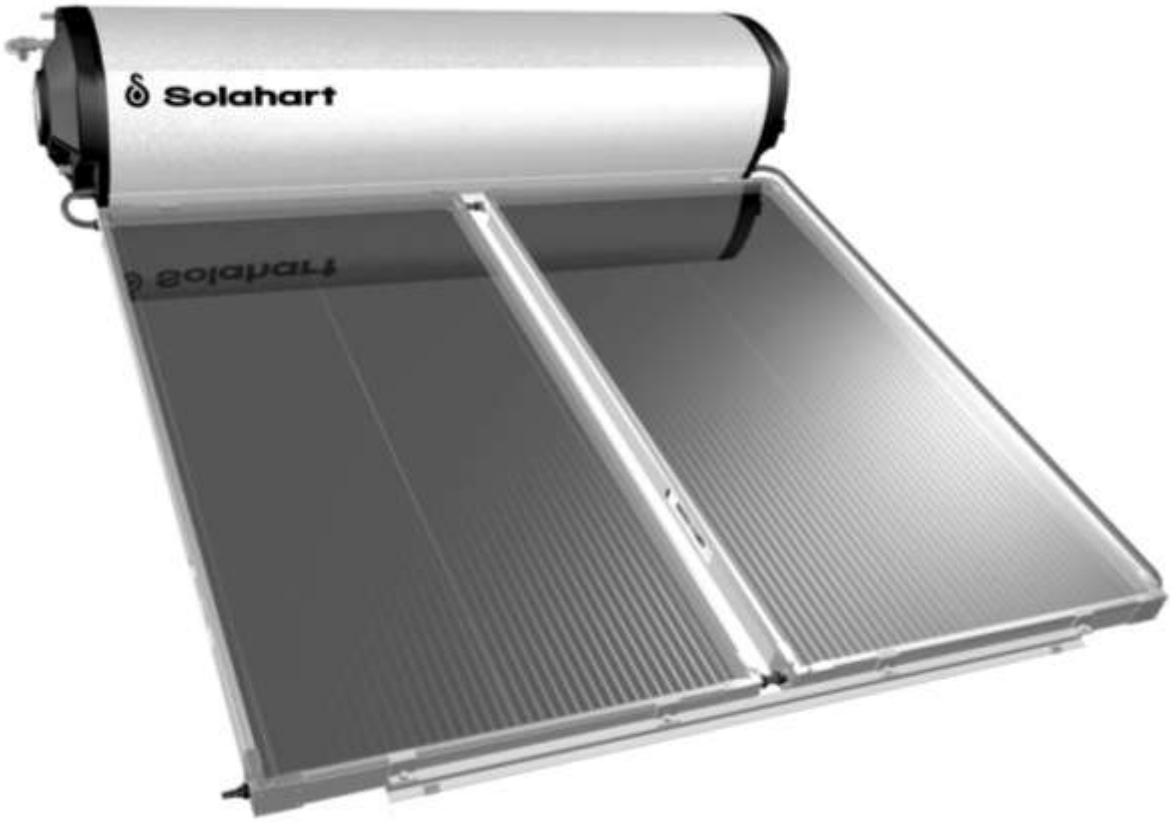
Solahart®

OWNER'S MANUAL

Includes Installation Instructions

SOLAR WATER HEATERS

Solahart Industries Pty Ltd
ABN 45 064 945 848



CONTENTS

HOME OWNER: WE RECOMMEND THAT YOU READ PAGES 1 TO 9
The other pages are intended for the installer but may be of interest to you

33-1197 Revision H – 2013 November

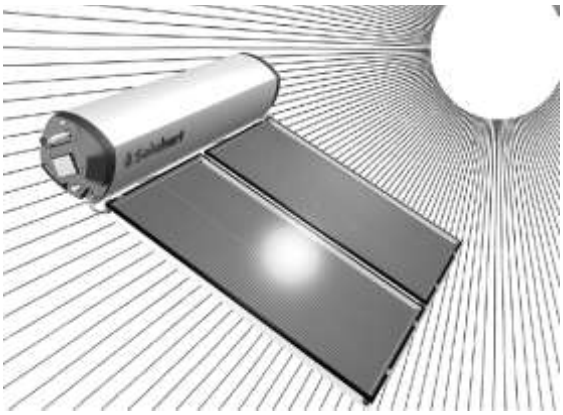
HERE'S HOW IT WORKS

Solahart thermosiphon solar water heaters are available in two series:

- Closed Circuit Series – J, KF, LCSC & BTC models
- Open Circuit Series – L & LCSD models

Both series transfer heat absorbed from the sun by the solar collectors to the water storage tank through the Natural Thermosiphon Principle without the need for pumps or sensors.

The Solahart collectors absorb solar energy. The low-iron content solar glass allows more solar energy to pass through and be retained than conventional glass.



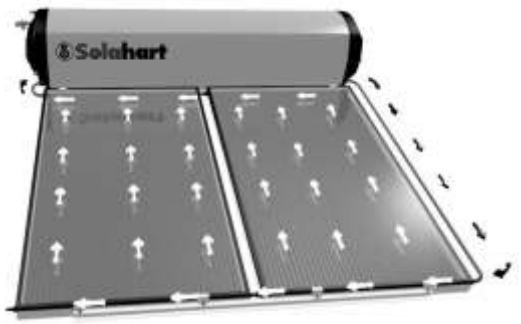
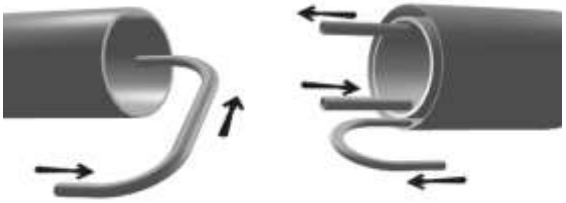


Diagram of Closed Circuit Series

In the Closed Circuit Series, heat is absorbed by the collector and passed to the 'Hartgard' heat transfer liquid inside the collector. As the temperature of the 'Hartgard' increases, the hot fluid rises up through the collector by the Natural Thermosiphon Principle, into the heat exchanger jacket around the potable water storage tank. Here, the heat is transferred to the potable water, cooling the 'Hartgard' fluid.

The cooler fluid is then forced back down into the collectors through the displacement action of further hot fluid rising up into the heat exchanger jacket.

The cooler fluid that has been forced down is again heated in the collectors and rises back up to pass the heat to the potable water in the storage tank. This circulation repeats until all water in the storage tank is heated.



Open Circuit Series Closed Circuit Series

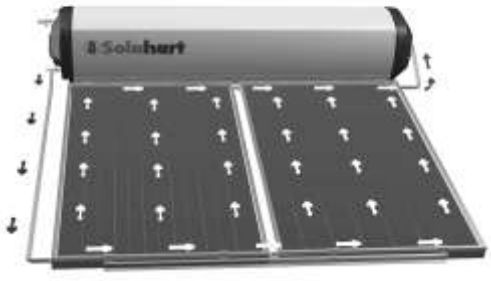


Diagram of Open Circuit Series

For the Open Circuit Series, heat is collected directly by the potable water circulating through the collector. As the potable water heats up, it rises by the Natural Thermosiphon Principle, directly to the storage tank. As the heated potable water travels through to the storage tank, the cooler potable water returns to the collectors. This circulation repeats until all water in the storage tank is heated.

FACTS YOU SHOULD KNOW ABOUT YOUR SOLAHART WATER HEATER

WARNING: FOR CONTINUED SAFETY OF THIS APPLIANCE IT MUST BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

CAUTION: 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 AND CHILDREN.
CHILDREN SHOULD BE SUPERVISED TO ENSURE THEY DO NOT INTERFERE WITH THE WATER HEATER.

WARNING: THIS WATER HEATER USES 240 V AC POWER FOR THE ELECTRICALLY OPERATED COMPONENTS. THE REMOVAL OF THE FRONT COVER WILL EXPOSE 240 V WIRING. IT MUST ONLY BE REMOVED BY A QUALIFIED ELECTRICAL SERVICE PERSON.

CAUTION: CARE SHOULD BE TAKEN NOT TO TOUCH THE PIPE WORK CONNECTING THE SOLAR STORAGE TANK AND THE SOLAR COLLECTORS. VERY HIGH TEMPERATURE HOT WATER CAN BE GENERATED BY THE SOLAR COLLECTORS UNDER CERTAIN CONDITIONS AND WILL FLOW THROUGH THE PIPE WORK FROM THE SOLAR COLLECTORS TO THE SOLAR STORAGE TANK.

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.

Under normal family use and summer solar conditions, the solar water heater should operate between 60ºC and 70ºC. However, the temperature can exceed this and under certain circumstances may be as high as 95ºC (see recommendation below). This can occur during periods of higher solar radiation (particularly in summer) or during long periods of reduced water usage. Extreme care should be taken in these circumstances.

CAUTION: 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 "Maintenance" on page 8 and to "Anode Inspection and Replacement" on page 8.

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.

Water Quality - Is It Suitable For The Solahart Water Heater?

Your Solahart water heater is suitable for use with water with a total dissolved solid content less than 1,000 ppm and for which the total hardness does not exceed 200 ppm $CaCO_3$. Water supplies having calcium hardness ($CaCO_3$) and an alkalinity in excess of 150 ppm should be treated by a softening process prior to use with this water heater to prevent scaling and damage to the electric booster element.

A water analysis can be obtained from your water supply authority.

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.

'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.

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

150 model	180 model	220 model	300 model	440 model
75 litres	90 litres	110 litres	150 litres	200 litres

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 may be fitted to the system to turn the booster on when required. This method 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.

Off Peak Electricity & Boosting

If your Solahart water heater's in-tank electric booster is connected to an 'Off Peak' (night rate) electrical supply, it is important to remember that the booster may only operate late at night. 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. In areas where a 'Day Rate' electrical switch is permitted, the storage tank can be boosted to ensure hot water is available at the end of the day.

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.

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

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 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	220 model	300 model	440 model
1.5 kW	3 hours	3 ¾ hours	4 ½ hours	6 hours	8 ¾ hours
1.8 kW	2 ½ hours	3 hours	3 ¾ hours	5 hours	7 ½ hours
2.4 kW	2 hours	2 ¼ hours	2 ¾ hours	3 ¾ hours	5 ½ hours
2.5 kW	2 hours	2 ¼ hours	2 ¾ hours	3 ¾ hours	5 ¼ hours
3.6 kW	1 ½ hours	1 ½ hours	2 hours	2 ½ hours	3 ¾ hours
4.8 kW	1 hour	1 ¼ hours	1 ½ hours	2 hours	2 ¾ 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	220 model	300 model	440 model
1.5 kW	2 ¾ hours	3 ¼ hours	4 hours	5 ½ hours	8 hours
1.8 kW	2 ¼ hours	2 ¾ hours	3 ¼ hours	4 ¾ hours	6 ¾ hours
2.4 kW	1 ¾ hours	2 hours	2 ½ hours	3 ½ hours	5 hours
2.5 kW	1 ¾ hours	2 hours	2 ½ hours	3 ¼ hours	4 ¾ hours
3.6 kW	1 ¼ hours	1 ½ hours	1 ¾ hours	2 ¼ hours	3 ¼ hours
4.8 kW	1 hour	1 hours	1 ¼ hours	1 ¾ hours	2 ½ 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	220 model	300 model	440 model
1.5 kW	2 ½ hours	3 hours	3 ½ hours	4 ¾ hours	7 hours
1.8 kW	2 hours	2 ½ hours	3 hours	4 hours	6 hours
2.4 kW	1 ½ hours	2 hours	2 ¼ hours	3 hours	4 ½ hours
2.5 kW	1 ½ hours	1 ¾ hours	2 ¼ hours	3 hours	4 ¼ hours
3.6 kW	1 hour	1 ¼ hours	1 ½ hours	2 hours	3 hours
4.8 kW	¾ hour	1 hour	1 ¼ hours	1 ½ hours	2 ¼ hours

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 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.

IN-SERIES GAS BOOSTING

An in-series gas booster (also known as an instantaneous gas booster) can be installed between the solar water heater and the hot outlets in the house. This 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; if below it will automatically heat the water up to the preset outlet temperature setting. This device 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 this booster, consult the owner's manual for the product.

TEMPERATURE STABILISATION

Temperature stabilisation is the reduction in water temperature as the hot water at the top of the storage cylinder transfers some of its heat to the cooler water in the lower section of the cylinder. 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 may make it necessary to use the booster to raise the water in the top section of the cylinder back to an acceptable temperature.

Over-night temperature stabilisation is most evident in the morning if the booster switch or time clock is left OFF over-night. It is more prevalent the more hot water is used the night before and also in the cooler months. Day time temperature stabilisation is quite evident on days of lower solar radiation particularly during the cooler months if the 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 4.

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 an existing water heater provided that:

1) The power supply to the Solahart is not connected.
2) The existing water heater is thermostatically-controlled not flow-controlled, except when used in conjunction with an electronic instantaneous water heater.
3) The operating pressures of the two water heaters are compatible or reduced to the lower of the two heaters.
4) The existing water heater has sufficient thermal capacity in its own right to supply normal water requirements and is complete with its own controls and valves and these are not interfered with.
5) If using the Solahart water heater as a pre-heater to an instantaneous water heater, a temperature controlled by-pass valve is installed to the instantaneous heater if required (consult the instantaneous water heater's installation manual).
6) If using the Solahart water heater as a pre-heater to a storage water heater, the water supply from the Solahart heater be tempered to the temperature setting of the storage heater OR a temperature controlled by-pass valve be installed to the storage heater to divert water from the Solahart heater when at a temperature above this setting. These configurations ensure that the storage heater's thermal cut-out does not operate unnecessarily, resulting in the storage heater no longer operating.

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

Troubleshooting – Save A Service Call

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.

Collector Glass Breakage

WARNING: NO ATTEMPT SHOULD BE MADE TO REPAIR BROKEN COLLECTOR GLASS

The collector glass is not offered as a replacement part. Should the solar collector require replacement, contact your local Solahart Dealer.

NOTE: The product warranty DOES NOT cover breakage of 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.

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.

MAINTENANCE

Minor Six Month Maintenance

It is recommended minor maintenance be performed every six months by the dwelling occupant.

The minor maintenance includes:

1) If accessible, operate the easing lever on the temperature pressure relief valve. It is very important you raise and lower the lever gently. Refer to "Temperature Pressure Relief Valve" on page 9.

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 accessible, contact your local Solahart Dealer.

2) Operate the easing lever on the expansion control valve. It is very important you raise and lower the lever gently. Refer to "Expansion Control Valve" on page 9.

Major Service

This major service should be performed to coincide with the anode replacement OR at five years, whichever is sooner (refer to the Anode Replacement Period section). Only genuine replacement parts should be used on this water heater.

THE MAJOR SERVICE CAN ONLY BE CARRIED OUT BY A QUALIFIED PERSON.
CONTACT YOUR LOCAL SOLAHART DEALER OR AUTHORISED SERVICE REPRESENTATIVE.

The major service addresses the following aspects:

1) Check the closed circuit fluid level (Closed Circuit Series only).
2) Replace the temperature pressure relief valve (Part No. 45-1104).
3) Flush the cold water relief valve (Part No. 45-1103).
4) Where fitted, check the electric element for excessive calcium build up or corrosion. Replace if necessary.
5) Visually check the unit for any potential problems, e.g. broken glass, excessive dust build-up, shading etc.
6) Carefully inspect all connections.
7) Drain and flush out tank sediment build-up if required (see "To Empty the Water Heater" on page 54).
8) Drain and flush collectors ('L' Series only) (see "To Empty the Water Heater" on page 54).
9) Replace the anode.

Note: The five year service and routine replacement of any components, such as the anode and relief valves, are not included in the Solahart warranty. A charge will be made for this work.

For units fitted with a tempering valve or a water softener, the operation should be checked at this time. These checks are not covered within the major service.

Anode Inspection & Replacement

Corrosion protection of the water heater's tank is obtained by using two coats of high quality vitreous enamel and the use of a sacrificial anode.

The anode installed in your water heater will slowly dissipate whilst protecting the cylinder. The life of the cylinder may be extended by replacing the anode. The following table shows the when the anode should be replaced.

Water Quality Total Dissolved Solids (ppm)	Anode	Recommended Anode Replacement Period
0 - 600	Standard anode	5 years
	Free-Heat anode	10 years
600 - 1,000	Aluminium anode	3 years
Over 1,000	Aluminium anode	Less than 2 years

Water quality details should be obtained from the water authority where special water supplies are used. Generally, where the water is supplied from a bore or well, the quality of the water will be such that a three-year anode change (or less) will be required. A water analysis is recommended for these locations.

Pressure Relief Valve - Six Monthly Maintenance

The easing gear of pressure relief valves fitted to your water heater system must be operated every six months to assure their continuing function.

WARNING: FAILURE TO HAVE THE TEMPERATURE PRESSURE RELIEF VALVE EASING GEAR OPERATED AT LEAST ONCE EVERY SIX MONTHS MAY RESULT IN THE WATER HEATER EXPLODING.

WARNING: NEVER BLOCK THE OUTLET OF A RELIEF VALVE OR ITS DRAIN LINE FOR ANY REASON.

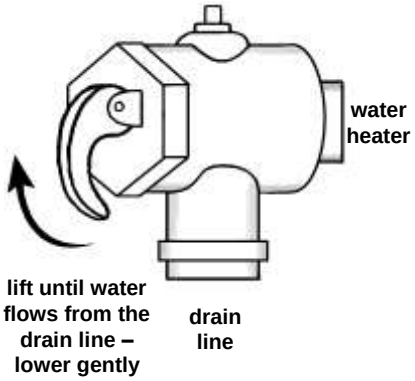
CAUTION: IT IS VERY IMPORTANT THAT THE LEVER IS RAISED AND LOWERED GENTLY.

NOTE: CONTINUOUS LEAKAGE OF WATER FROM A RELIEF VALVE OR ITS DRAIN LINE MAY INDICATE A PROBLEM WITH THE WATER HEATER.

TEMPERATURE PRESSURE RELIEF VALVE

This valve is fitted in the top of the water heater tank and is essential for its safe operation. It is possible for the valve to release a little water through the drain line during each heating period. This occurs as the water is heated and expands by approximately 1/50 of its volume.

The easing lever on the temperature pressure relief valve should be operated once every six months. Refer to "Minor Six Month Maintenance" on page 8. If water does not flow freely from the drain line when the lever is lifted, then the water heater should be checked by your nearest Solahart Dealer.



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The temperature pressure relief valve should be replaced at intervals not exceeding 5 years, or more frequently in areas where there is a high incidence of water deposits.

