# *Owners Guide*
# *and*
# *Installation Instructions*

# *Rheem Heat Store Series 2*
# *Commercial Drain Back Solar*

*Install a Rheem*

**WARNING: Plumber – Be Aware**

**Use copper pipe <u>ONLY</u>. Plastic pipe <u>MUST NOT</u> be used.**
It is a requirement of a solar water heater installation that all pipe work be in copper and not plastic, due to the effects of high water temperatures.

This water heater system must be installed and serviced by a qualified person.
Please leave this guide with the unit at all times.

## WARNING: Plumber – Be Aware

- The solar hot and solar cold pipes between the solar storage tank and the solar collectors **MUST BE** of copper. All compression fittings must use brass or copper olives.
- The full length of the solar hot and solar cold pipes **MUST BE** insulated.
- The insulation must:
- be of a closed cell type or equivalent, suitable for a solar water heating application and capable of withstanding the temperature of the closed circuit fluid generated by the solar collectors under stagnation conditions
    - The specification of the chosen insulation material should be checked with the insulation manufacturer prior to installation as different materials may vary in temperature tolerance.
- be at least 13 mm thick, however thicker insulation may be required to comply with the requirements of AS/NZS 3500.4
- be weatherproof and UV resistant if exposed
- extend through any penetrations in the eaves, ceiling and roof
- cover valves and fittings in the solar hot and solar cold pipe work
- be fitted up to and cover the connections on both the solar storage tank and the solar collectors.
- The insulation will offer corrosion protection to a metal roof against water runoff over the copper pipe, assist in avoiding accidental contact with the solar pipe work as high temperature closed circuit fluid can flow from the solar collectors to the solar storage tank and also reduce pipe heat losses.
- There **MUST BE a continuous fall** of a minimum 5° (1 in 10 grade) in the pipe work between the solar collector and solar storage tank for efficient and effective drain back to occur. The highest point of the solar cold pipe and solar hot pipe must be where they connect to the solar collector.
- The system has NO WARRANTY for freeze damage if there is not a continuous fall in the solar hot and solar cold pipes, or they are not insulated in accordance with the installation instructions, or the closed circuit fluid has been incorrectly mixed.
- Plastic pipe **MUST NOT** be used, as it will not withstand the temperature of the closed circuit fluid generated by the solar collectors under stagnation conditions. The solar collectors can generate extremely high closed circuit fluid temperatures of up to 150°C. Plastic pipe cannot withstand these temperatures and **MUST NOT** be used. Failure of plastic pipe can lead to the release of high temperature closed circuit fluid and cause severe water damage and flooding.

⚠ **Warning:** Upon completion of the installation and commissioning of the water heater, leave this guide with the householder or responsible officer. **DO NOT** leave this guide inside of the cover of the water heater, as it may interfere with the safe operation of the water heater or ignite when the water heater is turned on.

**PATENTS**

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

**TRADEMARKS**

® Registered trademark of Rheem Australia Pty Ltd.
TM Trademark of Rheem Australia Pty Ltd.

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

# Contents

# Chapter 1 – Product Information

Rheem Heat Store Series 2 is a commercial solar water heating package that can be used in a variety of applications. It can be integrated into an existing installation to provide solar pre-heating for fuel cost reduction, used in the replacement of existing equipment, and used in new installations. Rheem Heat Store Series 2 provides versatility and flexibility in being able to utilise most back-up energy sources, including heat pump, natural gas, propane, electricity, oil or solid fuel.

Rheem Heat Store Series 2 is available in 4 models and can be installed indoors or outdoors. Rheem Heat Store Series 2 provides superior benefits to conventional solar water heaters including ultimate frost and over-temperature protection by way of its unique drain-back function.

## System Features

### A Complete Package

Each Rheem Heat Store Series 2 requires only minimum onsite installation work. The onsite installation work is usually limited to collector mounting plus water and electrical / gas supply connections to become a fully operational hot water system.

### Dual Storage Feature

The combination of the copper heat exchange coils and closed circuit storage tank enables the use of full mains pressure for hot water whilst providing all the advantages of a low pressure closed circuit heat transfer system to minimise stress on the storage tank and collector circuit.

### Large Heat Exchange Surface

Rheem Heat Store Series 2 is designed to have an exceptionally large heat exchange area that effectively transfers the energy in the closed circuit fluid storage tank to the potable water circuit with minimal heat exchange penalty.

### Automatic Drain-Back Feature – Solar Freeze & Overheat Protection

The automatic drain-back feature of the closed circuit prevents wet stagnation of the closed circuit fluid in the collector array. This eliminates potential damage due to boiling of the fluid and also ensures that the collected energy remains in the Heat Store. This same feature provides inherent protection of the collectors from freezing during frost periods.

### Ease of Maintenance

The simple design of Rheem Heat Store Series 2 enables preventative maintenance to be carried out quickly and easily.

### Multiple Installations Available

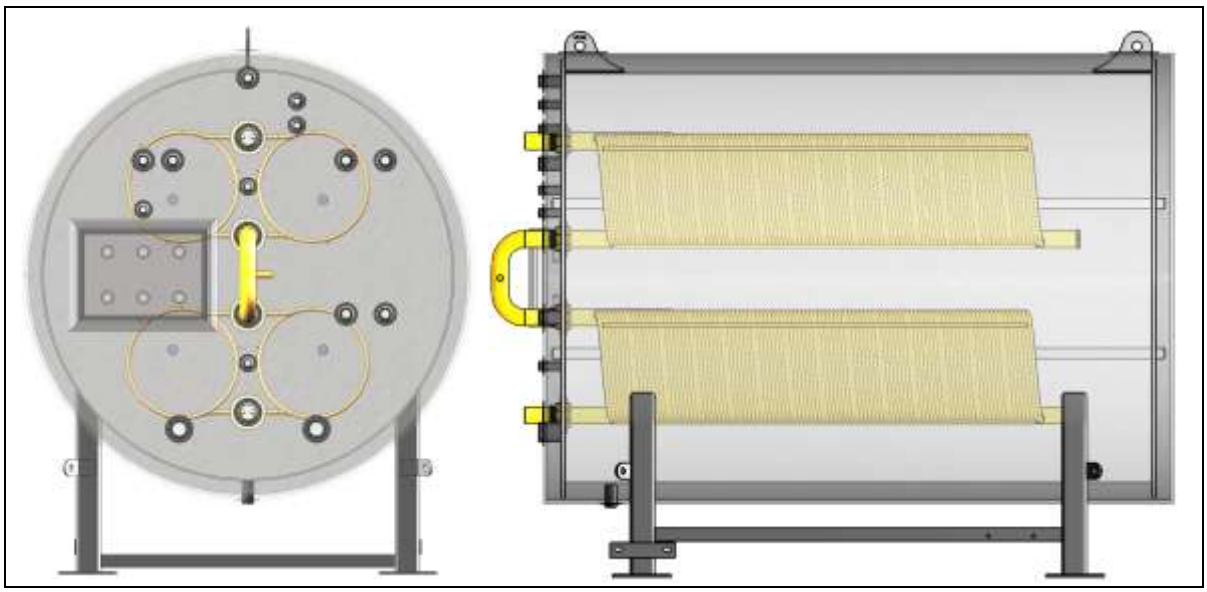
Rheem Heat Store Series 2 can be installed and plumbed together in multiple unit combinations to cater for large hot water demands. The cold and hot water supplies are manifolded in parallel. Each Heat Store could be individually plumbed to its own collector array or the system can be plumbed as one complete system. The most suitable system design will depend on site specific factors. Consult Rheem for advice.

