Hartgard’ from the heat exchange jacket into the potable water.

Although ‘Hartgard’ is of food-grade quality and not hazardous to health, the blue colour in the water does indicate a fault and your Solahart dealer should be contacted to inspect the system.

Over-Temperature Protection System

The Closed Circuit Series solar water heaters have a means of controlling the maximum temperature of the water in the storage tank. These systems may be installed with a 'HartStat' valve located between the hot outlet of the collectors and the inlet to the tank heat exchanger. This valve closes when the tank has reached a sufficiently high temperature, thereby preventing further heat transfer to the tank, and thus limiting its temperature.

The Open Circuit Series systems may be installed with a 'TRV' located between the cold inlet of the tank and the cold inlet of the collectors. This valve restricts the flow through the collectors when the tank has reached a sufficiently high temperature.

PR6 / PR200 Jacket Pressure Relief Valve

The Closed Circuit Series tank's heat exchange jacket has a pressure relief valve located in the vent pipe of the jacket. This relief valve is to prevent over-pressurisation of the closed circuit either due to incorrect filling or abnormal operating conditions. During the water heater's first summer season, fluid will discharge from the relief valve until the ideal closed circuit fluid volume is established. Discharges from the valve after this time could indicate the water heater is not operating efficiently. Under these circumstances contact your nearest Solahart dealer immediately. Do not attempt to service the water heater yourself.

When operating in daylight, the heat exchange circuit will be pressurised and will contain a mixture of superheated water and steam. Do not remove the PR6 / PR200 valve during operation as there may be a very high SCALDING risk present.

Period of Reduced Usage or Holidays

⚠ Warning: If the water heater is left unused for two weeks or more, flammable hydrogen gas may accumulate in the water cylinder.

To dissipate this gas safely, it is recommended that a sink hot tap be turned on for several minutes. Do not use a dishwasher, clothes washer or other appliance for this purpose. During this procedure there must be no smoking, open flames or any electrical appliance operating nearby. If hydrogen is discharged through the tap it will make an unusual sound like air escaping.

Temperature Redistribution

A lower water temperature may be noticed in the morning when the booster heating unit has not been energised overnight. This temperature reduction is caused by the transfer of heat energy overnight from the hot water in the upper part of the storage tank to the cold water in the lower part of the storage tank. This effect is often perceived as heat loss, but is actually the redistribution of stored heat more evenly over the entire contents of the storage tank. This heat is not lost to the system.

Temperature redistribution is more prevalent the more hot water is used the night before or if the booster switch or time clock is left OFF over-night and in particular may be experienced during periods of low solar energy gain, such as during the cooler months. Temperature redistribution can also occur during days of lower solar radiation particularly during the cooler months if power to the booster heating element is not available, or the booster switch or time clock is left off.

If higher temperature water is required, particularly in the morning, then use of the booster heating unit is necessary to raise the temperature of the water in the top section of the cylinder. Refer to ["In-tank Boosting"](#) on page 12.

If the water heater is connected to an Off-Peak (overnight) electricity supply, then switching to an Extended Off-Peak (overnight and day) supply should be considered. If a timer is being utilised, then a timed boost period in the afternoon prior to the evening usage should be considered.

OPERATING YOUR SOLAR WATER HEATER

Primary heating of your hot water will be from solar energy. The solar heating requires no operation by the user. Supplementary water heating (“boosting”) is also provided. Dependent upon the system that you have purchased, this will be either:

- In-tank electric boosting
- In-series gas boosting

Note: Australian Standard AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water.

- With in-tank boosting, this water heater can satisfy this AS 3498 requirement provided the booster is either permanently on or switched on by timer control for a sufficient period each day, and the electric booster thermostat setting is 60°C or higher. Refer to the tables commencing on page 13 for recommended boosting periods.
- If this water heater is installed with an in-series continuous flow gas booster, then this requirement of AS 3498 can be satisfied provided the booster is permanently on, its preset outlet temperature setting is 70°C or higher and a remote temperature controller is not used.
- If this water heater is installed with an in-series storage booster, then this requirement of AS 3498 can be satisfied provided the storage booster is permanently on and its thermostat setting is 60°C or higher.

IN-TANK BOOSTING

An isolating switch is installed in the electrical meter box for an electrically in-tank boosted model. This should be left switched on to allow the booster heating unit to operate if required. The booster heating unit is for heating the water at times of low solar energy gain, such as during very cloudy or rainy weather, or during the colder months.

The booster heating unit will only activate if heating is required and power is available from the switchboard. When the water is below the thermostat setting, the booster heating unit will turn on and heat the water. The booster heating unit will automatically turn off when the temperature of the water reaches the thermostat setting. If the water temperature drops below the setting again the booster will re-activate.

The amount of water heated by the raised booster heating unit of a thermosiphon storage tank is:

150 model	180 model	300 model
75 litres	90 litres	150 litres

The water heater is more suited for the booster heating unit to be connected to either a continuous, or a time of use, or an extended Off-Peak (overnight and day) electricity supply. A timer can also be used to control the boosting periods turning the booster on when required and help maximise solar savings. Refer to [“Timer Control of the Tank Boosting”](#) on page 13.

The booster heating unit may be connected to an Off-Peak (overnight) electricity supply, however this will only allow the booster to heat the water overnight. On cloudy days the tank may only gain a small amount of energy during the day. Careful planning will be required to avoid running out of hot water if large quantities are drawn during the day. If this type of connection is considered, care must be taken to ensure there is sufficient boost capacity to meet the household’s full day and night hot water supply during periods of no or low solar gain, particularly in cold weather.

The water heater features a tradesperson adjustable thermostat. This requires a licensed tradesperson to make any temperature adjustments. The thermostat is factory set at 60°C and has a maximum temperature setting of 70°C.

Leaving the isolating switch switched on will also provide a sufficient period of time each day for the booster heating unit to operate, if required, to satisfy the requirements of AS 3498.

The overall performance and energy savings that you will obtain from your Solahart water heater will depend on your hot water usage pattern and your operation of the in-tank booster. A time clock can increase energy savings.

The following hints are provided to assist you in with your operation of your solar water heater:

1. Solar energy input is greater on sunny days between 10am and 3pm. If possible, schedule your large hot water demands (e.g. heavy washing or laundry) for as close as possible to the middle of the day.
2. If a timer is installed, boost your tank’s water after this 10am to 3pm hot period. The sun has made its maximum contribution by this time, the booster will then raise the water to the desired temperature if the sun has not done so (in winter for example).
3. Keep trees in the sun’s path at a level where the collectors are not shaded at any time during periods of effective solar radiation.

Timer Control of the Tank Boosting

A timer control switch can be installed and will help maximise energy savings with an electrically boosted solar water heater connected to a **continuous, time of use or extended Off-Peak (overnight and day)** electricity supply. Further information for an electrician on the recommended methods of wiring the timer are outlined in “[Timer Control Switch](#)” on page 23.

Programming the Timer

Power must be available to the timer control switch before the booster heating unit can be activated.

The timer control switch should be programmed:

- to suit the hot water consumption pattern of the household,
- with the end of the boost period to coincide with the commencement of the evening hot water usage,
- to enable a boosting period of not less than the recommended continuous length of time for boosting, and
- for a period when power will be available for the booster heating unit to operate.

It may be necessary to program a second period into the timer, such as prior to the morning hot water usage.

Note: When daylight saving time applies, you may consider resetting the timer accordingly.

The booster heating unit will only activate if heating is required and power is available from the timer. When the water is below the thermostat setting, the booster heating unit will turn on and heat the water. The booster heating unit will automatically turn off either when the temperature of the water reaches the thermostat setting or at the end of the timer period, whichever comes first.

The recommended boosting periods are sufficient to allow the booster heating unit to heat up the boost volume of the solar storage tank to 60°C where the winter cold water temperatures do not fall below those shown. This may be necessary during periods of very low solar energy gain through the solar collectors, such as during constant rain or extremely cloudy weather, particularly in winter when the incoming cold water temperature is lower. The period will also provide a sufficient heat up time for the electric booster to operate, if required, to satisfy the requirements of AS 3498.

The recommended continuous length of time for boosting (for a 240 V power supply) is:

Cool/temperate climate

Minimum winter cold water supply temperature	= 10°C
Thermostat set point	= 60°C
Temperature rise	= 50°C

Booster Heating Unit	150 model	180 model	300 model
1.5 kW	3 hours	3 ¾ hours	6 hours
1.8 kW	2 ½ hours	3 hours	5 hours
2.4 kW	2 hours	2 ¼ hours	3 ¾ hours
3.6 kW	1 ½ hours	1 ½ hours	2 ½ hours
4.8 kW	1 hour	1 ¼ hours	2 hours

Temperate/sub-tropical climate

Minimum winter cold water supply temperature	= 15°C
Thermostat set point	= 60°C
Temperature rise	= 45°C

Booster Heating Unit	150 model	180 model	300 model
1.5 kW	2 ¾ hours	3 ¼ hours	5 ½ hours
1.8 kW	2 ¼ hours	2 ¾ hours	4 ¾ hours
2.4 kW	1 ¾ hours	2 hours	3 ½ hours
3.6 kW	1 ¼ hours	1 ½ hours	2 ¼ hours
4.8 kW	1 hour	1 hours	1 ¾ hours

Sub-tropical / Tropical climate

Minimum winter cold water supply temperature = 20°C
 Thermostat set point = 60°C
 Temperature rise = 40°C

Booster Heating Unit	150 model	180 model	300 model
1.5 kW	2 ½ hours	3 hours	4 ¾ hours
1.8 kW	2 hours	2 ½ hours	4 hours
2.4 kW	1 ½ hours	2 hours	3 hours
3.6 kW	1 hour	1 ¼ hours	2 hours
4.8 kW	¾ hour	1 hour	1 ½ hours

TO TURN OFF THE WATER HEATER

If you plan to be away from home for a few nights, we suggest you leave the water heater switched on.

If it is necessary to turn off the water heater:

- Switch off the electrical supply at the isolating switch to the solar storage tank on the switchboard.
- Close the cold water isolation valve at the inlet to the water heater.

TO TURN ON THE WATER HEATER

- Open the cold water isolation valve fully at the inlet to the water heater.
- Switch on the electrical supply at the isolating switch to the solar storage tank on the switchboard.
- Check and if required reset the timer, if one is installed.

USING YOUR SOLAHART WATER HEATER AS A PRE-HEATER

This water heater is designed to be installed as an electric boosted solar water heater with its booster heating unit connected to a power supply; however it may be installed with an in-series continuous flow or storage booster.

If this water heater is installed with an in-series booster, then the electric booster heating unit will not be connected to a power supply and the references to the electric booster heating unit, thermostat and boosting controls in these installation instructions will not be applicable to the installation.

Your Solahart can be used as a pre-heater to a new or existing in-series booster water heater provided:

1. The in-series booster water heater is:
 - thermostatically-controlled not flow-controlled, except when used in conjunction with an electronic continuous flow gas water heater, and
 - Is suitable to be used as an in-series booster water heater for a solar water heater.
2. The operating pressures of the two water heaters are compatible or reduced to the lower of the two water heaters.
3. The in-series booster water heater has sufficient thermal capacity to supply the hot water requirements of the application during periods of low or no solar gain.
4. A temperature-operated bypass valve is installed if the in-series water heater has either an over temperature energy cut-out which can be permanently disabled by high temperature hot water or a maximum recommended inlet supply temperature less than the temperature of water which can be supplied by this solar water heater.

It will be necessary to check with the manufacturer of the in-series water heater as to its suitability for use as an in-series booster to this solar water heater.

The booster should be permanently active. The booster senses the temperature of the water passing through it. If the water temperature is above its temperature setting it does nothing and if below it will automatically heat the water up to the preset outlet temperature setting. The booster ensures hot water delivery for a variety of hot water demands without the need for user intervention while enabling maximum solar energy contribution to the water heating. For more information on the booster, consult the owner’s manual for the product.

Note: With flow-controlled water heaters the Solahart water heater can act as a supplementary heat source only and not as a pre-heater. The Solahart heater can be connected in a parallel circuit only via a changeover valve(s).

SAVE A SERVICE CALL

TROUBLESHOOTING

Should your Solahart not provide hot water please check the following before requesting a service call:

1. Shading from trees is not excessive and is not covering the collectors for all or part of the day.
2. Hot water usage is not excessive.
3. Hot water is not leaking from within the plumbing system.
4. Booster switch and/or time switch is turned ON.
5. Booster circuit fuse or circuit breaker is sound.
6. Electric meter speeds up when the booster switch is turned ON after being OFF.

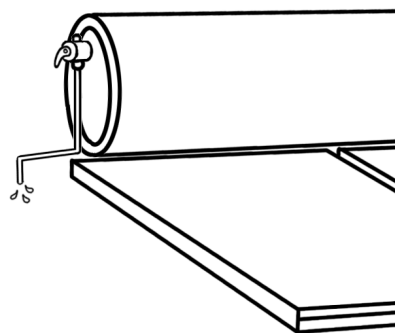
Contact your local Solahart Dealer if all of the above have been checked and there is still no hot water.

TEMPERATURE PRESSURE RELIEF VALVE OR EXPANSION CONTROL VALVE RUNNING

- **Normal Operation**

It is normal and desirable the temperature pressure relief valve or expansion control valve allows a small quantity of water to escape during the heating cycle. This quantity should be equal to approximately 1/50 of the hot water used, as water expands by this volume when heated. However, if it discharges more than a bucket full of water in 24 hours, there may be another problem.

The expansion control valve will discharge water instead of the temperature pressure relief valve as it has a lower pressure rating. A benefit is that energy is conserved as the discharged water is cooler. This valve is installed in the cold water line to the water heater (refer to the [cold water connection diagram](#) on page 24).



- **Continuous dribble**

If readily and safely accessible, try gently raising the easing lever on the relief valve for a few seconds (refer to “[Relief Valves](#)” on page 7). This may dislodge a small particle of foreign matter and clear the fault. The lever should be released gently.

If the relief valve lever is not readily and safely accessible, contact your nearest Solahart Dealer. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

- **Steady flows for long period (often at night)**

This may indicate the mains water pressure sometimes rises above the designed pressure of the water heater. Ask your installing plumber to fit a pressure limiting valve.

⚠ Warning: Never replace the relief valve with one of a higher pressure rating.

- **Heavy flows of hot water from the temperature pressure relief valve until water heater is cold - then stops until water reheats**

If this occurs when the water heater is being boosted by the electric booster heating unit, then the water heater **must** be switched off at the isolating switch or switchboard. Phone your nearest Solahart Dealer to arrange for an inspection.

This may also occur on a water heater without an over temperature protection (OTP) system during periods of increased solar gain in the hotter months and particularly if there is a reduced level of hot water consumption. It is most likely to happen during the daytime.

The temperature pressure relief valve will discharge water if the water temperature increases to a very high level under these conditions. This higher temperature water is replaced with incoming cold water to reduce the energy level inside of the tank. The valve will close when cooler water surrounds the temperature probe of the valve. As this is a function of the temperature pressure relief valve under these conditions, it is not necessary to make a service call, however you may consider having an over temperature protection (OTP) system installed.

COLLECTOR GLASS BREAKAGE

The Solahart warranty **DOES NOT** cover breakage of solar collector glass. It is recommended that the household insurance policy cover the collector glass and/or damage to the water heater, especially in cyclonic areas and in locations where severe hail is likely to occur. The collector glass is not offered as a replacement part. Should the solar collector require replacement, contact your local Solahart Dealer.

⚠ Warning: No attempt should be made to remove or replace broken collector glass.

Solahart solar collectors have passed the AS/NZS 2712 requirements for resistance to hailstone damage, so it is not normally necessary to fit a guard to a collector. Stone Guards are available to provide a level of protection to the collectors against vandalism or accidental damage. Refer to your Solahart Dealer for details.

WATER SUPPLIES

This water heater must be installed in accordance with this advice to be covered by the Solahart warranty.

This water heater is manufactured to suit the water conditions of most public reticulated water supplies. However, there are some known water chemistries which can have detrimental effects on the water heater and its operation and / or life expectancy. If you are unsure of your water chemistry, you may be able to obtain information from your local water supply authority. This water heater should only be connected to a water supply which complies with these guidelines for the Solahart warranty to apply.

Change of Water Supply

The changing or alternating from one water supply to another can have a detrimental effect on the operation and / or life expectation of a water heater cylinder, a temperature pressure relief valve, a heating unit and a solar collector in an open circuit solar water heater system.

Where there is a changeover from one water supply to another, e.g., a rainwater tank supply, bore water supply, desalinated water supply, public reticulated water supply or water brought in from another supply, then water chemistry information should be sought from the supplier or it should be tested to ensure the water supply meets the requirements given in these guidelines for the Solahart warranty to apply.

Anode

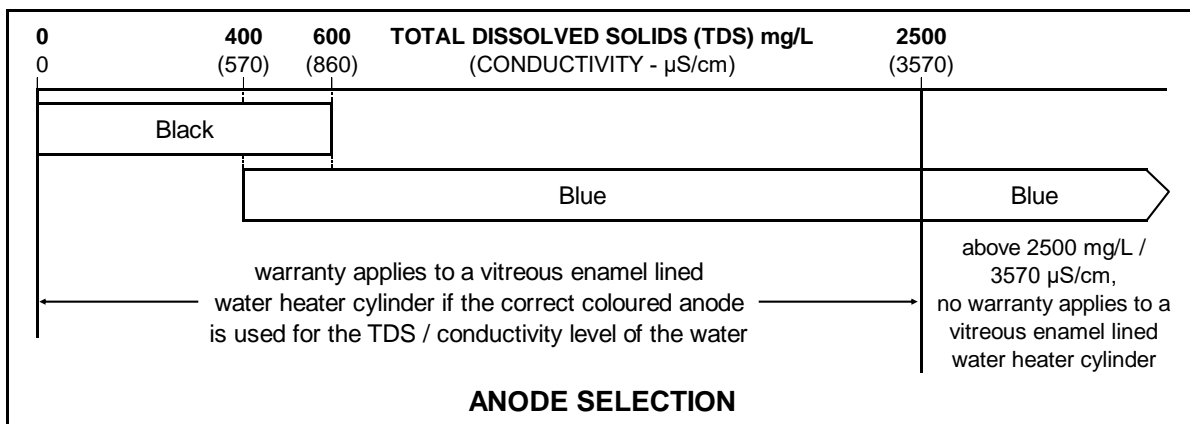
The vitreous enamel lined cylinder of the water heater is only covered by the Solahart warranty when the total dissolved solids (TDS) content in the water is less than 2500 mg/L and when the correct colour coded anode is used. If an incorrect colour coded anode is used in the water heater, any resultant faults will not be covered by the Solahart warranty. In addition, the use of an incorrect colour coded anode may shorten the life of the water heater cylinder.

The correct colour coded anode must be selected and fitted to the water heater in accordance with the following advice and the [Anode Selection chart](#) on page 16 for the Solahart warranty to apply to the water heater cylinder.

Total Dissolved Solids	Anode colour code
0 – 400 mg/L	Black
400 – 600 mg/L	Black or Blue
600 – 2500 mg/L	Blue
2500 mg/L +	Blue (no cylinder warranty)

The changing of an anode must be carried out by a qualified person.

Note: Some water analysis reports may state the conductivity of the water rather than the level of total dissolved solids. Conductivity, measured in microsiemens per centimetre ($\mu\text{S} / \text{cm}$), is directly proportional to the TDS content of the water. TDS, in mg / L, is approximately 70% of the conductivity in $\mu\text{S} / \text{cm}$.



Anode Inspection and Replacement

The anode installed in this water heater will slowly dissipate whilst protecting the cylinder. The life of the cylinder may be extended by replacing the anode.

For water supplies which are either softened or desalinated, or where the water supply may alternate between a water tank and a reticulated public supply or another supply, or where there is a variable supply (e.g. from a bore or public reticulated supply from various water sources), the anode must be inspected (and replaced if there is any sign of depletion) within 5 years of its installation for an L or J tank, or within 10 years of its installation for an LF, LX or F tank. For known very aggressive water supplies, the anode should be inspected within 3 to 4 years of its installation for an L or J tank, or within 6 to 8 years of its installation for an LF, LX or F tank. Refer to your local Solahart Dealer.

For all water supplies, if the anode is not replaced during a major service (refer to “Major Service Every Five Years” on page 19) then the maximum time after installation when the anode should be replaced is at the next Five Year Service.

Caution

If the water supply has a TDS greater than 600 mg/L and a black anode has not been changed to a blue anode, there is the possibility the anode may become overactive and hydrogen gas could accumulate in the top of the water heater during long periods of no use.

If, under these conditions, the water heater has not been used for two or more weeks the following procedure should be carried out before using any electrical appliances (automatic washing machines and dishwashers) which are connected to the hot water supply.

The hydrogen, which is highly flammable, should be vented safely by opening a hot tap and allowing the water to flow. There should be no smoking or naked flame near the tap whilst it is turned on. Any hydrogen gas will be dissipated. This is indicated by an unusual spurting of the water from the tap. Once the water runs freely, any hydrogen in the system will have been released.

Saturation Index

The saturation index is used as a measure of the water’s corrosive or scaling properties. The saturation index figures stated are calculated using a water temperature of 80°C.

In a corrosive water supply, the water can attack copper parts and cause them to fail.

Where the saturation index is less than –1.0, the water is very corrosive and the Solahart warranty does not apply to a copper sheathed heating unit or a solar collector in an open circuit solar water heater system. A corrosion resistant heating unit must be used for the Solahart warranty to apply to the heating unit.

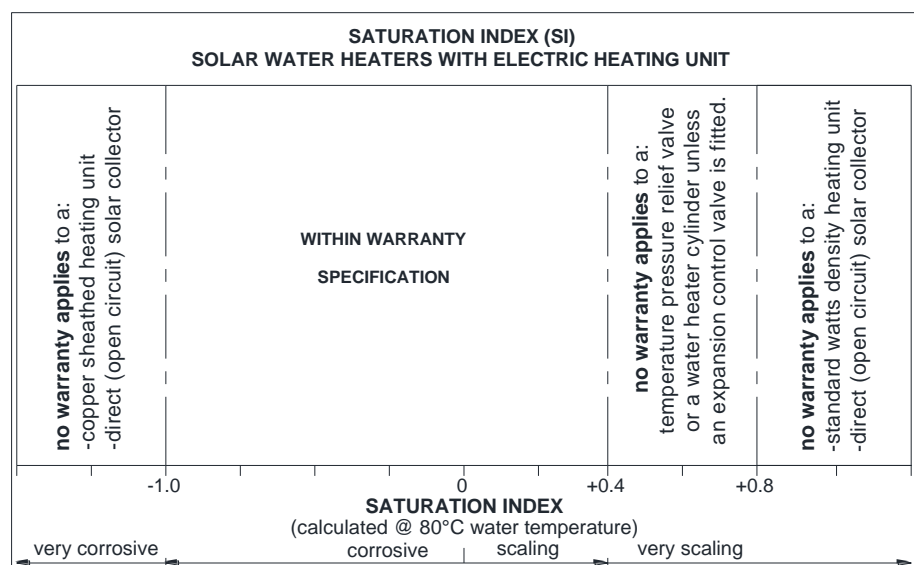
In a scaling water supply calcium carbonate is deposited out of the water onto any hot metallic surface.