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 South Australia, Western Australia and scaling water areas, it is mandatory this valve is installed. Water will flow from its drain line during the heating period.

The easing lever on the expansion control valve should be operated once every six months. Refer to "Minor Six Month Maintenance" on page 8. If water does not flow freely from the drain line when the lever is lifted, then the water heater should be checked by your nearest Solahart Dealer. The expansion control valve should be checked for performance or replaced at intervals not exceeding 5 years, or more frequently in areas where there is a high incidence of water deposits.

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.

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 Standards AS/NZS 3500.4, AS/NZS 3000, AS 5601 or AS/NZS 5601.1, as applicable under local regulations, 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, the installation must also conform with NZS 5261, as applicable under local regulations, and Clause G12 of the New Zealand Building Code.

INSTALLATION MUST COMPLY WITH LOCAL ELECTRICAL AND PLUMBING CODES

Victorian Installers

Notice to Victorian Installers from the Victorian Plumbing Industry Commission 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 'List of systems capable of complying with the regulations' published by Sustainability Victoria (see www.sustainability.vic.gov.au). 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 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 backup redundancy into the hot water supply system.

LOCATION

The installation should be as close as possible to the most frequently used hot water outlet or existing water heater system in retrofit installations. 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: The element/anode end of the Tank should be placed no nearer than ¾ length of the Tank, to any wall or obstruction, so that the anode can be replaced during a service.

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. The installation of this solar water heater on a suitable frame, subject to the frame's design criteria not being exceeded:

- is suitable for installation in geographic locations up to and within Wind Region D (With Pitch frame) or up to and within Wind Region C (Fixed Pitch frame), as defined in the Building Code of Australia, Australian / New Zealand Standard AS/NZS 1170.2:2002 and the Australian Standard AS 4055-2006, or equivalent location, and
- also provides an acceptable method of installation where it is necessary to satisfy the requirements of the Building Code of Australia and AS/NZS 3500.4 Clause 6.5.3.4 for high wind areas, or equivalent requirements.

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.

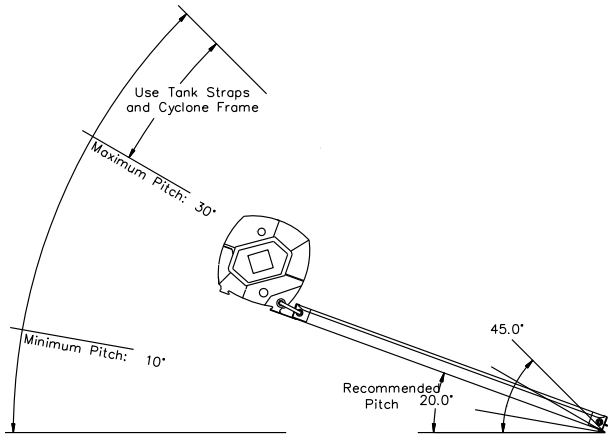
However, the optimum orientation of solar collectors is not always practical or achievable. Solar collectors may be installed up to 90° from the optimum orientation. Where the orientation is greater than 60° from the optimum, either an additional solar collector or selective surface collectors in lieu of non selective surface collectors should be installed to make up for the reduction in solar performance. Each of these options should be discussed with the system owner. If neither of these options is possible nor acceptable to the system owner, then the system owner needs to be made aware of, understand and accept that more 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 Fixed 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 Fixed 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 1 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

All electrical work and permanent wiring must be carried out by a qualified person. All installations are to be in accordance with national and local electrical codes and regulatory authority requirements applicable in your area. In Australia, this must also be in accordance with the Wiring Rules AS/NZS 3000.

WARNING: DO NOT TURN POWER ON UNTIL THE WATER HEATER IS FILLED WITH WATER OR DAMAGE TO THE HEATING ELEMENT WILL RESULT

The power rating and current requirement of your Solahart water heater will be specified on the heater's data plate, located on the cover to the electrical cavity. The temperature rating of the power supply lead's insulation should suit this application. All electric wiring should be enclosed in suitable weatherproof conduit with watertight fittings.

An isolation switch MUST be installed in the meter box for service work on the unit. The isolating switch should be left switched on. 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.

If water and/or power are not available on completion of installation, isolation switch in the meter box in the OFF position and place a warning label "Do not turn on electricity until filled with water" on the electrical isolation switch.

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:

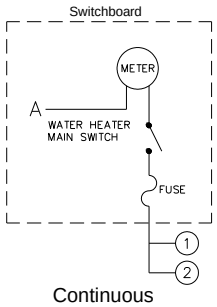
- Be operated by a continuous power supply on its own circuit from the switchboard with the booster heating unit operated by the Off-Peak power supply.
  A double pole isolating switch is required to be installed at the switchboard to simultaneously isolate both circuits.

Or

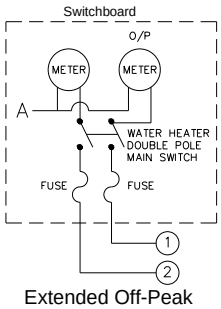
- Be of a type which has an internal rechargeable battery to keep time when the power supply is not available to the timer.

Refer to "Programming the Timer" on page 5.

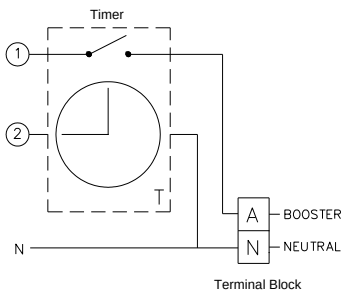
Timer Control Switch Wiring Diagram



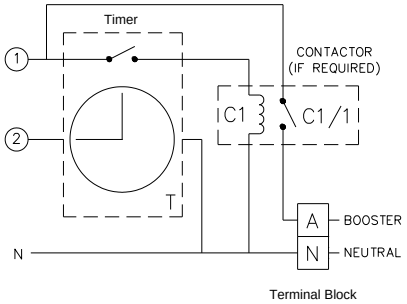
Continuous
Power Supply



Extended Off-Peak
Power Supply



Timer Without Contactor



Timer With Contactor (if required)

CONTROL THERMOSTAT/SAFETY CUT-OUT COMBINATION SWITCH

A combination thermostat/safety cut-out is installed to control the electrical heating element to the factory pre-set temperature of 60°C. Individual situations may require this setting to be altered. Only qualified electricians or Solahart service contractors are permitted to adjust the thermostat. The safety cut-out (also called a thermal cut-out) will de-energise the element should the temperature within the tank reach 83°C when the element is activated. This cut-out is of a type that DOES NOT require additional control devices to prevent its operation due to solar heating of the tank water above this temperature.

WARNING: THE OPERATION OF THE OVER-TEMPERATURE CUT-OUT ON THE 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.

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 AS/NZS 3500.4 and in New Zealand, the installation must conform with Clause G12 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 PIPING SHOULD NOT BE USED IN ANY HOT WATER PIPING RUNS DUE TO THE HIGH OPERATING TEMPERATURE AND PRESSURE OF SOLAR WATER HEATER. USE ONLY SOLAHART PARTS TO CONNECT THE COLLECTORS TO THE TANK.

TEMPERATURE PRESSURE RELIEF VALVE

A combined temperature and pressure relief (TPR) valve (Part No. 45-1104) is 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. It is MANDATORY that this TPR valve be fitted in all cases, except where the storage tank is vented to atmosphere through an open pipe.

The TPR valve is shipped in the pipe kit and must be fitted before the water heater is operated. Before fitting the TPR valve, make sure the probe has not been bent. Seal the TPR valve thread with Teflon tape (never hemp) ensuring that the tape is at least 3 mm back from the end of the thread to prevent tape fouling the valve seat. Screw the valve into the correct opening leaving the valve outlet pointing downwards. Do not use a wrench on the TPR valve body - use the spanner flats provided.

Continuous leakage of water from the TPR valve or its drain line may indicate a problem with the water heater

WARNING: NEVER BLOCK THE OUTLET OF THE TPR VALVE OR ITS DRAIN LINE FOR ANY REASON.

TPR VALVE DRAIN

A copper drain line must be fitted to the TPR valve to carry the discharge clear of the water heater. Connect the drain line to the TPR valve using a disconnection union. The pipe work from the TPR valve to the drain should be as short as possible and run away from the water heater in a continuously downward direction and with no restrictions. It should have no more than three right angle bends in it. Use DN15 pipe. The outlet of the drain line must be in such a position that flow out of the pipe can be easily seen (refer to AS/NZS 3500.4) but arranged so hot water discharge will not cause injury, damage or nuisance. The drain line must discharge at an outlet or air break not more than 9 metres from the TPR valve.

In locations where water pipes are prone to freezing, the drain line must be insulated and not exceed 300 mm in length. In this instance, the drain line is to discharge into a tundish through an air gap of between 75 mm and 150 mm.

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

EXPANSION CONTROL VALVE

Local regulations may make it mandatory to install an expansion control valve (ECV) in the cold water line to the water heater. In other areas, an ECV is not required unless the water saturation index is greater than +0.4. For this Solahart water heater an RMC H50 Cold Relief Valve (part no 45-1103) is supplied in the parts kit for use as the ECV. Solahart recommend its fitment in all instances.

The ECV must always be installed after the TRIO valve (part no 33-1675), and must be the last valve installed prior to the water heater (see a typical cold water configuration page 14). A copper drain line must be run separately from the drain of the TPR valve. The TRIO valve in the cold water inlet line also enables the water to be turned OFF for servicing purposes.

DRAIN LINES - GENERAL

The TPR valve and ECV should both have drain pipes connected to their outlets. These pipes should run to ground level where hot water discharge is safe and clear of any paved areas. Do not seal or block the ends of these drain pipes or the valve outlets. Do not allow water from the valve outlets or drain pipes to drip or discharge onto roofing materials or roof gutters.

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.

WATER PRESSURE

Solahart advises the limiting of water pressure to 500kPa with a pressure limiting valve to suit this solar water heater and its associated pressure relief valves. 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

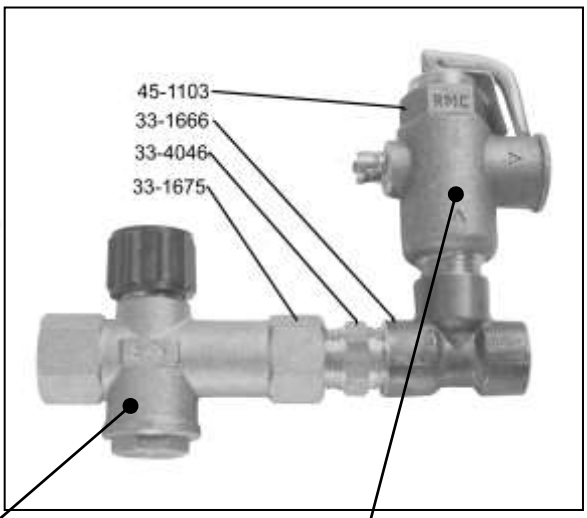
All the valves in the inlet cold supply line (i.e. the TRIO valve and ECV) must be located at least 1 metre away from the water heater and readily accessible from ground or floor level to enable homeowner operation without the need for a ladder. The valves should not be located on the house roof and NOT IN THE CEILING SPACE.

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.

TPR Valve (45-1104)

Typical Cold Water Inlet Configuration



TRIO Valve (33-1675) Non Return & Isolating Valve with Strainer

H50 Cold Relief Valve (45-1103)

TEMPERATURE LIMITING DEVICES

This water heater can deliver water at temperatures which can cause scalding.

It is necessary and we recommend that a temperature limiting device be fitted between the water heater and the hot water outlets in any ablution area such as a bathroom or ensuite, to reduce the risk of scalding. The installing plumber may have a legal obligation to ensure the installation of this water heater meets the delivery water temperature requirements of AS/NZS 3500.4, or other plumbing codes applicable in your area, so that scalding water temperatures are not delivered to a bathroom, ensuite or other ablution area. Refer to plumbing codes applicable in your area to see if a temperature limiting device is required for this installation for the supply of hot water from the solar water heater.

The temperature limiting device used with a solar water heater should have a specified 'minimum temperature differential' between the hot water inlet and the tempered water outlet of no greater than 10°C. In addition, a temperature limiting device capable of receiving a hot water supply temperature of up to 99°C should be used in conjunction with a thermosiphon system. Refer to the specifications of the temperature limiting device.

For safety reasons Solahart recommends the fitment of temperature limiting devices in all instances.

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 should have closed cell insulation of minimum 13 mm thickness; this includes tank to collector inter-connecting pipe. 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 and at least 120°C for tank to collector connections).
- 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 improve system performance and will also protect against burns where heater is in 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. Installation details for these devices are available from Solahart on application. 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.

IN-SERIES GAS BOOSTING

Refer to the installation manual provided with the booster.

PACKING, STORAGE & TRANSPORTATION

All Thermosiphon products are to be kept in the original packaging materials and should be stored or transported in the vertical position - note there is an arrow to indicate the 'UP' direction for Tanks.

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.

For installation checklist please see page 54.

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.

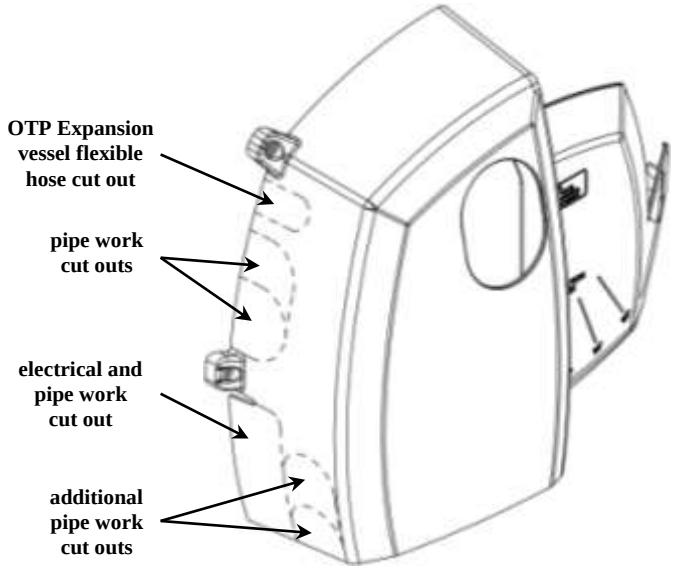
Installation with a HartStat Over Temperature Protection System

Installation without a HartStat Over Temperature Protection System

FITTING THE PIPE SHROUD COVER

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

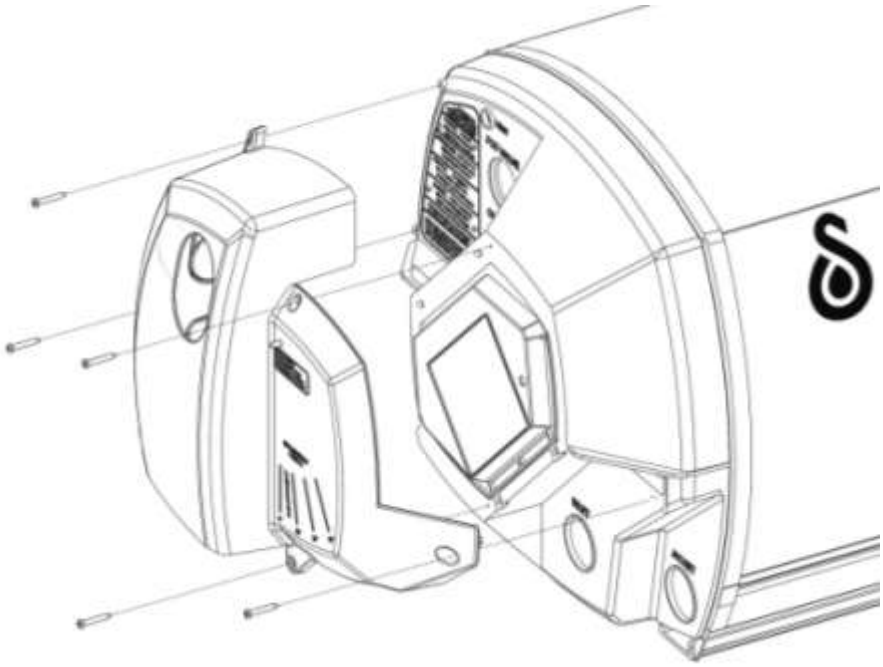
- Each cut-out can be removed using a pair of snips by following the preformed cut-out lines.
- Remove only the necessary cut-outs to suit the installation.
- **Caution:** Practise safe working procedures when using the snips and care is to be taken to avoid potential injury from cut edges.
- Additional 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.



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 (1270 mm for 301 & 221 Closed Circuit System) from the centre of the batten to determine the location of the collector rail (refer to drawings, Page 51), 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 each additional single collector rail (short) (if used). Refer to "Hooking Collector / Tank Strap to Collector Rail" on page 51 and Detail A on page 51.

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. 33-7121). 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. 33-7134) and the collector bung assembly (Part No. 33-7135) 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. 33-7144) 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. 20-4600) and the aluminium clamps (Part No. 33-0872). 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 52. 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. 45-1104) into the tank as per water connection diagrams on page 50.

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 20 and to the installation instructions provided with the HartStat Kit for details.

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 41).

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 -15ºC 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 -10ºC, 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 0ºC. Connect the heater tape to a normally ON power supply.

FILLING AND COMMISSIONING OF THE STORAGE TANK

WARNING: DO NOT TURN ON ELECTRIC POWER UNTIL AFTER THE WATER HEATER HAS BEEN FILLED WITH WATER.

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'. Refer to the section on water quality on Page 3 of this manual. Should the water quality be above these limits, 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 BEFORE FILLING THE CLOSED CIRCUIT.

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.

Fill the system by the siphon method using a known quantity of fluid. Check this volume against the closed circuit volume required for the system to ensure the correct amount of fluid has been added.

System	Closed circuit volume	System	Closed circuit volume	System	Closed circuit volume	System	Closed circuit volume
151	12 litres	221	14.5 litres	301	15.5 litres	443	30 litres
181	13.5 litres	222	18 litres	302	19 litres	444	34 litres
182	17 litres			303	23 litres		

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.

Instructions detailing the closed circuit commissioning process commences on Page 22.

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 INDIRECT 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

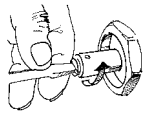
Position end cap over recess and insert

Secure end cap with screw

CLOSED CIRCUIT COMMISSIONING PROCEDURE – GENERAL

Remove the Fill Plug from the Collector Fill Assembly.
Remove PR6/PR200 Valve from the Tank.
Connect a ½" hose to the Collector Fill Assembly
and fill the Closed Circuit with water.
(Hose to be supplied by Installer).