### Combined Heating / Hot Water Supply Installations

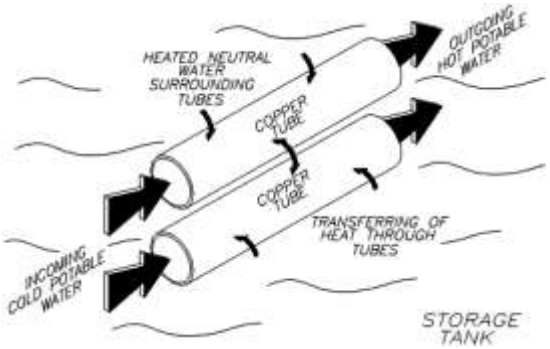
The Rheem Heat Store Series 2 package has the ability to be connected to systems requiring both domestic hot water and space heating hot water supplies. The sizing and design of these systems is not covered by this manual and enquiries of this nature should be referred directly to Rheem.

## DBs Series

The Rheem Heat Store Series 2 system uses the DBs Series tank range as its storage tank. This storage tank range is available in 4 models: 1500DBs, 2200DBs, 3500DBs and 5000DBs – the model number referring to the nominal storage capacity of the closed circuit in litres.



### How it Works




The storage tank is constructed of steel and contains a number of copper heat exchange coils. The storage tank houses a neutral low-pressure closed circuit fluid that is used to store and transfer heat and is not consumed. The copper heat exchange coils are immersed within this closed circuit fluid. They contain high-pressure potable water connected to the water main.

As hot potable water is drawn, cold potable water enters and passes through the heat exchange coils. As it passes, heat energy stored in the closed circuit fluid is conducted to it through the walls of the copper coils. This raises its temperature before being supplied to the hot outlet.

The closed circuit fluid receives heat energy primarily from the solar collectors where fitted. If no solar contribution is available, the closed circuit fluid may be heated by a remote heat source such as a heat pump or gas burner or alternatively the potable water may be boosted in series. Maximum heating rates by electric and gas heat sources are detailed in the following table on page .6

Each Rheem Heat Store Series 2 can utilise a varying number of solar collectors to meet the hot water demand of the proposed installation. Recommended collector quantities are shown in the table on page 6. Only in extremely high or low radiation areas should collector quantities outside the recommend ranges be installed. Please contact Rheem for further information.

**Technical Data Table**

| Model | unit | 1500DBs | 2200DBs | 3500DBs | 5000DBs |
|---|---|---|---|---|---|
| **Nominal Storage Capacity** | litres | 1500 | 2200 | 3500 | 5000 |
| **Peak DHW Flow rate** | l/min | 60 | 120 | 120 | 180 |
| **Pressure Drop at Peak Flow** | kPa | 33 | 33 | 33 | 33 |
| **Max Working Pressure of Storage Tank** | kPa | 90 | 90 | 90 | 90 |
| **Cold Water Supply Pressure Min/Max** (see note 3) | kPa | 140/680 | 140/680 | 140/680 | 140/680 |
| **Weight Empty** | kg | 720 | 950 | 1280 | 1670 |
| **Weight Full** | kg | 2135 | 3160 | 4630 | 6770 |
| **Domestic Hot Water Connections** (see note 1) | | DN32 | DN50 | DN50 | DN80 |
| **Height** | mm | 1422 | 1672 | 1966 | 2210 |
| **Length** | mm | 2150 | 2150 | 2150 | 2150 |
| **Storage Tank Diameter** | mm | 1112 | 1362 | 1656 | 2016 |
| **Base Length** | mm | 1400 | 1400 | 1400 | 1400 |
| **Base Width** | mm | 800 | 1050 | 1250 | 1500 |
| **Coils Surface Area** | $m^2$ | 8 | 16 | 20 | 32 |
| **Quantity of BT Solar Collectors** | pcs | 8 - 16 | 10 - 24 | 16 - 35 | 24 - 48 |
| **Solar Collector Aperture** | $m^2$ | 14.9-29.8 | 18.6-44.6 | 29.8-65.5 | 44.6-89.3 |
| **Maximum Energy Input - Electric Boost/Heat Pump** (see note 2, 4) | kW | 46 | 46 | 46 | 92 |
| **Maximum Energy Input - Gas Boost** (see note 4) | MJ/hr | 200 | 200 | 200 | 430 |

Notes: 1. The domestic hot water connections are to DN copper headers. The figures shown are the copper tube nominal sizes as defined by Australian Standard AS 1432. These nominal sizes relate to the pipe outside diameters:- DN32 = 31.75mm (1.25") max., DN50 = 50.80mm (2") max., and DN80 = 76.20mm (3") max.

2. Electric boost energy input is based on 240 V power supply.

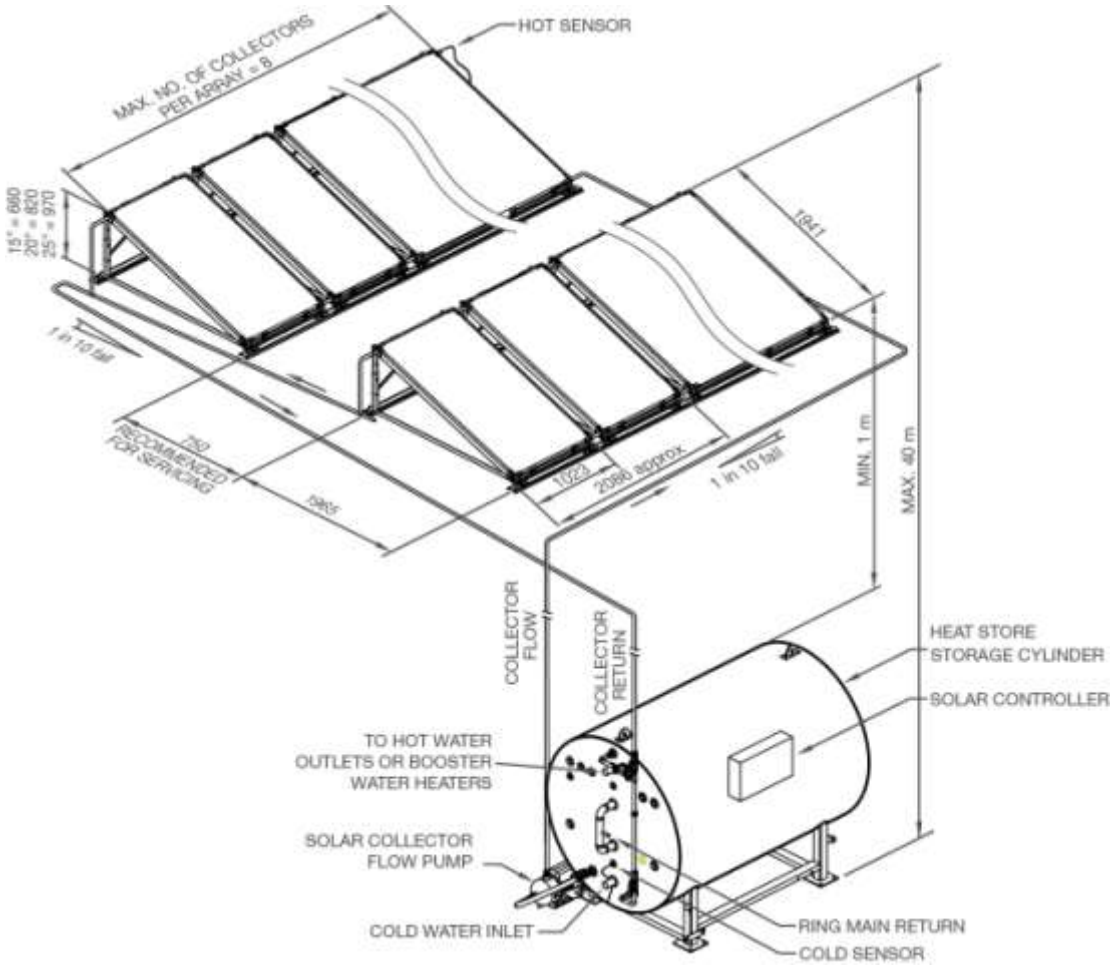
3. The maximum supply pressure can be increased to 960kPa if a 1200kPa expansion control valve is used in lieu of the supplied 850kPa valve. Operating pressure **must not** exceed the rating of any appliance in the hot water circuit downstream of the ECV.