Where the saturation index exceeds +0.40, the water is very scaling. An expansion control valve must be fitted on the cold water line after the non-return valve to protect and for the Solahart warranty to apply to the temperature pressure relief valve and water heater cylinder. Solar collectors in an open circuit solar water heater system should be covered when the water heater is not intended to be used for more than two weeks.

Where the saturation index exceeds +0.80, the Solahart warranty does not apply to a standard watts density heating unit or a solar collector in an open circuit solar water heater system. A low watts density heating unit must be used for the Solahart warranty to apply to the heating unit.

Water which is scaling may be treated with a water softening device to reduce the saturation index of the water.

Contact your local Solahart Dealer if a replacement heating unit is required.



Summary of Water Chemistry Advice Affecting Warranty

The water heater, solar collectors and their components are not suitable for certain water chemistries. Those chemistries are listed below. If the water heater is connected at any time to a water supply with the following water chemistry, the Solahart warranty will not cover any resultant faults on the components listed below:

Water Chemistry	Component
Total Dissolved Solids (TDS) > 2500 mg/L	water heater cylinder
Total Dissolved Solids (TDS) not suitable for anode type	water heater cylinder
Saturation Index (SI) < -1.0	solar collector copper sheathed heating unit
Saturation Index (SI) > +0.4 (if an expansion control valve is not fitted)	water heater cylinder temperature pressure relief valve
Saturation Index (SI) > +0.8	solar collector standard watts density heating unit

MAINTENANCE REQUIREMENTS

Collector Care

Ensure the glass on your solar collectors is free of dust, salt spray or any other matter which may reduce the effectiveness of the solar collectors. Rainfall should keep the collector adequately clean. It is recommended that the collector glass be washed clean at least every three months should adequate rain not have fallen in this period. Collector glass can be hosed down or if the solar collectors are accessible, wash the collector glass with water and a soft brush when the solar collectors are cool, such as early in the morning. In extremely dusty areas, such as mining towns and locations adjacent to dust forming plants, extra attention should be given to this matter.

Have any trees trimmed which may shade the solar collectors.

Minor Maintenance Every Six Months

It is recommended minor maintenance be performed every six (6) months. Minor maintenance can be performed by the dwelling occupant.

The minor maintenance includes:

1. If readily and safely accessible, operate the easing lever on the temperature pressure relief valve. **It is very important the lever is raised and lowered gently.** Refer to “Relief Valves” on page 7.

⚠ Warning: Exercise care to avoid any splashing of water, as water discharged from the drain line will be hot. Stand clear of the drain line’s point of discharge when operating the valve’s lever.

If the temperature pressure relief valve is not readily and safely accessible, contact your local Solahart Dealer. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

2. If readily and safely accessible, operate the easing lever on the expansion control valve. **It is very important the lever is raised and lowered gently.** Refer to “Relief Valves” on page 7.

If the expansion control valve is not readily and safely accessible, contact your local Solahart Dealer. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

Major Service Every Five Years

It is recommended a major service be conducted on the water heater every five (5) years. If an anode replacement is conducted sooner than a major service, then the major service should coincide with the replacement.

⚠ Warning: Servicing of a water heater must only be carried out by a qualified person. Phone your nearest Solahart Dealer.

Note: The major service and routine replacement of any components, such as the relief valve(s) and anode, are not included in the Solahart warranty. A charge will be made for this work. Only genuine replacement parts should be used on this water heater.

The major service addresses the following aspects:

1. Replace the temperature pressure relief valve (Part No. 451104).
2. Inspect and flush the expansion control valve. If required, replace the valve (Part No. 451103).
3. Anode Inspection: Inspect the anode for:
 - L and J Tank Systems – every five (5) years, or
 - LF, LX and F Tank Systems – every ten (10) years, andreplace if required. If the anode is not replaced at a major service, it should be replaced at the next major service. Refer to [“Anode Inspection and Replacement”](#) on page 17.
4. Where fitted, check the booster heating unit for excessive calcium build-up or corrosion and replace if necessary.
5. Drain, check and refill or replace (if required) the closed circuit fluid (closed circuit models).
6. Visually check the unit for any potential problems, e.g. broken glass, excessive dust build-up, shading.
7. Inspect all connections.
8. Drain and flush the solar storage tank of sediment build-up if required. Refer to [“Draining and Flushing the Solar Storage Tank and Collectors”](#) on page 54.
9. Drain and flush collectors (open circuit models). Refer to [“Draining and Flushing the Solar Storage Tank and Collectors”](#) on page 54.
10. Clean the collector glass.
11. Check the condition of the pipe insulation, if fitted, on the solar hot and solar cold pipes. Replace or make good if required.

Note: The solar storage tank may need to be drained during this service. After the completion of the service, the solar storage tank will take some time to reheat the water by solar gain. Depending upon the power supply connection to the booster heating unit, hot water may not be available until the next day.

If a temperature limiting device, water filter or a water softener are installed, their operation should be checked at this time. These checks are not covered within the major service. Components, devices and valves which are not part of the water heater, such as a temperature limiting device, pipe insulation, water filter and water softener are not covered by the Solahart warranty.

INSTALLATION INSTRUCTIONS - ALL MODELS

General

INSTALLATION STANDARDS

The water heater must be installed:

- by a qualified person, and
- in accordance with the installation instructions, and
- in Australia, in compliance with the Plumbing Code of Australia (PCA), Standards AS/NZS 3500.4 and AS/NZS 3000, and all local codes and regulatory authority requirements, or
- in other countries, in compliance with national and local codes and regulatory authority requirements.
- in New Zealand also conforming to Clauses G12 and H1 of the New Zealand Building Code.

⚠ Warning: This water heater may deliver water at high temperature. Refer to the Plumbing Code of Australia, local requirements and these installation instructions to determine if additional delivery temperature control is required.

INSTALLATION MUST COMPLY WITH LOCAL ELECTRICAL AND PLUMBING CODES

Victorian Installers

Notice to Victorian Installers from the Victorian Building Authority if this solar water heater is installed in a new Class 1 dwelling in the State of Victoria. The system model number is to be recorded on the Certificate of Compliance. It is also a requirement to provide the householder with permanent documentation recording the system model number exactly as it is shown in the 'VEET Product Register' published by the Essential Services Commission in Victoria. See www.veu-registry.vic.gov.au/Public/ProductRegistrySearch.aspx. This documentation may be in the form of an indelible label adhered to the solar storage tank, or other suitable form placed in an accessible location, such as the meter box, for later inspection.

WATER HEATER APPLICATION

This water heater is designed for the purpose of heating potable water. Its use in an application other than this may shorten its life.

If this water heater is to be used where an uninterrupted hot water supply is necessary for the application or business, then there should be back-up redundancy within the hot water system design. This should ensure the continuity of hot water supply in the event that this water heater was to become inoperable for any reason. We recommend you provide advice to the system owner about their needs and building back-up redundancy into the hot water supply system.

LOCATION

The solar water heater should be installed close to either the most frequently used outlet or the previously installed water heater in a retrofit installation if existing pipe work is to be utilised, and its position chosen with safety and service in mind. The water heater must be installed in an area that is free of shade all year round. Ensure that trees do not shade the water heater, particularly in winter.

NOTE: Sufficient space should be left around the thermosiphon solar water heater to allow for safe service access. A distance equal to the length of the tank should be left at the water supply connections end of the tank to any wall or obstruction so that the anode can be removed and replaced during a service. In addition, a minimum of one (1) metre clearance is recommended to be left around the solar storage tank and solar collectors on the other three sides for safe service access.

⚠ Warning: The water heater must be installed on an adequately supported area of roof. In cyclone areas additional mounting restraints are required

Refer to the Technical Specifications section for the weight of the water heater. It is advisable that the weight of the water heater be braced to a load bearing wall. If in any doubt of the construction or the condition of the roof, obtain advice from a registered builder or structural engineer. The installer must ensure that the structural integrity of the roof is not compromised by the installation of the solar water heater.

In areas susceptible to cyclones, hurricanes or very high winds, a suitable With Pitch frame is required. Refer to your local Solahart Dealer for details.

Orientation of Solar Collectors

To help maximise system performance, solar collectors should be installed with an optimum orientation facing true north (in the southern hemisphere) or true south (in the northern hemisphere). Always check for true north or true south using a compass or other suitable device.

The solar performance of a system reduces as the orientation of the collectors moves away from the optimum orientation, resulting in the need for increased boosting to supply the same hot water load. Solar collectors facing up to 45° from the optimum orientation will receive about 4% to 5% less total solar radiation.

However, the optimum orientation of solar collectors is not always practical or achievable. Solar collectors may be installed up to 90° from the optimum orientation. Where the orientation is greater than 60° from the optimum, either an additional solar collector or selective surface collectors in lieu of non-selective surface collectors should be installed to make up for the reduction in solar performance. Note, these options may not be required in either warmer latitudes where sufficient solar performance can still be achieved, or where over-performance of such a system is likely or has proven to occur. Each of these options should be discussed with the system owner. If neither of these options is possible nor suitable, nor acceptable to the system owner, then the system owner needs to be made aware of, understand and accept that increased boosting may be required to meet their hot water requirements.

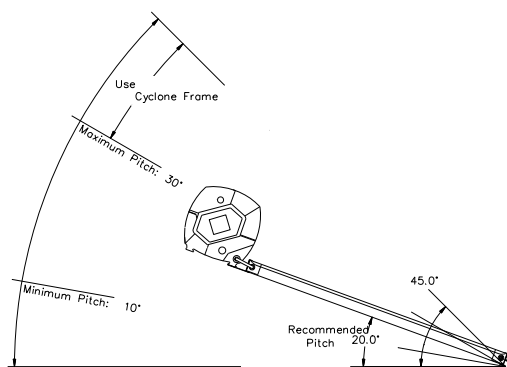
If it is not possible to face the equator, the decision of either an EASTERLY or WESTERLY bias must be made. If the majority of hot water usage is before 2 p.m. favour an EASTERLY bias. If the majority of hot water usage is after 2 p.m. favour a WESTERLY bias.

Inclination of Solar Collectors

To help maximise system performance, solar collectors should be installed with an optimum inclination. This is equal to 90% to 100% of the local latitude angle when collectors are oriented within 60° of true north or true south, and between 10° and 20° if the collectors are oriented between 60° and 90° from the optimum orientation.

Generally, improved summer performance is obtained from an angle of inclination less than the optimum angle and improved winter performance is obtained by an angle of inclination greater than the optimum angle. If the angle of inclination varies by 20° from the optimum angle, the solar collectors will receive about 10% less total annual solar radiation.

However, the optimum inclination of solar collectors is not always practical or achievable. Solar collectors may be installed at the roof angle for simplicity of installation and appearance, but must never be less than 10° for a thermosiphon water heater installation.



A Variable-Pitch frame can be installed to increase the angle of inclination of a thermosiphon water heater and should be used if the roof pitch either is less than 10° or varies by more than 20° from the optimum angle. At pitches greater than 30°, the system must be installed mounted on a With Pitch frame. A suitable frame is available from your local Solahart Dealer.

The use of a Variable-Pitch frame should be discussed with the system owner. If this option is neither possible nor acceptable to the system owner, then the system owner needs to be made aware of, understand and accept that increased boosting may be required to meet their hot water requirements.

FROST / FREEZE PROTECTION

An Open Circuit system does not have freeze protection and is not suitable for installation in areas prone to freeze conditions. Freeze conditions occur below 5°C (41°F). This system has NO WARRANTY for freeze damage. In areas that are prone to frost / freezing, a Closed Circuit system should be used.

Solahart recommends using a minimum of one complete 4.5 litre bottle of ‘Hartgard’ in each system (or a minimum concentration of 20% in large capacity systems) as standard where ambient temperatures do not fall below 0°C. Alternatively, the concentration of ‘Hartgard’ in the closed circuit should be determined to suit the minimum ambient temperature that the system will be exposed to. The Freezing Point temperature of varying concentrations of ‘Hartgard’ solution in water is given below:

20% Hartgard by volume	-7°C	18°F	40% Hartgard by volume	-22°C	-8°F
30% Hartgard by volume	-13°C	7°F	50% Hartgard by volume	-34°C	-29°F

If the system is to be installed in an area where the temperature falls below -34°C (-29°F), please contact your local Solahart dealer for advice.

Electrical

ELECTRICAL CONNECTION AND CODES

The power supply to the water heater must not be switched on until the water heater is filled with water and a satisfactory megger reading is obtained, or damage to the heating unit will result.

All electrical work and permanent wiring must be carried out by a qualified person and in accordance with national and local codes and regulatory authority requirements applicable in your area. In Australia and New Zealand this must be in accordance with the edition of the Wiring Rules AS/NZS 3000 in force in the state or territory at the time of installation.

If this water heater is installed with an in-series booster, then the electric booster heating unit will not need to be connected to a power supply and the references to the electric booster heating unit, thermostat and boosting controls in these installation instructions will not be applicable to the installation.

Note: AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement provided, where an in-series booster water heater is not installed, the electric booster is energised for a sufficient period each day and the electric booster thermostat setting is 60°C or higher.

If this water heater is installed with an in-series continuous flow gas booster, then this requirement of AS 3498 can be satisfied provided the booster is energised, its preset outlet temperature setting is 70°C or higher and a remote temperature controller is not used.

Solar Storage Tank

The solar storage tank with an electric booster heating unit must be directly connected to a 220 V - 240 V a.c. 50 Hz mains power supply with an isolating switch installed at the switchboard. It must be on its own circuit with the circuit breaker suitably rated for the booster heating unit.

The Wiring Rules AS/NZS 3000:2018 requires a second and lockable isolating switch be installed adjacent to but not on or attached to the solar storage tank, and a residual current device (RCD) installed in the electrical circuit to the water heater. The second and lockable isolating switch and RCD may not be required if the installation of this solar storage tank is considered a repair under Clause 1.9.3.2 of the Wiring Rules, i.e., the installation of the solar storage tank is a straight change-over with a straight disconnect / reconnect of the wiring and where there is no modification to the electrical wiring of the final subcircuit or no increase in electrical load above the circuit capacity.

The power rating and current requirement of the water heater is specified on the rating label, located on the electrical cover located at the side of the tank. The booster heating unit and the terminal block for the electrical connection is behind the electrical cover. A flexible 20 mm conduit is required for the electrical cable to the solar storage tank. The conduit is to be connected to the unit with a 20 mm terminator.

Connect the power supply wires directly to the terminal block and earth tab connection, ensuring there are no excess wire loops inside the front cover. The temperature rating of the power supply wires insulation must suit this application, or the wiring protected by insulating sleeving with an appropriate temperature rating if it can make contact with the internal storage cylinder. The temperature of the internal storage cylinder can reach 95°C during its operation.

The water heater is more suited for the booster heating unit to be connected to either a continuous, or a time of use, or an extended Off-Peak (overnight and day) electricity supply. A timer can also be used to control the boosting periods and help maximise solar savings. Refer to [“Booster Control”](#) on page 23.

The booster heating unit may be connected to an Off-Peak (overnight) electricity supply, however this will only allow the booster to heat the water overnight. If this type of connection is considered, care must be taken to ensure there is sufficient boost capacity to meet the household’s full day and night’s hot water supply during periods of no or low solar gain, particularly in cold weather. [Temperature Redistribution](#) (refer to page 11) is more evident with this type of electricity supply connection and its implications should be discussed with the householder. Discuss the power supply and hot water usage requirements with the householder.

If water and / or power are not available on completion of installation, leave the isolation switch in the meter box in the off position and place a warning label “Do not turn on electricity until the water heater is filled with water and the water heater has been commissioned” on the electrical isolating switch.

Lightning Protection

If the national or local installation codes or Regulatory Authorities require a Lightning Protection system be installed, then an equipotential connection must be provided between the metal pipes of the solar circuit and the common earthing system as well as between collector and tank using a 16 mm² minimum cross-section copper yellow-green conductor.

If there is an existing lightning protection system (LPS), the hot water system may be integrated with it – seek agreement from a structural engineer or the building owner. The hot water system may be earthed using a stake, with the earth electrode positioned outside the walls of the building.

The hot water system earth electrode should be connected to the common building earthing system using an equipotential conductor also of 16 mm² minimum cross-section.

Any lightning protection work must be carried out exclusively by a competent company or persons.

Thermostat Setting

The thermostat is adjustable from 60°C to 70°C. The factory setting of the thermostat is 60°C. The thermostat is adjusted by turning the adjuster anticlockwise to decrease the temperature setting and clockwise to increase the temperature setting. Only adjust the temperature setting when the isolating switch is switched off at the switchboard.

For reasons of safety and economy, we advise the thermostat be set at the lowest temperature that will provide sufficient hot water during periods when boosting is required. It is recommended the thermostat is set at 60°C to maximise solar contribution. Discuss the thermostat setting requirements with the householder.

The thermostat has a safety cut-out (also called an over-temperature energy cut-out) that will de-energise the element should the temperature within the tank reach 83°C whilst the element is activated. This safety cut-out is not resettable. This cut-out is of a type that will not activate due to solar heating of the water in the storage tank above this temperature whilst the element is not energised.

Booster Control

The isolating switch(s) installed at the switchboard and adjacent to the solar storage tank (if installed) should be left switched on.

Leaving the isolating switch(s) switched on will also provide a sufficient period of time each day for the booster heating unit to operate, if required, to satisfy the requirements of AS 3498.

Timer Control Switch

A suitably rated timer control switch can be installed and will help maximise energy savings with an electrically boosted solar water heater connected to a continuous, time of use or extended Off-Peak (overnight and day) electricity supply.

If used with an extended Off-Peak (overnight and day) electricity supply, the timer switch should:

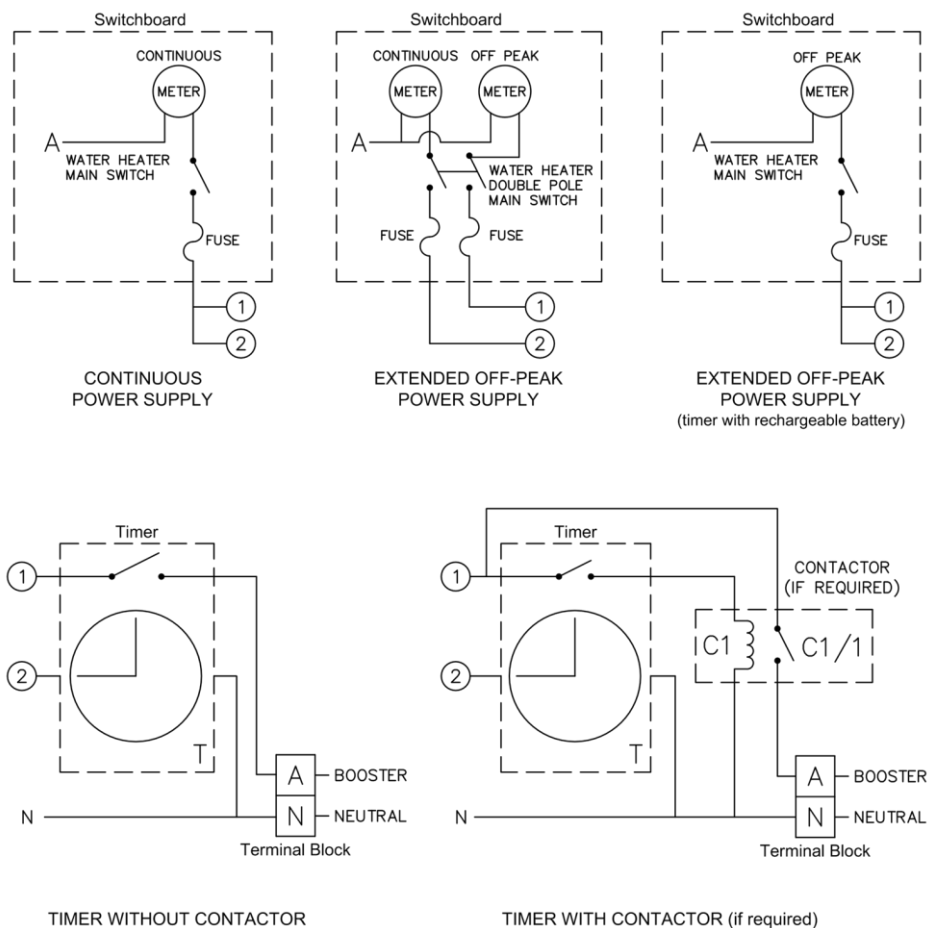
- Be operated by a continuous power supply on its own circuit from the switchboard with the booster heating unit operated by the Off-Peak power supply.

A double pole isolating switch is required to be installed at the switchboard to simultaneously isolate both circuits.

Or

- Be of a type which has an internal rechargeable battery to keep time when the power supply is not available to the timer.

Timer Control Switch Wiring Diagram



Refer to “Programming the Timer” on page 13.

Plumbing

All plumbing work must be carried out by a qualified person. All installations are to be in accordance with national and local codes and regulatory authority requirements applicable in your area. In Australia, this must also be in accordance with Standards AS/NZS 3500.4 and all local codes and regulatory authority requirements. In New Zealand, the installation must conform to Clauses G12 and H1 of the New Zealand Building Code.

Note that any pipes that are required to enter to the house either through a wall, ceiling cavity or roof need to be fully sealed and waterproofed and should comply with local building codes and practices.

⚠ Warning: Plastic pipe work should not be used between this water heater and a temperature limiting device or a hot water outlet if a temperature limiting device is not installed.

This water heater can produce water at a temperature and pressure which can exceed the performance limits of plastic pipe. This may result in pipe work failure leading to severe water damage to the property. If plastic pipe is used as a hot water pipe in the property, then a temperature limiting device must be installed between the water heater and this pipe work.

Note: The solar storage tank of a solar water heater should not be installed as part of a circulated hot water flow and return system in a building. The benefits of solar gain will be significantly reduced. If a circulated flow and return system is required, it is necessary to install a secondary water heater in the circulated flow and return system and supplied from the solar water heater. The flow and return lines connect to the secondary water heater, not the solar storage tank.