1



Continue filling until water overflows from the
Jacket Relief Valve Port and there are no air bubbles
in the overflowing water.

2

Fit the Test Block into the Jacket Relief Valve Port.

3

Fit the PR6/PR200 Valve to the Test Block.

4

Remove the hose from the Collector Fill Assembly
and replace the Fill Plug as quickly as possible
to minimise fluid spillage.

5

IMPORTANT: If more than 0.5 litres of fluid is spilled, repeat steps 1-5

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.

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.

Connect a bicycle pump/portable compressor
to the Test Block and pressurise the Closed Circuit
to 80kPa/170kPa, as appropriate.
Remove bicycle pump/portable compressor from Test Block.

6

WARNING: DO NOT ALLOW THE CLOSED CIRCUIT PRESSURE TO RISE ABOVE 200KPA OR PERMANENT SYSTEM DAMAGE MAY OCCUR.

If the PR6/PR200 Valve opens during the pressure test, wait
until the Valve re-seals before checking all connections for
evidence of leakage.
If the Valve does not open during the pressure test then
check all connections for any evidence of leakage.

7

Ensure that the Closed Circuit pressure
remains stable for at least 10 minutes.

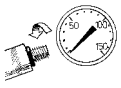
8

If any leakage is observed at any of the connections,
rectify the problem and repeat steps 1 to 8.

9

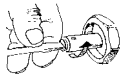
Release the pressure from the Closed Circuit
by removing the PR6/PR200 Valve from the Test Block.
Once the pressure is relieved, replace PR6/PR200 Valve.

10



Remove the Fill Plug from the Fill Assembly
and connect the ½" hose as quickly as possible
to minimise fluid spillage.

11



IMPORTANT: If more than 0.5 litres of fluid is spilled, repeat steps 1-5

Remove the PR6/PR200 Valve and siphon the entire contents of the Hartgard container into the Closed Circuit using the ½" hose.

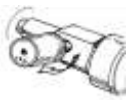
12

Water will flow from the PR6/PR200 Valve Port during this operation (4.5 litres for each container of Hartgard).

13

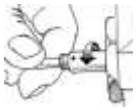
When the Hartgard container is empty, flush approx 1 litre of clean water through the hose into the Collector (to ensure all of the Hartgard has been siphoned into the system), and refit the PR6/PR200 Valve to the Test Block.

14



Remove the hose from the Fill Assembly and screw in the Fill Plug as quickly as possible to minimise fluid spillage.

15



IMPORTANT: If more than 0.5 litres of fluid is spilled, repeat steps 1-5

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.

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.

Pressurise the Closed Circuit to 80kPa/170kPa, as appropriate, using the bicycle pump/portable compressor and ensure there is no leak at the Fill Assembly. Remove bicycle pump/portable compressor from Test Block.

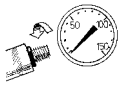
16

Ensure that the pressure remains stable for at least 10 minutes.

17

Release the pressure from the Closed Circuit by removing the PR6/PR200 Valve from the Test Block.

18



Remove the Test Block from the Tank.

19

Fit the PR6/PR200 Valve to the Jacket Relief Valve Port when ready or as soon as water starts to be expelled (440 systems). The closed circuit system is now ready for operation.

20

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

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 (1170 mm for 301L & 221L) from the centre of the batten to determine the location of the collector rail. (refer to drawings, Page 51) 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 each additional single collector rail (short) (if used). Refer to "Hooking Collector / Tank Strap to Collector Rail" on page 51 and Detail A on page 51.

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 51).

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. 33-0695 – screwed fitting, 34-1390 – 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. 33-0606) and collector nuts (Part No. 33-0600) for collectors with screwed fittings or the collector bung assembly (Part No. 34-1391) 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 Direct Systems – End Cap" on page 25). Fit the cold pipe to the tank cold inlet socket. Refer to "Open Circuit Direct Systems – Thermosiphon Restrictor Valve (TRV)" on page 26 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. 20-4600) and the aluminium clamps (Part No. 33-0872). 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 52. 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. 45-1104) into the tank as per the connection diagram on page 50.

Fit the pipe shroud cover if supplied. Refer to "Thermosiphon Pipe Shroud Cover" on page 16.

WARNING: UNCOATED DR BRASS CONETITE FITTINGS MUST ONLY BE USED IF LCS COLLECTORS ARE BEING INSTALLED WITH AN OPEN CIRCUIT SYSTEM.

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 51).

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.

STANDS

Refer to installation sheet in the stand kit.

OPEN CIRCUIT DIRECT SYSTEMS – END CAP

The end cap is supplied fitted to the 'tail' end of the tank. The end cap used on the open circuit direct 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.

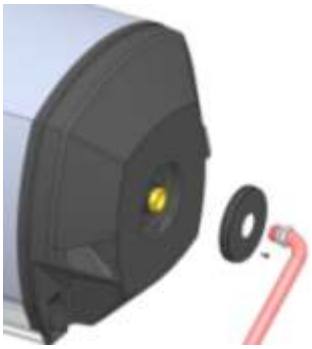
If it is necessary to remove the end cap:

- 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

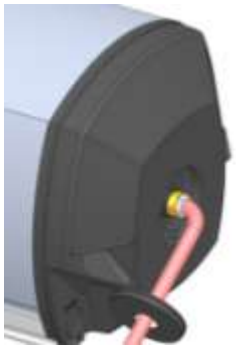
To fit the end cap with the solar hot pipe:

- 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

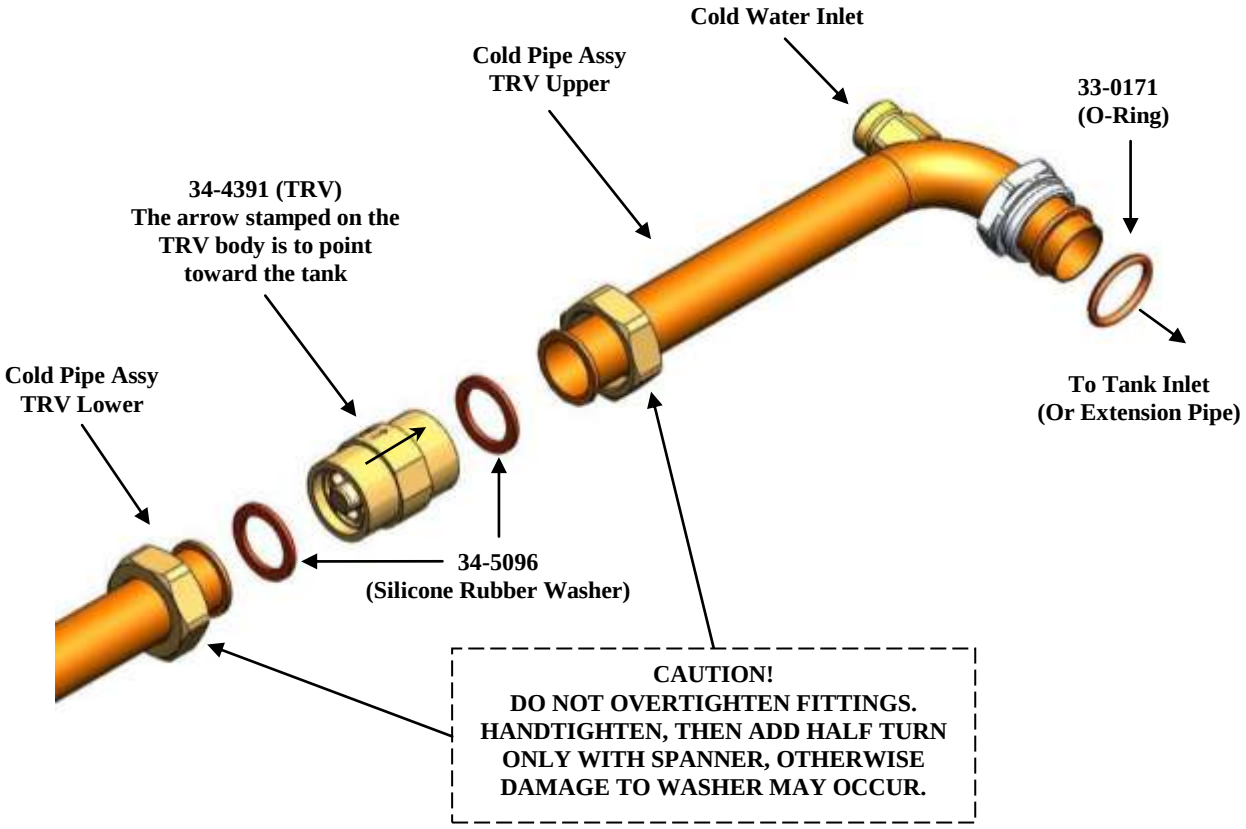
OPEN CIRCUIT DIRECT SYSTEMS – THERMOSIPHON RESTRICTOR VALVE (TRV)

A Thermosiphon Restrictor Valve (TRV) is available for use on an open circuit direct 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 222, 303, 443 system regardless of the type of collector installed and on a 302 system installed with LCS collectors.

When assembling the cold pipe, ensure:

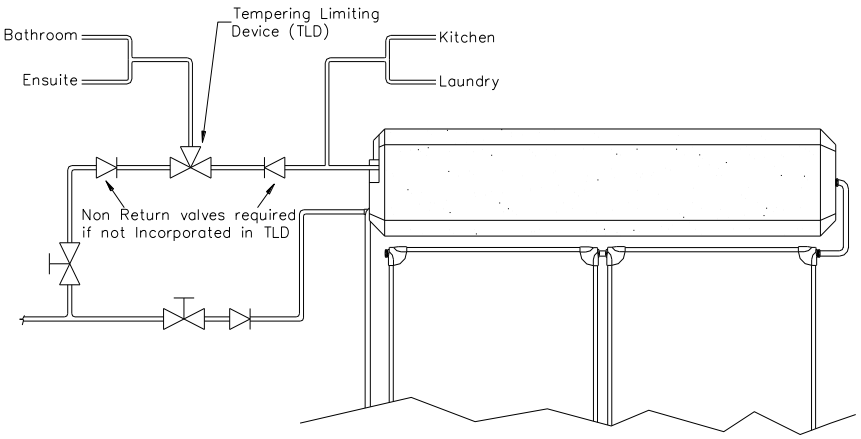
- A Silicone Rubber Washer is used between the flared pipe ends and each end of the TRV.
- The TRV is to be orientated with the copper element probe facing upward toward the tank. The TRV has an arrow and the word 'FLOW' stamped on the outside of the body. The arrow is to point upwards in the direction 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

INSTALLATIONS INCLUDING TEMPERATURE LIMITING DEVICES

In the event of the collectors stagnating and generating steam, it is possible that high temperature water may by-pass the temperature limiting device. To prevent this from occurring please follow the connection details shown below.



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 and pressure limiting valve to the solar storage tank, but it MUST BE before the non return valve prior to an open circuit direct system. The cold water line to the temperature limiting device can be branched off the cold water line either before or after the non return valve prior to a closed circuit indirect system. If an expansion control valve is required, it must always be installed after the non return valve and be the last valve prior to the solar storage tank.

WARNING: A NON RETURN VALVE MUST BE INSTALLED ON THE COLD WATER LINE TO THE SOLAR STORAGE TANK **AFTER** THE COLD WATER BRANCH TO A TEMPERATURE LIMITING DEVICE PRIOR TO AN OPEN CIRCUIT DIRECT SYSTEM.

If a combination isolation valve and non return valve (duo or trio valve) is installed on the cold water line to the solar water heater and the cold water line to the temperature limiting device branches off after this valve prior to an open circuit direct system, then a second non return valve must be installed between the cold water branch and 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).

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		151L & 151L FREE HEAT	151J	151KF	181L & 181L FREE HEAT	181J & 181J FREE HEAT	181KF & 181KF FREE HEAT	181BTC & 181BTC FREE HEAT	182L & 182L FREE HEAT	182J & 182J FREE HEAT
Delivery	litres	130	130	130	160	160	160	160	160	160
(solar)	US gal.	34	34	34	42	42	42	42	42	42
Auxiliary	litres	75	75	75	90	90	90	90	90	90
boost	US gal.	20	20	20	23	23	23	23	23	23
Weight	kg	239	256	256	275	292	292	279	311	337
(full)	lbs	527	564	564	606	644	644	615	685	743
Weight	kg	86	102	102	92	108	108	97	125	153
(empty)	lbs	190	225	225	203	238	238	214	276	337
Length	m	2.475	2.475	2.475	2.475	2.475	2.475	2.475	2.475	2.475
	in	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5
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	1.29	1.485	1.485	1.485	1.485	2.31	2.31
	in	50.8	50.8	50.8	58.5	58.5	58.5	58.5	90.9	90.9
Working	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000
Pressure	psi	145	145	145	145	145	145	145	145	145
Tank type		150L or 150LF	150J	150J	180L or 180LF	180J or 180F	180J or 180F	180J or 180F	180L or 180LF	180J or 180F
Type of Collector		L	J	KF	L	J	KF	BT	L	J
Number of Collectors		1	1	1	1	1	1	1	2	2

Systems		182KF & 182KF FREE HEAT	221L & 221L FREE HEAT	221J & 221J FREE HEAT	221KF & 221 KF FREE HEAT	222L & 222L FREE HEAT	222J & 222J FREE HEAT	222KF & 222 KF FREE HEAT	301L & 301L FREE HEAT	301J & 301J FREE HEAT
Delivery	litres	160	200	200	200	200	200	200	260	260
(solar)	US gal.	42	52	52	52	52	52	52	68	68
Auxiliary	litres	90	110	110	110	110	110	110	150	150
boost	US gal.	23	29	29	29	29	29	29	39	39
Weight	kg	338	324	347	347	324	347	347	421	448
(full)	lbs	745	714	765	765	714	765	765	928	987
Weight	kg	154	101	123	123	101	123	123	118	144
(empty)	lbs	339	223	271	271	223	271	271	260	317
Length	m	2.475	2.475	2.475	2.475	2.475	2.475	2.475	2.475	2.475
	in	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5
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	2.31	1.76	1.76	1.76	1.76	1.76	1.76	2.31	2.31
	in	90.9	69.3	69.3	69.3	69.3	69.3	69.3	90.9	90.9
Working	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000
Pressure	psi	145	145	145	145	145	145	145	145	145
Tank type		180J or 180F	220L or 220LF	220J or 220F	220J or 220F	220L or 220LF	220J or 220F	220J or 220F	300L or 300LF	300J or 300F
Type of Collector		KF	L	J	KF	L	J	KF	L	J
Number of Collectors		2	1	1	1	2	2	2	1	1

Systems		301KF & 301KF FREE HEAT	302L & 302L FREE HEAT	302LCSD & 302LCSD FREE HEAT	302J & 302J FREE HEAT	302KF & 302KF FREE HEAT	302BTC & 302BTC FREE HEAT	302LCSC & 302LCSC FREE HEAT	303L & 303L FREE HEAT	303J & 303J FREE HEAT
Delivery	litres	260	260	260	260	260	260	260	260	260
(solar)	US gal.	68	68	68	68	68	68	68	68	68
Auxiliary	litres	150	150	150	150	150	150	150	150	150
boost	US gal.	39	39	39	39	39	39	39	39	39
Weight	kg	448	457	451	495	495	469	469	493	540
(full)	lbs	987	1007	995	1091	1091	1044	1044	1087	1190
Weight	kg	144	151	147	186	186	164	164	184	228
(empty)	lbs	317	333	324	410	410	362	362	406	503
Length	m	2.475	2.475	2.475	2.475	2.475	2.475	2.475	2.475	2.475
	in	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5
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	2.31	2.31	2.31	2.31	2.31	2.31	2.31	3.16	3.16
	in	90.9	90.9	90.9	90.9	90.9	90.9	90.9	124.4	124.4
Working	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000
Pressure	psi	145	145	145	145	145	145	145	145	145
Tank type		300J or 300F	300L or 300LF	300L or 300LF	300J or 300F	300J or 300F	300J or 300F	300J or 300F	300L or 300LF	300J or 300F
Type of Collector		KF	L	LCS	J	KF	BT	LCS	L	J
Number of Collectors		1	2	2	2	2	2	2	3	3

Notes: Solar Delivery: typical draw from field tests, methodology analogous to AS1056.1

Systems		303KF & 303KF FREE HEAT	303LCSC & 303LCSC FREE HEAT	443L & 443L FREE HEAT	443J & 443J FREE HEAT	443KF & 443KF FREE HEAT	443BTC & 443BTC FREE HEAT	444L & 444L FREE HEAT	444J & 444J FREE HEAT	444KF & 444KF FREE HEAT
Delivery	*litres*	260	260	400	400	400	400	400	400	400
(solar)	*US gal.*	68	68	105	105	105	105	105	105	105
Auxiliary	*litres*	150	150	200	200	200	200	200	200	200
boost	*US gal.*	39	39	53	53	53	53	53	53	53
Weight	*kg*	552	513	676	730	730	691	712	775	788
(full)	*lbs*	1217	1131	1490	1609	1609	1524	1569	1708	1737
Weight	*kg*	229	196	250	289	289	256	260	319	332
(empty)	*lbs*	505	432	551	637	637	565	573	703	732
Length	*m*	2.475	2.475	2.475	2.475	2.475	2.475	2.475	2.475	2.475
	in	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5
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*	3.16	3.16	3.34	3.34	3.34	3.34	4.36	4.36	4.36
	in	124.4	124.4	131.5	131.5	131.5	131.5	171.8	171.8	171.8
Working	*kPa*	1000	1000	1000	1000	1000	1000	1000	1000	1000
Pressure	*psi*	145	145	145	145	145	145	145	145	145
Tank type		300J or 300F	300J or 300F	440L or 440LF	440J or 440F	440J or 440F	440J or 440F	440L or 440LF	440J or 440F	440J or 440F
Type of Collector		KF	LCS	L	J	KF	BT	L	J	KF
Number of Collectors		3	3	3	3	3	3	4	4	4

Notes: Solar Delivery: typical draw from field tests, methodology analogous to AS1056.1

Tanks		150L & 150LF	150J	180L & 180LF	180J	180F	220L & 220LF	220J	220F	300L & 300LF	300J	300F
Capacity	litres	150	150	180	180	180	220	220	220	300	300	300
	US gal.	40	40	48	48	48	58	58	58	80	80	80
Weight	kg	199	206	235	245	246	284	297	298	381	398	399
(full)	lbs	439	454	518	540	542	626	655	657	840	877	879
Weight	kg	49	56	55	65	66	64	77	78	81	98	99
(empty)	lbs	108	123	121	143	145	141	170	172	179	216	218
Length	m	1.28	1.28	1.494	1.494	1.494	1.76	1.76	1.76	2.31	2.31	2.31
	in	50.4	50.4	58.8	58.8	58.8	69.3	69.3	69.3	91	91	91
Height &	m	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
width	in	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1

Tanks		440L & 440LF	440J	440F
Capacity	litres	405	405	405
	US gal.	107	107	107
Weight	kg	531	531	531
(full)	lbs	1171	1171	1171
Weight	kg	124	147	148
(empty)	lbs	273	324	324
Length	m	3.285	3.285	3.285
	in	129.3	129.3	129.3
Height &	m	0.51	0.51	0.51
width	in	20.1	20.1	20.1

Cylinder material	Steel, low carbon, 2.5 mm (0.1")
Cylinder lining	Primaglaze: ceramic vitreous enamel, 2 coats
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):1.8, 2.4, 3.0, 3.6, 4.8
Supply Voltage: 220V - 250V

Collectors		L	LCS	BT	J	KF
Aperture	m^2	1.86	1.86	1.86	1.86	1.86
	ft^2	20	20	20	20	20
Capacity	*litres*	1.5	2	2.1	3.8	3.8
	US gal.	0.396	0.528	0.554	1.003	1.003
Weight	*kg*	31	33	33	46	46
(full)	*lbs*	68	72	72	101	101
Weight	*kg*	29	31	31	42	42
(empty)	*lbs*	64	68	68	93	93
Length	*m*	1.941	1.941	1.941	1.941	1.941
	in	76.41	76.41	76.41	76.41	76.41
Depth	*m*	0.08	0.08	0.08	0.08	0.08
	in	3.14	3.14	3.14	3.14	3.14
Width	*m*	1.023	1.023	1.023	1.023	1.023
	in	40.27	40.27	40.27	40.27	40.27
Working	*kPa*	1400	1400	1400	200	200
pressure	*psi*	203	203	203	29	29
Test	*kPa*	300	300	300	450	450
pressure	*psi*	43	43	43	65	65
No of risers		7	6	13	35	35
Riser material		Copper	Copper	Copper	Steel	Steel
Absorber material		Aluminium	Aluminium	Copper	Steel	Steel
Absorber surface		P*	S*	S*	P*	C*

Tray:	Aluminium: 0.7 mm	P* = Polyester powder coat
Insulation:	Polyester: 38mm - L and J	C* = Chromonyx selective surface
	Glasswool: 38mm - LCS, BT, KF	S* = Sputtered selective surface
Glass:	Tempered Low Iron, 3.2mm thick	

ANNUAL PERFORMANCE CALCULATIONS FOR EUROPE

SYSTEM WIND AND SNOW LOAD PRESSURE

Under the requirements of EN 12795-1 (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/m^2.