4. The maximum energy input may be increased if the auxiliary energy source has a T&PR valve/s with thermal relief equal to the energy output rating of the auxiliary energy source.

## Heating by Solar Collectors

Solar collectors are used to absorb energy from the sun, supplying heat to fluid circulated through them. The collectors are typically installed on the roof of the facility in which the system is used.

A pump is used to circulate closed circuit fluid between the Rheem Heat Store Series 2 storage tank and the solar collectors. This solar circulation pump is controlled by an intelligent differential controller with optional data logging capability. This differential controller measures the temperature in the solar collector array and the storage tank. When the solar collector array temperature is sufficiently higher than the storage tank temperature, the differential controller will switch on the solar circulation pump.




As the solar circulation pump operates, closed circuit fluid is drawn from the coolest portion of the storage tank and circulated through the collector array. The fluid is heated by the sun as it flows through the collectors and returns to the storage tank. This continual heating and recirculation process raises the temperature of the closed circuit fluid.

The solar circulation pump will continue to operate until the differential controller senses that the collector array temperature has fallen to an unsatisfactory level or the storage tank has reached its user defined temperature (maximum 75°C).

When the solar circulation pump ceases operation, the closed circuit fluid will drain back to the storage tank. The drain-back function ensures that frost damage will not occur in colder climates and over-heating of the system will not occur during periods of high solar contribution and low water consumption. An additional benefit is that the solar water heating system can be sized to maximise the winter solar load without causing issues with over performance in the summer.

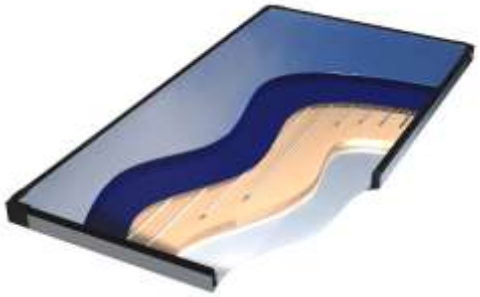
### Solar Collectors

Rheem Heat Store Series 2 can be used in conjunction with high efficiency BT solar collectors.

Each solar collector is constructed with an aluminium outer casing and is lined with heavy insulation to minimise heat losses. Low iron, tempered glass is utilised to enable the maximum amount of solar energy to be received by the absorber.

### BT Collector

The BT collector is designed to generate maximum solar performance in all climatic conditions. The ultra-high efficiency copper absorber with its blue sputtered selective surface maximises absorption and minimises emission. Heat loss is minimised with the use of glass wool insulation. The 13 copper risers are laser welded to the copper absorber sheet, ensuring maximum heat transfer.



### Collector Specifications

| Collector | Units | BT |
|---|---|---|
| **Overall Dimension** | mm | 1941 x 1023 x 80 |
| **Aperture Area** | $m^2$ | 1.86 |
| **Weight (empty/full)** | kg | 31/33 |
| **Number of risers** | - | 13 |
| **Average Efficiency** | % | 70% |
| **Fluid Capacity** | litres | 2.1 |
| **Max Working Pressure** | kPa | 1400 |
| **Insulation** | - | Glass Wool |
| **Glazing Type** | - | Matt-Matt |
| **Absorber Material** | - | Sputtered Copper |
| **Tray Material** | - | Aluminium |

## Temperature Control Unit

The Rheem Heat Store Series 2 system is supplied with a temperature controller to operate the solar functions.

The main function of the controller is to measure various temperatures in the storage tank and collector array to determine when to operate the solar circuits.

The controller will control solar operation by way of a differential thermostat. It can also be used to control back-up boosting or a 3 way diverter valve. The controller can be connected to a Building Management Systems (BMS), and by the addition of other components can be used to measure energy and flow metering.

**Note:** For further details on the control unit, refer to page 37
**Note:** AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement under these conditions:

If this water heater is installed with an auxiliary in-tank booster then this requirement of AS 3498 can be satisfied provided the booster is energised for a sufficient period each day and the thermostat setting allows the booster to heat the water to 60°C or higher.

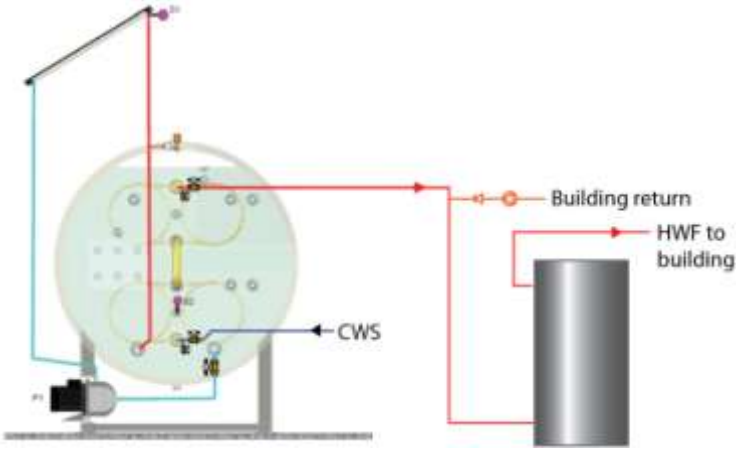
If this water heater is installed with an in-series continuous flow gas booster, then this requirement of AS 3498 can be satisfied provided the booster is energised and its preset outlet temperature setting is 70°C or higher.

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 energised and its thermostat setting is 60°C or higher.