This water heater is intended to be permanently connected to the water mains and not connected by a hose-set. A braided flexible hose or semi-flexible connector may be used for connection to the water heater, where permitted by AS/NZS 3500.4.

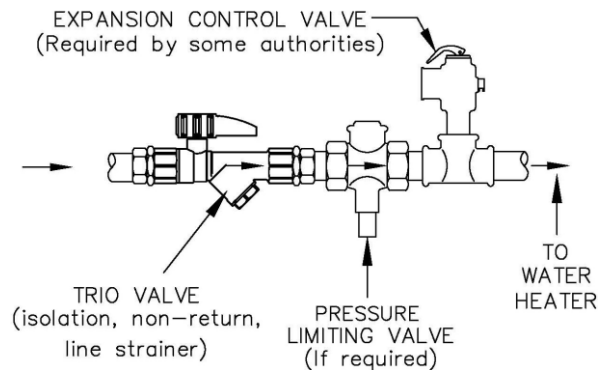
WATER PRESSURE

Refer to local plumbing codes (e.g. AS/NZS3500.4) for specific requirements of permissible supply pressure and associated reduction/limiting valve type applicability.

COLD SUPPLY LINE VALVE LOCATION

Solahart supply a TRIO valve (part no 203701) in the parts kit. The TRIO valve is a combination cold water isolation valve, non-return valve and water strainer and enables the water to be turned off for servicing purposes. This must be installed on the cold water line to the water heater. The ECV must always be installed after the TRIO valve. An acceptable arrangement is shown in the diagram.

The TRIO valve and expansion control valve must be accessible from ground or floor level to enable homeowner operation without the need for a ladder. They must not be installed either on the roof or in the ceiling space, unless it is an accessible trafficable area or local regulations allow it to be installed in these locations. Extend the cold water line to the cold water inlet fitting on the solar storage tank.



TEMPERATURE PRESSURE RELIEF VALVE

A combined temperature and pressure relief (TPR) valve (Part No. 451104) is to fitted to the connection end of the tank to limit both the tank water pressure to 1000 kPa and the tank water temperature to 99°C. The temperature pressure relief valve is supplied in the pipe kit. The temperature pressure relief valve must be fitted to the end of the hot water outlet Tee before the water heater is operated, except where the storage tank is vented to atmosphere through an open pipe. Before fitting the relief valve, make sure the probe has not been bent.

To fit the relief valve:

- Seal the thread with an approved thread sealant such as Teflon tape - never hemp. Make sure tape does not hang over the end of the thread.
- Hand tighten the valve into the hot water outlet Tee (refer to “[Connection Details](#)” page 48).
- Using a spanner engaged on the valve’s spanner flats and applying medium pressure to tighten, turn the relief valve an additional ½ to 1 ½ turns to secure and make the joint water tight, leaving the valve drain pointing downwards towards the rear of the storage tank and away from the electrical cover.

⚠ Warning: Do not use a pipe wrench or poor fitting tool on the valve body nor over tighten the valve, as this could damage the valve and prevent safe operation.

- Operate the easing lever on the valve to check the smooth operation of the valve plunger. It is very important the lever is raised and lowered gently. The lever should move smoothly and without undue force.

- If the lever cannot be moved or is jerky in its movement, then the valve has been damaged and must be replaced.
- A copper drain line must be fitted to the temperature pressure relief valve (refer to "[Relief Valve Drain](#)" on page 25). The drain line **must not** be installed in front of or prevent access to the electrical cover of the water heater.
- The valve must be insulated with closed cell polymer insulation or similar (minimum thickness 9 mm) and the insulation installed so as not to impede the operation of the valve.

The insulation must be weatherproof and UV resistant if exposed.

EXPANSION CONTROL VALVE

An RMC H50 Expansion Control Valve (part no 451103) is supplied in the pipe kit and Solahart recommend its fitment in all instances. Install the expansion control valve using a brass Tee, brass union and brass nipple on the cold water line to the water heater.

Local regulations may make it mandatory to install an expansion control valve in the cold water line to the water heater. In other areas, an ECV is required if the saturation index is greater than +0.4. Refer to "[Saturation Index](#)" on page 17.

The expansion control valve must always be installed after the TRIO valve (part no 203701) or non-return valve and be the last valve installed prior to the water heater. Refer to "[Cold Supply Line Valve Location](#)" and diagram on page 24. A copper drain line must be fitted to the expansion control valve. Refer to "[Relief Valve Drain](#)" on page 25.

The expansion control valve and its easing gear must be accessible from ground or floor level. It must not be installed either on the roof or in the ceiling space, unless it is an accessible trafficable area or local regulations allow it to be installed in these locations. Extend the cold water line from the expansion control valve to the cold water inlet fitting on the water heater.

The valve, if installed within 500 mm of the water heater, must be insulated with closed cell polymer insulation or similar (minimum thickness 9 mm) and the insulation installed so as not to impede the operation of the valve. The insulation must be weatherproof and UV resistant if exposed.

RELIEF VALVE DRAIN

DN15 copper drain lines must be fitted to the temperature pressure relief valve and expansion control valve. Connect the drain lines to the valves using disconnection unions. The drain line from the valve to the point of discharge should be as short as possible, have a continuous fall all the way from the water heater to the discharge outlet and have no tap, valves or other restrictions in the pipe work.

A drain line from a relief valve must comply with the requirements of AS/NZS 3500.4. A drain line must be no longer than 9 metres with no more than three bends greater than 45° before discharging at an outlet or air break. The maximum length of 9 metres for a drain line is reduced by 1 metre for each additional bend required of greater than 45°, up to a maximum of three additional bends. Where the distance to the point of final discharge exceeds this length, the drain line can discharge into a tundish.

Subject to local regulatory authority approval, the drain lines from the temperature pressure relief valve and expansion control valve from an individual water heater may be interconnected.

The outlet of a drain line must not discharge onto roofing materials, roof gutters or onto paved areas. It must be in such a position that flow out of the pipe can be easily seen, but arranged so discharge will not cause injury, damage or nuisance. The termination point of a drain line must comply with the requirements of AS/NZS 3500.4.

In locations where water pipes are prone to freezing, drain lines must be insulated, must not exceed 300 mm in length and are to discharge into a tundish through an air gap of between 75 mm and 150 mm. If a drain line discharges into a tundish, the drain line from the tundish must be not less than DN20. The drain line from a tundish must meet the same requirements as for a drain line from a relief valve.

Where a drain line crosses over a metal roof, the pipe work must be fully insulated with weatherproof lagging to offer corrosion protection to the metal roof against water runoff over the copper pipe. The insulation must be UV resistant if exposed.

⚠ Warning: As the function of the temperature pressure relief valve on this water heater is to discharge high temperature water under certain conditions, it is strongly recommended the pipe work downstream of the relief valve be capable of carrying water exceeding 93°C. Failure to observe this precaution may result in damage to pipe work and property.

SUPPLEMENTARY ENERGY SUPPLIES – CONSIDER THE TPR VALVE RATING

The standard TPR valve that is fitted to the tank is rated at 10 kW. Supplementary energy supplies giving a combined total heat input in excess of 10 kW including the electric booster should not be fitted to the water heater unless the TPR valve is replaced with another of a larger capacity.

HOT WATER DELIVERY AND TEMPERATURE LIMITING DEVICES

⚠ Warning: This water heater can deliver water at temperatures which can cause severe scalding. This water heater can deliver hot water at temperatures up to 60°C to 75°C during normal operation, and on occasion up to around 90°C during periods of high solar radiation conditions and reduced hot water usage. These temperatures are sufficiently hot to cause severe scalding. Water at this temperature may be plumbed to fixtures where water hotter than 50°C is allowed, such as the kitchen and laundry, after ensuring all pipe work, fixtures and fittings are suitable for at least 95°C.

⚠ Warning: Plastic pipe work should not be used between this water heater and a temperature limiting device or a hot water outlet if a temperature limiting device is not installed.

The installing plumber may have a legal obligation to ensure the installation of this water heater meets the water temperature delivery requirements of the Plumbing Code of Australia, or other plumbing codes applicable in the area, so that heated water delivered to fixtures and appliances used primarily for personal hygiene is at a temperature which is unlikely to scald.

It is necessary and we recommend that a temperature limiting device be fitted between the water heater and the fixtures and appliances used primarily for personal hygiene such as in a bathroom, ensuite, public amenities or other ablution areas, to reduce the risk of scalding. Refer to plumbing codes applicable in the area to see if a temperature limiting device is required for this installation for the supply of hot water from the solar water heater.

For safety reasons Solahart recommends the fitment of a temperature limiting device in all instances. A temperature limiting device is not covered by the Solahart warranty.

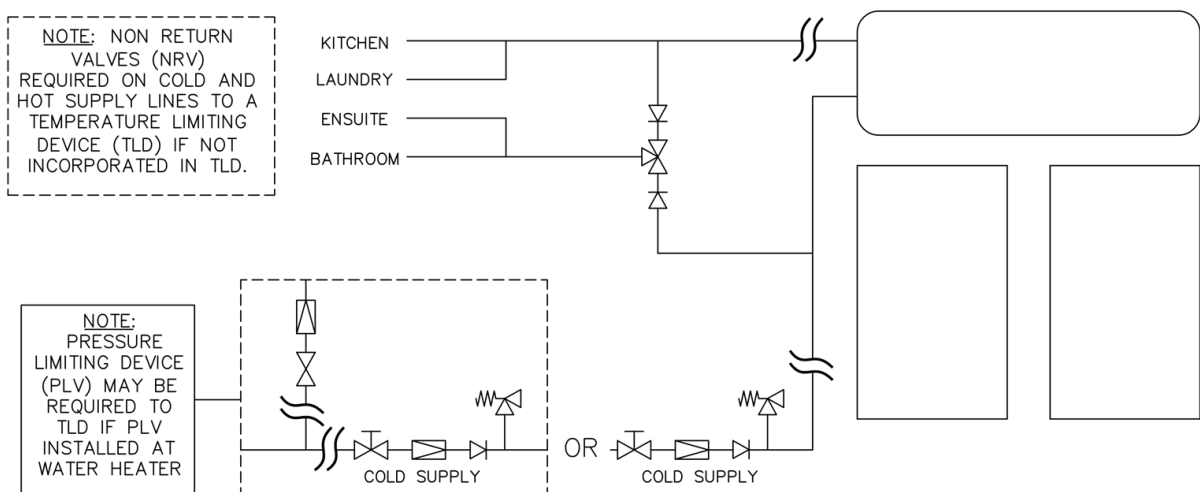
The temperature limiting device must be of a type suitable for use with a solar water heater. Refer to the manufacturer’s specifications of the temperature limiting device.

If there is a separate higher temperature hot water line to a non-ablution area or if a tempering valve is not required, then a primary temperature control valve can be installed to reduce the temperature after the water heater if a 75°C or greater delivery temperature is considered by a consumer to be too high for their needs or if the plumbing materials used in the heated water system are not rated to carry 75°C or higher water temperature.

Where a temperature limiting device is installed adjacent to the solar water heater, the cold water line to the temperature limiting device can be branched off the cold water line either before or after the isolation valve, pressure limiting valve, non-return valve and expansion control valve to the water heater.

The expansion control valve must always be installed after the non-return valve and be the last valve prior to the solar storage tank.

If a pressure limiting valve is installed on the cold water line to the solar water heater and the cold water line to a temperature limiting device branches off before this valve or from another cold water line in the premises, then a pressure limiting valve of an equal pressure setting may be required prior to the temperature limiting device (refer to the temperature limiting device’s installation manual for detail of acceptable pressure differentials).



Two Temperature Zones Using a Temperature Limiting Device

PIPE SIZES AND PIPE WORK

To achieve true mains pressure operation, the cold water line to the water heater should be the same size or bigger than the hot water line from the water heater.

The pipe sizing for hot water supply systems should be carried out by persons competent to do so, choosing the most suitable pipe size for each individual application. Reference to the technical specifications of the water heater and local regulatory authority requirements must be made.

Exposed pipe work between the solar storage tank and the penetrations through the roofing material should be kept to a minimum to maintain the aesthetics of the installation.

Pipes must not be installed in direct contact with metal roofs. Where it is necessary to run piping across a metal roof, it must be fixed above the roof and surrounded with weatherproof insulation of a minimum thickness given in AS/NZS 3500.4. The insulation must be UV resistant if exposed. The insulation is to assist in freeze protection and to protect the metal roof against corrosion by water runoff over the copper pipe. Consideration should be made for thermal expansion and contraction of the roof material.

Note: Penetrations through the roofing material are to be:

- at the high point of the roof tile or metal sheet;
- made neatly and kept as small as practicable;
- waterproofed upon installation of the hot and cold pipes.

Pipe work, including that within the roof space, is to be securely fixed to prevent vibration.

IN-SERIES BOOSTER (IF INSTALLED)

The pipe work between the solar storage tank and an in-series booster has a minimum recommended pipe size of DN20, **MUST BE** of copper and be fully insulated with a closed cell type insulation or equivalent and in accordance with the requirements of AS/NZS 3500.4.

The insulation must be weatherproof and UV resistant if exposed. The insulation must be fitted up to the connections on both the solar storage tank and the in-series booster.

An isolation valve may be installed on the solar preheat water line to the in-series booster. The isolation valve must be of a full flow type if the in-series booster is a continuous flow water heater.

EXTERNAL PIPE INSULATION

Refer to local plumbing codes (e.g. AS/NZS 3500.4) for the requirement for insulation of external pipe work.

Solahart recommends:

- That all hot water pipe work from the water heater should have closed cell insulation of minimum 13 mm thickness. Thicker insulation may be required on external pipes to comply with the energy efficiency requirements of AS/NZS 3500.4 in certain regions. Insulation should be suitable for the temperature of operation (i.e. at least 90°C for hot water supply pipes).
- Where potable water piping is in an external location or attic space where the temperature can be as low as -7°C (18°F) it should be insulated with a minimum 19mm closed cell insulation; where the temperature can fall to -11°C (12°F) the insulation thickness should be increased to 38mm.
- Insulation in external locations should be weatherproof and resistant to UV radiation.
- Insulation will protect against burns where the water heater is in a trafficable location.

STOVE COIL BOOSTERS

Manually fed boosters such as stove coils, back boilers or coils in open fired grates are not permitted to be connected to Solahart water heaters unless the storage cylinder is open vented. Such auxiliary energy sources must not be connected into the closed circuit. In Australia, refer to AS/NZS 3500.4 for additional information. Refer also to your local water authority requirements for details of vent design, header tank and reduction valves.

PACKING, STORAGE & TRANSPORTATION

All Thermosiphon products are to be kept in the original packaging materials and should be transported or stored in the vertical position - note there is an arrow to indicate the 'UP' direction for Tanks. They may be stored horizontally in the correct orientation, as shown on the packaging, if handled carefully with correct lifting equipment.

SYSTEM DECOMMISSIONING

Decommissioning of the system should be undertaken by an installer or suitable qualified plumber and / or electrician (if required). All materials used in this product can be passed to your local material recycling centre for disposal - refer to local council regulations for details.

Thermosiphon Pipe Shroud Cover

The function of the Pipe Shroud Cover is to cover the plumbing pipe-work and electrical connections to the thermosiphon tank, including the drain line from the temperature pressure relief valve, without restricting pipe runs for the installation or the operation of the TPR valve.

KIT CONTENTS

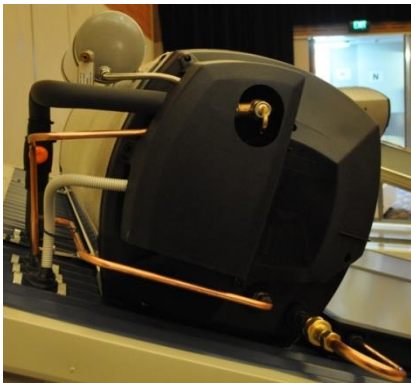
The Thermosiphon Pipe Shroud Cover Kit consists of:

Component Part No	Kit 12104050 Thermosiphon Pipe Shroud Cover Kit Component Description	Quantity
208002	Pipe shroud cover	1
330370	Screw 8G x ½” pan head stainless steel	5
207501	Installation instructions	1

PIPE WORK AND CONNECTIONS

The installation of the pipe work and electrical connection is to be planned so their position aligns with the cut-outs at the rear of the Pipe Shroud Cover.

- The pipe work should also be positioned with any roof penetrations behind the solar storage tank to maintain the aesthetics of the installation.
- The pipe work, including the TPR valve drain line, shall not obstruct the hexagonal electrical cover.
- The pipe work is to be installed to allow the fitting of the Pipe Shroud Cover without any distortion.
- The TPR valve drain line must have a continuous fall and be installed in accordance with the installation instructions.
- The installation of valves must be in accordance with national and local codes and regulatory authority requirements.
- Penetrations through the roofing material must be at the high point of the roof tile or metal sheet, made neatly and kept as small as practicable and be waterproofed.



Installation of Pipe Shroud Cover with a HartStat Over Temperature Protection System



Installation of Pipe Shroud Cover without a HartStat Over Temperature Protection System

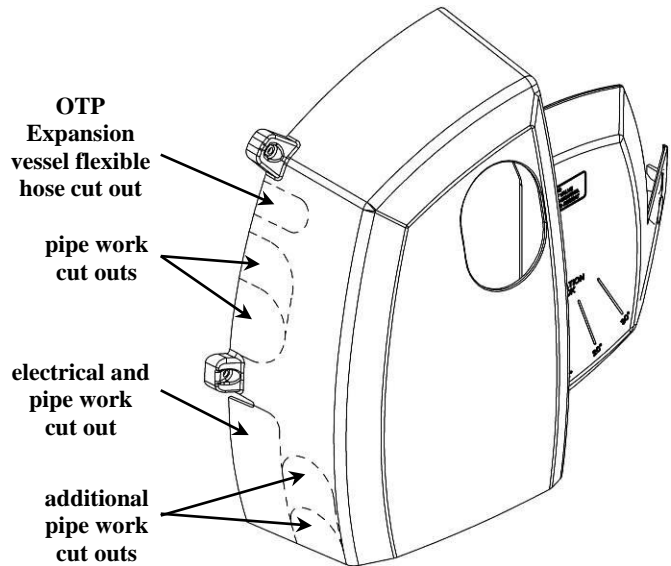
FITTING THE PIPE SHROUD COVER

The Pipe Shroud Cover contains a number of preformed cut outs.

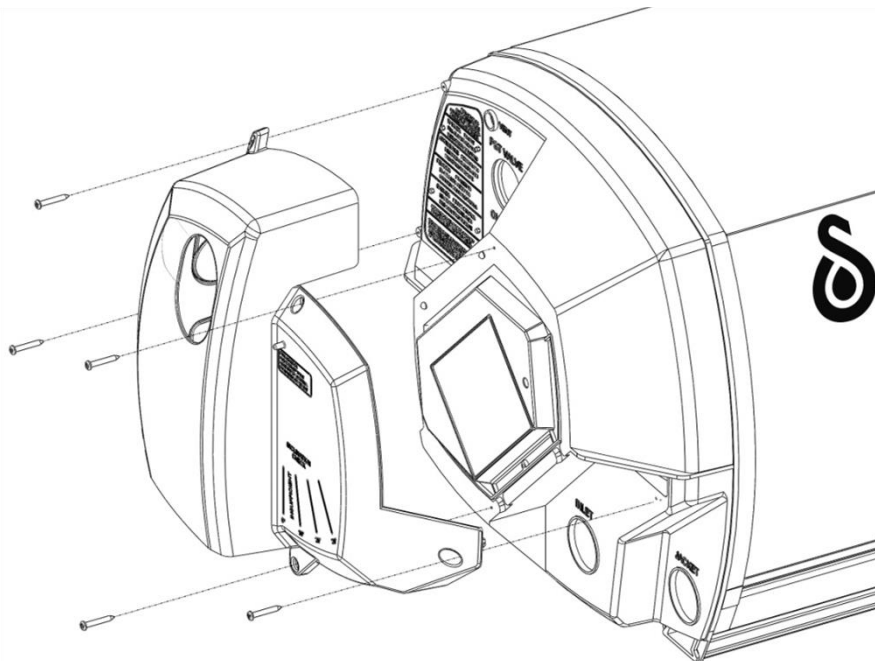
- Each cut-out can be removed using a pair of snips by following the preformed cut-out lines.
- Remove only the necessary cut-outs to suit the installation.
- **Caution:** Practise safe working procedures when using the snips and care is to be taken to avoid potential injury from cut edges.
- Additional cut outs other than those moulded into the cover should not be made.

To fit the Pipe Shroud Cover to the jacket end after the plumbing pipe work and electrical connection has been made:

- Position the cover so the five connection points line up over the five screw penetrations in the tank end cover.
- Screw in the five screws provided, taking care not to over tighten the screws.
Only use the screws provided.



Note: The Pipe Shroud Cover when fitted must be flush with the jacket end of the solar storage tank. There is to be no distortion of the cover due to poorly installed pipe work. Correct the pipe work if the cover does not fit correctly.



To Turn Off The Water Heater

If it is necessary to turn off the water heater on completion of the installation, such as on a building site or where the premises is vacant, then:

- Ensure the collectors are covered with an opaque material,
- Switch off the electrical supply at the water heater isolating switch(s) on the switchboard and at the isolating switch(s) at the solar storage tank(s) (if installed),
- Close the cold water isolation valve at the inlet to the water heater(s) to shut down the entire system, or;
- Close the isolation valves on the cold and hot water branches to shut down an individual water heater in a bank.

For [installation checklist](#) please see page 52.

INSTALLATION INSTRUCTIONS – CLOSED CIRCUIT SERIES

⚠ Warning: The tanks and collectors are heavy. Improper lifting techniques could result in personal injury during installation. It is the installer's responsibility to use only approved lifting and safety devices and techniques when lifting collectors and tanks on roofs.

⚠ Warning: Do not remove the solar collector packaging completely prior to the installation as the solar collector surface can become very hot. This will assist in preventing potential personal injury and also prevent premature heating of the Hartgard solution prior to completion of the commissioning process. Remove only sufficient packaging material to enable the installation of the solar collectors.

Select the location of the storage tank. The front mounting foot of the tank should be positioned directly over a tile batten. Remove several tiles to expose the rafters and this batten.

Measure down 2050 mm from the centre of the batten to determine the location of the collector rail (refer to drawings, Page 49), mark this location. Remove several roofing tiles from this location to expose the rafters. If more than two solar collectors are installed, locate the additional collector rail from the parts kit adjacent to the first collector rail and join together using the drive cleat supplied in the parts kit.