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.

KF SYSTEMS

Annual performance calculations of Solahart thermosiphon KF systems with the KF collector according to EN12976 SolarKeyMark Systems ITW Test Report 10SYS90-1 and 09SYS72 for the 151KF (150 tank, 1 collector), 181KF (180 tank, 1 collector), 182KF (180 tank, 2 collectors), 221KF (220 tank, 1 collector), 222KF (220 tank, 2 collectors), 301KF (300 tank, 1 collector), 302KF (300 tank, 2 collectors), 303KF (300 tank, 3 collectors), 443KF (440 tank, 3 collectors) systems and 444KF (440 tank, 4 collectors) systems.

Qd = energy demand QL = solar energy (load) f-sol = solar fraction

Model		**151KF**			**151KF**			**151KF**			**151KF**		
Demand		**80 litres / day**			**110 litres / day**			**140 litres / day**			**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	2367	53.3	6107	2925	47.9	7772	3334	42.9	11103	3708	33.4
Wurzburg	49.5°N	4257	2512	59.0	5854	3167	54.1	7450	3658	49.1	10643	4193	39.4
Davos	46.8°N	4820	3726	77.3	6628	4606	69.5	8435	5204	61.7	12050	5712	47.4
Athens	38.0°N	3305	2961	89.6	4545	3831	84.3	5784	4546	78.6	8263	5553	67.2

Model		**181KF**			**181KF**			**181KF**			**181KF**		
Demand		**110 litres / day**			**140 litres / day**			**170 litres / day**			**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	6107	2852	46.7	7772	3233	41.6	9438	3492	37.0	11103	3631	32.7
Wurzburg	49.5°N	5854	3091	52.8	7450	3561	47.8	9047	3917	43.3	10643	4108	38.6
Davos	46.8°N	6628	4441	67.0	8435	4994	59.2	10243	5347	52.2	12050	5531	45.9
Athens	38.0°N	4545	3186	70.1	5784	3765	65.1	7024	4228	60.2	8263	4569	55.3

Model		**182KF**			**182KF**			**182KF**			**182KF**		
Demand		**80 litres / day**			**110 litres / day**			**140 litres / day**			**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	2718	61.2	6107	3524	57.7	7772	4244	54.6	11103	5363	48.3
Wurzburg	49.5°N	4257	2823	66.3	5854	3688	63.0	7450	4478	60.1	10643	5790	54.4
Davos	46.8°N	4820	4227	87.7	6628	5560	83.9	8435	6740	79.9	12050	8507	70.6
Athens	38.0°N	3305	3143	95.1	4545	4240	93.3	5784	5269	91.1	8263	7015	84.9

Model		**221KF**			**221KF**			**221KF**			**221KF**		
Demand		**140 litres / day**			**200 litres / day**			**250 litres / day**			**300 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	7772	3381	43.5	11103	3886	35.0	13879	4080	29.4	16655	4180	25.1
Wurzburg	49.5°N	7450	3703	49.7	10643	4374	41.1	13304	4630	34.8	15965	4757	29.8
Davos	46.8°N	8435	5230	62.0	12050	5941	49.3	15063	6221	41.3	18075	6362	35.2
Athens	38.0°N	5784	4564	78.9	8263	5701	69.0	10329	6352	61.5	12395	6705	54.1

Model		**222KF**			**222KF**			**222KF**			**222KF**		
Demand		**140 litres / day**			**200 litres / day**			**250 litres / day**			**300 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	7772	4314	55.5	11103	5529	49.8	13879	6218	44.8	16655	6645	39.9
Wurzburg	49.5°N	7450	4545	61.0	10643	5939	55.8	13304	6798	51.1	15965	7376	46.2
Davos	46.8°N	8435	6832	81.0	12050	8748	72.6	15063	9806	65.1	18075	10375	57.4
Athens	38.0°N	5784	5310	91.8	8263	7139	86.4	10329	8366	81.0	12395	9333	75.3

Model		**301KF**			**301KF**			**301KF**			**301KF**		
Demand		**200 litres / day**			**250 litres / day**			**300 litres / day**			**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	3930	35.4	13879	4191	30.2	16655	16655	26.2	22206	22206	20.3
Wurzburg	49.5°N	10643	4427	41.6	13304	4749	35.7	15965	15965	31.0	21286	21286	24.2
Davos	46.8°N	12050	5958	49.7	15063	6371	42.3	18075	18075	36.6	24100	24100	28.4
Athens	38.0°N	8263	5735	69.4	10329	6476	62.7	12395	12395	56.1	16526	16526	44.1

Model		**302KF**			**302KF**			**302KF**			**302KF**		
Demand		**200 litres / day**			**250 litres / day**			**300 litres / day**			**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	5540	49.9	13879	6259	45.1	16655	6762	40.6	22206	7173	32.3
Wurzburg	49.5°N	10643	5949	55.9	13304	6838	51.4	15965	7503	47.0	21286	8131	38.2
Davos	46.8°N	12050	8688	72.1	15063	9776	64.9	18075	10465	57.9	24100	10966	45.5
Athens	38.0°N	8263	7114	86.1	10329	8366	81.0	12395	9383	75.7	16526	10841	65.6

Model		**303KF**			**303KF**			**303KF**			**303KF**		
Demand		**200 litres / day**			**250 litres / day**			**300 litres / day**			**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	6207	55.9	13879	7300	52.6	16655	8211	49.3	22206	9371	42.2
Wurzburg	49.5°N	10643	6535	61.4	13304	7769	58.4	15965	8828	55.3	21286	10345	48.6
Davos	46.8°N	12050	9833	81.6	15063	11598	77.0	18075	12996	71.9	24100	14725	61.1
Athens	38.0°N	8263	7610	92.1	10329	9224	89.3	12395	10647	85.9	16526	12890	78.0

Model		**443KF**			**443KF**			**443KF**			**443KF**		
Demand		**250 litres / day**			**300 litres / day**			**400 litres / day**			**600 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	13879	7883	56.8	16655	8960	53.8	22206	10637	47.9	33309	12091	36.3
Wurzburg	49.5°N	13304	7942	59.7	15965	9084	56.9	21286	10941	51.4	31929	12804	40.1
Davos	46.8°N	15063	11854	78.7	18075	13412	74.2	24100	15689	65.1	36150	17497	48.4
Athens	38.0°N	10329	9337	90.4	12395	10845	87.5	16526	13403	81.1	24789	16857	68.8

Model		**444KF**			**444KF**			**444KF**			**444KF**		
Demand		**250 litres / day**			**300 litres / day**			**400 litres / day**			**600 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	13879	8036	57.9	16655	9227	55.4	22206	11236	50.6	33309	13557	40.7
Wurzburg	49.5°N	13304	8408	63.2	15965	9738	61.0	21286	12048	56.6	31929	15070	47.2
Davos	46.8°N	15063	12668	84.1	18075	14623	80.9	24100	17810	73.9	36150	21220	58.7
Athens	38.0°N	10329	9647	93.4	12395	11366	91.7	16526	14427	87.3	24789	18889	76.2

Note: The over temperature protection tests have been carried out according to EN12976 with an irradiation higher than 20 MJ/m^2/day. An over temperature protection device should be installed in the situation that irradiation this exposure levels could be exceeded.

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), 182J (180 tank, 2 collectors), 221J (220 tank, 1 collector), 222J (220 tank, 2 collectors), 301J (300 tank, 1 collector), 302J (300 tank, 2 collectors), 303J (300 tank, 3 collectors), 443J (440 tank, 3 collectors) systems and 444J (440 tank, 4 collectors) systems.

Qd = energy demand QL = solar energy (load) f-sol = solar fraction

Model		**151J**			**151J**			**151J**			**151J**		
Demand		**80 litres / day**			**110 litres / day**			**140 litres / day**			**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		**181J**			**181J**			**181J**			**181J**		
Demand		**80 litres / day**			**110 litres / day**			**140 litres / day**			**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		**182J**			**182J**			**182J**			**182J**		
Demand		**80 litres / day**			**110 litres / day**			**140 litres / day**			**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	2372	53.4	6107	3127	51.2	7772	3808	49.0	11103	4808	43.3
Wurzburg	49.5°N	4257	2520	59.2	5854	3331	56.9	7450	4075	54.7	10643	5279	49.6
Davos	46.8°N	4820	3731	77.4	6628	4951	74.7	8435	6039	71.6	12050	7616	63.2
Athens	38.0°N	3305	2978	90.1	4545	4017	88.4	5784	4992	86.3	8263	6627	80.2

Model		**221J**			**221J**			**221J**			**221J**		
Demand		**140 litres / day**			**200 litres / day**			**250 litres / day**			**300 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	7772	3039	39.1	11103	3586	32.3	13879	3803	27.4	16655	3897	23.4
Wurzburg	49.5°N	7450	3375	45.3	10643	4076	38.3	13304	4350	32.7	15965	4470	28.0
Davos	46.8°N	8435	4656	55.2	12050	5459	45.3	15063	5784	38.4	18075	5911	32.7
Athens	38.0°N	5784	4292	74.2	8263	5462	66.1	10329	6084	58.9	12395	6358	51.3

Model		**222J**			**222J**			**222J**			**222J**		
Demand		**140 litres / day**			**200 litres / day**			**250 litres / day**			**300 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	7772	3855	49.6	11103	4996	45.0	13879	5621	40.5	16655	5912	35.5
Wurzburg	49.5°N	7450	4112	55.2	10643	5439	51.1	13304	6226	46.8	15965	6673	41.8
Davos	46.8°N	8435	6082	72.1	12050	7893	65.5	15063	8812	58.5	18075	9182	50.8
Athens	38.0°N	5784	5015	86.7	8263	6767	81.9	10329	7912	76.6	12395	8738	70.5

Model		**301J**			**301J**			**301J**			**301J**		
Demand		**200 litres / day**			**250 litres / day**			**300 litres / day**			**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	3608	32.5	13879	3928	28.3	16655	4130	24.8	22206	4308	19.4
Wurzburg	49.5°N	10643	4087	38.4	13304	4483	33.7	15965	4741	29.7	21286	4960	23.3
Davos	46.8°N	12050	5471	45.4	15063	5935	39.4	18075	6254	34.6	24100	6507	27.0
Athens	38.0°N	8263	5470	66.2	10329	6218	60.1	12395	6718	54.2	16526	7040	42.6

Model		**302J**			**302J**			**302J**			**302J**		
Demand		**200 litres / day**			**250 litres / day**			**300 litres / day**			**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		**303J**			**303J**			**303J**			**303J**		
Demand		**200 litres / day**			**250 litres / day**			**300 litres / day**			**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

Model		**443J**			**443J**			**443J**			**443J**		
Demand		**250 litres / day**			**300 litres / day**			**400 litres / day**			**600 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	13879	6787	48.9	16655	7744	46.5	22206	9238	41.6	33309	10392	31.2
Wurzburg	49.5°N	13304	6905	51.9	15965	7918	49.6	21286	9621	45.2	31929	11047	34.6
Davos	46.8°N	15063	10002	66.4	18075	11351	62.8	24100	13376	55.5	36150	14785	40.9
Athens	38.0°N	10329	8532	82.6	12395	9916	80.0	16526	12295	74.4	24789	15220	61.4

Model		**444J**			**444J**			**444J**			**444J**		
Demand		**250 litres / day**			**300 litres / day**			**400 litres / day**			**600 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	13879	7148	51.5	16655	8261	49.6	22206	10170	45.8	33309	12091	36.3
Wurzburg	49.5°N	13304	7583	57.0	15965	8828	55.3	21286	11047	51.9	31929	13634	42.7
Davos	46.8°N	15063	11297	75.0	18075	13086	72.4	24100	16075	66.7	36150	18798	52.0
Athens	38.0°N	10329	9141	88.5	12395	10758	86.8	16526	13684	82.8	24789	17699	71.4

Note: The over temperature protection tests have been carried out according to EN12976 with an irradiation higher than 20 MJ/m^2/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, LC collectors according to EN12976 SolarKeyMark Systems ITW Test Report 11SYS92-01 for the 151L, 151LC (150 tank, 1 collector), 181L, 181LC (180 tank, 1 collector), 221L, 221LC (220 tank, 1 collector), 302L, 302LC (300 tank, 2 collectors) and 443L, 443LC (440 tank, 3 collectors) systems.

Qd = energy demand QL = solar energy (load) f-sol = solar fraction

Model		**151L, 151LC**			**151L, 151LC**			**151L, 151LC**			**151L, 151LC**		
Demand		**110 litres / day**			**140 litres / day**			**170 litres / day**			**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	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		**181L, 181LC**			**181L, 181LC**			**181L, 181LC**			**181L, 181LC**		
Demand		**140 litres / day**			**170 litres / day**			**200 litres / day**			**250 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	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		**221L, 221LC**			**221L, 221LC**			**221L, 221LC**			**221L, 221LC**		
Demand		**140 litres / day**			**170 litres / day**			**200 litres / day**			**250 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	7772	3047	39.2	9438	3284	34.8	11103	3475	31.3	13879	3484	25.1
Wurzburg	49.5°N	7450	3204	43.0	9047	3483	38.5	10643	3672	34.5	13304	3685	27.7
Davos	46.8°N	8435	4327	51.3	10243	4630	45.2	12050	4868	40.4	15063	4865	32.3
Athens	38.0°N	5784	4101	70.9	7024	4614	65.7	8263	5040	61.0	10329	5226	50.6

Model		**302L, 302LC**			**302L, 302LC**			**302L, 302LC**			**302L, 302LC**		
Demand		**200 litres / day**			**250 litres / day**			**300 litres / day**			**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	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

Model		**443L, 443LC**			**443L, 443LC**			**443L, 443LC**			**443L, 443LC**		
Demand		**250 litres / day**			**300 litres / day**			**400 litres / day**			**600 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	13879	7217	52.0	16655	8027	48.2	22206	9327	42.0	33309	9526	28.6
Wurzburg	49.5°N	13304	7330	55.1	15965	8222	51.5	21286	9706	45.6	31929	10090	31.6
Davos	46.8°N	15063	10679	70.9	18075	11767	65.1	24100	13400	55.6	36150	13556	37.5
Athens	38.0°N	10329	8821	85.4	12395	10077	81.3	16526	12262	74.2	24789	14204	57.3

Note: The over temperature protection tests have been carried out according to EN12976 with an irradiation higher than 20 MJ/m^2/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	181KF	181J	302KF	302J
Tank	180J / 180F		300J / 300F	
Collector	1 x KF	1 x J	2 x KF	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.	17.882	19.04	35.407	35.535
Heat Loss Coefficient	2.93 W/K		2.04 W/K	
Total Energy Rating – kW/h/m^2/day South African Climate	3.2 (KF collector)	3.4 (J collector)	3.2 (KF 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.