## System Applications

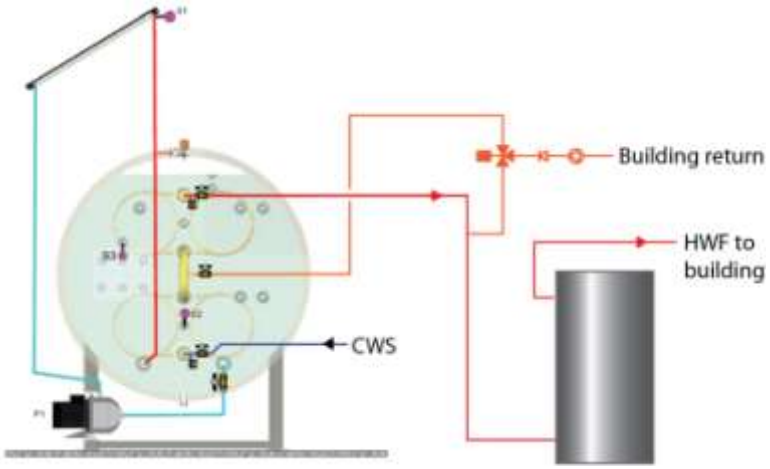
### Application 1: Solar Pre-Heat to In Series Boost

This is the most common type of application. The hot water outlet of the solar pre-heat system connects into the cold water feed to the conventional water heating plant. The water heating plant is designed to meet 100% of the peak requirements. As hot water is consumed, solar pre-heated water is delivered to the water heating plant. If required, supplementary boosting will occur in the water heating plant to meet the demands of the installation.



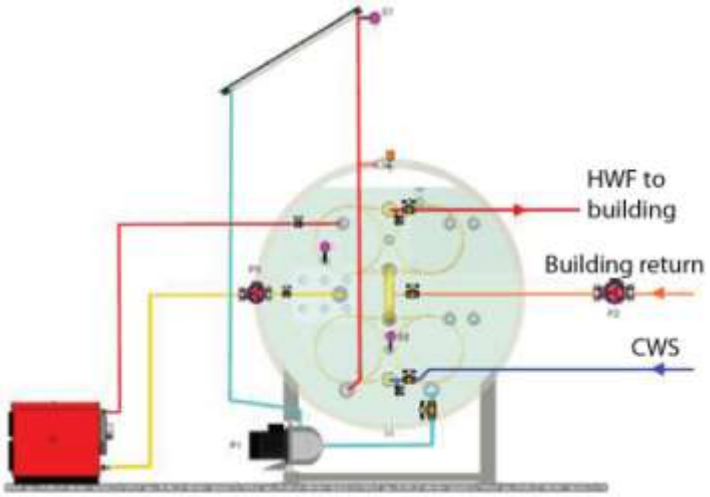

### Application 2: In Series Boosted Solar with Solar Secondary Return

Similar set up to application 1, however, the stored energy in the Heat Store can be monitored and a 3 way motorised valve is used to divert building return water through the top half of the Heat Store instead of the in series boost plant to maximise solar energy use.




### Application 3: In Tank Heat Pump, Gas or Electric Boosted Solar

In this application the remote heat pump, gas or electric heat source (B1) operates when the temperature controller senses that the closed circuit temperature of the Rheem Heat Store storage tank has fallen below a pre-determined level and provides power to the closed circuit circulation pump (P3). The controller shuts down the booster circulation pump when the closed circuit fluid temperature reaches the pre-determined temperature set point. This method has the advantage of requiring less in series storage space, but at the expense of solar storage.




For best results, the remote booster should be located as close as possible to the storage tank, with the connecting pipe lengths kept to a minimum.

**Note:** The solar circuit and the back-up booster circuit are able to operate simultaneously. Appropriate arrangements should be made to ensure the back-up booster operation is limited during periods of solar gain to optimise the solar contribution. The controller has a timer function which can be programmed for this purpose. Three on/off periods can be programmed per day.

### Application 4: Combined Hot Water / Hydronic Heating

The potable water is used to provide hot water for the ablutions and the closed circuit fluid is circulated through a heat exchanger to provide energy for hydronic / space heating requirements. The closed circuit fluid can be boosted with a remote heat source as described in application 3.

## System Operation

**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.

Care should be taken **TO NOT** 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.

The setting of the Rheem Heat Store Series 2 controls will be completed during the commissioning of the system. The heating of water will commence automatically after this time. There are no operator requirements to assure freeze protection of the solar circuit in the event of freezing temperatures occurring. In the event of power loss and or water supply loss, the Rheem Heat Store Series 2 will resume normal operation without the need of human interaction.

For issues arising during operation, see the "Troubleshooting" section on page 53 in this guide. A number of maintenance aspects are also discussed in the "Maintenance" section on page 54 in the guide.

# Chapter 2 - Installation Requirements

**THIS WATER HEATER IS NOT SUITABLE FOR POOL HEATING.**

## IMPORTANT:

The installation must comply with these installation instructions and with the requirements of AS/NZS 3500.4, AS/NZS 3000 and all local codes and regulatory authority requirements.

In New Zealand, the installation must conform with Clause G12 of the New Zealand Building Code.

## General

The Rheem Heat Store Series 2 commercial solar system is an indirect solar water heater operating on the drain back principle. In heating mode, the solar pump transfers heating fluid from the main storage volume of the tank via the solar cold line and floods the collectors. The heated water drains back via the solar hot line to the storage tank. When heating is complete or insufficient solar gain is available, the pump is deactivated and the heating fluid drains back into the storage tank. This method of heating is ideally suited to areas subject to frost as the collectors are inherently protected by the drain back function. The drain back function also protects the system from the effects of high temperature stagnation when used with high efficiency collectors. This system is designed for use with high efficiency Rheem BT solar collectors.

The solar circuit must be installed with a continuous fall of a minimum 5° (1 in 10 grade) in the pipe work from the solar collector to the solar storage tank, with the full length of the solar hot and solar cold pipes insulated to offer protection against freeze damage. The system has NO WARRANTY for freeze damage if there is not a continuous fall in the solar hot and solar cold pipes, or they are not insulated in accordance with the installation instructions. (refer to "Warranty Exclusions" on page 63 and to "Warning: Plumber Be Aware" on page 2)

**Note:** AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement under these conditions:

If this water heater is installed with an auxiliary in-tank booster then this requirement of AS 3498 can be satisfied provided the booster is energised for a sufficient period each day and the thermostat setting allows the booster to heat the water to 60°C or higher.

If this water heater is installed with an in-series continuous flow gas booster, then this requirement of AS 3498 can be satisfied provided the booster is energised and its preset outlet temperature setting is 70°C or higher.

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 energised and its thermostat setting is 60°C or higher.