Note: The collector / tank straps are to be fitted to the collector rail(s) before fixing the straps to the rafters.

Determine which slots in the collector rail(s) will be used for the collector straps. Hook two collector straps to the first bottom collector rail and one collector strap to an additional single collector rail (short) (if used). Refer to [“Hooking Collector / Tank Strap to Collector Rail”](#) on page 49 and [Detail A](#) on page 49.

Line up the straps with the rafters. After positioning the rail level, raise the left hand side 12 mm for each collector fitted (i.e. 12 mm for a single collector system, 24 mm for a two collector system, 36 mm for a three collectors etc) and fix the straps to the rafters. Replace the tiles.

Move back up to where the storage tank is to be positioned. If used, fit the tank flashing sheet under the top of the solar collectors and extend up the roof to the top of the solar storage tank location. Place the flashing over this row of tiles and tuck the top of the flashing under the row above.

Now using a lifting device, lift the collectors onto the roof and place them carefully into the collector rail. Remove the red transit plugs from the collector sockets.

Join the collectors together using the collector connector assemblies (Part No. 337121 or 203000). On systems that use conetite fittings, ensure the fittings are fully inserted into the sockets before tightening the nuts. Only medium spanner pressure will be required. The conetite fittings should be used only once. If for any reason, assemblies with conetite fittings need to be removed, replace them completely with new assemblies.

Fit the fill assembly (Part No. 337134 or 22036) and the collector bung assembly (Part No. 337135) into the bottom left and top right hand corners (respectively) of the left and right hand collectors (respectively) using medium spanner pressure. Centralise the collectors on the rail, and lock the collectors to the rail with the collector clamps (2 per collector) and tighten, using the nuts and bolts provided.

For roof installations, slide the tank-to-collector spacers (Part No. 337144 or 204401) over the top of the collectors. These should be located 200 mm from the outer edge of the collectors, and on a high spot of the tiles (or profile for metal roofs).

Now using a lifting device, lift the tank onto the roof. Place the tank onto an aluminium flashing (if used) and locate the tank central to the collectors before sliding it down onto the spacers.

Secure the tank to the roof rafters in a similar manner to that for the collectors, using the tank straps (Part No. 204600) and the aluminium clamps (Part No. 330872). Loosely attach the tank clamps to the rear foot of the tank base, and clip in and bolt the tank straps. Refer to [“Hooking Collector / Tank Strap to Tank Clamp”](#) and drawings on page 50. Ensure the bolt heads fit into the valley of the tile.

Remove the yellow instruction label from the cold pipe. Fit the cold pipe first at the right hand side of the tank and insert the other end of the pipe to the lower collector socket and tighten. Remove the yellow instruction label from the hot pipe. Fit the hot pipe first at the left hand side of the tank. Tighten collector-side nut, before tightening tank-side nut. The floating conetite should always be on the tank-side. Note that neither the hot nor the cold pipes (collector return and flow lines) require insulation on these systems. It is recommended however insulation be fitted to these should the system be installed on a metal or trafficable roof.

When in position, secure the tank straps to the roof rafters as for the collector strap. Ensure the straps are tight. Replace the roof tiles. Fit the Temperature Pressure Relief Valve (Part No. 451104) into the tank as per water connection diagrams on page 48.

If the installation involves the HartStat System this should now be fitted. Refer to “[Systems Installed with an Over Temperature Protection \(OTP\) System](#)” on page 32 and to the installation instructions provided with the HartStat Kit for details.

FIBRE CEMENT OR METAL SHEET ROOFING

Select a location for the storage tank, close to a purlin. Avoid locating tank at mid-span of sheeting. Fixing and assembly procedures are similar to that detailed for tiled roofs, with the exception that the tank straps and the collector straps are fixed with coach screws to the purlins below.

METAL TILED ROOF

Select a location for the storage tank. The front mounting foot of the tank should be positioned directly over a tile batten. Fixing and assembly procedures are similar to that detailed for tiled roofs, except that the tank and collector straps are fixed with spring head galvanised nails directly through the metal tiles into the rafters below. Seal under the straps with a weatherproof mastic sealer.

INSTALLATIONS USING STANDS

Refer to installation sheet in the stand kit.

SPECIAL CONSIDERATIONS FOR COLD CLIMATES

In areas where air temperatures fall below -15°C at any time or where snow will remain on the ground for more than 24 hours continuously, refer to your Solahart dealer for specific recommendations on suitability of location.

In areas subject to heavy snowfalls, care should be taken that snow cannot build up behind the tank and that the brackets installed are capable of withstanding the expected snow loading. In these cases install the tank as close as possible to the roof ridge.

Ensure that pipes and valves are located away from freeze locations wherever possible. Note that freezing of the valves can permanently damage the valves. Take particular care at roof penetrations. Install the TRIO Valve and Cold Relief Valve indoors (e.g. in the laundry) or in other locations not subject to freezing, but NOT in the ceiling space. If these valves are located external to the building they must be insulated with at least 19 mm of elastomeric closed cell insulation, and sealed to prevent entry of moisture.

In locations frequently subject to atmospheric temperature below -10°C , hot and cold pipes and valves may freeze even when insulated. It is recommended that in these locations, the cold pipes and valves to the Solahart storage tank and the hot pipe from the tank should have electric heater tape under the insulation. The electric heater tape should have a heat output of between 10 and 20 W/m. The tape should be a self-limiting tape such as “Raychem” and should be controlled by a thermostat set at 0°C . Connect the heater tape to a normally ON power supply.

FILLING AND COMMISSIONING OF THE STORAGE TANK

⚠ Warning: The power supply to the water heater must not be switched on until the water heater is filled with water and a satisfactory megger reading is obtained.

Turn on at least one hot water outlet tap - preferably over a bath or laundry basin. Open the mains water supply tap on the line to the water heater and allow the water to fill the storage cylinder displacing air out of the top of the cylinder through the open tap. As soon as water flows freely (without air bursts) from the tap, close the tap and allow the cylinder to pressurise. Check all joints for water tightness.

Turn on the electric power to the booster element ensuring that the power is correctly connected i.e. ‘Active’ line to ‘Active’ terminal etc.

Operate both pressure relief valves’ easing gears to ensure that the valves are functional. The storage tank is now filled and ready to operate as an electric water heater. To operate as a solar water heater, the closed circuit must be commissioned by an authorised Solahart installer or service contractor.

FILLING AND COMMISSIONING THE CLOSED CIRCUIT

The solar collectors and tank heat exchanger jacket are connected together to create a sealed, closed circuit that is entirely separate from the potable water in the storage cylinder. The circuit is filled with ‘Hartgard’ fluid. Under no circumstances can any fluids other than ‘Hartgard’ be used as the heat transfer fluid. Only potable water can be used in conjunction with ‘Hartgard’. If potable water cannot be sourced, then distilled or deionised water should be used.

Only Solahart trained and authorised installers are permitted to fill the closed fluid circuit. Refer to your Solahart dealer for more information. For authorised installers, a special set of instructions and installation tools are provided.

⚠ Warning: The storage tank must be filled with water and pressurised before filling the closed circuit. Filling the storage tank provides water pressure inside of the cylinder, protecting it from the pressure within the closed circuit during the commissioning process. Not filling the storage tank with water may result in damage to the cylinder lining.

The solar collectors must be covered with an opaque material. Covering the collectors prevents solar gain and heating from occurring, keeping the collectors and closed circuit fluid cooler during the commissioning procedure. This will reduce the risk of scalding and burn injury by preventing the collector surface and closed circuit fluid from becoming very hot.

Systems Installed with an Over Temperature Protection (OTP) System

An Over Temperature Protection system incorporates a HartStat valve. The HartStat valve is a temperature actuated valve that is designed to close when exposed to high temperatures.

⚠ Warning: Apart from being an occupational health and safety concern to the installer, if the solar collectors and HartStat valve are not covered during the commissioning procedure of the closed circuit of a thermosiphon unit, it is possible for the solar collectors to generate enough heat to close the valve. This will create a vapour lock that prevents complete filling of the closed circuit.

If the HartStat valve was to close and the closed circuit is only partially filled the solar performance can be severely reduced resulting in a no hot water complaint. In addition, excessive noise can be generated from the system leading to possible disturbance and irritation to the householders.

To avoid premature closure of the HartStat valve, the following instructions **MUST BE** followed during the commissioning procedure and charging of the closed circuit.

Ensure the collectors are covered with the carton material. If not, securely cover the collectors with an opaque material. This is to prevent solar gain and heating of the closed circuit fluid during the commissioning procedure.

Cover the HartStat valve with a cloth soaked in cold water. This is to keep the valve as cool as possible and ensure it remains in the open position during the commissioning procedure.

Closed Circuit Fluid and Concentration

The Hartgard heat transfer fluid concentrate is supplied a 4.5 litre bottle. A minimum of one (1) complete 4.5 litre bottle of concentrate is recommended and should be used in each system as standard where the ambient temperature does not fall below -7°C. A Hartgard concentration greater than 20% is required to suit ambient temperatures below -7°C and the volume used may need to be increased in the closed circuit.

The volume of Hartgard heat transfer fluid concentrate to be used in the closed circuit of each system is given in the table below. Check this volume against the closed circuit volume required for the system to ensure the correct amount of fluid has been added. Failure to mix the correct volume of Hartgard concentrate may void the Solahart warranty. Solution concentrations over 50% become proportionally less thermally efficient. The Hartgard can be siphoned into the closed circuit system using a known quantity of fluid. Fill the system by the siphon method using a known quantity of fluid.

System Size	Number of SPA2000 or J Collectors	Closed Circuit Volume	4.5 litre* heat transfer fluid concentrate	Heat transfer fluid concentrate volume (litres) for minimum ambient operating temperature			
				-7°C (18°F) 20% fluid concentrate	-13°C (7°F) 30% fluid concentrate	-22°C (-8°F) 40% fluid concentrate	-34°C (-29°F) 50% fluid concentrate
151	1	11.9	33.6%	2.4	3.6	4.8	6.0
181	1	13.4	29.9%	2.7	4.0	5.4	6.7
302	2	19.2	20.8%	3.8	5.8	7.7	9.6
303	3	23	17.4%	4.6	6.9	9.2	11.5

If the system is unable to take the correct amount of fluid then further investigation will be required to determine if the HartStat OTP valve has closed or if there is a blockage in the system.

Note: Closed circuit systems with copper header and riser collectors (Bt, CSA2007, CSA2013, L, LCS) will have a closed circuit volume and percentage fluid concentrate volume (columns 5 to 8) slightly less than the figures in the table above. These systems will also have a 4.5 litre heat transfer fluid concentrate percentage figure (column 4) slightly higher than the figures in the table above.

Instructions detailing the closed circuit commissioning process commences on page 34.

PRECAUTIONS WITH HARTGARD FOR BUILDING WITH RAINWATER TANKS

While Hartgard is non-toxic to humans, it does have an adverse effect on water stored in rainwater tanks. Hartgard will kill microscopic algae that is typically present in rainwater tanks. This may then render the rainwater foul and unfit for human consumption. Solahart recommends that installers ensure that rainwater tanks cannot be contaminated with Hartgard solution. Before installing a closed circuit system, the installer should determine whether the run-off from the roof on which the system will be mounted, is collected in a rainwater tank.

If this is the case, then the section of gutter immediately beneath the proposed location of the new Solahart system should be isolated from the rainwater collection system. This can be done by blocking that section of gutter from the remaining gutter, and fitting a separate down pipe to take any run-off water from that section of roof away to waste. If this is not practical for a specific installation, then the installer should discuss the possible options with the home owner.

This should be done prior to installing the new system, so that any leak or spillage during installation does not make its way into the rainwater tank. If a rainwater tank does become contaminated, then the following actions are necessary to return the water supply to a consumable state.

- a. Correct the leak or spillage.
- b. Wash down the roof area where the spill or leak has occurred.
- c. Flush out the gutters and down pipes.
- d. Empty the rainwater tank, and clean out all algae from the inside of the tank.
- e. Refill the rainwater tank with fresh water.

CLOSED CIRCUIT SYSTEMS – END CAP

The end cap is supplied fitted to the ‘tail’ end of the tank. The end cap used should not need to be removed to complete the installation.

Removing the End Cap

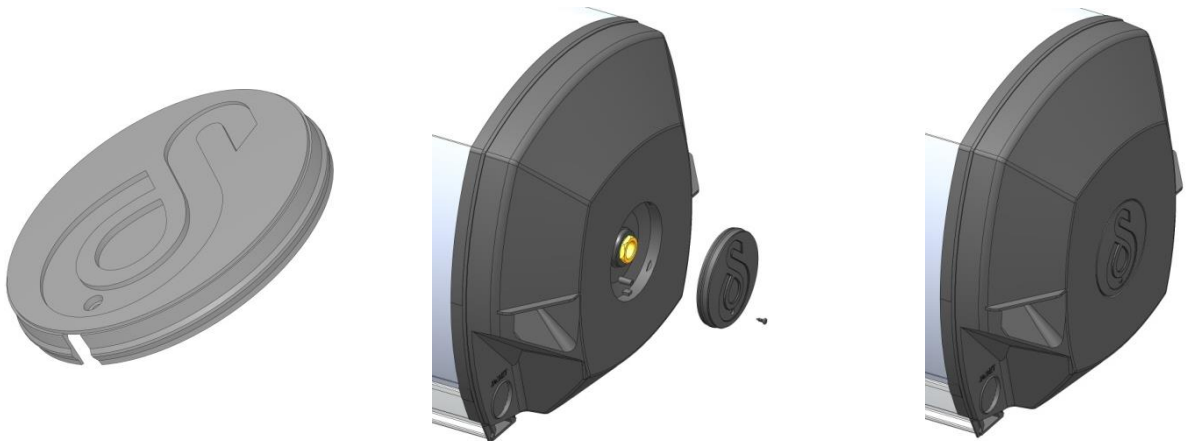
If it is necessary to remove the end cap:

- Remove the screw from the end cap
- Using a flat faced screwdriver, gently lever the end cap out of its recess from the key slot at the bottom of the end cap.

Fitting the End Cap

To fit the end cap:

- Position the end cap in the jacket end recess, lining up the slot at the bottom of the end cap with the key on the jacket end.
- Gently push into the recess so the end cap engages with the ridges on the jacket end.
- Secure the end cap with the screw provided, taking care not to over tighten the screw.
Only use the screw provided.



End cap closed circuit system

Position end cap over recess and insert

Secure end cap with screw

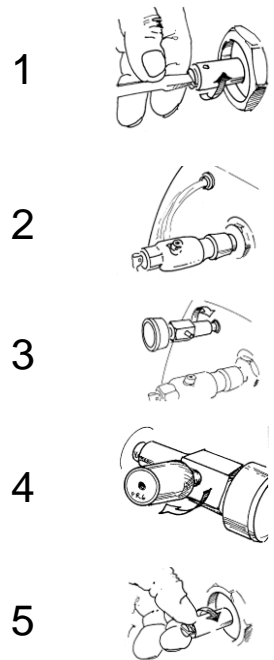
CLOSED CIRCUIT COMMISSIONING PROCEDURE

It is necessary to fill the heat exchanger and solar collectors with closed circuit fluid before the water heater can be operated and solar contribution achieved. Ensure the solar storage tank is filled with water and the solar collectors are covered with an opaque material.

Note: Care must be taken to ensure there is no spillage of the closed circuit fluid onto the roof surface. Any spilled closed circuit fluid must be cleaned up immediately and the roof surface cleaned of any fluid residue.

To fill the heat exchanger:

- Connect a ½” hose to the Valve Drain port of the Fill Drain Valve Assembly (hose to be supplied by installer).
Remove PR6 relief valve from the Tank.
Loosen (but do not remove) the Valve Screw in the Fill Drain Valve Assembly and fill the closed circuit with water through the hose.
- Continue filling until water overflows from the jacket relief valve port and there are no air bubbles in the overflowing water.
- Fit the Test Block and pressure gauge (from the commissioning kit) into the jacket relief valve port.
- Fit the PR6 or PR200 relief valve to the Test Block.
- Tighten the Valve Screw in the Fill Drain Valve Assembly.



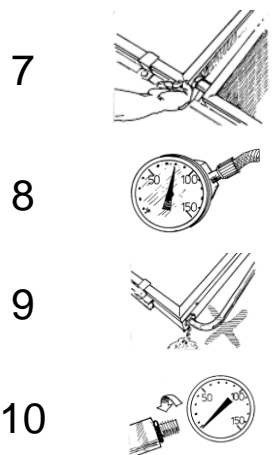
Important: There should be no water spillage, however if more than 0.5 litres of water is spilled, repeat steps 1-5.


- When charging the system using a PR6 Valve, pressurise the system until the PR6 Valve opens or until a pressure of 80kPa is read on the pressure gauge, whichever happens first.
- When charging the system using a PR200 Valve, pressurise the system until the PR200 Valve opens or until a pressure of 170kPa is read on the pressure gauge, whichever happens first.
- Connect a bicycle pump / portable compressor to the Test Block and pressurise the closed circuit until a pressure of 80kPa or 170kPa as applicable is read on the pressure gauge or the relief valve opens, whichever occurs first.
Remove the bicycle pump / portable compressor from Test Block.




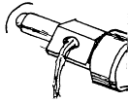
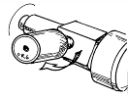
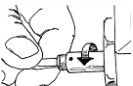
Warning: Do not allow the closed circuit pressure to rise above 200kPa or permanent system damage may occur.

- If the PR6 or PR200 relief valve opens during the pressure test, wait until the valve re-seals before checking all connections later for leaks.
If the valve does not open during the pressure test then check all connections for any evidence of leakage.
- Ensure that the closed circuit pressure remains stable for at least 10 minutes.
- If any leakage is observed at any of the connections, rectify the problem and repeat steps 1 to 8.
- Release the pressure from the closed circuit by removing the PR6 or PR200 relief valve from the Test Block.
Once the pressure is relieved, replace PR6 or PR200 relief valve.



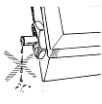




- With the ½” hose connected to the Valve Drain port of the Fill Drain Valve Assembly, loosen (but do not remove) the Valve Screw in the Fill Drain Valve Assembly. 11 

Important: There should be no water spillage, however if more than 0.5 litres of water is spilled, repeat steps 1-5.

- Remove the PR6 or PR200 relief valve and siphon the entire contents of the heat transfer fluid concentrate container into the closed circuit using the ½” hose connected to the Fill Drain Valve Assembly. 12 
- Water will flow from the PR6 or PR200 relief valve port during this operation (4.5 litres for each container of Hartgard). 13 
- When the container is empty, flush approximately 1 litre of clean water through the hose into the collector to ensure all of the Hartgard heat transfer fluid concentrate has been siphoned into the system. Refit the PR6 or PR200 relief valve to the Test Block. 14 
- Tighten the Valve Screw in the Fill Drain Valve Assembly and remove the hose from the Valve Drain port. 15 

Note: Placing an absorbent cloth on the roof under the Fill Drain Valve Assembly prior to removing the hose will assist in catching any spilt closed circuit fluid.

Important: There should be no water spillage, however if more than 0.5 litres of fluid is spilled, repeat steps 1-5.

- Connect a bicycle pump / portable compressor to the Test Block and pressurise the closed circuit until a pressure of 80kPa or 170kPa as applicable is read on the pressure gauge or the PR6 or PR200 relief valve opens, whichever occurs first. Ensure there is no leak at the Fill Drain Valve Assembly. Remove the bicycle pump / portable compressor from Test Block. 16 
- Ensure that the pressure remains stable for at least 10 minutes. 17 
- Release the pressure from the closed circuit by removing the PR6 or PR200 relief valve from the Test Block. 18 
- Remove the Test Block from the tank. 19 
- Fit the PR6 or PR200 relief valve to the jacket relief valve port. 20 

The closed circuit system is now ready for operation.

If the system is ready to be put into operation, remove the solar collector packaging. This must be removed completely prior to the permanent operation of the water heater.

The closed circuit fluid contains food grade additives (rust inhibitor, anti-freeze agent, and colour) and is harmless to the environment. However, it is good practice to recover any excess closed circuit fluid and remove from site. It is important to prevent any of the closed circuit fluid or heat transfer fluid concentrate from getting into a rainwater collection system.

INSTALLATION INSTRUCTIONS – OPEN CIRCUIT SERIES

⚠ Warning: The tanks and collectors are heavy. Improper lifting techniques could result in personal injury during installation. It is the installer's responsibility to use only approved lifting and safety devices and techniques when lifting collectors and tanks on roofs.

⚠ Warning: Do not remove the solar collector packaging completely prior to the installation as the solar collector surface can become very hot. This will assist in preventing potential personal injury during the commissioning process. Remove only sufficient packaging material to enable the installation of the solar collectors.

Select the location of the storage tank. The front mounting foot of the tank should be positioned directly over a tile batten. Remove several tiles to expose the rafters and this batten. Measure 2050 mm down from the centre of the batten to determine the location of the collector rail (refer to drawings, Page 49) Mark this location. Remove several roofing tiles from this location to expose the rafters. If more than two solar collectors are installed, locate the additional collector rail from the parts kit adjacent to the first collector rail and join together using the drive cleat supplied in the parts kit.

Note: The collector / tank straps are to be fitted to the collector rail(s) before fixing the straps to the rafters.

Determine which slots in the collector rail(s) will be used for the collector straps. Hook two collector straps to the first bottom collector rail and one collector strap to an additional single collector rail (short) (if used). Refer to [“Hooking Collector / Tank Strap to Collector Rail”](#) on page 49 and [Detail A](#) on page 49.

Line up the straps with the rafters. After positioning the rail level, raise the right hand side 12 mm for each collector fitted (i.e. 12 mm for a single collector system, 24 mm for a two collector system, 36 mm for a three collector system etc) and fix the straps to the rafters. Replace the tiles (refer to drawings, Page 49).

Move back up to where the storage tank is to be positioned. If used, fit the tank flashing sheet under the top of the solar collectors and extend up the roof to the top of the solar storage tank location. Place the flashing over this row of tiles and tuck the top of the flashing under the row above. Now using a lifting device lift collectors onto the roof. Place the collectors carefully into collector rail. Remove the red transit plugs from the collector with a screwdriver. Silicon O-rings are supplied in the Parts Box and must be fitted at each pipe connection.