SOUTH AFRICAN SPECIFIC OPERATING COMPONENTS

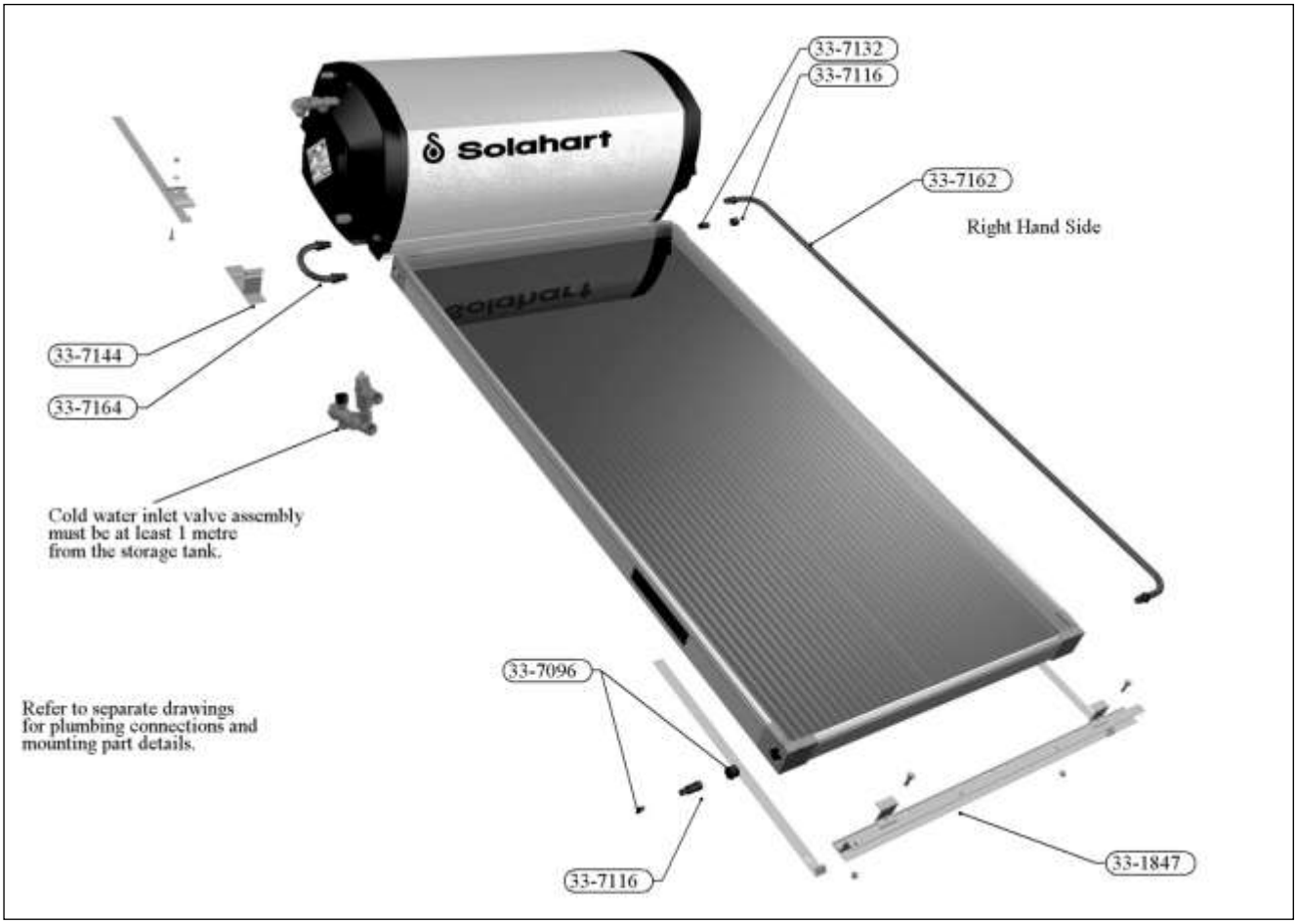
SANS 198 Compliant

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

INSTALLATION DIAGRAM
MODELS 151J & 151KF



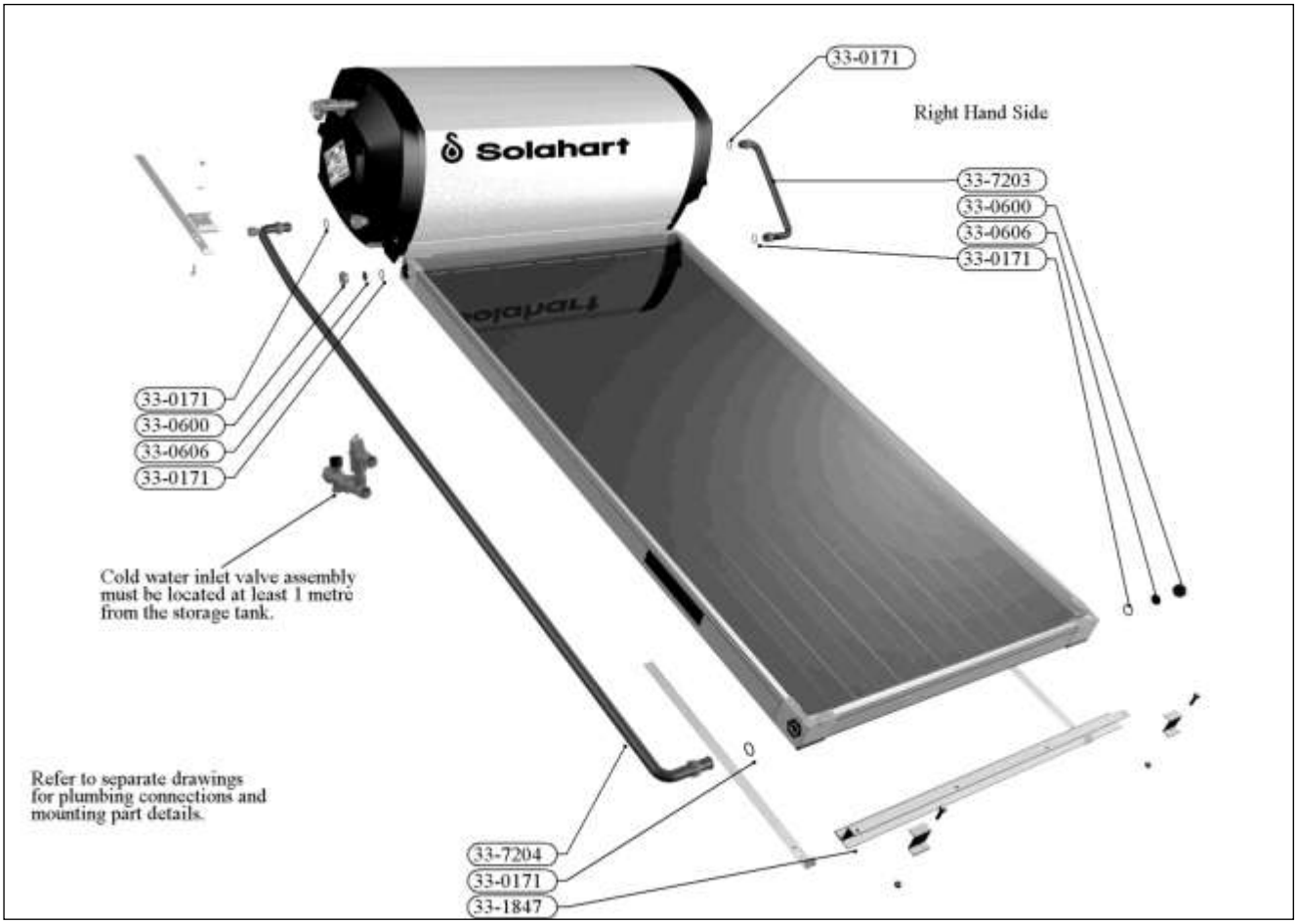
For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Closed Circuit models, refer to Page 18.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

INSTALLATION DIAGRAM
MODELS 151L & 151L FREE HEAT



For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Open Circuit models, refer to Page 24.

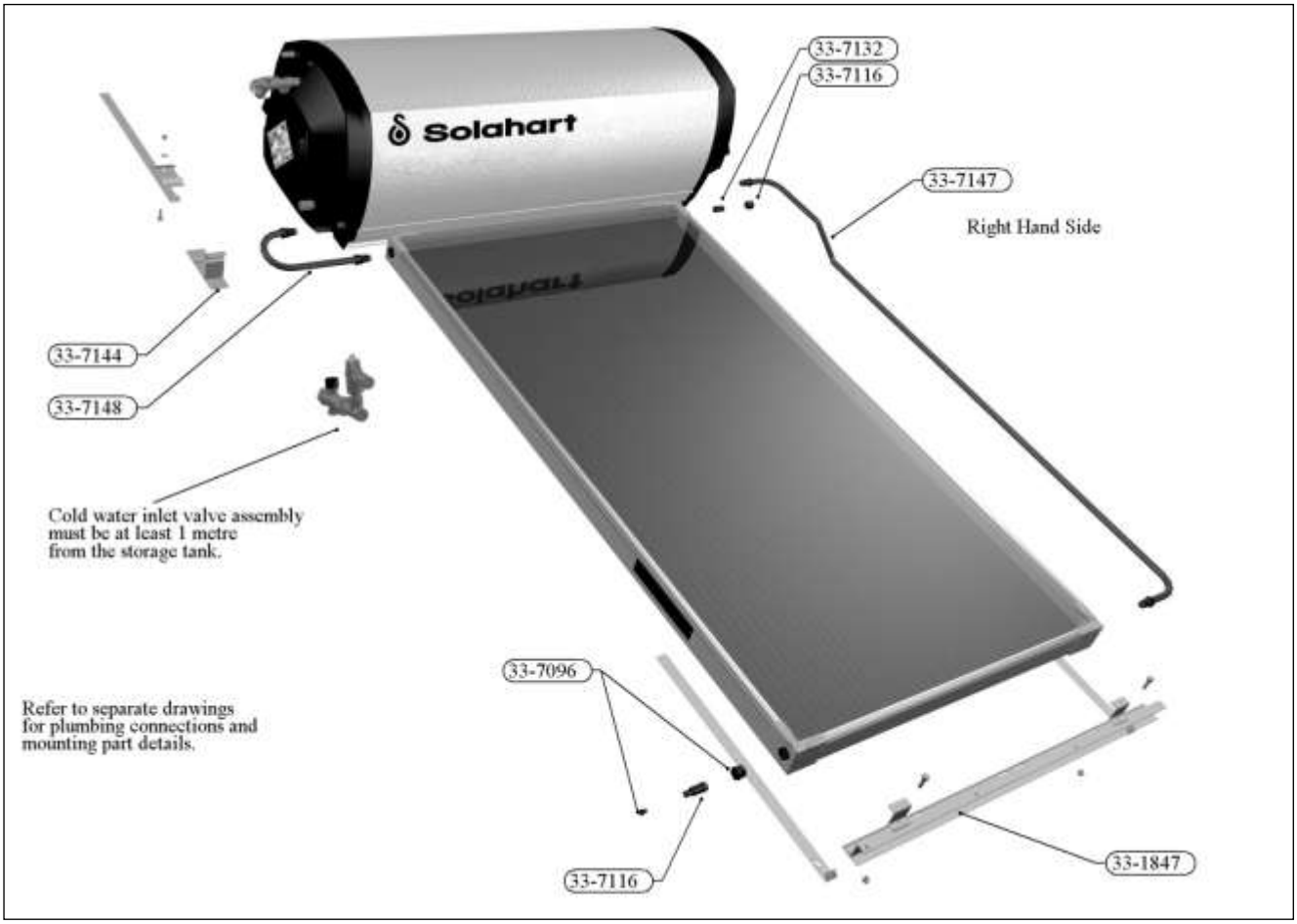
For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

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.

INSTALLATION DIAGRAM
MODELS 181J, 181KF, 181BTC,
181J FREE HEAT, 181KF FREE HEAT & 181BTC FREE HEAT



* J collector illustrated.

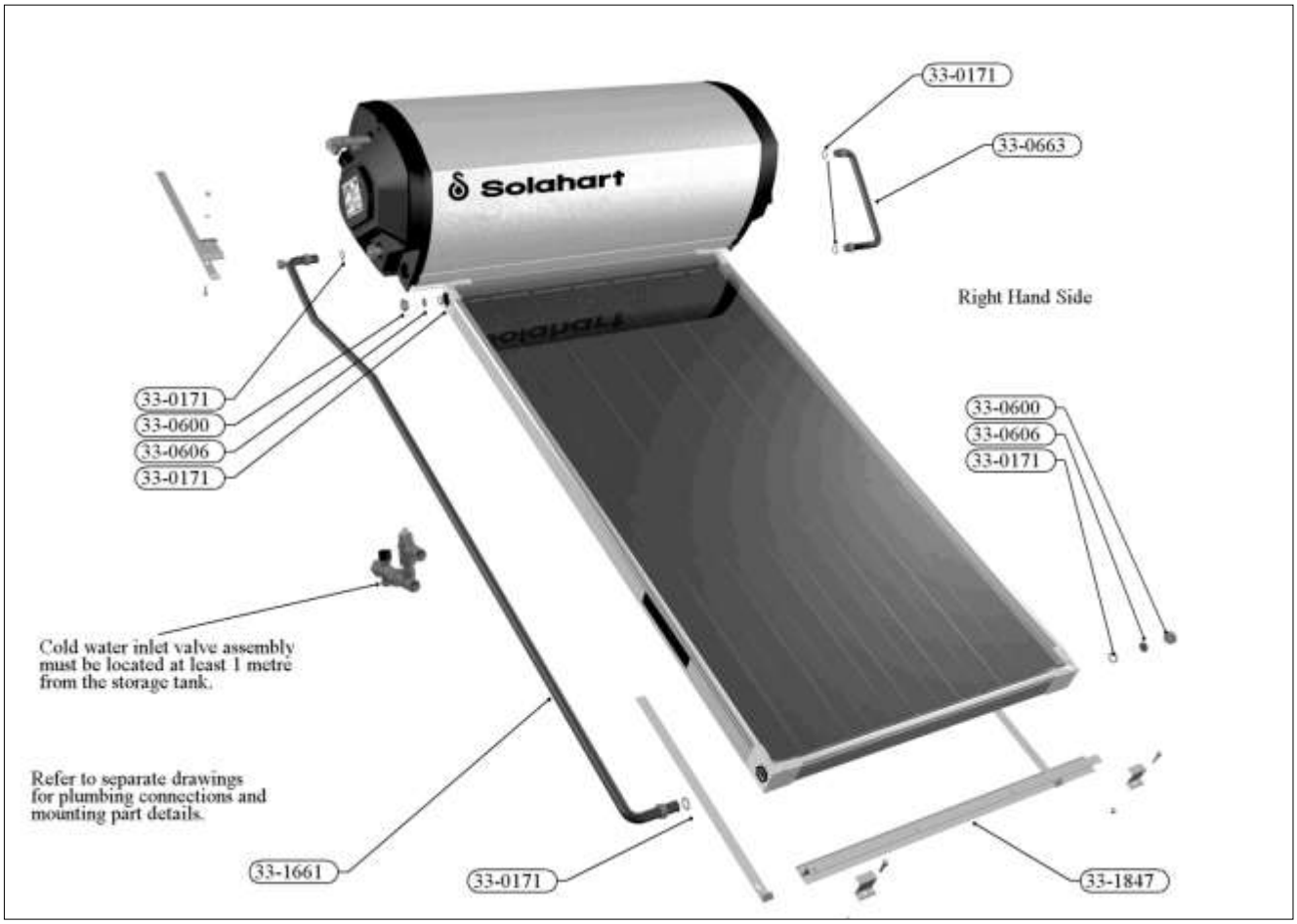
For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Closed Circuit models, refer to Page 18.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

INSTALLATION DIAGRAM
MODELS 181L & 181L FREE HEAT



For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Open Circuit models, refer to Page 24.

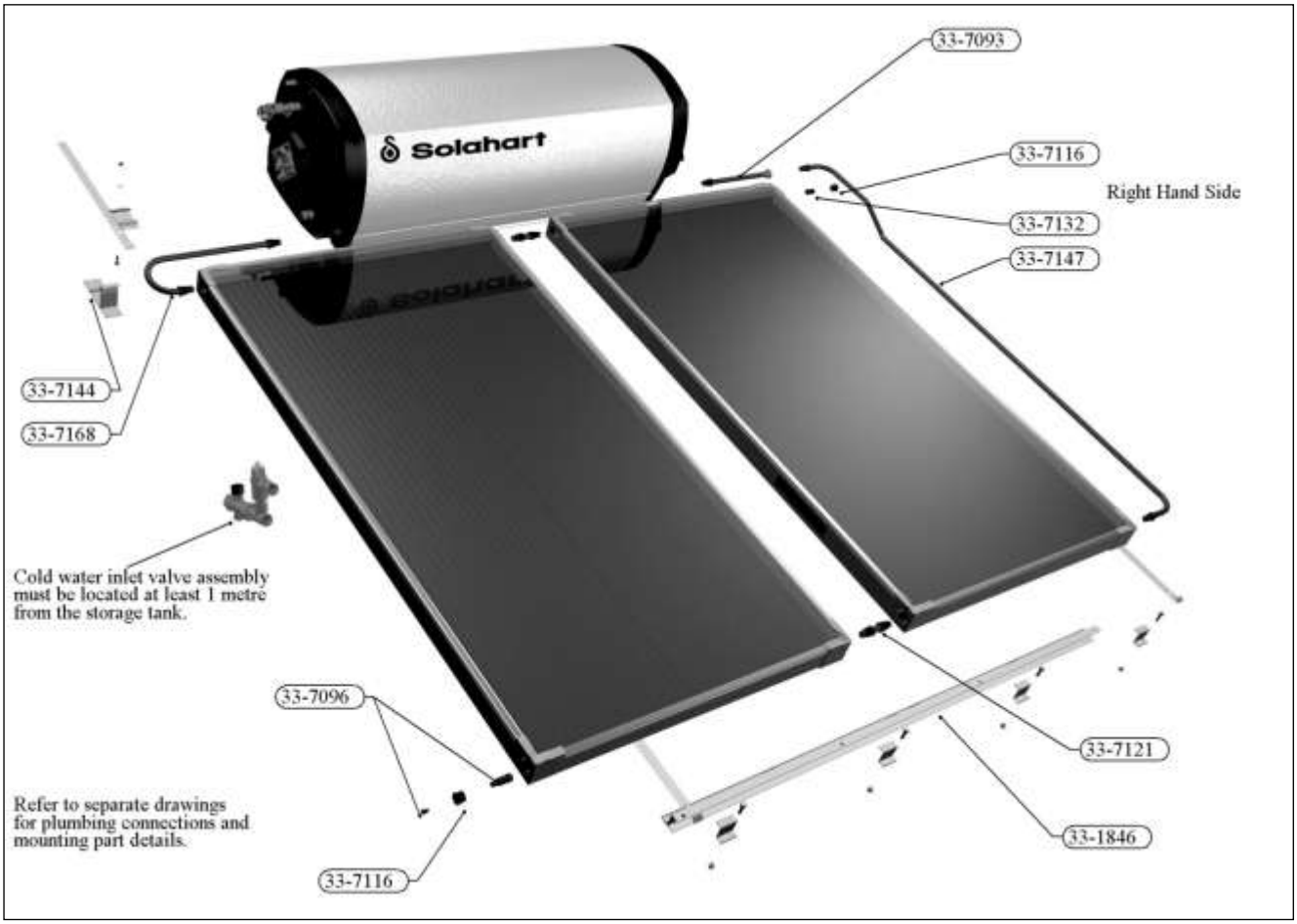
For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

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.

INSTALLATION DIAGRAM
MODELS 182J, 182KF,
182J FREE HEAT & 182KF FREE HEAT



* J collectors illustrated.