## Typical Installation

A typical Rheem Heat Store Series 2 installation will include the following:

- Generally one, but could be multiple storage tanks
- 8 or more solar collectors
- Solar pump
- In line or in tank boost water heating plant
- 3-way valve for building recirculation control (optional)
- Warm water plant and disinfection (optional)

## Technical Data Table

| Model | unit | 1500DBs | 2200DBs | 3500DBs | 5000DBs |
|---|---|---|---|---|---|
| **Nominal Storage Capacity** | litres | 1500 | 2200 | 3500 | 5000 |
| **Peak DHW Flow rate** | l/min | 60 | 120 | 120 | 180 |
| **Pressure Drop at Peak Flow** | kPa | 33 | 33 | 33 | 33 |
| **Max Working Pressure of Storage Tank** | kPa | 90 | 90 | 90 | 90 |
| **Cold Water Supply Pressure Min/Max** (see note 3) | kPa | 140/680 | 140/680 | 140/680 | 140/680 |
| **Weight Empty** | kg | 720 | 950 | 1280 | 1670 |
| **Weight Full** | kg | 2135 | 3160 | 4630 | 6770 |
| **Domestic Hot Water Connections** (see note 1) | | DN32 | DN50 | DN50 | DN80 |
| **Height** | mm | 1422 | 1672 | 1966 | 2210 |
| **Length** | mm | 2150 | 2150 | 2150 | 2150 |
| **Storage Tank Diameter** | mm | 1112 | 1362 | 1656 | 2016 |
| **Base Length** | mm | 1400 | 1400 | 1400 | 1400 |
| **Base Width** | mm | 800 | 1050 | 1250 | 1500 |
| **Coils Surface Area** | $m^2$ | 8 | 16 | 20 | 32 |
| **Quantity of BT Solar Collectors** | pcs | 8 - 16 | 10 – 24 | 16 – 35 | 24 – 48 |
| **Solar Collector Aperture** | $m^2$ | 14.9-29.8 | 18.6 – 44.6 | 29.8 – 65.1 | 44.6 - 89.3 |
| **Maximum Energy Input – Electric Boost/Heat Pump** (see note 2, 4) | kW | 46 | 46 | 46 | 92 |
| **Maximum Energy Input – Gas Boost** (see note 4) | MJ/hr | 200 | 200 | 200 | 430 |

Notes:

1. The domestic hot water connections are to DN copper pipes. The figures shown are the copper tube nominal sizes as defined by Australian Standard AS 1432. These nominal sizes relate to the pipe outside diameters:- DN32 = 31.75mm (1.25") max., DN50 = 50.80mm (2") max., and DN80 = 76.20mm (3") max.

2. Electric boost energy input is based on 240 V power supply.

3. The maximum supply pressure can be increased to 960kPa if a 1200kPa expansion control valve is used in lieu of the supplied 850kPa valve. Operating pressure **must not** exceed the rating of any appliance in the hot water circuit downstream of the ECV.

4. The maximum energy input may be increased if the auxiliary energy source has a T&PR valve/s with thermal relief equal to the energy output rating of the auxiliary energy source.

## Safety

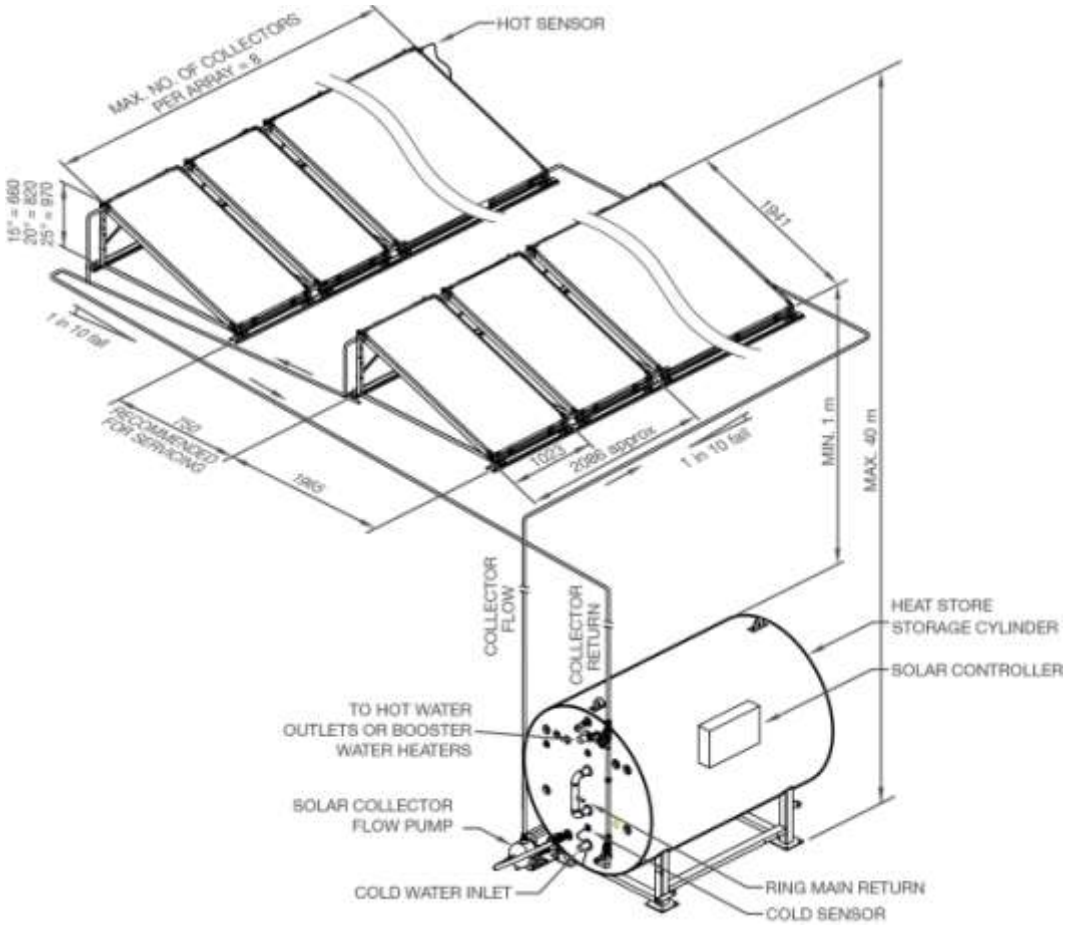
Safety is number one priority in all installations. Please observe the safety warnings in this manual and other safety information provided on the Rheem Heat Store Series 2 system. Common safety precautions are:

- System must only be installed, commissioned or serviced by a qualified person.
- Scalding occurs at temperatures above 50°C. This appliance is capable of providing hot water above this temperature.

## Installation Overview

Installation of the Rheem Heat Store Series 2 system involves:

- Preparation of installation site for the system (materials not supplied).
- The positioning of the storage tank.
- Installation of solar circulation pump.
- Installation of pipe work between storage tank and collectors.
- The installation and interconnection of the collectors using the components supplied.
- Supply of potable water to the Rheem Heat Store Series 2 and connection of hot water to the hot water reticulation system (pipe work not supplied).
- Installation and interconnection of any remote heat sources configured for the system.
- Connection of a gas supply (remote gas boosted heat source systems only).
- Installation of secondary recirculation by-pass valve (optional)
- Supply of a three phase or single phase power supply, and installation of an electrical distribution board (not supplied).
- Installation of temperature control unit.
- Electrical connections of the temperature control unit to mains power (eg. from distribution board).
- Electrical connections from the temperature control unit to the solar circulation pump and optional recirculation by-pass valve (wiring not supplied).
- Pressure testing of the collector array.
- Pressure testing of the pipe work between the collector array and the Rheem Heat Store Series 2.