Join the collectors using the collector unions provided (Part No. 330695 – screwed fitting, 341390 – conetite fitting). Apply only medium pressure with a spanner to tighten. Centralise the collectors on the rail. Lock the collectors to the rail with the collector clamps (2 per collector). Tighten using the nuts and bolts provided. Fit either the copper blanking discs (Part No. 330606) and collector nuts (Part No. 330600) for collectors with screwed fittings or the collector bung assembly (Part No. 341391) for collectors with conetite fittings into the top left hand corner of the left hand collector and into the bottom right hand corner of the right hand collector.

Now use a lifting device to lift the tank onto the roof. Place the tank onto the aluminium flashing (if used), central to the collectors. Fit the collector hot pipe into the top right hand corner of the right hand collector. Fit the collector cold pipe into the lower left hand corner of the left hand collector. After lining up the connecting pipes with the tank, fit the hot pipe (refer to [“Open Circuit Systems – End Cap”](#) on page 37). Fit the cold pipe to the tank cold inlet socket. Refer to [“Open Circuit Systems – Thermosiphon Restrictor Valve \(TRV\)”](#) on page 38 if a Thermosiphon Restrictor Valve (TRV) is to be installed in the cold pipe.

Secure the tank to the roof rafters in a similar manner to that for the collectors, using the tank straps (Part No. 204600) and the aluminium clamps (Part No. 330872). Loosely attach the tank clamps to the rear foot of the tank base, and clip in and bolt the tank straps. Refer to [“Hooking Collector / Tank Strap to Tank Clamp”](#) and drawings on page 50. Ensure the bolt heads fit into the valley of the tile. Ensure straps are tight. Replace roof tiles.

Fit the temperature pressure relief valve (Part No. 451104) into the tank as per the connection diagram on page 48.

Fit the pipe shroud cover if supplied. Refer to [“Thermosiphon Pipe Shroud Cover”](#) on page 28.

⚠ Warning: Only use components with cones of uncoated DR Brass as part of an open circuit system if LCS collectors are being installed. Coated brass cones must not be used.

Connect the solar cold pipe and the solar hot pipe to the solar collectors. Use the O’rings provided for collectors with screwed fittings. Fit the cold pipe at the left hand side of the tank and insert the other end of the pipe to the lower collector socket and tighten. Fit the hot pipe at the right hand side of the tank. Tighten collector-side nut and tank-side nut. Note that neither the hot nor the cold pipes (collector return and flow lines) require insulation on these systems. It is recommended however insulation be fitted to these should the system be installed on a metal or trafficable roof.

FIBRO CEMENT OR METAL SHEET ROOFING

Select a location for the storage tank close to a purlin. Avoid locating tank at mid-span of sheeting. Fixing and assembly procedures are similar to that detailed for tiled roofs, with the exception that the tank straps and the collector straps are fixed with coach screws to the purlins below (refer to drawings, Page 49).

METAL TILED ROOF

Select a location for the storage tank. The front mounting foot of the tank should be positioned directly over a tile batten. Fixing and assembly procedures are similar to that detailed for tiled roofs, except that the tank and collector straps are fixed with spring head galvanised nails directly through the metal tiles into the rafters below. Seal under the straps with a weatherproof mastic sealer.

FRAMES AND STANDS

Refer to installation sheet in the frame and stand kit.

OPEN CIRCUIT SYSTEMS – END CAP

The end cap is supplied fitted to the ‘tail’ end of the tank. The end cap used on the open circuit system has an opening to enable the solar hot pipe to be connected to the solar storage tank.

Installing the Solar Hot Pipe

When installing the solar hot pipe with the end cap in position, ensure:

- There is suitable access to the flats on the solar hot pipe fitting nut to enable it to be fitted securely
- Scoring of the end cap by the tool does not occur when screwing in the fitting
- The connection does not leak.

Removing the End Cap

The end cap can be removed from the jacket end if required to allow the fitting of the solar hot pipe.

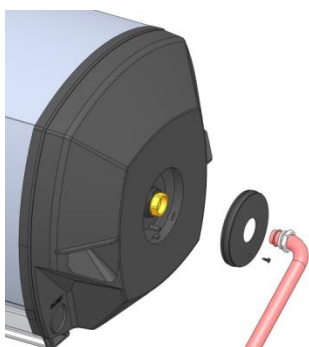
If it is necessary to remove the end cap:

- Remove the screw from the end cap
- Using a flat faced screwdriver, gently lever the end cap out of its recess from the key slot at the bottom of the end cap.

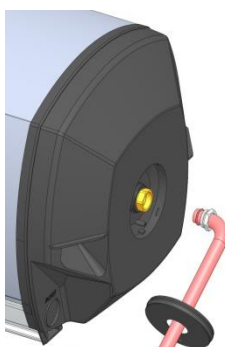
Fitting the End Cap

To fit the end cap with the solar hot pipe:

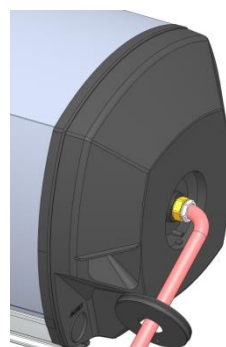
- Place the end cap over the solar hot pipe with the flat face away from the solar storage tank.
It may be necessary to slide the end cap down the solar hot pipe to allow access to the fitting nut on the pipe.
- Fit the solar hot pipe to the solar storage tank.
- Slide the end cap back up the solar hot pipe and position in the jacket end recess, lining up the slot at the bottom of the end cap with the key on the jacket end.
- Gently push into the recess so the end cap engages with the ridges on the jacket end.
- Secure the end cap with the screw provided, taking care not to over tighten the screw.
Only use the screw provided.



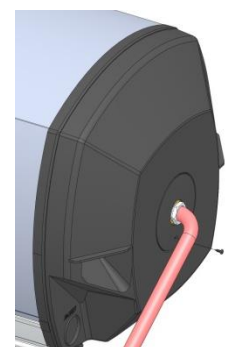
Position end cap and solar hot pipe



Place end cap over solar hot pipe



Fit solar hot pipe to tank



Secure end cap with screw

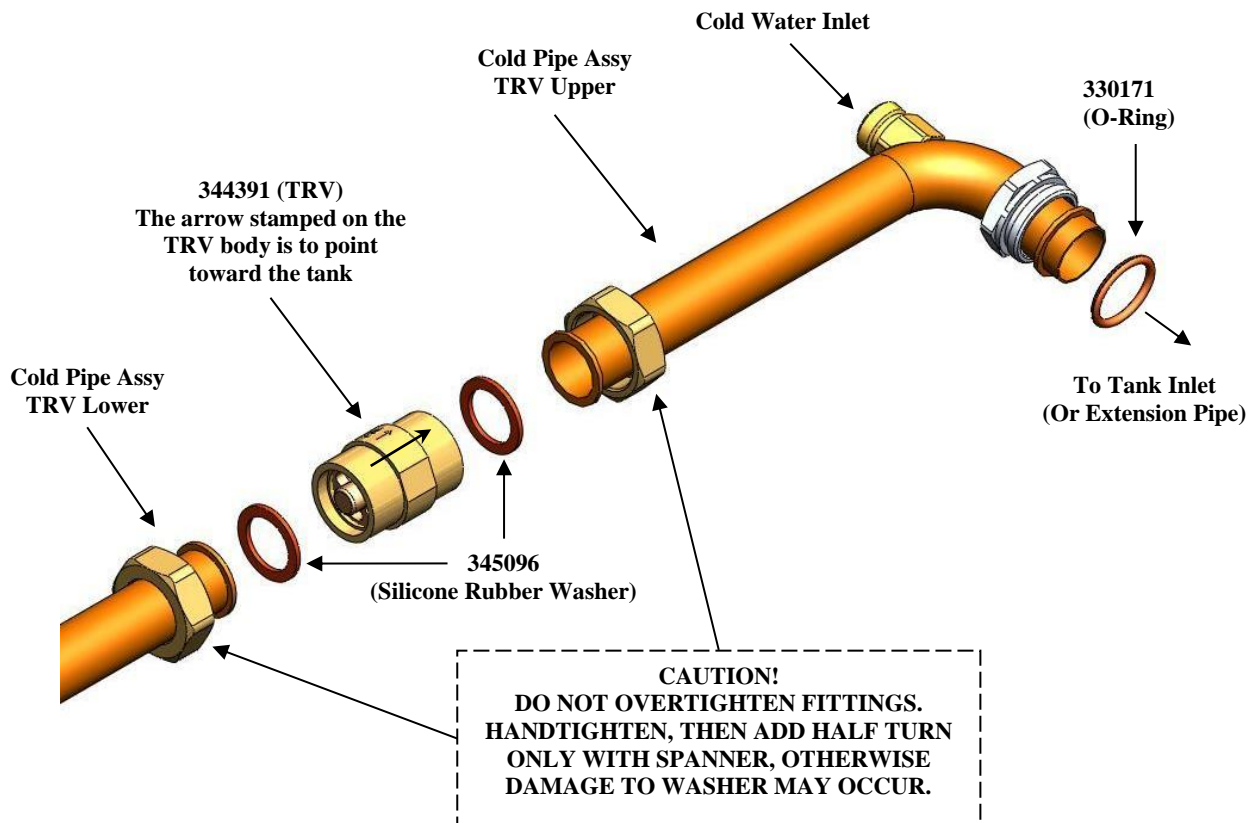
OPEN CIRCUIT SYSTEMS – THERMOSIPHON RESTRICTOR VALVE (TRV)

A Thermosiphon Restrictor Valve (TRV) is available for use on an open circuit system to assist with over temperature protection of the system. The TRV locates in the top end of the cold pipe assembly. A non-standard cold pipe arrangement is required to accommodate the TRV.

In Australia, a TRV must be used on a new installation of a 303 system regardless of the type of collector installed and on a 302 system installed with LCS collectors.

When assembling the cold pipe, ensure:

- A Silicone Rubber Washer is used between the flared pipe ends and each end of the TRV.
- The TRV is to be orientated with the copper element probe facing upward toward the tank. The TRV has an arrow and the word ‘FLOW’ stamped on the outside of the body. The arrow is to point upwards in the direction of the tank.
- If this pipe assembly is being retrospectively fitted to an existing system, replace existing O-Rings with the new ones to seal cold pipe to the tank/collector and extension pipe (if any).



Thermosiphon Restrictor Valve (TRV) Assembly

FILLING AND COMMISSIONING THE STORAGE TANK AND COLLECTORS

⚠ Warning: Do not turn on electric power until after the water heater has been filled with water.

Turn on a least one hot water outlet tap, preferably over a bath or laundry basin. Open the mains water supply valve on the line to the water heater to allow water to fill the storage cylinder and collectors, dispelling air out of the top of the cylinder through the open tap. As soon as water flows freely (without air bursts) from the tap, close the tap and allow the cylinder to pressurise. Check all joints for water tightness.

Turn ON the electric power to the booster element ensuring that the power is correctly connected i.e. ‘Active’ line to ‘Active’ terminal etc.

Operate the easing lever on both pressure relief valves to ensure that the valves are functional. The system tank is now filled and ready to operate.

Remove the solar collector packaging. This must be removed completely prior to the permanent operation of the water heater.

TECHNICAL SPECIFICATIONS – SYSTEMS

Systems		151L	151J	181L & 181L FREE HEAT	181AP07D & 181AP07D FREE HEAT	181J & 181J FREE HEAT	181SP & 181SP FREE HEAT	181CS07C & 181CS07C FREE HEAT	181CS13C & 181CS13C FREE HEAT	181BTC & 181BTC FREE HEAT
Capacity	litres	150	150	180	180	180	180	180	180	180
	US gal.	40	40	48	48	48	48	48	48	48
Auxiliary boost	litres	75	75	90	90	90	90	90	90	90
	US gal.	20	20	23	23	23	23	23	23	23
Weight (full)	kg	239	271	280	285	315	320	311	312	307
	lbs	527	597	617	628	694	705	686	688	677
Weight (empty)	kg	87	109	98	103	121	126	119	120	115
	lbs	192	240	216	227	267	278	262	265	254
Length	m	2.49	2.49	2.49	2.49	2.49	2.49	2.63	2.63	2.49
	in	98	98	98	98	98	98.0	103.5	103.5	98
Height	m	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
	in	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
Width	m	1.29	1.29	1.67	1.67	1.62	1.62	1.62	1.62	1.62
	in	50.8	50.8	65.8	65.8	63.8	63.8	63.8	63.8	63.8
Working Pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000
	psi	145	145	145	145	145	145	145	145	145
Tank type		150L or 150LF	150J	180L or 180LF	180L or 180LF	180J or 180F	180J or 180F	180J or 180F	180J or 180F	180J or 180F
Type of Collector		L	J	L	APA2007	J	SPA2000	CSA2007	CSA2013	BT
Number of Collectors		1	1	1	1	1	1	1	1	1

Systems		302L & 302L FREE HEAT	302AP07D & 302AP07D FREE HEAT	302LCS & 302LCS FREE HEAT	302J & 302J FREE HEAT	302SP & 302SP FREE HEAT	302CS07C & 302CS07C FREE HEAT	302CS13C & 302CS13C FREE HEAT	302BTC & 302BTC FREE HEAT	302LCS & 302LCS FREE HEAT
Capacity	litres	300	300	300	300	300	300	300	300	300
	US gal.	80	80	80	80	80	80	80	80	80
Auxiliary boost	litres	150	150	150	150	150	150	150	150	150
	US gal.	40	40	40	40	40	40	40	40	40
Weight (full)	kg	462	472	465	521	531	509	512	502	500
	lbs	1019	1041	1025	1149	1171	1122	1129	1107	1102
Weight (empty)	kg	159	169	161	201	211	194	196	186	184
	lbs	351	373	355	443	465	428	432	410	406
Length	m	2.49	2.49	2.49	2.49	2.49	2.63	2.63	2.49	2.49
	in	98.0	98.0	98.0	98.0	98.0	103.5	103.5	98.0	98.0
Height	m	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
	in	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
Width	m	2.48	2.48	2.48	2.43	2.43	2.43	2.43	2.43	2.43
	in	97.5	97.5	97.5	95.7	95.7	95.7	95.7	95.7	95.7
Working Pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000
	psi	145	145	145	145	145	145	145	145	145
Tank type		300L or 300LF	300L or 300LF	300L or 300LF	300J or 300F	300J or 300F	300J or 300F	300J or 300F	300J or 300F	300J or 300F
Type of Collector		L	APA2007	LCS	J	SPA2000	CSA2007	CSA2013	BT	LCS
Number of Collectors		2	2	2	2	2	2	2	2	2

Systems		303L & 303L FREE HEAT	303J & 303J FREE HEAT	303SP & 303SP FREE HEAT	303CS07C & 303CS07C FREE HEAT	303CS13C & 303CS13C FREE HEAT
Capacity	litres	300	300	300	300	300
	US gal.	80	80	80	80	80
Auxiliary boost	litres	150	150	150	150	150
	US gal.	40	40	40	40	40
Weight (full)	kg	527	578	593	551	555
	lbs	1162	1274	1307	1215	1224
Weight (empty)	kg	210	255	270	234	237
	lbs	463	562	595	516	522
Length	m	2.49	2.49	2.49	2.63	2.63
	in	98.0	98.0	98.0	103.5	103.5
Height	m	0.51	0.51	0.51	0.51	0.51
	in	20.1	20.1	20.1	20.1	20.1
Width	m	3.37	3.38	3.38	3.38	3.38
	in	132.7	133.1	133.1	133.1	133.1
Working Pressure	kPa	1000	1000	1000	1000	1000
	psi	145	145	145	145	145
Tank type		300L or 300LF	300J or 300F	300J or 300F	300J or 300F	300J or 300F
Type of Collector		L	J	SPA2000	CSA2007	CSA2013
Number of Collectors		3	3	3	3	3

TECHNICAL SPECIFICATIONS – TANKS AND COLLECTORS

Tanks		150L	150J	180L	180LF & 180LX	180J	180F	300L	300LF & 300LX	300J	300F
Capacity	litres	150	150	180	180	180	180	300	300	300	300
	US gal.	40	40	48	48	48	48	80	80	80	80
Weight (full)	kg	200	209	239	241	249	251	389	392	405	408
	lbs	441	461	527	531	549	553	858	871	893	900
Weight (empty)	kg	50	59	59	61	69	71	89	92	105	108
	lbs	110	130	130	134	152	157	196	203	231	238
Length	m	1.28	1.28	1.494	1.494	1.494	1.494	2.31	2.31	2.31	2.31
	in	50.4	50.4	58.8	58.8	58.8	58.8	91	91	91	91
Height & width	m	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
	in	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1

Collectors		L	LCS	BT	J	APA2007	SPA2000	CSA2007	CSA2013
Style		Folded Tray	Folded Tray	Folded Tray	Folded Tray	Envelope	Envelope	Envelope	Envelope
Aperture	m ²	1.86	1.86	1.86	1.86	1.88	1.88	1.88	1.88
	ft ²	20	20	20	20	20.2	20.2	20.2	20.2
Capacity	litres	1.5	2	2.1	3.8	1.5	3.8	1.5	2.1
	US gal.	0.396	0.528	0.554	1.003	0.396	1.003	0.396	0.476
Weight (full)	kg	32	33	33	47	37	52	38	39
	lbs	71	72	72	104	82	115	84	86
Weight (empty)	kg	30	31	32	43	35	48	36	37
	lbs	67	68	71	95	77	106	79	82
Length	m	1.943	1.943	1.943	1.943	1.996	1.996	1.996	1.996
	in	76.5	76.5	76.5	76.5	78.6	78.6	78.6	78.6
Depth	m	0.083	0.083	0.083	0.083	0.082	0.082	0.082	0.082
	in	3.27	3.27	3.27	3.27	3.2	3.2	3.2	3.2
Width	m	1.027	1.027	1.027	1.027	1.043	1.043	1.043	1.043
	in	40.43	40.43	40.43	40.43	41.1	41.1	41.1	41.1
Working pressure	kPa	1400	1400	1400	200	1400	200	1400	1400
	psi	203	203	203	29	203	29	203	203
Test pressure	kPa	300	300	300	450	450	450	300	300
	psi	43	43	43	65	65	65	43	43
No of risers		7	6	13	35	7	35	7	13
Riser material		Copper	Copper	Copper	Steel	Copper	Steel	Copper	Copper
Absorber material		Aluminium	Aluminium	Copper	Steel	Aluminium	Steel	Copper	Copper
Absorber surface		P*	S*	S*	P*	P*	P*	S*	S*

Tank Material Information

Cylinder material: Steel, low carbon, 2.5 mm (0.1")

Cylinder lining: Brilliant Cobalt Blue ceramic vitreous enamel

Insulation: Polyurethane: pressure injected foam, zero CFC

Case: Aluminium: 0.4 mm (0.2")

End caps: Polypropylene: carbon black, UV stabilised

Anode: Magnesium, sacrificial, with steel core

Auxilliary Electric Booster

Type: Copper sheath, immersion

Rating (kW): 1.5, 1.8, 2.4, 3.0, 3.6, 4.8

Supply Voltage: 220V - 250V

Folded Tray: Aluminium: 0.7 mm
 Envelope: Extruded aluminium sides, Zinalume backing sheet
 Insulation: Polyester: 38mm - L, J, APA2007, SPA2000
 Glasswool: 38mm - LCS, BT, CSA2007, CSA2013
 Glass: Tempered Low Iron, 3.2mm thick
 P* = Polyester powder coat
 S* = Sputtered selective surface

Refer to Installation Diagrams commencing on page 44.

For general (for ALL models) Installation Instructions, refer to Page 20.

For Installation Instructions on Closed Circuit models, refer to Page 30.

For Installation Instructions on Open Circuit models, refer to Page 36.

For Water Connection details, refer to Page 48.

For Tank and Collector fixing details, refer to Page 49.

PLEASE NOTE

An Open Circuit system does not have freeze protection and is not suitable for installation in areas prone to freeze conditions. This system has NO WARRANTY for freeze damage. In areas that are prone to frost / freezing or in bad water areas, a Closed Circuit system should be used.

ANNUAL PERFORMANCE CALCULATIONS FOR EUROPE

SYSTEM WIND AND SNOW LOAD PRESSURE

Under the requirements of EN 12975-1 (European Standard) the type of collector used in these systems has been tested (ITW 11COL1015) to 2000 Pa, the maximum pressure (positive and negative) limit of the test equipment. This value has been used to determine the maximum permissible limits of wind load (v_m) as 56.6 m/s (203.6 km/h) and snow load (s_k) as 2 kN/m².

Systems or collector only installations using these collectors are only to be installed where the maximum values of s_k (snow load) and v_m (mean wind velocity) for the specific geographical area and installation circumstances do not exceed the European permissible limit of wind and snow load. Values of v_m and s_k for your area can be obtained by consulting the local dealer, a qualified structural engineer or relevant authorities.

These collectors and systems are routinely used in Australian Cyclonic regions.

J SYSTEMS

Annual performance calculations of Solahart thermosiphon J systems with the J collector according to EN12976 SolarKeyMark Systems ITW Test Report 10SYS82-1 for the 151J (150 tank, 1 collector), 181J (180 tank, 1 collector), 302J (300 tank, 2 collectors) and 303J (300 tank, 3 collectors) systems.

Qd = energy demand

QL = solar energy (load)

f-sol = solar fraction

Model Demand	151J 80 litres / day			151J 110 litres / day			151J 140 litres / day			151J 200 litres / day			
	Location	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %
Stockholm	59.6°N	4441	2101	47.3	6107	2644	43.3	7772	3047	39.2	11103	3375	30.4
Wurzburg	49.5°N	4257	2278	53.5	5854	2898	49.5	7450	3382	45.4	10643	3853	36.2
Davos	46.8°N	4820	3292	68.3	6628	4136	62.4	8435	4724	56.0	12050	5182	43.0
Athens	38.0°N	3305	2776	84.0	4545	3622	79.7	5784	4327	74.8	8263	5255	63.6

Model Demand	181J 80 litres / day			181J 110 litres / day			181J 140 litres / day			181J 200 litres / day			
	Location	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %
Stockholm	59.6°N	4441	2096	47.2	6107	2614	42.8	7772	3023	38.9	11103	3486	31.4
Wurzburg	49.5°N	4257	2273	53.4	5854	2868	49.0	7450	3353	45.0	10643	3959	37.2
Davos	46.8°N	4820	3268	67.8	6628	4049	61.1	8435	4648	55.1	12050	5314	44.1
Athens	38.0°N	3305	2763	83.6	4545	3581	78.8	5784	4292	74.2	8263	5354	64.8

Model Demand	302J 200 litres / day			302J 250 litres / day			302J 300 litres / day			302J 400 litres / day			
	Location	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %
Stockholm	59.6°N	11103	5030	45.3	13879	5676	40.9	16655	6096	36.6	22206	6373	28.7
Wurzburg	49.5°N	10643	5481	51.5	13304	6279	47.2	15965	6865	43.0	21286	7280	34.2
Davos	46.8°N	12050	7833	65.0	15063	8751	58.1	18075	9345	51.7	24100	9736	40.4
Athens	38.0°N	8263	6726	81.4	10329	7871	76.2	12395	8825	71.2	16526	10031	60.7

Model Demand	303J 200 litres / day			303J 250 litres / day			303J 300 litres / day			303J 400 litres / day			
	Location	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %
Stockholm	59.6°N	11103	5507	49.6	13879	6537	47.1	16655	7361	44.2	22206	8261	37.2
Wurzburg	49.5°N	10643	5886	55.3	13304	7051	53.0	15965	8046	50.4	21286	9259	43.5
Davos	46.8°N	12050	8724	72.4	15063	10333	68.6	18075	11622	64.3	24100	12869	53.4
Athens	38.0°N	8263	7181	86.9	10329	8697	84.2	12395	10040	81.0	16526	11998	72.6

Note: The over temperature protection tests have been carried out according to EN12976 with an irradiation higher than 20 MJ/m²/day. An over temperature protection device should be installed in the situation that irradiation this exposure levels could be exceeded.