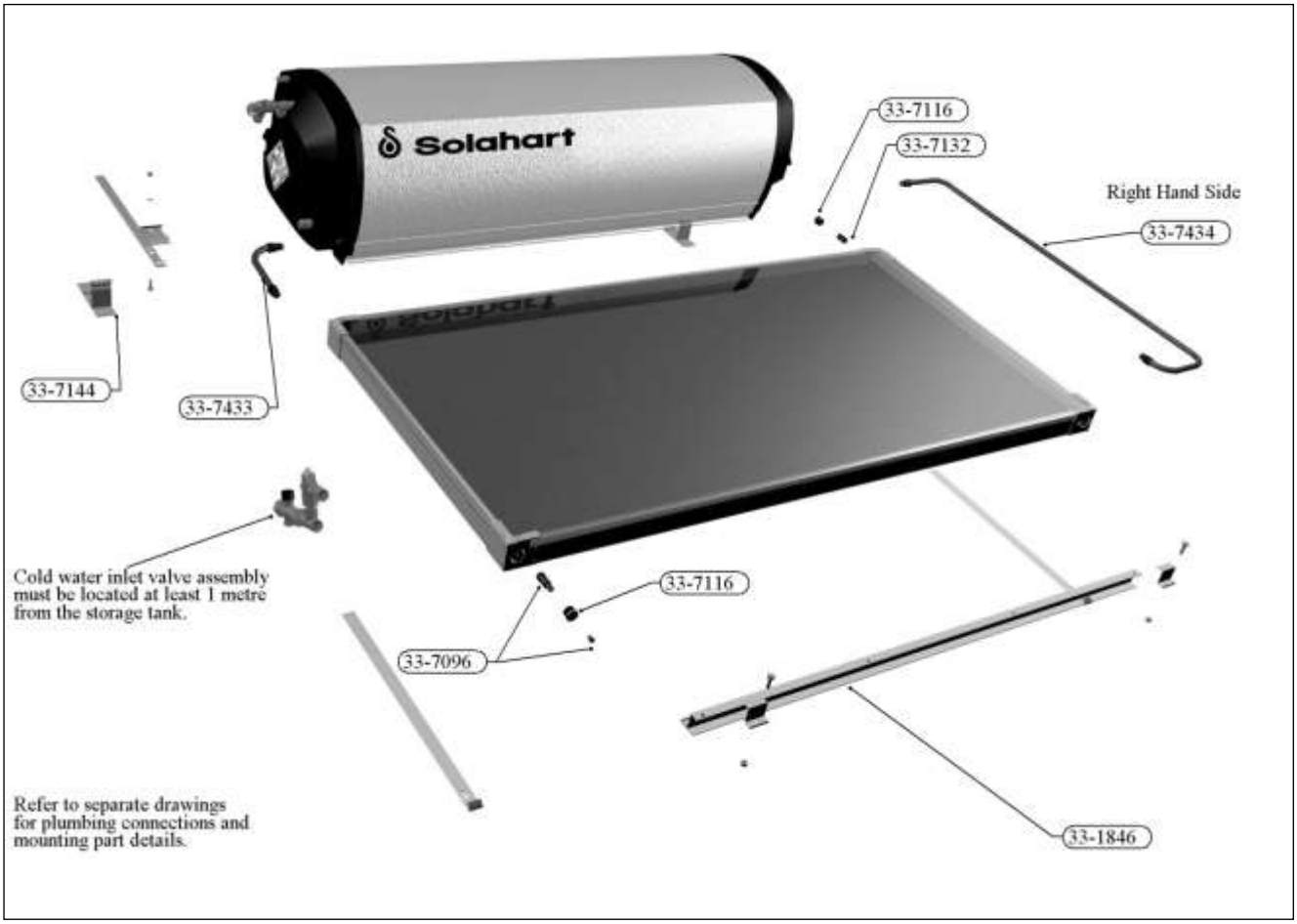
For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Closed Circuit models, refer to Page 18.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

INSTALLATION DIAGRAM
MODELS 221J & 221KF



* J collector illustrated.

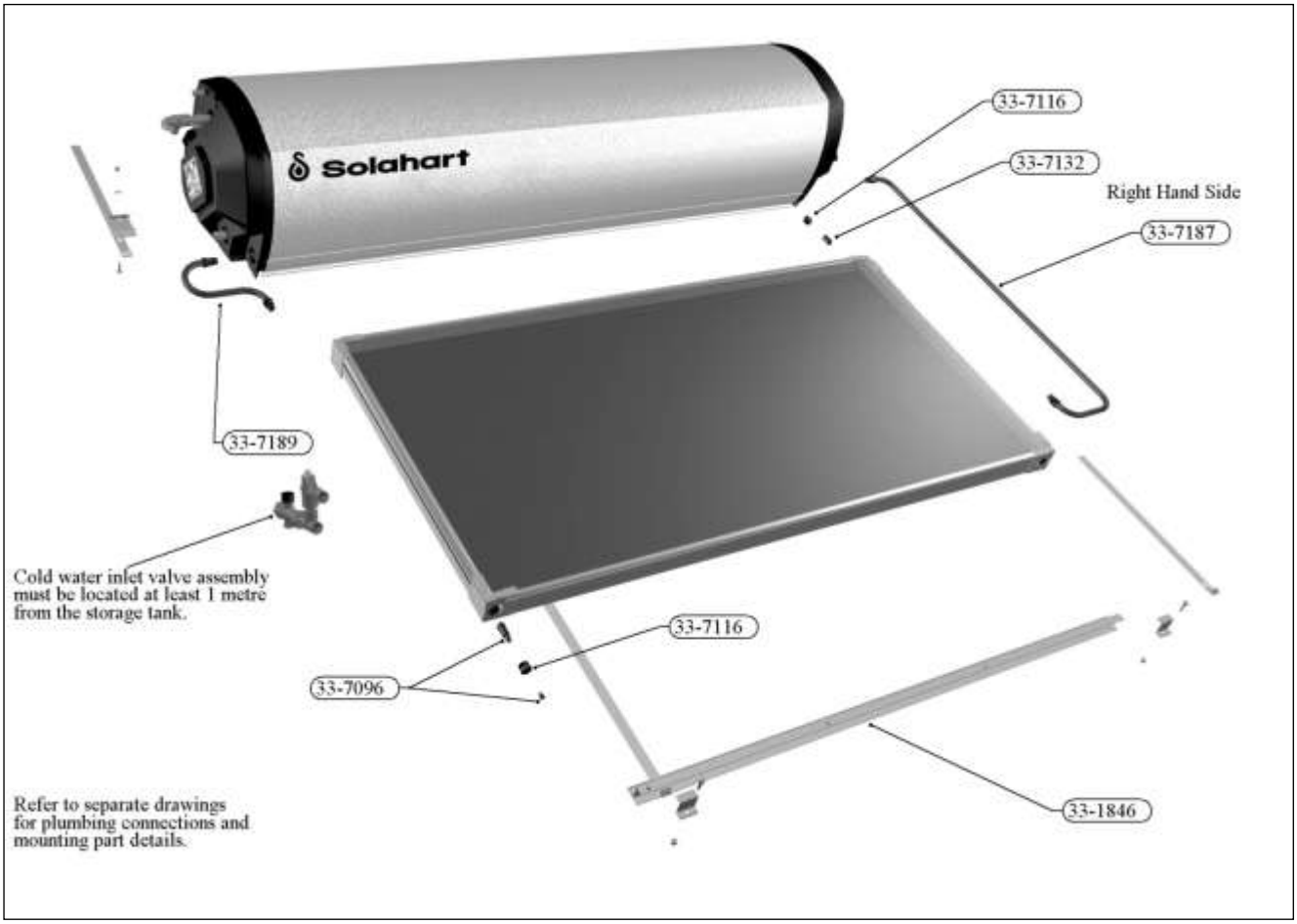
For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Closed Circuit models, refer to Page 18.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

INSTALLATION DIAGRAM
MODELS 301J & 301KF



* J collector illustrated.

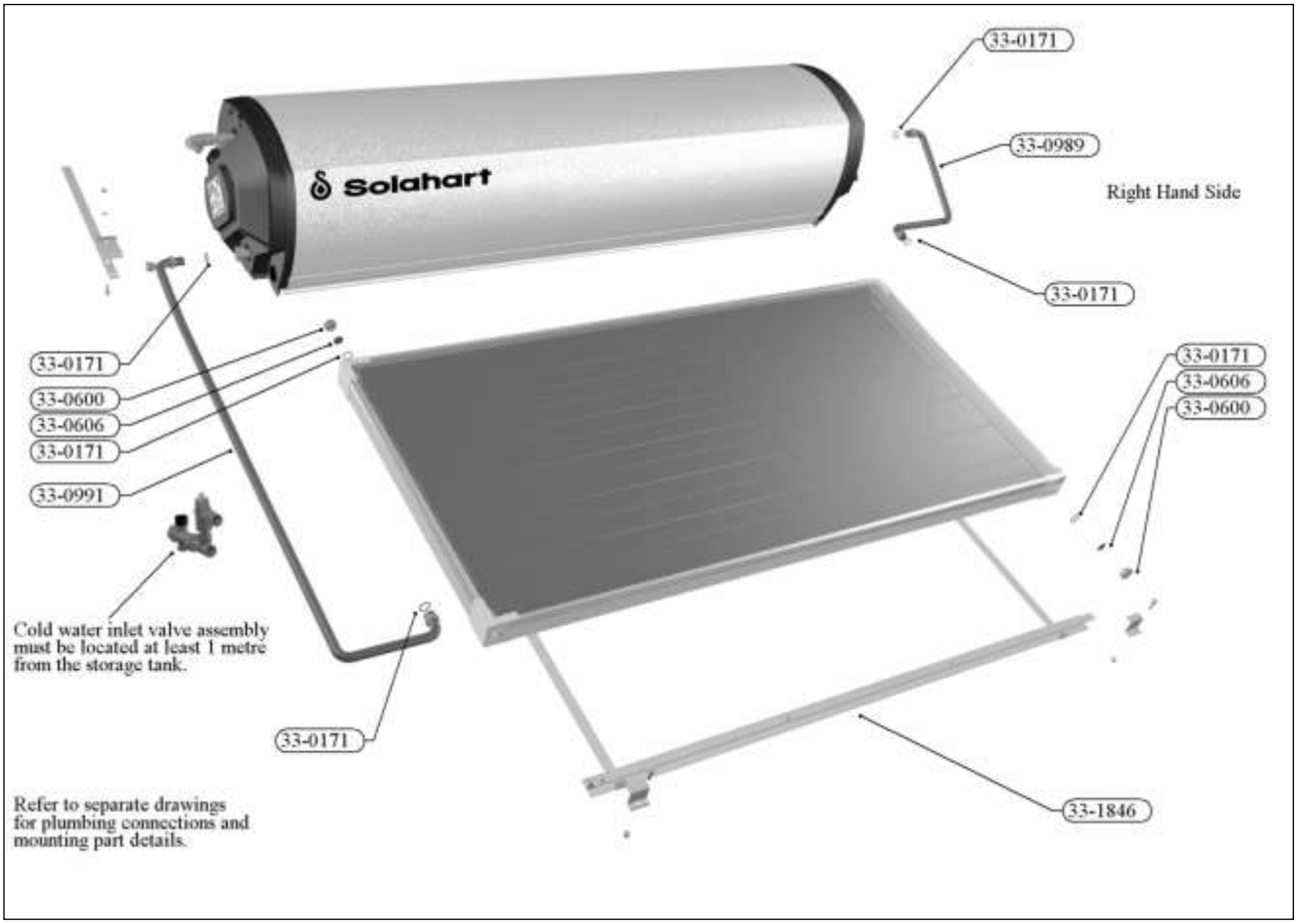
For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Closed Circuit models, refer to Page 18.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

INSTALLATION DIAGRAM
MODELS 301L & 301L FREE HEAT



For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Open Circuit models, refer to Page 24.

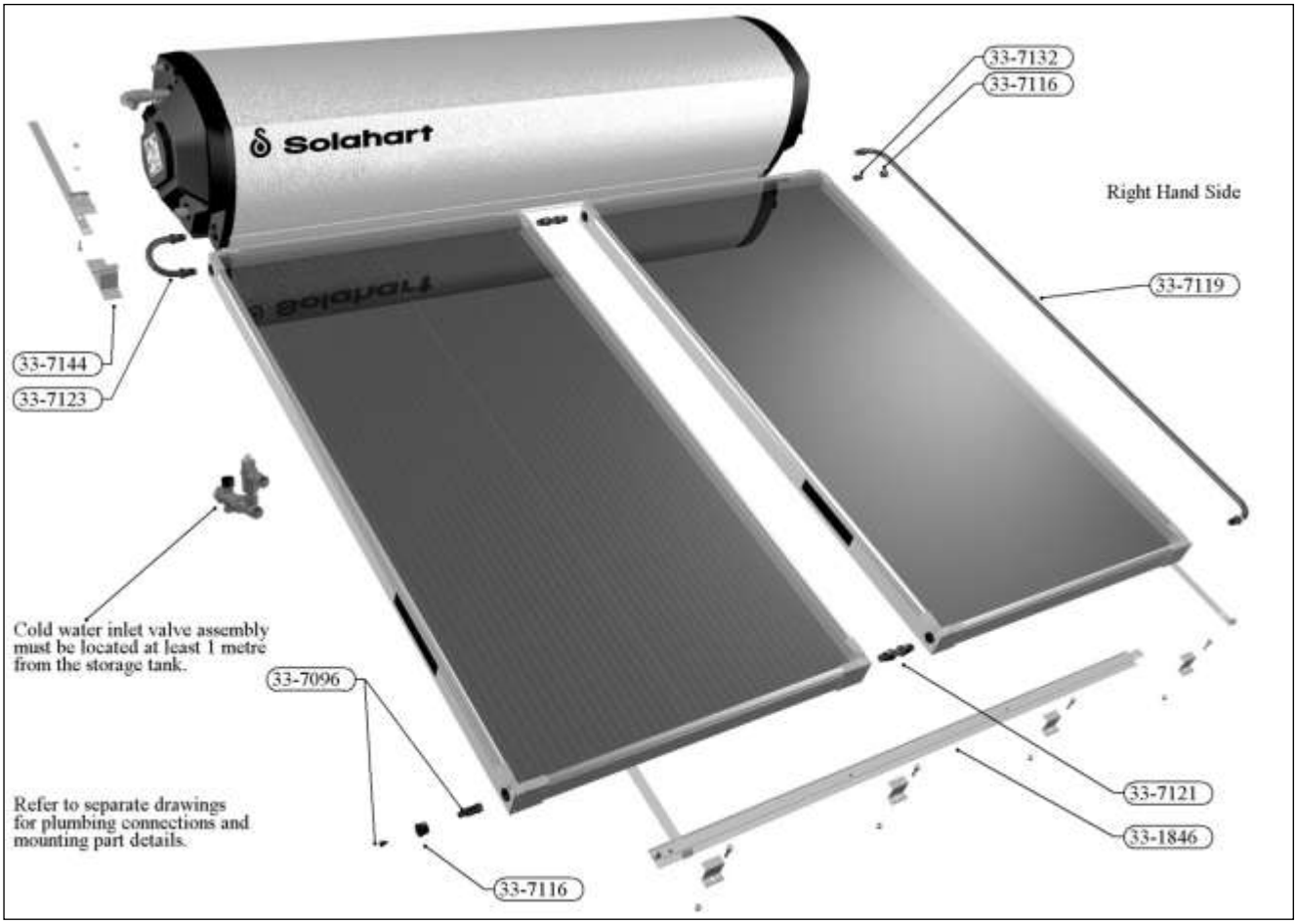
For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

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.

INSTALLATION DIAGRAM
MODELS 302J, 302KF, 302BTC,
302J FREE HEAT, 302KF FREE HEAT & 302BTC FREE HEAT



* J collectors illustrated.

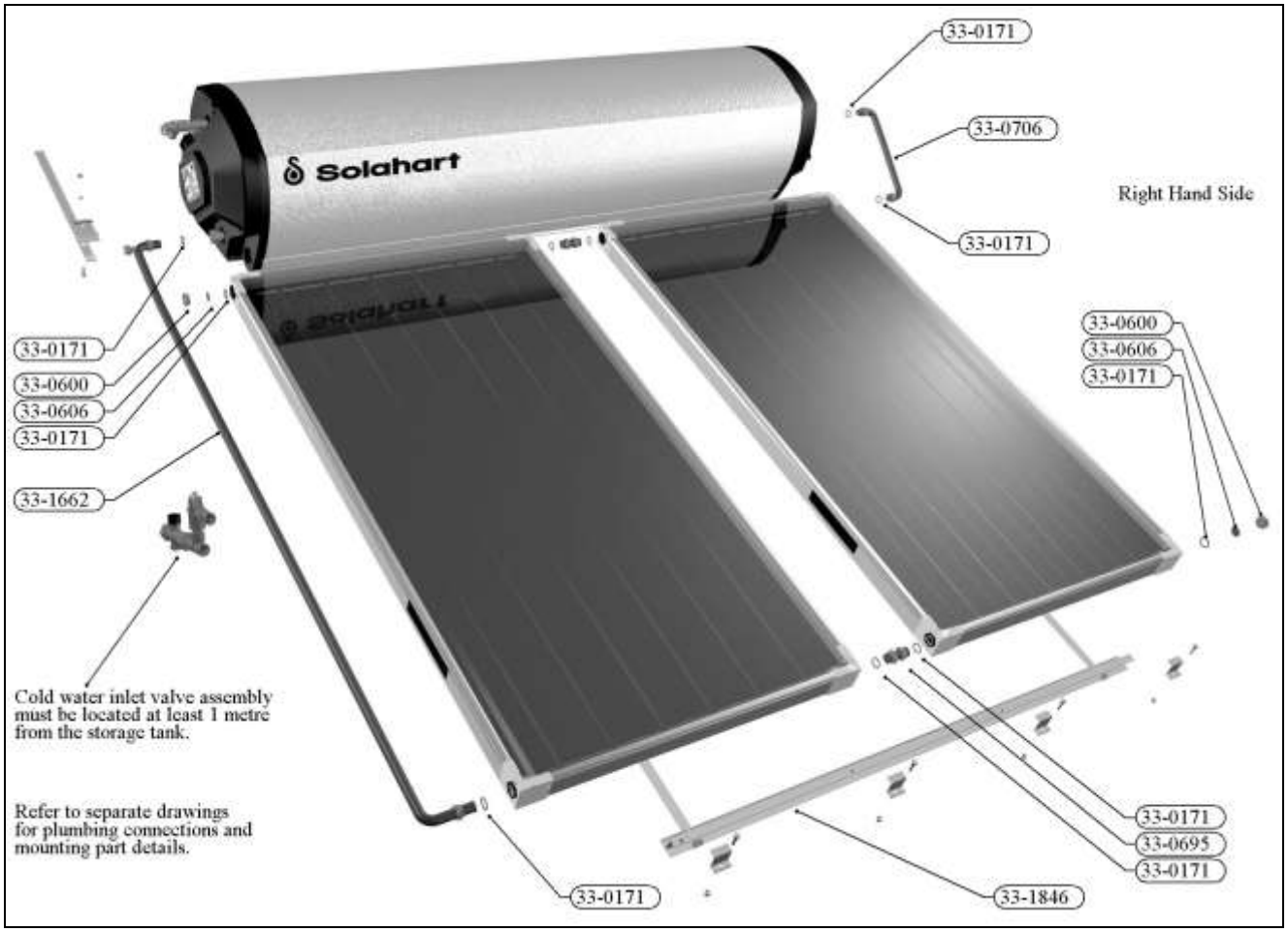
For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Closed Circuit models, refer to Page 18.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

INSTALLATION DIAGRAM
MODELS 302L & 302L FREE HEAT



For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Open Circuit models, refer to Page 24.