# Installation of the Storage Tank

## Storage Tank Location

Locate the storage tank as close as possible to the collector array and to the most frequently used hot water outlet. Consideration must also be given to the selected location to ensure that it is accessible for maintenance.

The top of the storage tank **MUST BE** a minimum of one (1) metre **BELOW** the bottom of the collector array to enable the drain-back function. If the distance from the storage tank to the collector array exceeds 40 metres, the solar circulation pump may need to be upgraded (refer to Rheem for sizing).

## Safe Tray

The Heat Store tank is suitable for both indoor and outdoor installation. If installed indoors the storage tank must be located on an impervious floor with drainage in accordance with AS/NZS3500.4.

## Concrete Pad

Position the storage tank on a well-drained concrete plinth with a minimum thickness of 150 mm. The table below shows the recommended plinth dimensions for each Heat Store Series 2 tank.

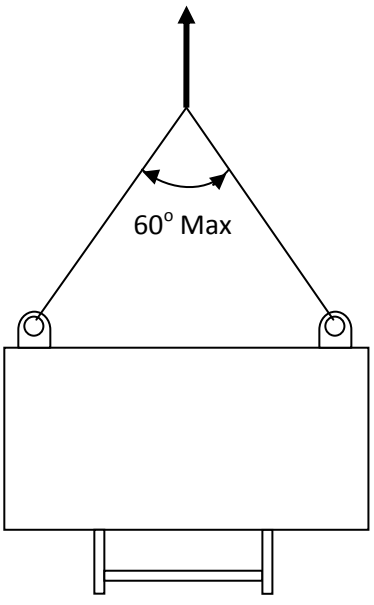
| Model | 1500DBs | 2200DBs | 3500DBs | 5000DBs |
|---|---|---|---|---|
| Length (mm) | 2700 | 2700 | 2700 | 2700 |
| Width (mm) | 1800 | 2000 | 2300 | 2600 |

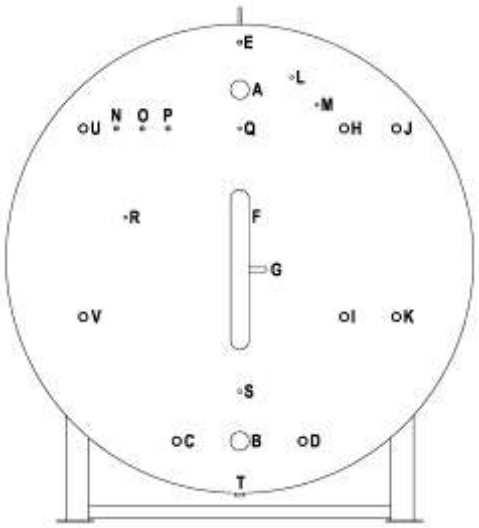
## Lifting

Use a forklift to place the storage tank in its correct location, lifting from beneath the leg structure. Refer to the table below for storage tank weights and dimensions. Alternatively, the unit can be lifted into place using the certified lifting lugs supplied and observing the following requirements:

- The tank is only to be lifted when empty.
- The maximum sling included angle is not to exceed 60° as shown in the diagram below.
- The maximum out of plane lifting angle is 10°.
- The dry weight of each model is shown in the table below:

| Model | 1500DBs | 2200DBs | 3500DBs | 5000DBs |
|---|---|---|---|---|
| Weight empty (kg) | 720 | 950 | 1280 | 1670 |
| Height (mm) | 1422 | 1672 | 1966 | 2210 |
| Length (mm) | 2150 | 2150 | 2150 | 2150 |
| Diameter (mm) | 1112 | 1362 | 1656 | 2016 |






**Fitting Locations**

A - Hot water outlet
B - Cold water inlet
C - Cold to solar collectors
D - Hot from solar collectors
E - Collector drain back/vent
F - Coil bridge
G - Ring main return
H - Process flow
I - Process return
J - Process flow
K - Process return
L - Fill level port
M - Low level sensor
N - P & T valve
O - P & T valve
P - Pressure relief valve
Q - TOC
R - Mid tank sensor
S - Solar probe
T - Fill / drain port
U - Hot from auxiliary boost
V - Cold to auxiliary boost

## Plumbing Connections

All connections can be made at the front of the storage tank, except the fill/drain port which is at the bottom of the storage tank. Some applications may not require all connection points (eg. process flow and returns may not be required in a hot water only application). Therefore, blanking plugs will be required to seal any unused ports.

**Note:** Use tapered fittings only where required. Rheem will accept no responsibility for leakage of fittings if tapered fittings are not used.

**Connection Sizes**

| Model | Reference | unit | 1500 | 2200 | 3500 | 5000 |
|---|---|---|---|---|---|---|
| **Potable Inlet & Outlet** | A & B | Copper | 32 | 50 | 50 | 80 |
| **Solar Cold/Hot** | C & D | BSPF | RP1/25 | RP1¼/32 | RP1¼/32 | RP1½/40 |
| **Ring Main Return** | G | Copper | 20 | 20 | 20 | 20 |
| **Process Flow/Return** | H, I, J, K | BSPF | RP1/25 | RP1/25 | RP1/25 | RP1½/40 |
| **Fill Level Port** | L | BSPF | RP½/15 | RP½/15 | RP½/15 | RP½/15 |
| **Fill / Drain port** | T | BSPF | RP1/25 | RP1/25 | RP1/25 | RP1/25 |
| **Sensor Probes** | Q, R, S | BSPF | RP½/15 | RP½/15 | RP½/15 | RP½/15 |

## Closed Circuit Fixtures

The following valves and devices are supplied and fitted to the storage tank on the closed circuit:

- **Pressure Relief Valve (P)**

  A pressure relief valve set at 90 kPa (0.9 bar) pressure is mounted into the top of the closed circuit reservoir.

- **Temperature Relief Valve (P & T Valve)**

  A temperature relief valve set at 99°C is mounted into the top of the closed circuit reservoir. A single valve has a temperature relief power rating of 46 kW. Two valves are supplied in the 5000DBs providing a temperature relief power rating of 92kW.

- **Relief Valve Drain Line (not supplied)**

  A copper drain line **MUST BE** fitted to the relief valve to direct the discharge away from the storage tank. Connect the drain line to the relief valve using a connection union. The pipe work from the relief valve to the drain should be as short as possible and fall all the way from the water heater with no restrictions. It should have no more than three right angle bends in it. Use DN20 (3/4") 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 that 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 relief valve.

  **WARNING:**

  **NEVER** block the outlet of a relief valve or its drain line for any reason.

  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 relief valves on this water heater are to discharge high temperature heat exchanger fluid under certain conditions, it is strongly recommended the pipe work downstream of the relief valves be capable of carrying this fluid at a temperature exceeding 93°C. Failure to observe this precaution may result in damage to pipe work and property.

- **Fill / Drain Port (T)**

  The fill/drain port is used to fill and drain the storage tank with heating fluid. Connect an isolation valve to the fill/drain port, located at the underside of the storage tank.