L SYSTEMS

Annual performance calculations of Solahart thermosiphon L systems with the L collector according to EN12976 SolarKeyMark Systems ITW Test Report 11SYS92-01 for the 151L (150 tank, 1 collector), 181L (180 tank, 1 collector), and 302L (300 tank, 2 collectors) systems.

Qd = energy demand

QL = solar energy (load)

f-sol = solar fraction

Model Demand		151L 110 litres / day			151L 140 litres / day			151L 170 litres / day			151L 200 litres / day		
		Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %
Stockholm	59.6°N	6107	2712	44.5	7772	3031	39.0	9438	3048	32.3	11103	3053	27.5
Wurzburg	49.5°N	5854	2816	48.1	7450	3174	42.6	9047	3248	35.9	10643	3246	30.5
Davos	46.8°N	6628	3930	59.3	8435	4319	51.2	10243	4333	42.3	12050	4338	36.0
Athens	38.0°N	4545	3504	77.1	5784	4095	70.8	7024	4418	62.9	8263	4594	55.6

Model Demand		181L 140 litres / day			181L 170 litres / day			181L 200 litres / day			181L 250 litres / day		
		Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %
Stockholm	59.6°N	7772	3334	42.9	9438	3671	38.9	11103	3697	33.3	13879	3706	26.7
Wurzburg	49.5°N	7450	3457	46.4	9047	3863	42.7	10643	3927	36.9	13304	3938	29.6
Davos	46.8°N	8435	4791	56.8	10243	5234	51.1	12050	5242	43.5	15063	5257	34.9
Athens	38.0°N	5784	4361	75.4	7024	4973	70.8	8263	5313	64.3	10329	5609	54.3

Model Demand		302L 200 litres / day			302L 250 litres / day			302L 300 litres / day			302L 400 litres / day		
		Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %	Qd MJ/a	QL MJ/a	f-sol %
Stockholm	59.6°N	11103	5230	47.1	13879	5871	42.3	16655	6146	36.9	22206	6195	27.9
Wurzburg	49.5°N	10643	5375	50.5	13304	6093	45.8	15965	6498	40.7	21286	6577	30.9
Davos	46.8°N	12050	7628	63.3	15063	8420	55.9	18075	8766	48.5	24100	8772	36.4
Athens	38.0°N	8263	6610	80.0	10329	7695	74.5	12395	8490	68.5	16526	9271	56.1

Note: The over temperature protection tests have been carried out according to EN12976 with an irradiation higher than 20 MJ/m²/day. An over temperature protection device should be installed in the situation that irradiation this exposure levels could be exceeded.

SOUTH AFRICAN SYSTEM SANS 1307 DETAILS

System	181J	302J
Tank	180J / 180F	300J / 300F
Collector	1 x J	2 x J
Type	This is a dual purpose water heater. For solar heating, this is an indirect heated tank.	
Moisture Resistance Classification	IP34	IP34
Thermal Properties – Q factor At 16 MJ/m ² with temperature difference of 10°C.	19.04	35.535
Heat Loss Coefficient	2.93 W/K	2.04 W/K
Total Energy Rating – kW/h/m ² /day South African Climate	3.4 (J collector)	3.4 (J collector)
South African Tank Rated Capacity	175 litres	250 litres
South African Tank Rated Working Pressure	600 kPa (6 bar)	600 kPa (6 bar)
Standing Heat Loss / 24 hours – standard design	2.78 kWh	3.46 kWh
Standing Heat Loss / 24 hours – solar design	2.085 kWh	2.595 kWh
Rated Power Input	Either 1800, 2400, 3600, 4800 Watts – refer to tank rating label	

Notes:

- To ensure safe and effective performance, this water heater shall be installed, maintained and repaired strictly in accordance with the appropriate and relevant requirements of SANS 10254.
- For safe performance this water heater is fitted with a:
 - Thermostat
 - Non-self resetting thermal cut-out
 - Combination Temperature Pressure Relief (TPR) Valve (Safety Valve)
 - Pressure Control Valve and Expansion Control Valve (ECV) (unless the water supply pressure cannot exceed the rated pressure of this water heater or its safety value whichever is lowest)
 - Heat exchange jacket (solar heater transfer fluid circuit) pressure relief valve (when operated with solar heating)
 - 80 kPa – without Over Temperature Protection (OTP) to the heat exchanger jacket vent port
 - 200 kPa – with Over Temperature Protection (OTP) to the heating fluid reservoir tank.

Warnings

This water heater **MUST NOT BE OPERATED** without each of these devices fitted and in working order.

The Temperature Pressure Relief Valve, Expansion Control Valve and their drain pipes must not be tampered with.

DO NOT seal or block the relief valve, control valve or drain pipe outlet.

Emergency Shut Down Procedure

If it is necessary to turn off the water heater:

- Switch off the electrical supply at the isolating switch to the solar storage tank.
- Close the cold water isolation valve at the inlet to the water heater.
- Open a hot tap if it necessary to relieve the pressure in the water heater.

SOUTH AFRICAN SPECIFIC OPERATING COMPONENTS

SANS 198 Compliant

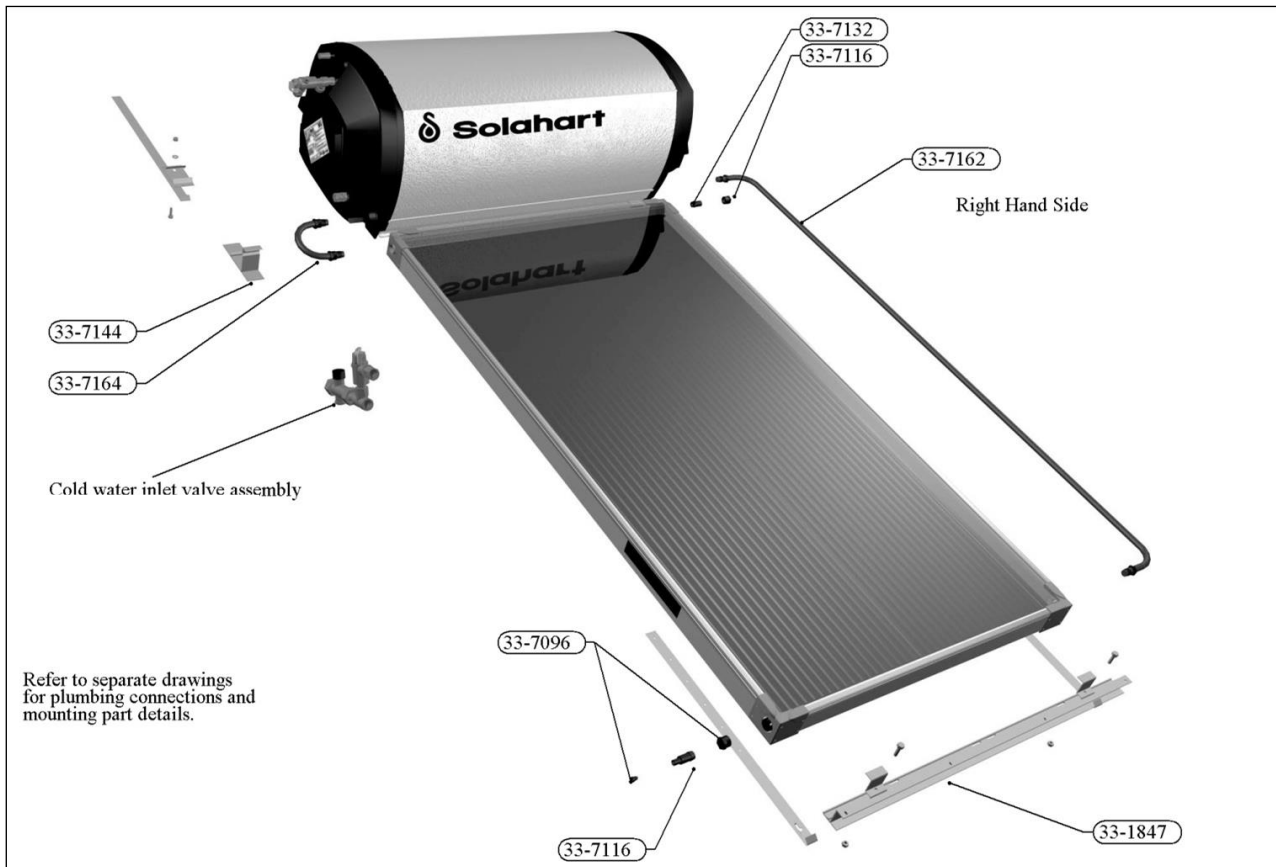
Pressure Control Valve	Caleffi 533CV4 – 400 kPa
Temperature Pressure Relief Valve (Safety Valve)	Apex – 400 kPa, 18 kW
Vacuum Breaker	Cobra PB 6.302

SANS 1808 Compliant

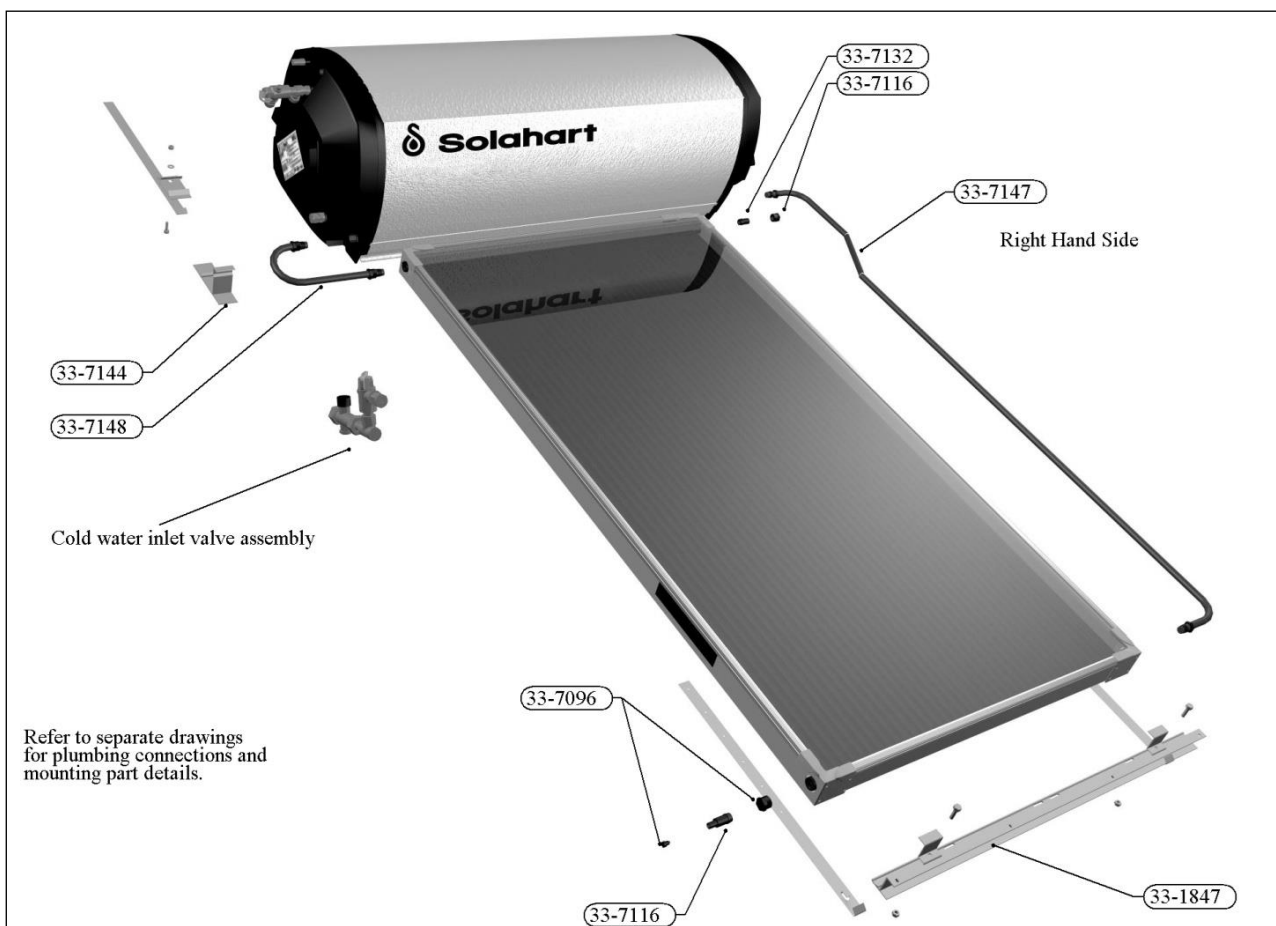
Drain Cock	not supplied
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INSTALLATION DIAGRAMS – MODELS 151J, 181J, 181LCSC, 181BTC

151J



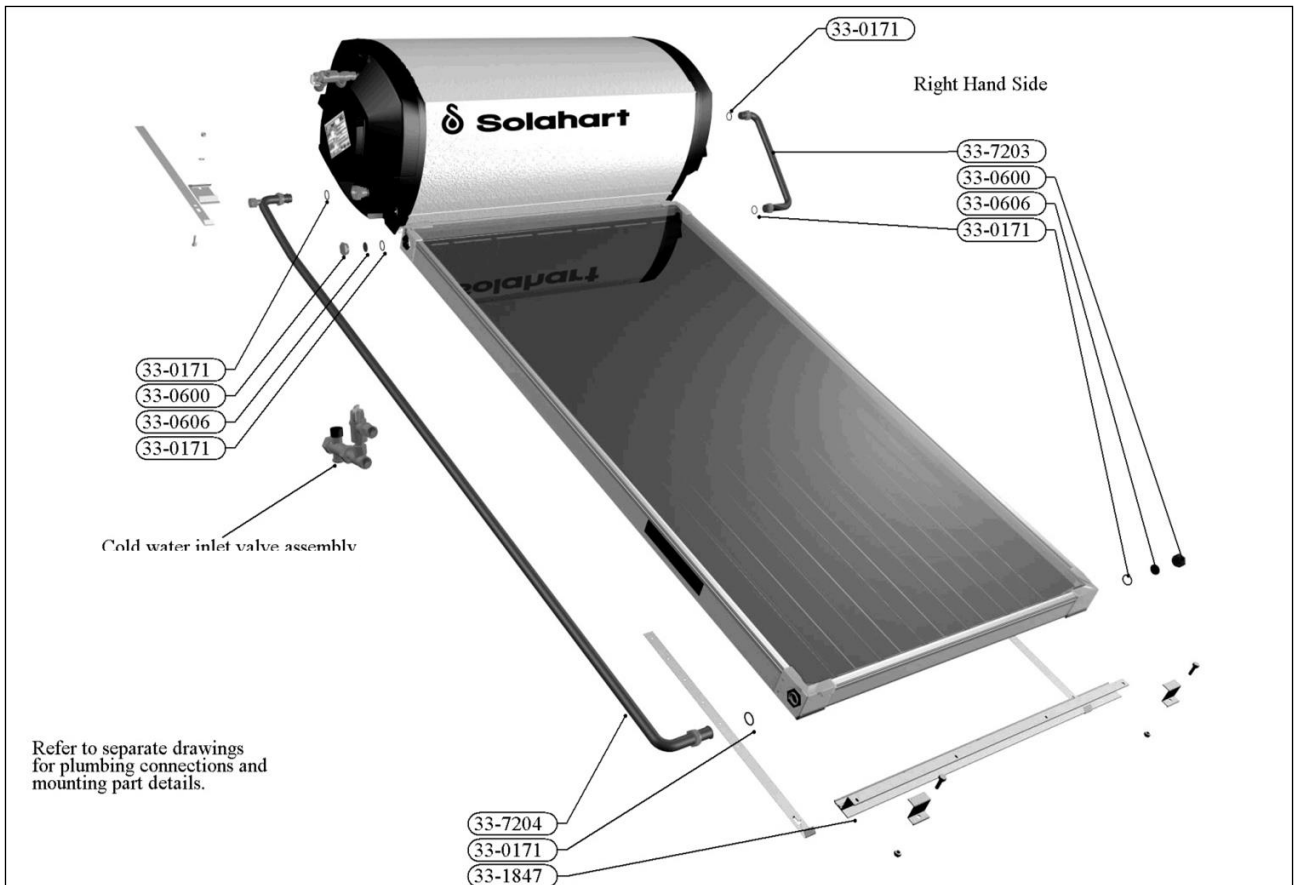
181J, 181LCSC, 181BTC and Free Heat Models



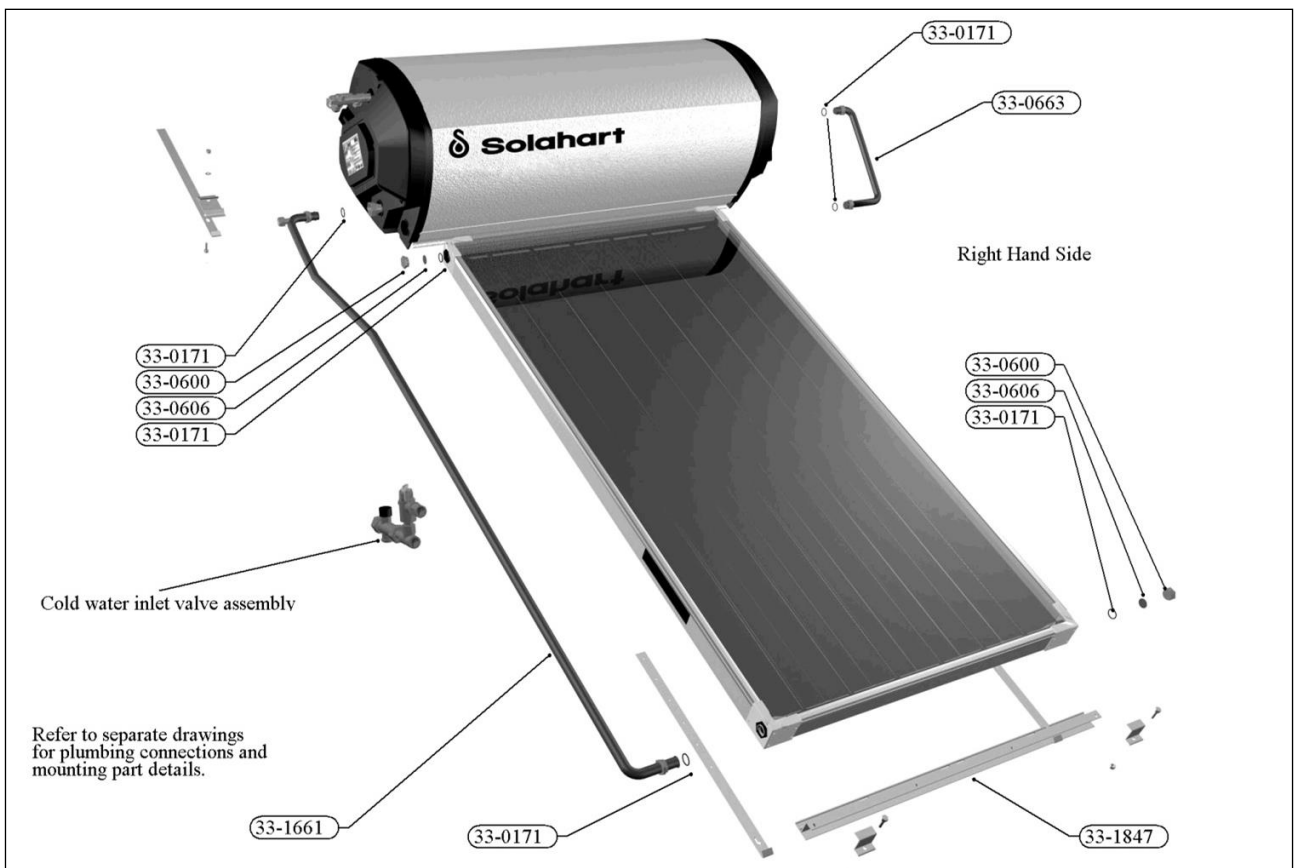
* J collector illustrated.