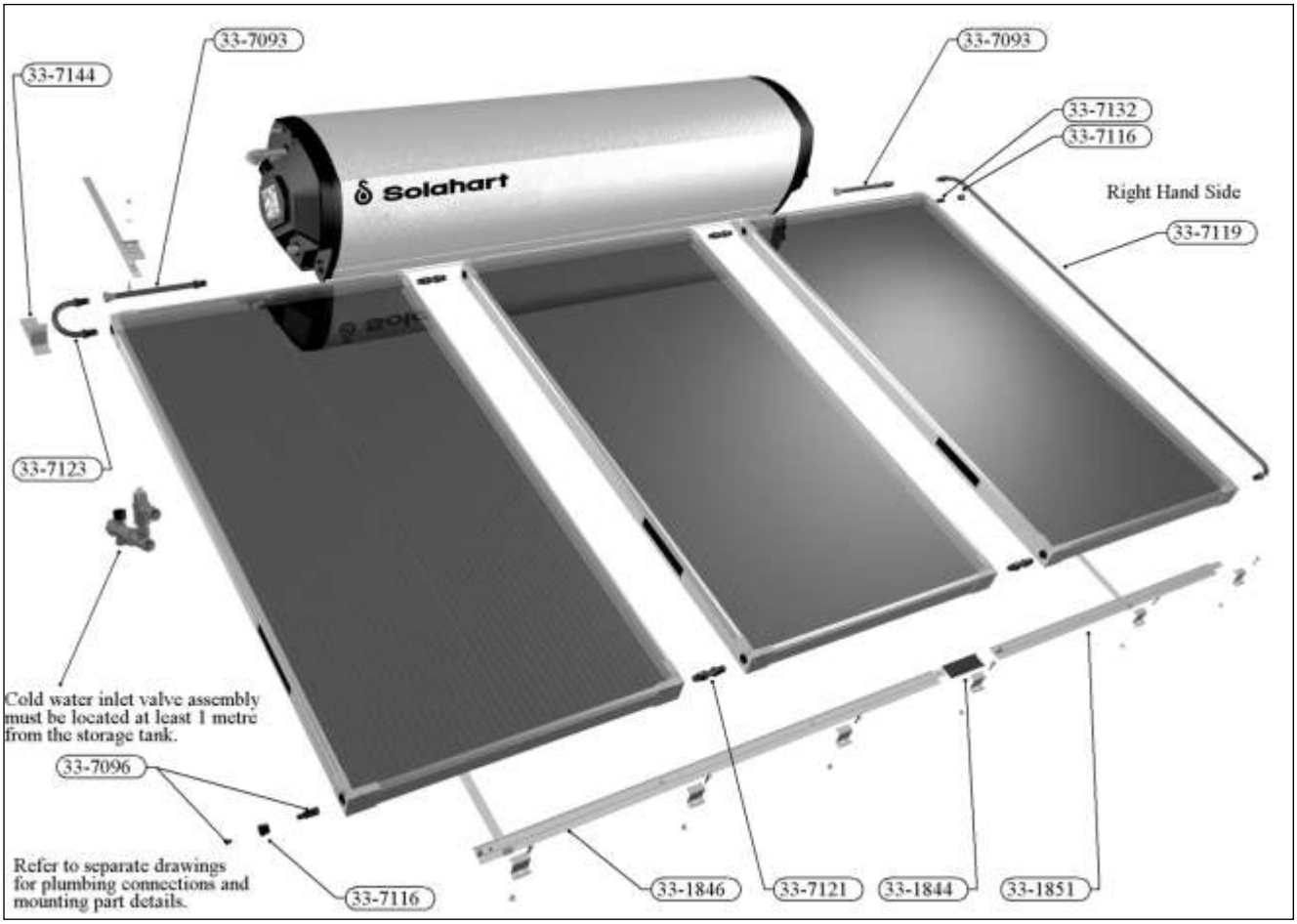
For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

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.

INSTALLATION DIAGRAM
MODELS 303J, 303KF,
303J FREE HEAT & 303KF FREE HEAT



* J collectors illustrated.

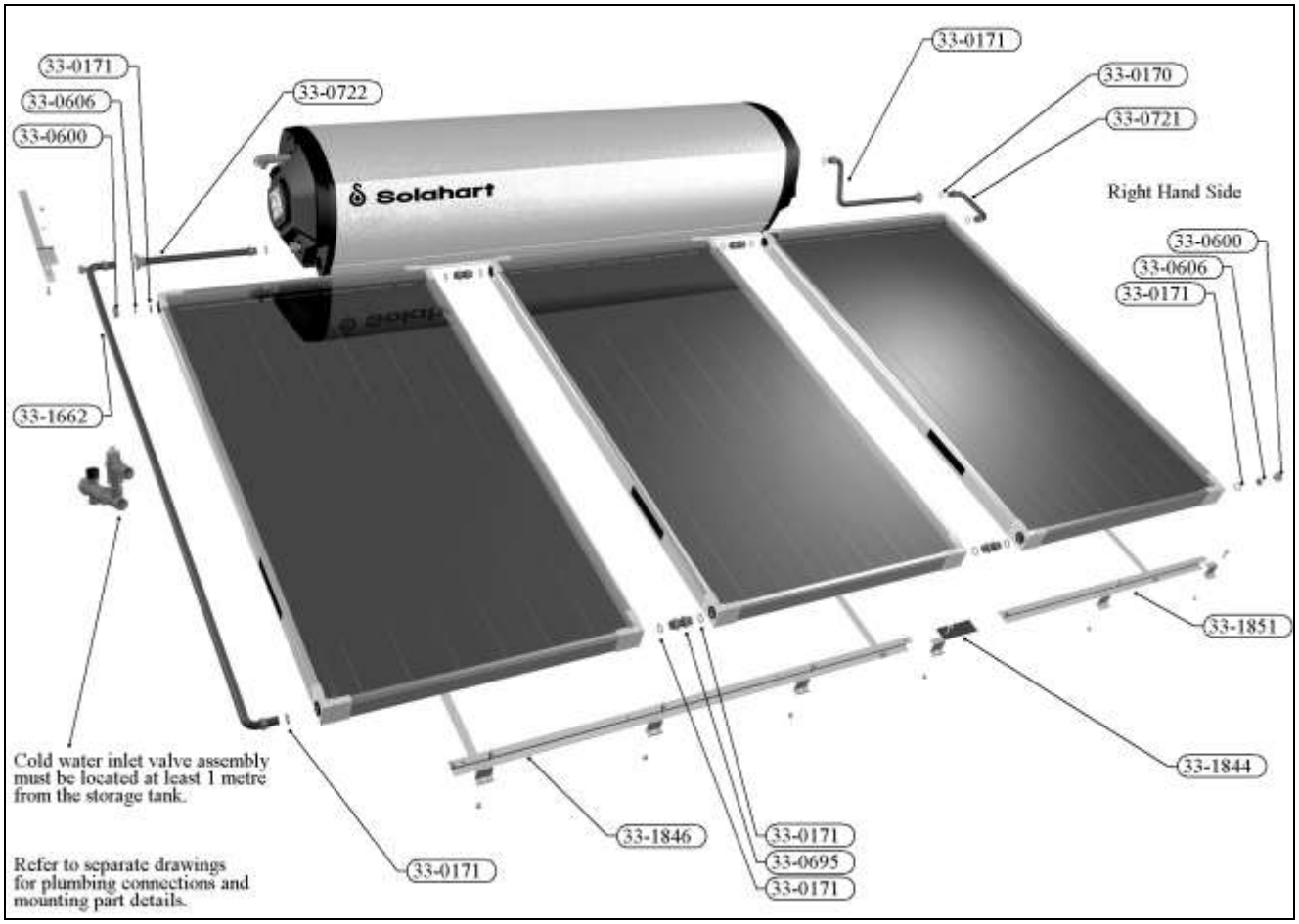
For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Closed Circuit models, refer to Page 18.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

INSTALLATION DIAGRAM
MODELS 303L & 303L FREE HEAT



For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Open Circuit models, refer to Page 24.

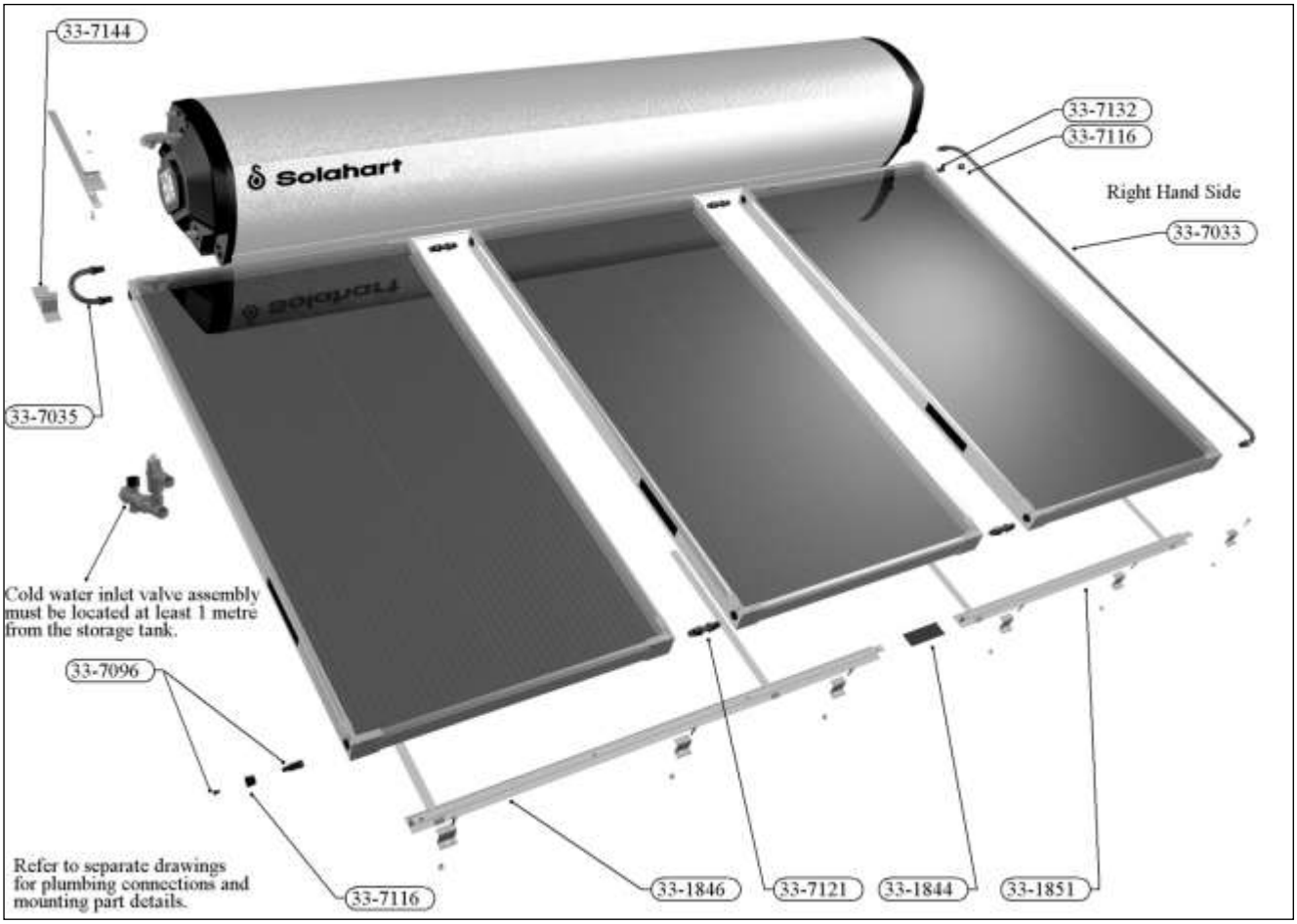
For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

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.

INSTALLATION DIAGRAM
MODELS 443J, 443KF, 443BTC,
443J FREE HEAT, 443KF FREE HEAT & 443BTC FREE HEAT



* J collectors illustrated.

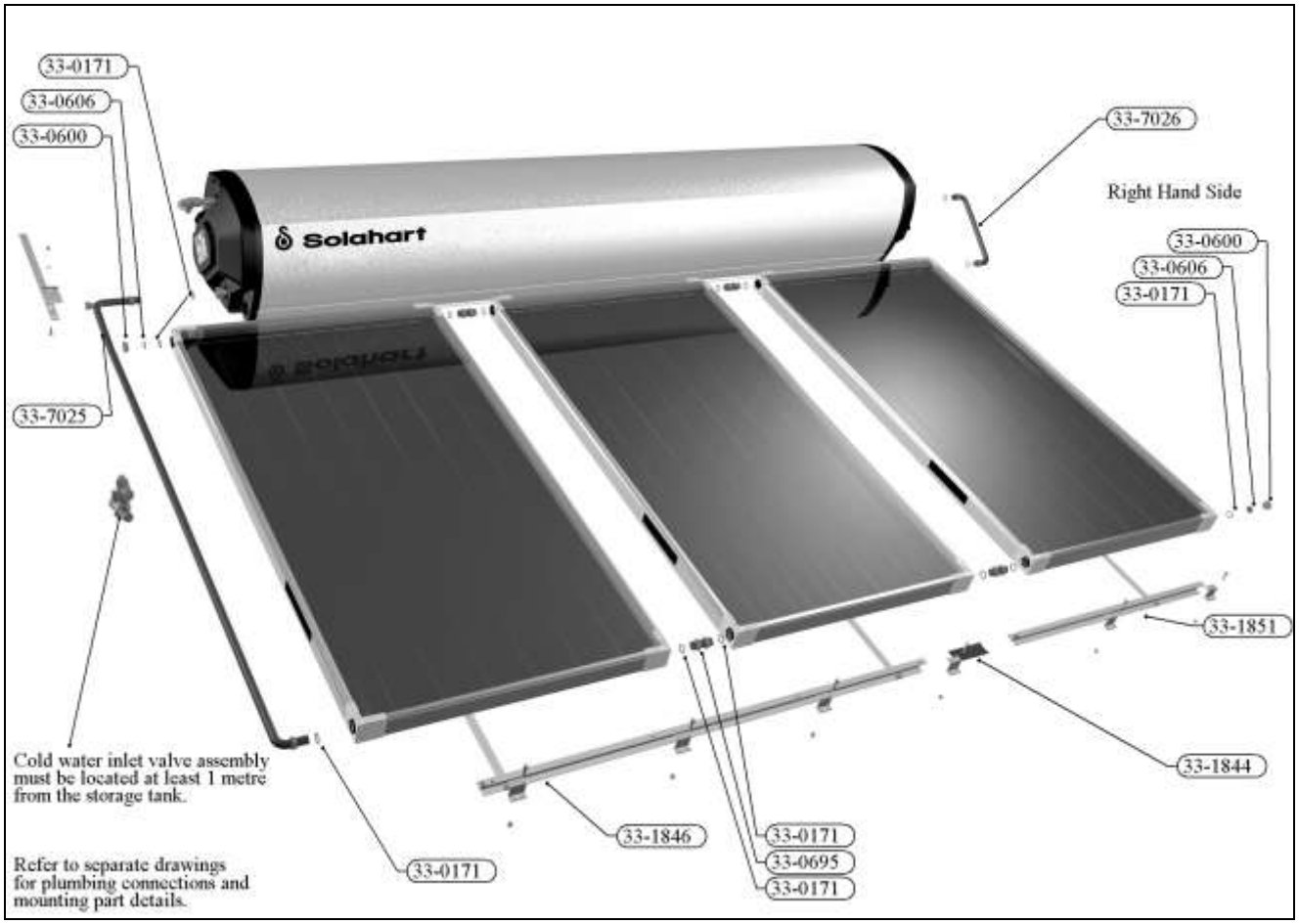
For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Closed Circuit models, refer to Page 18.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

INSTALLATION DIAGRAM
MODELS 443L & 443L FREE HEAT



For general (for ALL models) Installation Instructions, refer to Page 10.

For Installation Instructions on Open Circuit models, refer to Page 24.

For Water Connection details, refer to Page 50.

For Tank and Collector fixing details, refer to Page 51.