- **Fill Level Plug (L)**

  The closed circuit fill level plug is mounted at the fill level port of the storage tank. It is to be removed during the filling operation of the closed circuit to allow for the escape of air and to indicate when the correct operating level has been achieved. When fluid commences to discharge from the fill level port, the correct operating level of the storage tank has been obtained. The fill level plug is then replaced. During normal operation of the system, the port is to remain plugged.

- **Collector Drain Back Vent Kit (Refer to Appendix 1, 2, 3 and 4)**

  This kit is supplied with the Rheem Heat Store Series 2 and contains the following components:

  a. **Collector Fluid Drain Back/Vent (E)**

     The closed circuit of the Heat Store Series 2 is arranged to automatically drain the fluid in the collectors back into the storage tank through the collector hot and cold pipe, provided the pipes are continually graded from the collector array. A portion of the solar hot pipe work (including solar return vent line) is supplied in a kit, with each Rheem Heat Store Series 2 system. Refer to the instructions supplied in the kit and Appendix 1, 2, 3 and 4 for specific installation instructions.

  b. **Drain-Back Bypass Valve (Swing Check Valve)**

     The drain back by-pass valve is supplied as part of the Drain Back/Vent kit and is mounted in the collector hot vent line to the Rheem Heat Store Series 2. It is pre-set to allow full collector flow to be established before closing automatically and allowing the orifice plate to regulate the water flow through the collectors to a pre-set rate. This valve also forms part of the collector venting system that permits trapped air to be rapidly moved from storage tank to the collector array and back as the solar circulation pump cycles.

**Note:** The drain back by-pass valve is required to be installed in such an orientation that the arrow on the valve points **AGAINST** the flow of the drain-back fluid (or arrow points **AWAY** from the storage tank). The valve should be installed upside down so that the flap swings open when fluid is not being pumped.

**c. Orifice Plate**

The orifice plate is supplied as part of the Drain Back/Vent kit and controls the closed circuit fluid flow rate through the solar collector array when the solar circulation pump is operating and full flow has been established.

Each kit is supplied with two orifice plates to match with the number of collectors in the installation. The first orifice plate is supplied with a pre-determined diameter size, whilst the second is supplied undrilled in case adjustment to the flow rate must be made on site. The orifice plate **MUST BE** adjusted to suit the range of collectors on the project. The following table gives the tank model with the range of collectors and the corresponding orifice plate size.

| Tank Model | No. of Collectors | Orifice Plate Diameter |
|---|---|---|
| **1500DBs** | **8 to 16** | 6.0 mm |
| **2200DBs** | **10 to 24** | 6.5 mm |
| **3500BDs** | **16 to 35** | 7.5 mm |
| **5000DBs** | **24 to 60** | 9.0 mm |

## Pipe Sizing

The pipe work between the storage tank and collectors must be sized to achieve the correct flow rates with the length of the pipe work and number of collectors taken into consideration, and the pump must be sized and selected with the length and diameter of the pipe work and height of the collectors above the tank taken into consideration. Refer to the pipe size and pump selection chart below.

Pumps in the shaded section and highlighted in bold are three-phase only. All other pumps may be three-phase or single-phase.

**Pipe Size and Pump Selection Chart**

| COMMERCIAL SOLAR PIPE SIZE / PUMP SELECTION - RHEEM HEAT STORE SERIES 2 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Total Number Collectors** | **Pipe Dia** | **Total Height from Base of Storage Tank to Top of Collector (m)** | | | | | | |
| | | **10** | **15** | **20** | **25** | **30** | **35** | **40** |
| **8** | DN25 | CM3-2 | CM3-2 | CM3-3 | CM3-4 | CM3-4 | CM3-5 | CM3-6 |
| **12** | DN25 | CM3-2 | CM3-3 | CM3-4 | CM3-4 | CM3-5 | CM3-6 | CM3-6 |
| **16** | DN32 | CM3-2 | CM3-3 | CM3-4 | CM3-5 | CM3-5 | CM3-6 | CM5-5 |
| **20** | DN32 | CM5-2 | CM5-3 | CM5-4 | CM5-4 | CM5-5 | CM5-5 | **CM5-6** |
| **24** | DN40 | CM5-2 | CM5-3 | CM5-4 | CM5-4 | CM5-5 | CM5-5 | **CM5-6** |
| **28** | DN40 | CM5-3 | CM5-3 | CM5-4 | CM5-5 | CM5-5 | **CM10-3** | **CM10-3** |
| **32** | DN40 | **CM10-2** | **CM10-2** | **CM10-2** | **CM10-3** | **CM10-3** | **CM10-3** | **DN50/CM10-3** |
| **36** | DN40 | **CM10-2** | **CM10-2** | **CM10-2** | **CM10-3** | **CM10-3** | **CM10-3** | **DN50/CM10-3** |
| **40** | DN40 | **CM10-2** | **CM10-2** | **CM10-3** | **CM10-3** | **CM10-3** | **CM10-3** | **DN50/CM10-3** |
| **45** | DN50 | **CM10-2** | **CM10-2** | **CM10-2** | **CM10-3** | **CM10-3** | **CM10-3** | **DN65/CM10-3** |
| **50** | DN50 | **CM10-2** | **CM10-2** | **CM10-2** | **CM10-3** | **CM10-3** | **CM10-3** | **DN65/CM10-3** |

Notes:

1. If actual number of collectors falls between an array size, use the next biggest array.
2. If actual head height falls between two dimensions, use next highest.
3. Minimum pipe diameter is as shown in second column of table except where shown with the pump selection.
4. Pumps in the shaded section and highlighted in bold are **three-phase only. All other pumps may be three-phase or single-phase.**

**Solar Pump**

Refer to the instructions supplied in the kit and Appendix 1, 2, 3 and 4 for specific installation instructions. Mount the solar pump on the mounting frame supplied as shown in the diagram in the Appendix. The pump can be installed either at the right hand side or the left hand side of the storage tank. The connection pipe work from pump to the storage tank is supplied in a kit. Connect the solar cold pipe (flow to the collectors) from fitting C to the pump inlet.

## Solar Cold and Hot Pipes

**WARNING:**

The solar flow and return pipes between the storage tank and the solar collectors **MUST BE** of copper and all compression fittings must use brass or copper olives.

Plastic pipe **MUST NOT** be used as it will not withstand the temperature of the closed circuit fluid generated by the solar collectors. Failure of plastic pipe can lead to the release of high temperature closed circuit fluid and cause severe water damage and flooding.

**IMPORTANT:**

The Rheem Heat Store Series 2 is suitable for frost prone locations due to the drain-back function. It is necessary that the pipes from the solar collectors fall back to the storage tank in a continuously downward direction and with no restrictions.

Fit an isolation valve to the outlet of the pump and continue to install the solar cold pipe from the pump to the collectors and the solar hot pipe (return from the collectors). **DO NOT** fit a Non-Return Valve.

Assemble the Drain Back Kit as shown in Appendix 1, 2, 3 or 4 and fit to the storage tank at fitting D & E.

Connect the solar hot pipe to the inlet of the Drain Back Kit.