INSTALLATION DIAGRAMS – MODELS 151L, 181L

151L

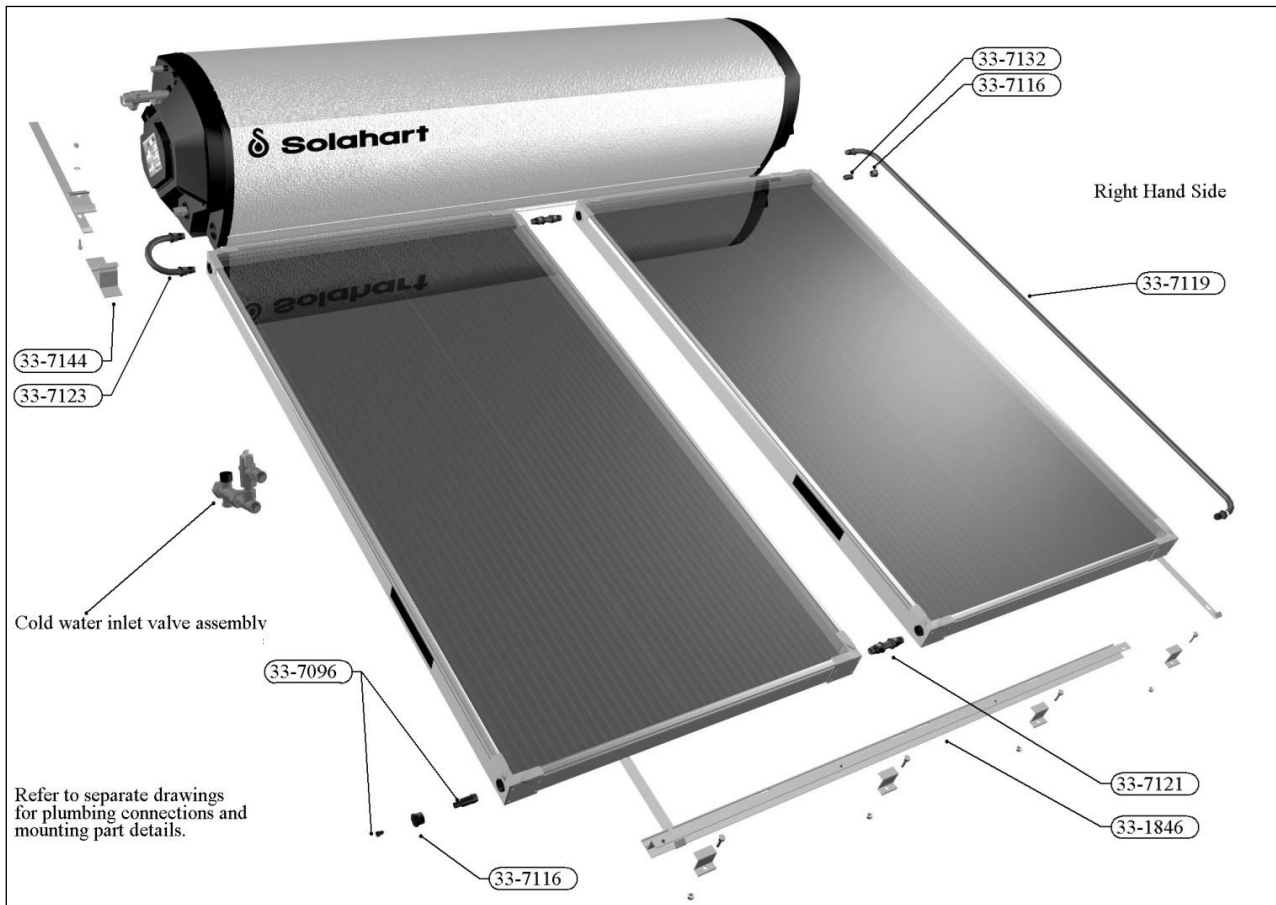


181L and Free Heat Models

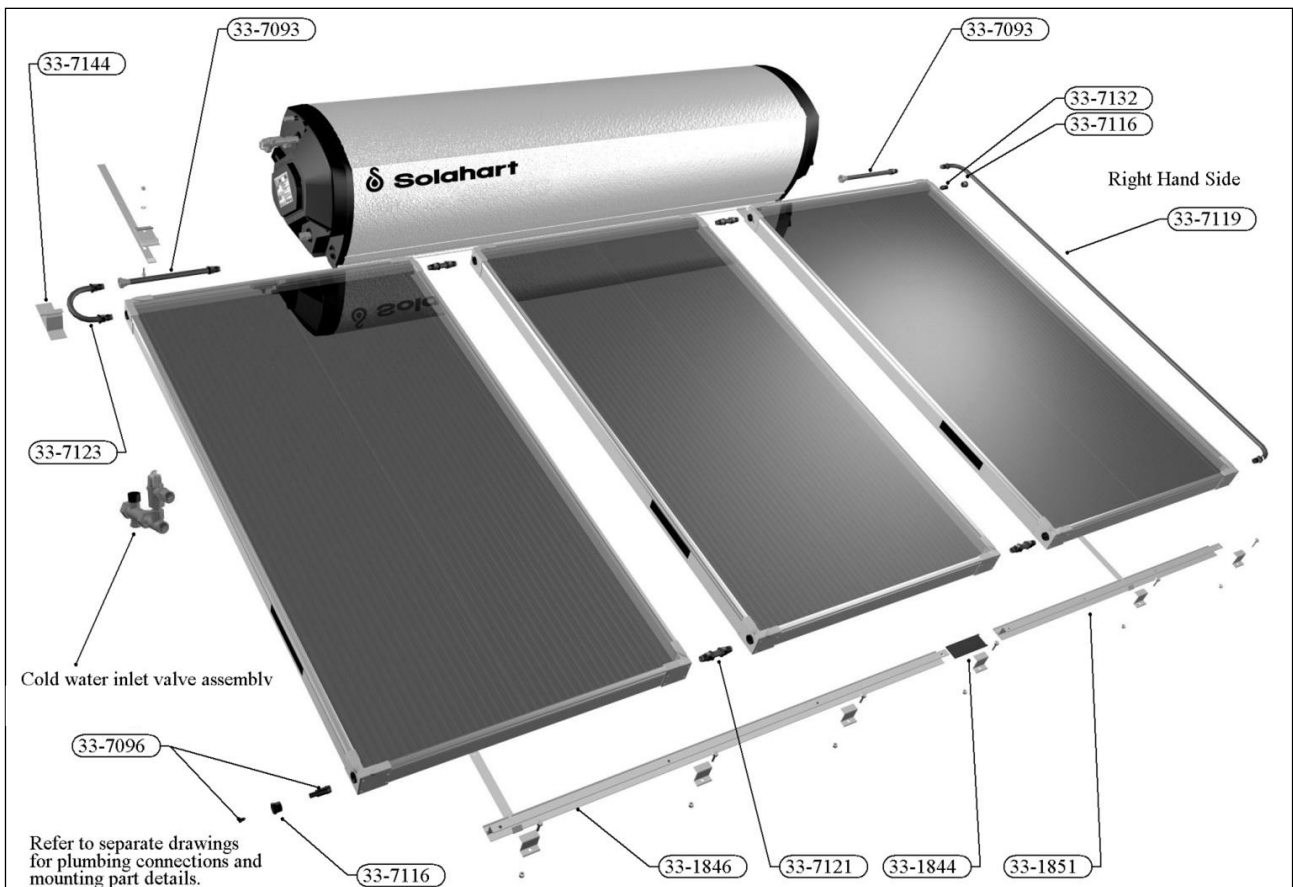


INSTALLATION DIAGRAMS – MODELS 302J, 302LCSC, 302BTC, 303J

302J, 302LCSC, 302BTC and Free Heat Models



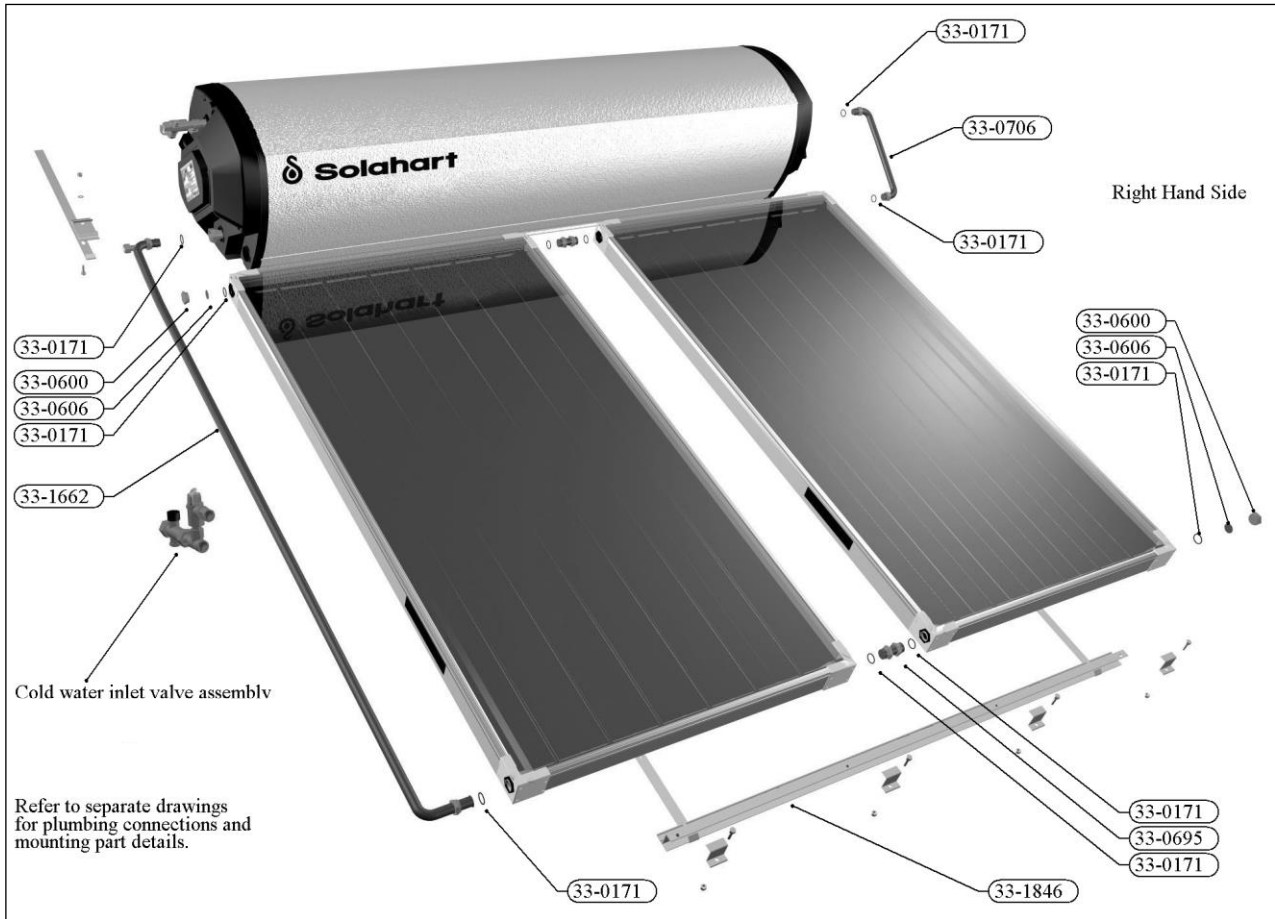
303J and Free Heat Models



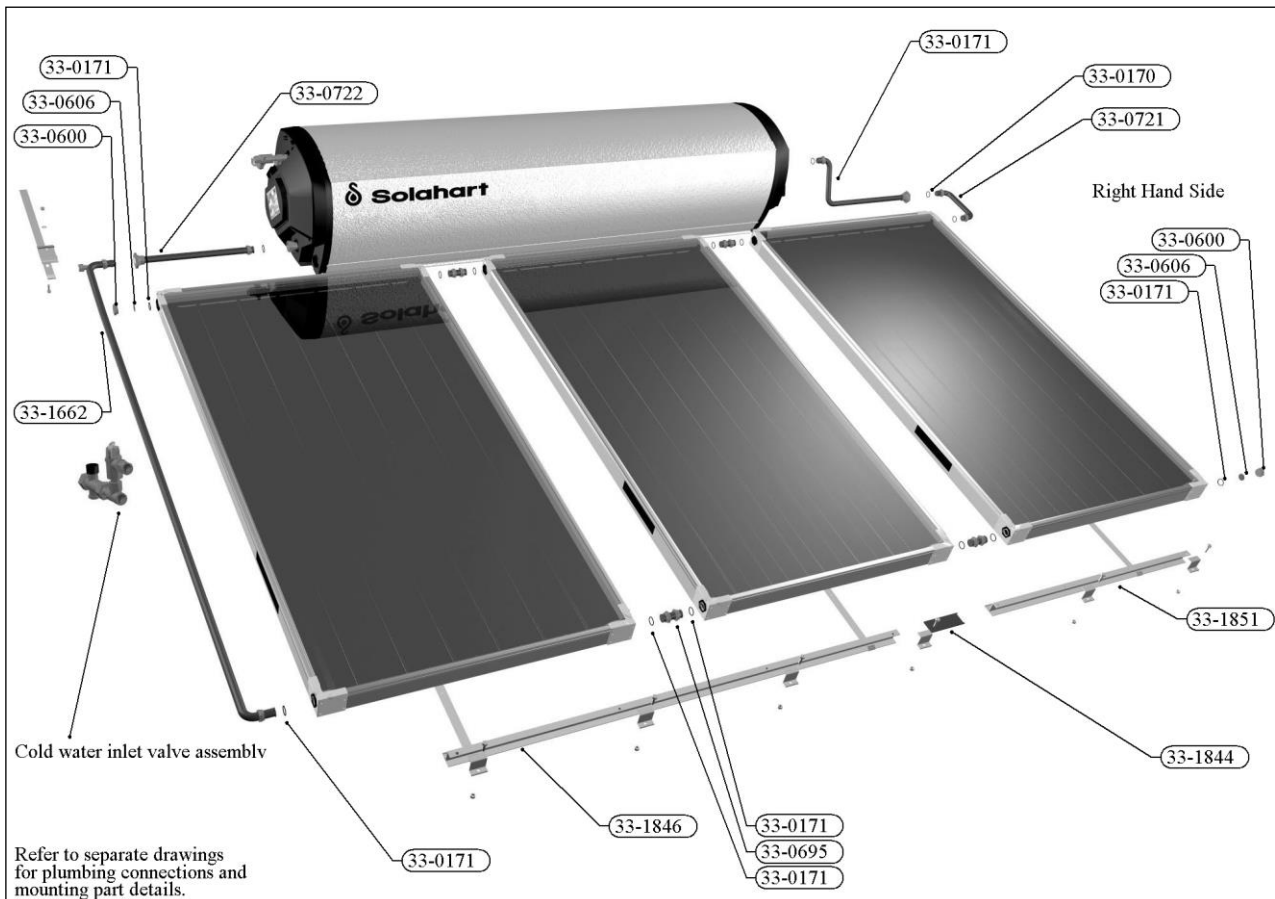
* J collectors illustrated.

INSTALLATION DIAGRAMS – MODELS 302L, LF, 303L, LF

302L and Free Heat Models



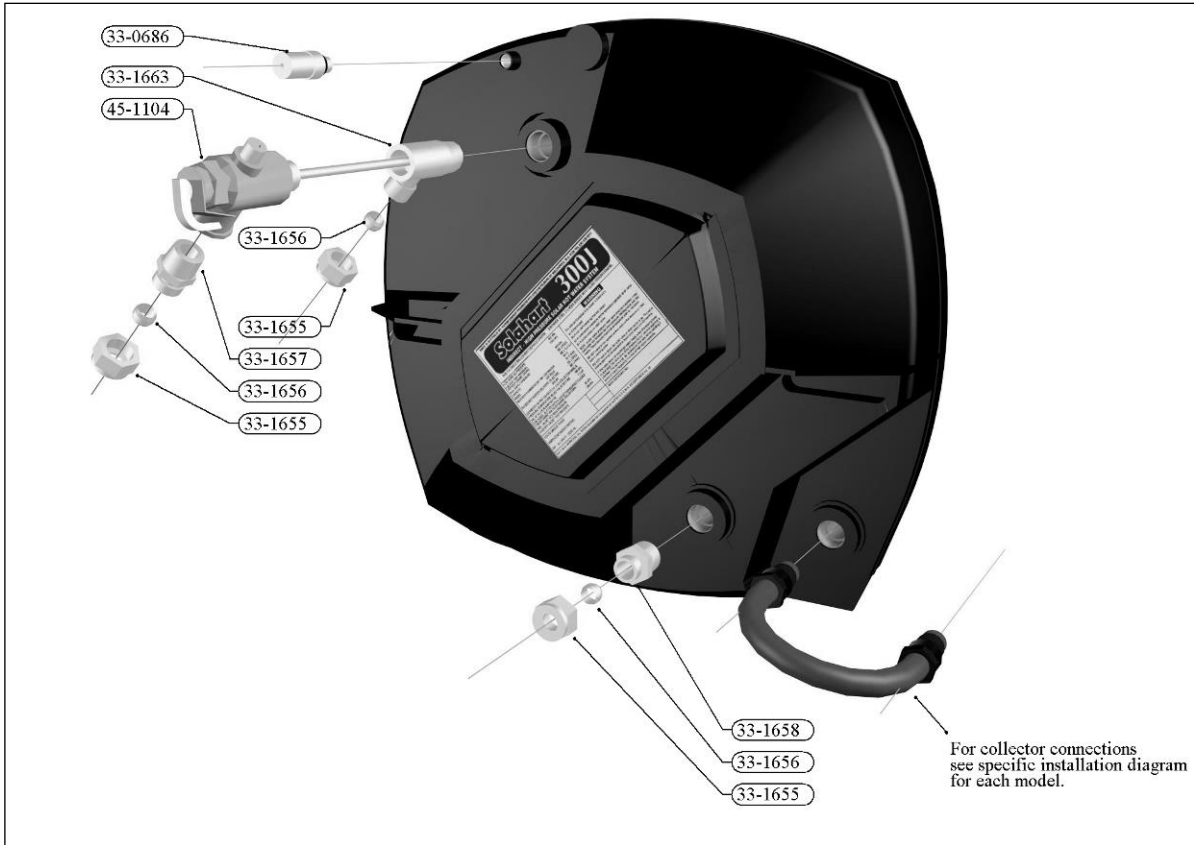
303L and Free Heat Models



CONNECTION DETAILS

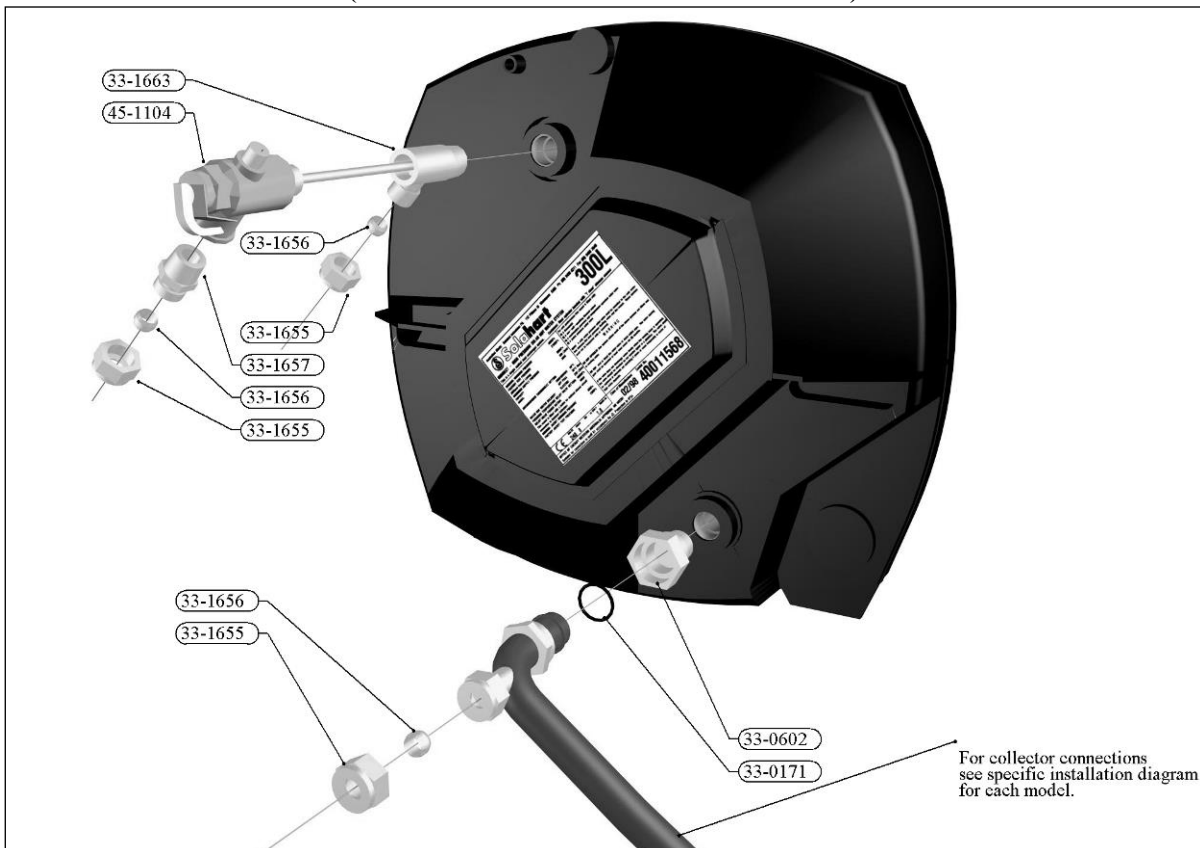
Closed Circuit Systems Water Connections

(All Potable water & drain lines are 1/2" BSP)



Open Circuit Systems Water Connections

(All Potable water & drain lines are 1/2" BSP)



Assembly Drawings

HOOKING COLLECTOR / TANK STRAP TO COLLECTOR RAIL

1. If three solar collectors are to be installed, locate the additional collector rail adjacent to the first collector rail and join together using the drive cleat supplied in the parts kit (refer to [Detail B](#)).
2. Determine which slots in the collector rail will be used for the roof straps after locating the rafters and taking note of the rafter spacing.

Note: The roof straps are to be fitted to the collector rail(s) before fixing the straps to the rafters.