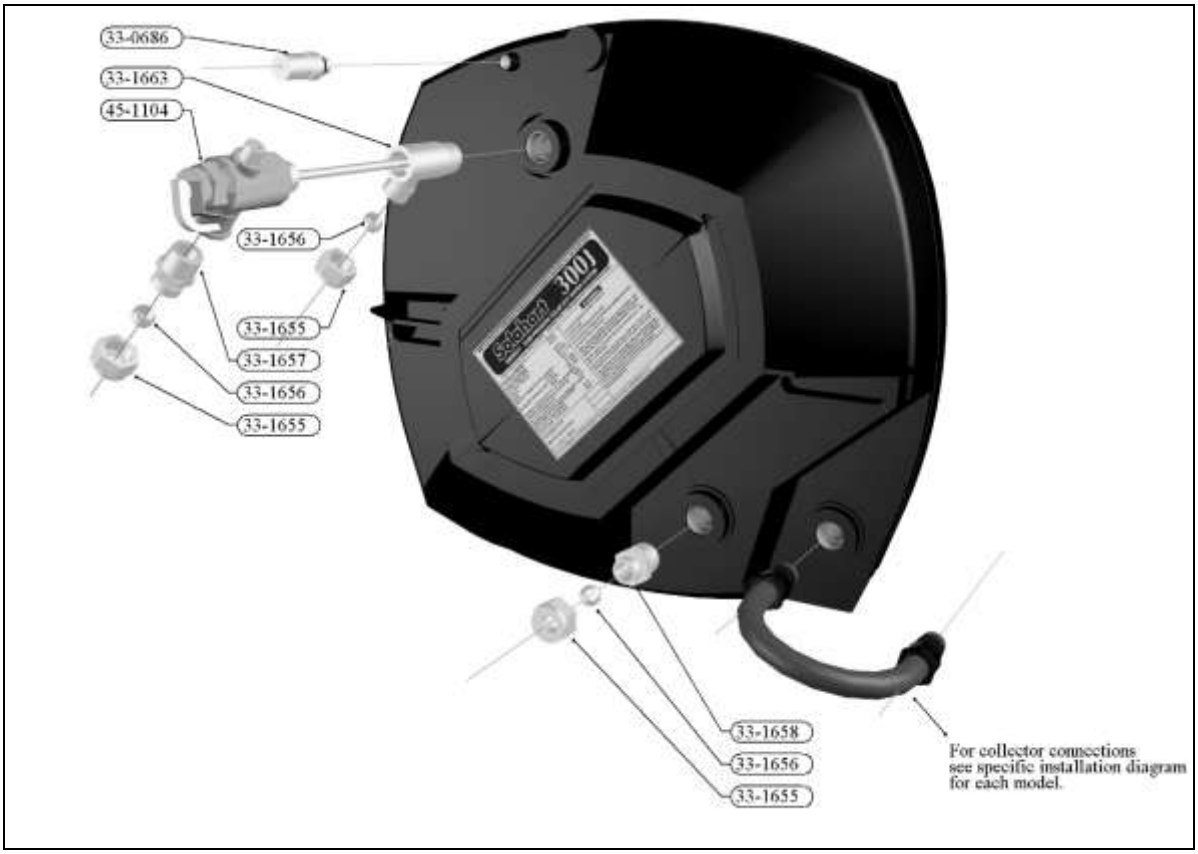
PLEASE NOTE

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.

CONNECTION DETAILS

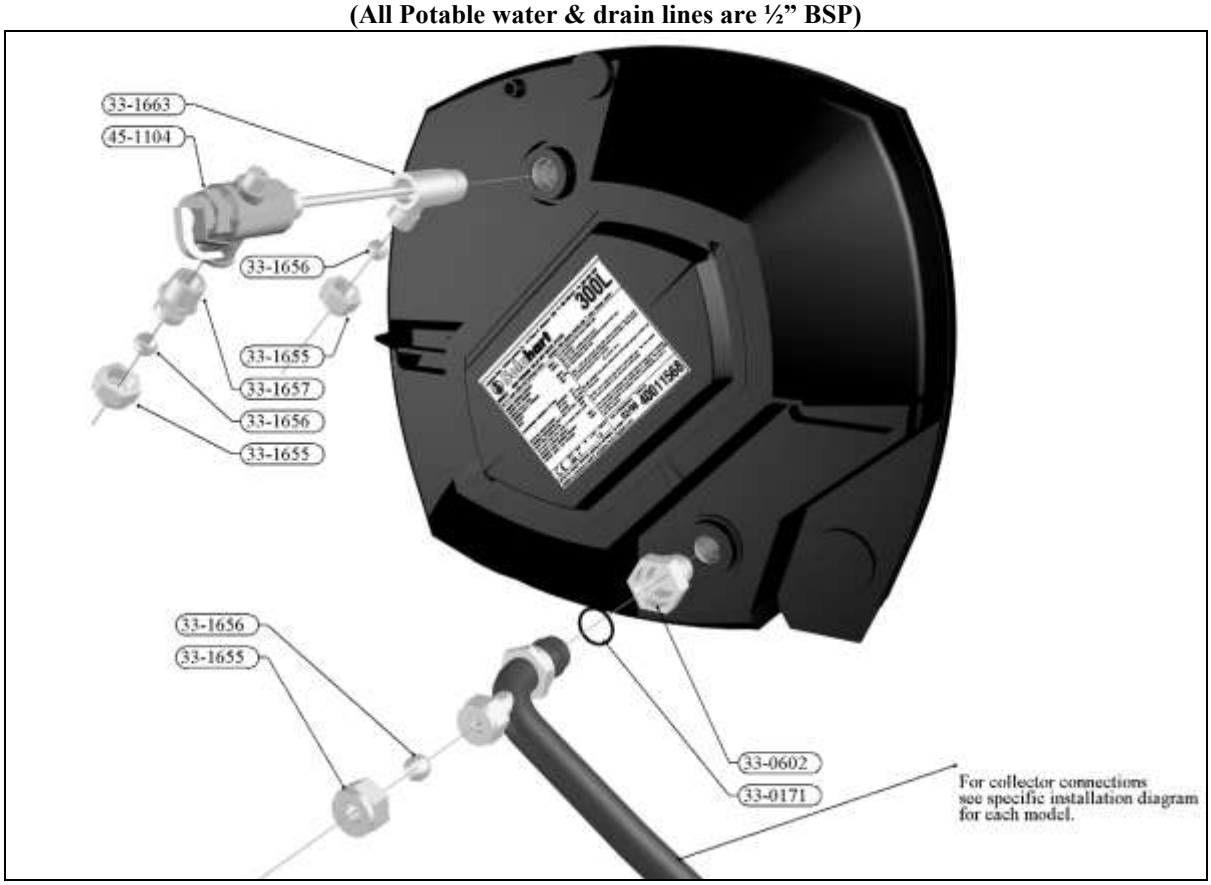
Closed Circuit Systems Water Connections

(All Potable water & drain lines are ½" BSP)



Open Circuit Systems Water Connections

(All Potable water & drain lines are ½" BSP)



Assembly Drawings

HOOKING COLLECTOR / TANK STRAP TO COLLECTOR RAIL

1. If more than two solar collectors are installed, locate the additional collector rail(s) adjacent to the first collector rail and join together using the drive cleat(s) supplied in the parts kit (refer to Detail B).

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

2. Determine which slots in the collector rail will be used for the collector / tank straps after locating the rafters and taking note of the rafter spacing.

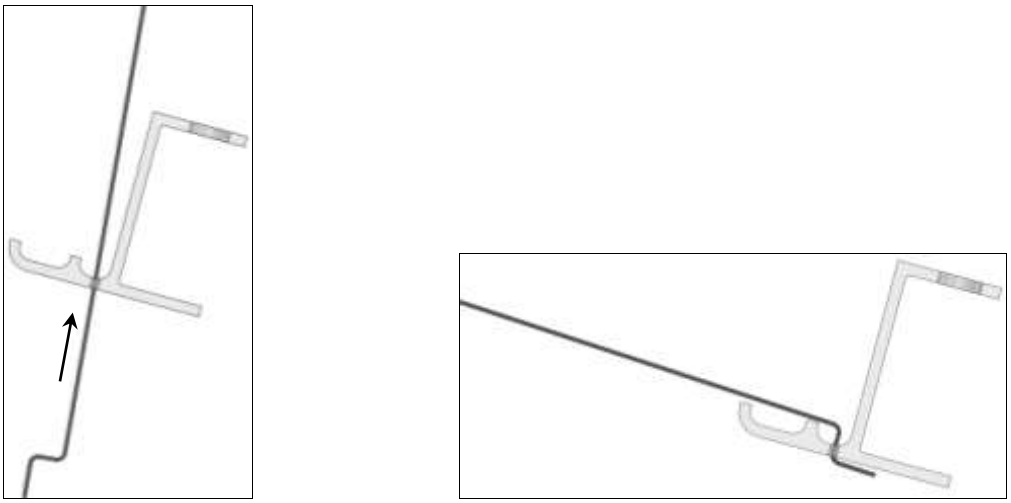
	Recommended slots			
Rafter spacing	**One collector (1 x one collector rail)**	**Two collectors (1 x two collector rail)**	**Three collectors (1 x two and 1 x one collector rails)**	**Four collectors (1 x two and 2 x one collector rails)**
300 mm (12")	1, 4 or 2, 3	1, 6 or 2, 5	1, 5 (long) & 3 (short)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

collector rail – one collector

collector rail – two collectors

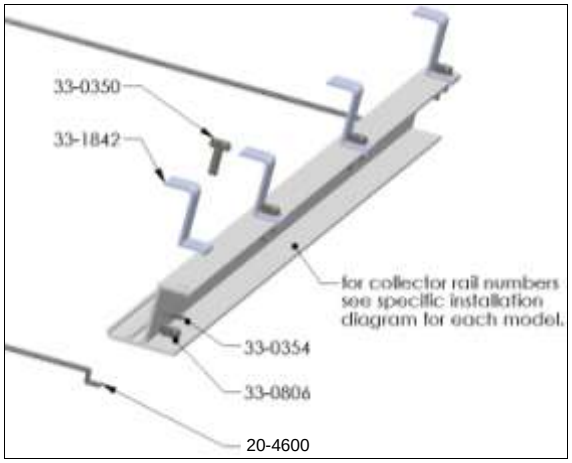
3. Noting the orientation of the collector strap's folded end, slide the long straight end of the collector strap through the appropriate slot from the underside of the collector rail (refer to Detail A).

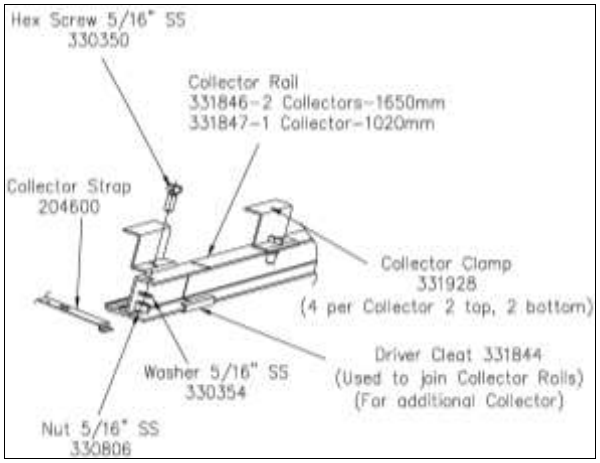
   Pull the collector strap through until the first bend in the strap slips into the slot in the collector rail. The strap will engage with the collector rail.



DETAIL A

BOTTOM COLLECTOR RAIL – COLLECTOR STRAP ORIENTATION



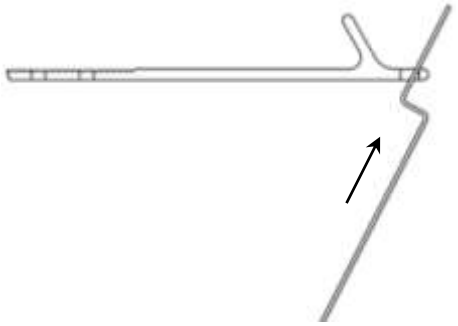


DETAIL B
BOTTOM COLLECTOR RAIL – COLLECTOR STRAP INSTALLATION

HOOKING COLLECTOR / TANK STRAP TO TANK CLAMP

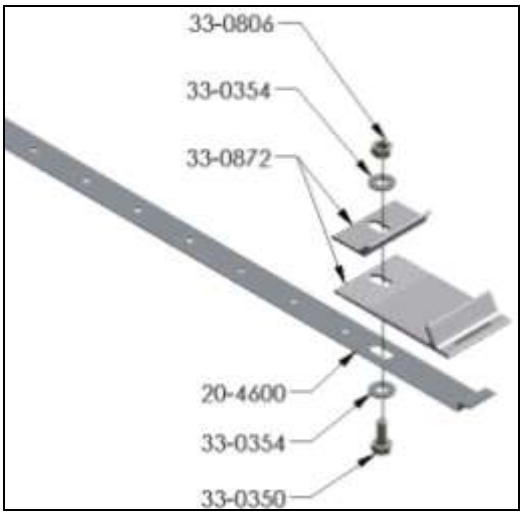
1. The tank clamp (330872) is supplied as a single extruded part and must be snapped into two. Snap by bending the clamp on the groove location.

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.

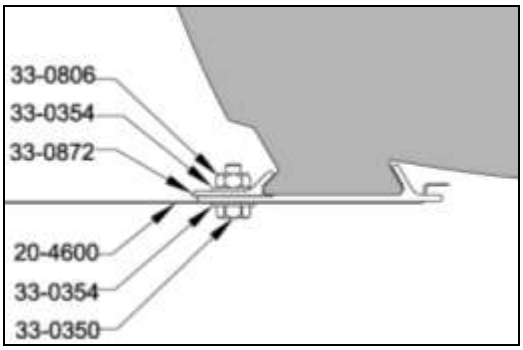


3. Push the strap end through the tank clamp and make sure it is correctly orientated as illustrated.

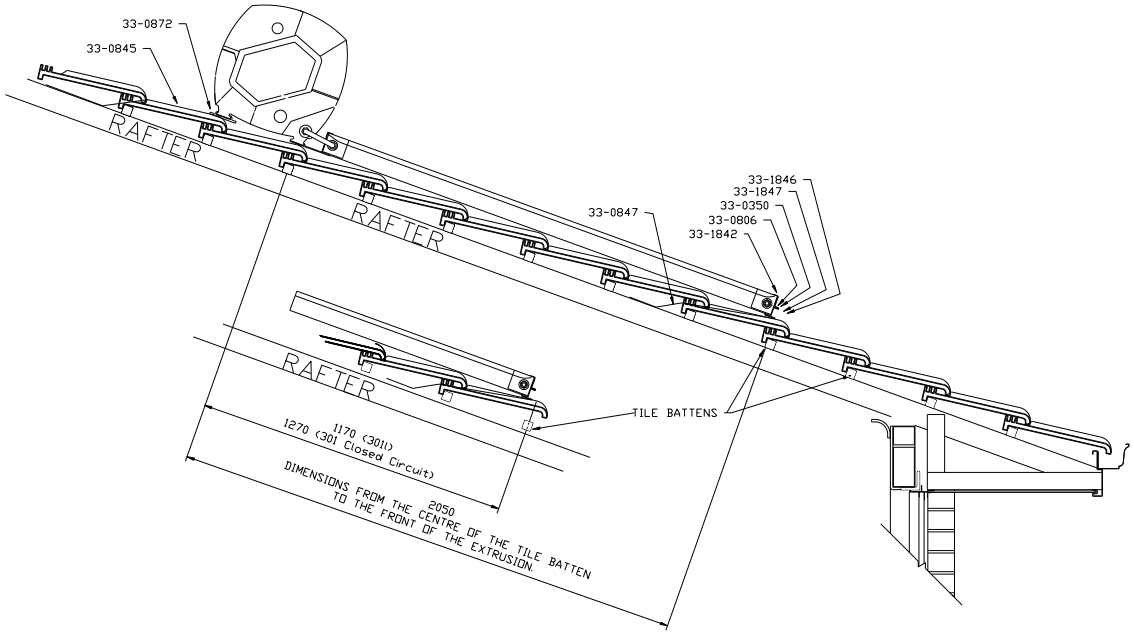
4. Loosely pre-assemble bolt, washer and nut as shown. Ensure the bolt head fits into the valley of the tile or roof sheet profile.



Tank Rail Fixing



Tank Clamp Assembly



With Pitch Tiled Roof Mounting

INSTALLER'S CHECKLIST

- ☐ Ensure that the system is installed as directed in this manual
- ☐ Ensure the system is installed with the correct TILT (hot pipe side higher)
- ☐ Check that all mechanical fixings are secured
- ☐ Check that all pipe connections are correctly tightened
- ☐ Ensure potable water is connected and switched on
- ☐ Check that the potable water tank is filled
- ☐ For Closed Circuit systems ensure the closed circuit has been commissioned correctly and is filled with the correct concentration of Hartgard solution
- ☐ Ensure that electrical power is switched on (if required)
- ☐ Ensure the Collector covers are removed
- ☐ Ensure that any pipe connections through the roof have been sealed correctly
- ☐ In case of a remote installation make sure that a minimum of ¾" or 22mm pipe is used and that the piping has a continuous upwards slope towards the tank.
- ☐ Ensure roof tiles are put back in to position and roof flashing is watertight
- ☐ Householder instructed on water heater system use
- ☐ Provide this manual to the householder

SERVICING

To Empty The Water Heater

WARNING: THE POTABLE WATER SUPPLY TO THE SYSTEM SHOULD NOT BE SWITCHED OFF UNTIL THE COLLECTORS ARE SECURELY COVERED BY AN OPAQUE MATERIAL.

1) For Closed Circuit Series, securely cover the collectors from sunlight with cardboard or other opaque material BEFORE emptying the water heater.
2) Turn off the electricity supply.
3) Flush cold water through the tank to cool both the tank and the closed circuit fluid and turn off water supply.
4) For Closed Circuit Series, relieve the pressure in the jacket by removing the PR6 or PR200 jacket relief valve. Extreme care should be taken when removing the valve as the jacket fluid could be at high temperature and under pressure.
5) Release the water pressure at the pressure/temperature relief valve by holding the relief arm open.
6) Disconnect the cold water inlet and allow the water to drain out via a hose fitted to the cold water inlet connection.
7) Avoid contact with the hot water and ensure that the hose safely discharges hot water away from the roof area.
8) Hold open the tank relief lever to allow air into the storage tank.
9) For 'L' Series only, unscrew and remove the bung plug on the bottom right-hand corner of the right-hand collector.

Note: If required, the tank can be flushed at this stage by removing the 6 bolt element flange and hosing out any sediment.

Anode Replacement

To replace the anode:

1) Turn off the electricity supply and water supply.
2) Release the water pressure at the pressure/temperature relief valve by holding the easing gear open.
3) Drain the cylinder to a level below the anode fitting (see "To Empty the Water Heater" below).
4) Remove the electrical cover.
5) Unscrew the anode nut located to the left of the electric element (or burner tube) and withdraw the old anode.
6) Insert the new anode assembly into the cylinder through the anode socket. Tighten the new anode nut.
7) Turn on the water supply, dispel air from the tank via a hot water tap or the pressure/temperature relief valve and then check that the seal on the nut is watertight.
8) Re-fit the cover and turn on the electricity supply.

WARNING: DO NOT TURN POWER ON UNTIL THE WATER HEATER IS FILLED WITH WATER OR DAMAGE TO THE HEATING ELEMENT WILL RESULT.

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 January 2012.

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 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.

2.9 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
BT, J, KF, L, LC, LCS 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.
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.

AFFIX INSTALLATION AND WARRANTY REPORT HERE

Note: Installation and Warranty report to be produced in quadruplicate
on carbon copy paper in the colours indicated

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