Rafter spacing	Recommended slots		
	One collector (1 x one collector rail)	Two collectors (1 x two collector rail)	Three collectors (1 x two and 1 x one collector rails)
300 mm (12")	1, 4 or 2, 3	1, 6 or 2, 5	1, 5 (long) & 3 (short)
400 mm (16")	1, 4	1, 5 or 2, 6	1, 5 (long) & 3 (short)
450 mm (18")	1, 4	2, 5	2, 5 (long) & 4 (short)
500 mm (20")	1, 4	1, 6 or 2, 5	1, 6 (long) & 4 (short)
600 mm (24")	2, 3	1, 5 or 2, 6	1, 5 (long) & 3 (short)
900 mm (36")	1, 4	2, 5	1, 4 (long) & 4 (short)



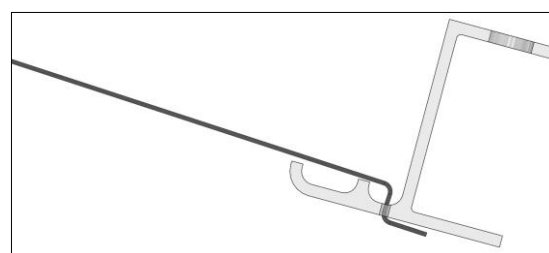
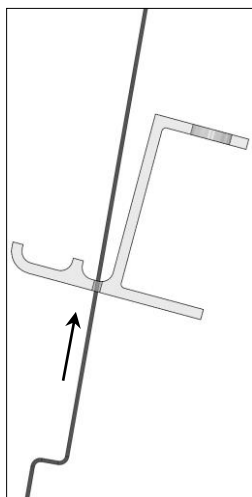
collector rail – one collector



collector rail – two collectors

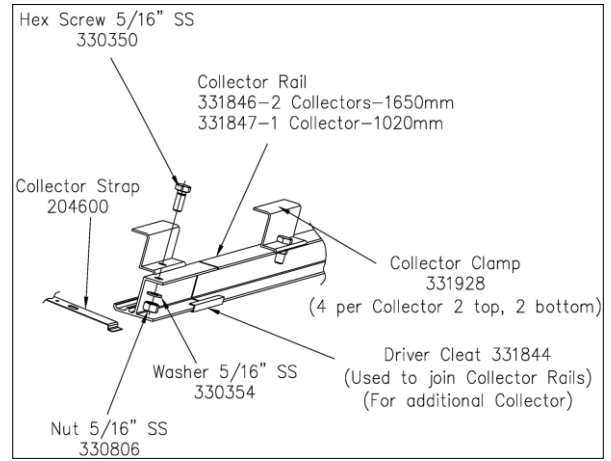
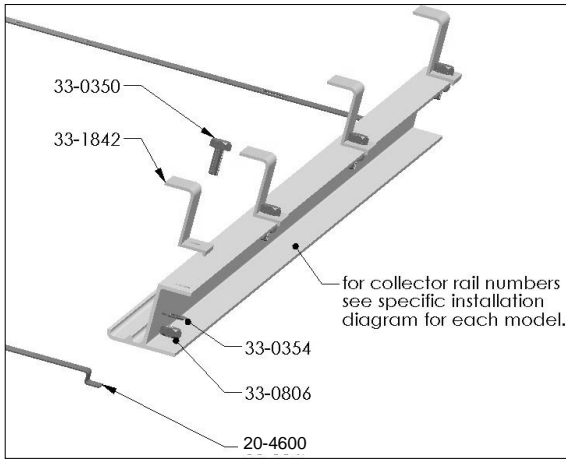
3. Noting the orientation of the collector strap's folded end, slide the long straight end of the collector strap through the appropriate slot from the underside of the collector rail (refer to [Detail A](#)).

Pull the collector strap through until the first bend in the strap slips into the slot in the collector rail. The strap will engage with the collector rail.



DETAIL A

BOTTOM COLLECTOR RAIL – COLLECTOR STRAP ORIENTATION



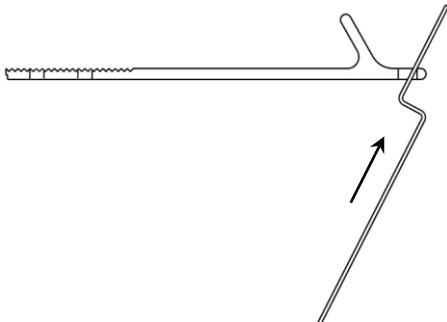
**DETAIL B
BOTTOM COLLECTOR RAIL – COLLECTOR STRAP INSTALLATION**

HOOKING COLLECTOR / TANK STRAP TO TANK CLAMP

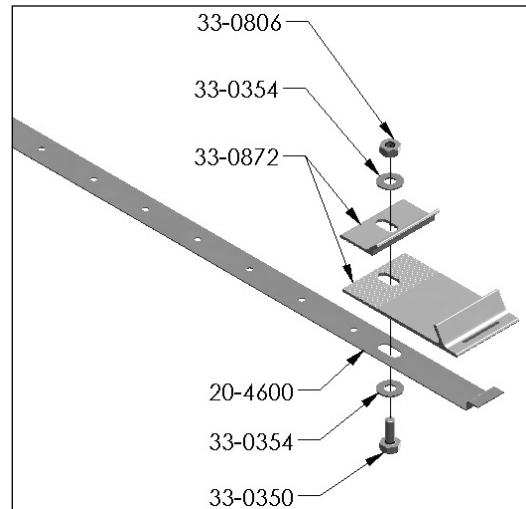
1. The tank clamp (330872) is supplied as a single extruded part and must be snapped into two. Snap by bending the clamp on the groove location.
2. Noting the orientation of the collector / tank strap's folded end, slide the short end of the strap through the slot from the underside of the tank clamp.
3. Push the strap end through the tank clamp and make sure it is correctly orientated as illustrated.
4. Loosely pre-assemble bolt, washer and nut as shown. Ensure the bolt head fits into the valley of the tile or roof sheet profile.



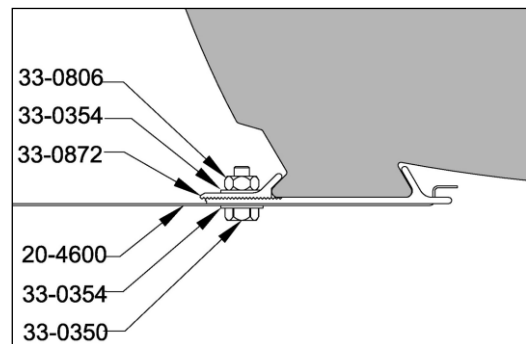
2. Noting the orientation of the collector / tank strap's folded end, slide the short end of the strap through the slot from the underside of the tank clamp.



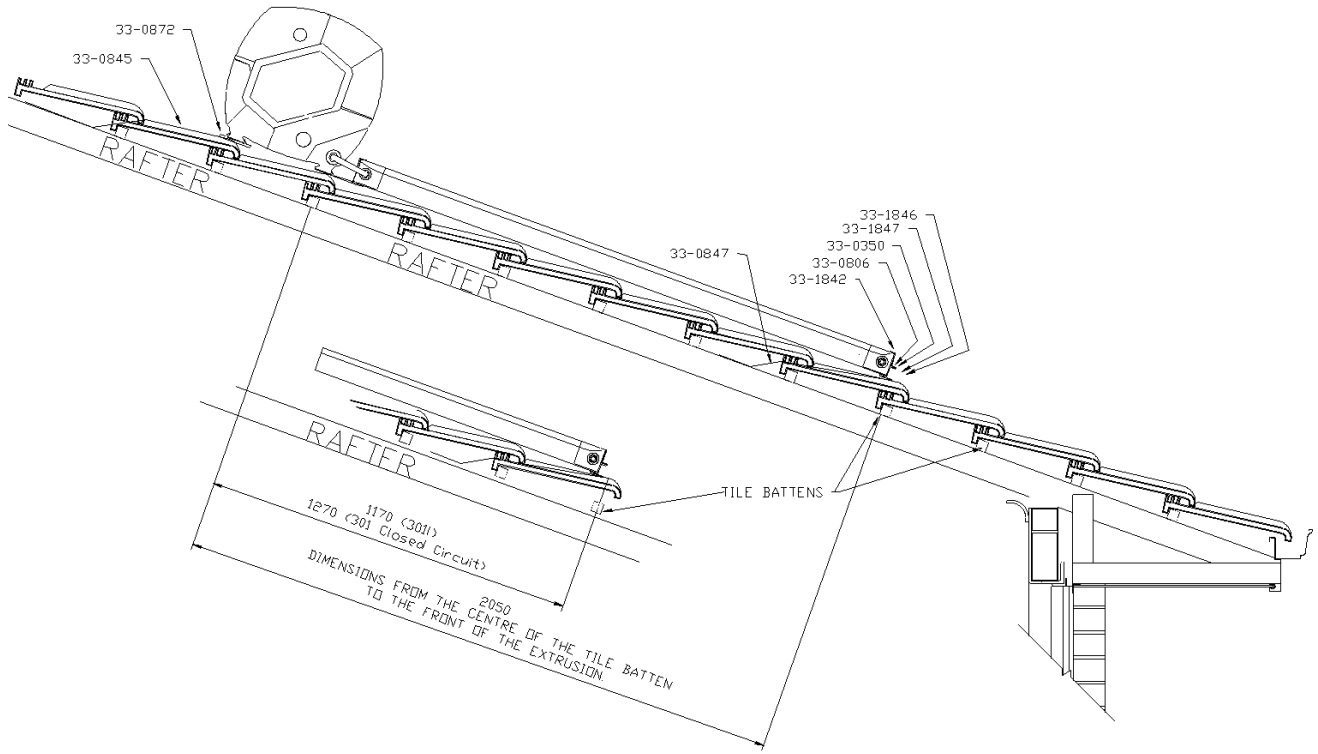
3. Push the strap end through the tank clamp and make sure it is correctly orientated as illustrated.



Tank Rail Fixing



Tank Clamp Assembly



With Pitch Tiled Roof Mounting

INSTALLATION CHECK LIST

Prior to handover, complete the installation check list:

1. System is installed as per the installation instructions..... []
2. Water is connected, turned on and solar storage tank is filled []
3. Closed circuit is filled with correct concentration of fluid and has been commissioned..... []
4. All mechanical fixings are secured..... []
5. Collector rail has a rise of 12-15 mm per collector on the hot outlet side of the solar collectors
if installed directly onto the roof []
6. Collector rail is either horizontal or higher on the hot outlet side of the solar collectors if part of a frame []
7. In the case of a remote installation ensure a minimum DN20 or 22mm pipe is used for the solar cold
and solar hot pipe, and the pipes have a continuous upwards slope towards the tank from the collectors..... []
8. Protective plastic film removed from tank (if fitted)..... []
9. Covers removed from collectors []
10. Pipe, conduit penetrations through the roof have been sealed correctly..... []
11. Roof tiles put back into position..... []
12. Roof flashing watertight..... []
13. System checked for water (and heating fluid) leaks and pipe connections are correctly tightened..... []
14. Cold and hot water piping checked for water leaks..... []
15. Drain pipes free of any obstruction []
16. All pipe work clipped where necessary..... []
17. Electrical power to the booster is switched on (if required)..... []
18. Operation of booster checked..... []
19. Air bled from taps []
20. Instruct the householder on the water heater system use and leave manual with the householder..... []

SERVICING

Draining the Closed Circuit Fluid

It may be necessary to drain the solar collectors and heat exchanger of a closed circuit system during maintenance. Draining the solar collectors and heat exchanger of closed circuit fluid should be conducted within three (3) hours of sunrise when the sun is low in the sky. The closed circuit fluid temperature inside the solar collectors should be lower as the solar collectors would not have had as much chance to gain as much heat as later in the day.

⚠ Warning: Exercise care to avoid splashing of closed circuit fluid, as fluid discharged from the solar collectors may be of a very high temperature.

Note: Care must be taken to ensure there is no spillage of the closed circuit fluid onto the roof surface. Any spilled closed circuit fluid must be cleaned up immediately and the roof surface cleaned of any fluid residue. The closed circuit fluid discharged from the solar collectors can render the water in a rainwater tank unusable.

Draining the Solar Collectors and Heat Exchanger

1. Cover the solar collectors with an opaque material to prevent absorption of solar energy. If fitted, cover the HartStat valve with a cloth soaked in cold water.

Failure to cover the solar collectors may cause a safety issue.

2. Open a hot water tap and allow the water to run for five minutes immediately prior to draining the solar storage tank.
This will assist in the transfer of any heat from high temperature closed circuit fluid in the heat exchanger and solar collectors to the water in the solar storage tank.
3. Close the hot water tap.
4. Attach one end of a hose to the valve drain port of the fill drain valve assembly and place the other end into a container of sufficient volume to hold the closed circuit fluid.

Refer to the [table](#) on page 32 for the volume of closed circuit fluid in the closed circuit of the water heater.

5. Place an absorbent cloth on the roof under the fill drain valve assembly prior to loosening the screw. This will assist in catching any spilt closed circuit fluid.
6. Loosen the valve screw on the fill drain valve assembly a few turns to open the valve drain port.
This will release the pressure in the closed circuit.
7. Very carefully, unscrew the PR6 or PR200 closed circuit relief valve on the left side of the solar storage tank.

⚠ Warning: Relieved air or closed circuit fluid may be hot.

Closed circuit fluid will drain through the hose.

8. Allow the closed circuit fluid to drain into a container and dispose of in accordance with the relevant local authority.

⚠ Warning: Closed circuit fluid may be hot.

9. When satisfied the closed circuit is drained, tighten the valve screw on the fill drain valve assembly.

Remove the hose from the valve drain port of the fill drain valve assembly.

10. Refit and tighten the PR6 or PR200 closed circuit relief valve on the left side of the solar storage tank.

11. To refill the solar collectors and closed circuit, refer to "[Closed Circuit Commissioning Procedure](#)" on page 34.

Draining and Flushing the Solar Storage Tank and Collectors

It may be necessary to drain or flush the solar storage tank of an open or closed circuit system or the solar collectors of an open circuit system during maintenance or if there is sediment in the water supply. This should be conducted in the morning, within three (3) hours of sunrise when the sun is low in the sky. The water or closed circuit fluid temperature inside the solar collectors should be lower as the solar collectors would not have had as much chance to gain as much heat as later in the day.

⚠ Warning: Exercise care to avoid splashing of water, as water discharged from the solar storage tank and solar collectors may be of a very high temperature.

Note: The water discharged from the solar storage tank and solar collectors may contain sediments and should be diverted away from any section of roof which is part of a rainwater collection system.

Prior to draining and / or flushing the solar storage tank and / or solar collectors:

Open and Closed circuit system

1. Cover the solar collectors with an opaque material to prevent absorption of solar energy and the transfer of heat to the solar storage tank. If fitted, cover the HartStat valve with a cloth soaked in cold water.
Failure to cover the solar collectors may cause a safety issue.
2. Open a hot water tap and allow the water to run for five minutes immediately prior to draining or flushing the solar storage tank and / or solar collectors.
This will assist in the transfer of any high temperature water in the solar collectors to the solar storage tank of an open circuit system or heat from high temperature closed circuit fluid in the heat exchanger and solar collectors to the water in the solar storage tank of a closed circuit system.
3. Close the hot water tap.
4. Turn off the water heater. Refer to [“To Turn Off the Water Heater”](#) on page 29.
5. Ensure all hot water taps are closed.

Closed circuit system

6. Attach a hose to the valve drain port of the fill drain valve assembly.
Place the end of the hose into a container.
Place an absorbent cloth on the roof under the fill drain valve assembly prior to loosening the screw. This will assist in catching any spilt closed circuit fluid.
7. Loosen (but do not remove) the valve screw on the fill drain valve assembly a few turns to open the valve drain port.
This will release the pressure in the closed circuit.
8. When the pressure is relieved, tighten the valve screw on the fill drain valve assembly.
9. Very carefully, unscrew the PR6 or PR200 closed circuit relief valve on the left side of the solar storage tank to relieve the pressure from the closed circuit.

Note: It is important the closed circuit is not pressurised whilst the storage tank is unpressurised.

⚠ Warning: Relieved air or closed circuit fluid may be hot.

Open and Closed circuit system

10. Operate the temperature pressure relief valve lever - do not let the lever snap back or you will damage the valve seat. **It is very important the lever is raised and lowered gently.**
Operating the lever will release the pressure in the solar storage tank.

Draining and Flushing the Solar Storage Tank

Open circuit system

11. Undo the union at the cold water inlet to the solar cold pipe.
12. Undo the fitting and remove the solar cold pipe from the solar storage tank.
Connect a hose to the tank connection. Let the other end of the hose go to a drain.

Closed circuit system

13. Undo the union at the cold water inlet to the solar storage tank and attach a hose.
Let the other end of the hose go to a drain.

Open and Closed circuit system

14. Open the temperature pressure relief valve by holding the lever in the raised position.
This will let air into the solar storage tank and allow the water to drain through the hose.
15. If flushing the solar storage tank:
 - Disconnect and remove the booster heating unit.
 - Place a hose inside the tank.
 - Open the isolation valve to the hose.
 - Allow the hose to run until water runs clear from the hose connected to the cold water connection.
 - When satisfied the solar storage tank is flushed, close the cold water isolation valve to the hose and remove the hose from the tank.
 - Replace and reconnect the booster heating unit.
16. When satisfied the solar storage tank is drained and / or flushed, remove the hose from the cold water inlet connection.

Open circuit system

17. Reconnect the solar cold pipe to the solar storage tank and cold water pipe work to the solar cold pipe.

Closed circuit system

18. Reconnect the cold water pipe work to the solar storage tank.
19. Refit and tighten the PR6 or PR200 closed circuit relief valve on the left side of the solar storage tank.
20. Remove the hose from the valve drain port of the fill drain valve assembly.

Draining and Flushing the Solar Collectors (Open Circuit System)

21. From the bottom end of the solar collectors, unscrew and remove the end plug.
Connect a hose to the collector connection. Let the other end of the hose go to a drain.
22. From the top end of the solar collectors, unscrew and remove the end plug.
This will let air into the collector and allow the water to drain through the hose.
23. If flushing the solar collector:
 - Connect a hose to the top collector connection. Let the other end of the hose go to a drain.
 - Open the cold water isolation valve to the water heater.
 - Water will flow through the solar cold and solar hot pipes into the solar collectors.
 - Allow water to flow from the solar collectors until it is clear of any sediment.
 - When satisfied the solar collectors are flushed, close the cold water isolation valve to the water heater.
24. When satisfied the solar collectors are drained or flushed, remove the hose(s) and reconnect the end plug(s).

Fill and Turn On the Water Heater

After the solar storage tank and solar collectors have been drained or flushed:

- Fill and turn on the water heater. Refer to:
 - Closed Circuit Systems – [“Filling and Commissioning of the Storage Tank”](#) on page 31 and [“Filling and Commissioning the Closed Circuit”](#) on page 32.
 - Open Circuit Systems – [“Filling and Commissioning the Storage Tank and Collectors”](#) on page 38.
- Remove the covering from the solar collectors.

Anode Replacement

It may be necessary to change the anode in the solar storage tank either:

- Prior to or during the installation of the water heater and before the tank is filled with water

This may occur if changing from a standard black (magnesium) anode to a blue (aluminium) anode to suit the chemistry of the water supply. This change is recommended to be performed either prior to the tank is installed, or prior to the tank being filled with water.

A magnesium anode is identified by the black end of the anode head and an aluminium anode is identified by blue paint applied to the end of the anode head.

- Or during a regular service of the water heater.

This may occur if replacing the anode to assist in extending the life of the solar storage tank.

A 27 mm A/F socket with at least 20 mm internal depth is required to tighten or loosen the anode in a J or L tank or the anode cover cap on an F, LF or LX tank. A speed brace or socket wrench or equivalent is suitable for the anode and anode cover cap removal and tightening. Each anode has a 13 mm deep GB 1/2 threaded spigot on its end. The purpose of the threaded spigot on the anode is to allow a tool, consisting of a rod or tube and non-sealing fitting, to be screwed over the end of the anode to assist in the removal and insertion of the anode.

The anode used in a J or L tank is of a taped thread sealing type and has an anode head with a 4 mm deep 27 mm A/F hex form. The hex form is used to tighten the anode into and loosen from the anode socket.

The anode used in an F, LF or LX tank has a larger diameter and is of a double O'ring sealing type. The anode head is covered by and held in position by a cap with a 27 mm hex form on its end. When tightened, this cap holds the anode in place and assists the anode to seal the O'rings against the anode fitting.

If the anode is being changed prior to or during the installation of the water heater, follow the procedure from step 3 below. If the anode is being changed during a service, follow the procedure in full.

To change or replace the anode:

1. Follow Steps 1 to 14 of the procedure [“Draining and Flushing the Solar Storage Tank and Collectors”](#) commencing on page 54.
2. Allow the cylinder to drain to a level below the anode fitting, then lower the temperature pressure relief valve lever to close the valve. **It is very important the lever is raised and lowered gently.**
3. Remove the electrical cover.
4. **J, L Tank:** Unscrew the anode nut located to the left of the electric element. Screw on the anode removal tool and withdraw the anode.
 - Ensure the thread of the new anode is sufficiently taped and insert the anode into the cylinder through the anode socket. Tighten the anode nut using a 27 mm socket.
5. **F, LF, LX Tank:** Undo and remove the anode cover cap. This exposes the tank anode fitting. Screw on the anode removal tool and withdraw the anode.
 - Insert the new anode into the cylinder through the anode fitting, pushing until it is almost all the way in.
 - Place the anode cover cap over the end of the anode and tighten using a 27 mm socket. This will push the anode home and align into the tank whilst turning to engage the threads. This will also form a seal between the 2 x O'rings and the tank anode fitting.
6. Follow Steps 16 to 20 of the procedure [“Draining and Flushing the Solar Storage Tank”](#) on page 54.
7. Fill and turn on the water heater, but do not switch on the electrical supply. Refer to:
 - Closed Circuit Systems – [“Filling and Commissioning of the Storage Tank”](#) on page 31 and [“Filling and Commissioning the Closed Circuit”](#) on page 32.
 - Open Circuit Systems – [“Filling and Commissioning the Storage Tank and Collectors”](#) on page 38.
8. Inspect for leaks at the anode connection to the water heater.

If a leak is detected, close the cold water isolation valve fully and relieve pressure from the water heater by either operating the easing lever on the temperature pressure relief valve or opening a hot tap. Repeat this Anode Replacement procedure to remove the anode. Reapply new thread sealant or check the O'rings, refit the anode and repeat Steps 5 to 8.
9. Re-fit the electrical cover.
10. Switch on the electrical supply at the water heater isolating switch(s) on the switchboard and at the isolating switch(s) at the solar storage tank(s) (if installed).

⚠ Warning: Do not turn power on until the water heater is filled with water or damage to the heating element will result.



SOLAHART INSTALLATION REPORT

Dear Customer

A copy of this installation report is to be attached to an STC Assignment Form (where applicable) as proof of installation. It can be copied and kept for your records. An electronic version may be provided by the Dealer instead.

Installer, please complete all details below

Owner's Name							
Installation Address							
Suburb		Telephone Home					
State		Work					
Postcode		Mobile					
Email Address							
Dealership / Agent		No. of Stories of Install		Single	Other		
Installer's Name		Installation Date					
Type of Installation (please circle)	Replace Complete Solar System	Replace Solar Tank	Replace Electric or Gas	Replace Heat Pump	New Building	New Install on Existing Building (not replacing a unit)	Other
System Model No		System Type					
Tank Model No		Tank Serial No					
Collector Model No		No of Collectors					
Collector Serial No's	1)	2)	3)	4)			
Electric Booster (please circle)	Electric continuous	Off Peak 1 (night)	Off Peak 2 (night & day)	Solar Preheat only			
Electric Booster Control (please circle)	None	Timer	Manual Switch	Other			
Gas Booster (if installed)	Model No		Serial No				

If replacing a water heater, please give details

Brand		Model No		Electric	Gas
If a Solahart unit	Tank Serial No		Date of manufacture		
Collector Serial No's	1)	2)	3)	4)	

Comments					

Signature:	Installer:	Customer:
Date		

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