Two 850kPa expansion control valves (ECV), model H50, are supplied with the Heat Store Series 2 drain-back pipe work, and one **MUST BE** installed into a branch on the solar cold pipe after the solar pump.

## Solar Collector Sensor Lead

It is recommended to carry the sensor lead through a conduit to the location of the collector sensor temperature probe to protect it from possible damage. The conduit may be of a flexible or rigid type, whichever is most suitable for the application. Fix the conduit to the adjacent building structure or pipe work insulation. A 2 core, 0.75 $mm^2$ figure 8 cable can be used to extend the collector sensor lead if additional length is required. Extension leads can be ordered from Rheem.

## Pipe Insulation

All pipe work **MUST BE** insulated with a minimum of 13 mm thick fibreglass insulation or similar. Thicker insulation may be required to comply with the requirements of AS/NZS 3500.4. The insulation **MUST BE** weatherproof and UV resistant if exposed. The insulation offers corrosion protection to a metal roof against water runoff over the copper pipe, reduces pipe heat losses, and also assists in avoiding accidental contact with the solar pipe work. The insulation **MUST BE** fitted up to the fitting connections, as very high temperature water can flow from the solar collectors to the Heat Store Series 2 under certain conditions.

Closed cell polymer insulation should not be used as it may not be able to withstand the temperature of the water generated by the solar collectors under stagnation conditions.

## Installation of the Solar Collectors

### WARNING:

The solar flow and return pipes between the storage tank and the solar collectors **MUST BE** of copper and all compression fittings must use brass or copper olives.

Plastic pipe **MUST NOT** be used as it will not withstand the temperature of the closed circuit fluid generated by the solar collectors. Failure of plastic pipe can lead to the release of high temperature closed circuit fluid and cause severe water damage and flooding.

Collectors **MUST BE** installed on an adequately supported area of roof.

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 installing collectors.

The collector installation shall provide safe access for maintenance.

### IMPORTANT:

The Rheem Heat Store Series 2 is suitable for frost prone locations due to the drain-back function. It is necessary that the pipes from the solar collectors fall back to the storage tank in a continuously downward direction and with no restrictions.

Ensure the collector red colour sealing plugs are in place and that they remain in place until the collectors are in position and ready to be connected. This ensures no foreign matter enters the collectors or system pipe work.

The BT collector glass meets AS/NZS 2712 requirements for hail impact damage resistance. The fitment of glass guards for this purpose is not required. Stone Guards are available for protection against accidental damage or vandalism, if considered necessary. Contact Rheem for more information.

**Note:** The maximum gross weight of each BT collector when filled with water is around 33 kg.

### Location of Solar Collectors

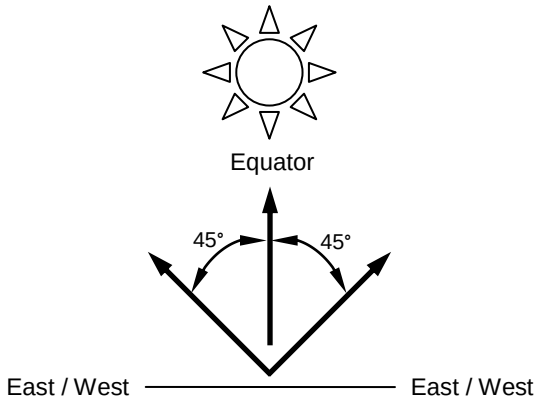
Collectors **MUST** always be located a minimum of 1m **ABOVE** the Heat Store Series 2 storage tank to enable the drain-back function.

Before commencing installing the solar collectors, inspect the roof structure to ensure that:

- The structural integrity of the roof is not compromised by the installation of the solar collector array, and
- The solar collector array is installed in an area that is free from shade all year, particularly between the hours of 9:30 am and 4:00 pm. Tall trees and adjacent buildings may cast a shadow on the collectors during winter.

### Orientation of Solar Collectors

For optimum performance, the solar collectors should be installed facing towards the equator (facing north in the southern hemisphere, facing south in the northern hemisphere). **ALWAYS USE A COMPASS TO CHECK THE ORIENTATION**. Deviation from the equator up to 45° east or west has little effect on the total annual solar output from the collectors (approximately 5%).

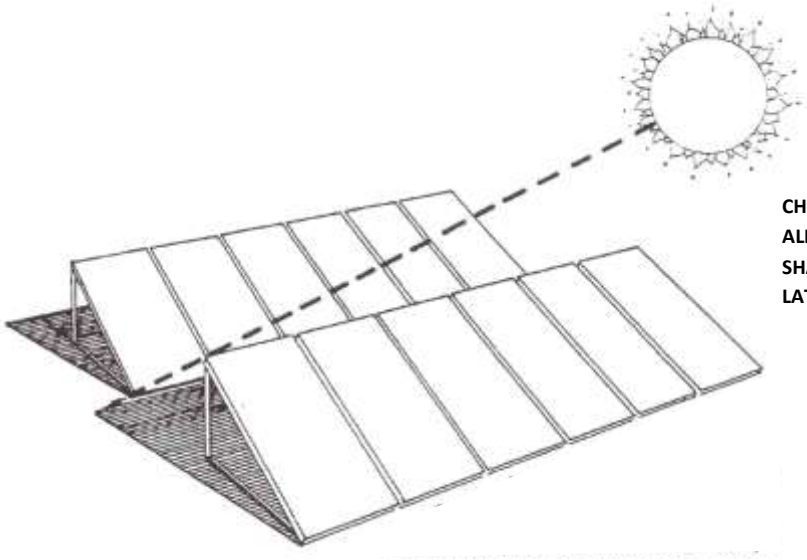



### Inclination (Angle) of Solar Collectors

The angle of inclination of the collectors should be the same as the geographic latitude angle of the location or within ± 20° of the latitude angle. Deviations from latitude angle up to ± 20° will have little effect on the total annual solar output from the collectors (approximately 5%). To ensure correct water run off, glass self cleaning, and collector case venting, the minimum permissible angle is 10°.

### Collector Bank Spacing

Where the collectors are mounted on variable pitch frames in multiple banks, maintain a distance of 750 mm between each bank of collectors to prevent shading and allow access for servicing.



**CHECK MINIMUM SUN ANGLE AND ALLOW CLEARANCE TO AVOID WINTER SHADING. 750mm AT APPROX 30° LATITUDE IS SATISFACTORY**

## IMPORTANT:

When installing collectors on all roof types, it is important that connections are made loosely to allow for adjustment while the other collectors are located. With all collectors positioned as indicated on page 26 the connections shall be made tight and the collectors finally clamped. Failure to follow this procedure may cause difficulties during assembly.

Do not remove the solar collector packaging completely prior to the installation as the solar collector surface can become very hot. Remove only sufficient packaging material to enable the installation of the solar collectors.

Upon completion of the installation of the solar collectors with conetite fittings the packaging material may be removed whether or not the solar circuit is connected to the solar storage tank and / or the solar water heater is commissioned, without damage to the solar collectors.

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

### Collector Installation on Pitched Tiled Roofs

Select a suitable area of roof sufficient to install all the collectors required. Each collector rail is supplied with 2 collector straps which are required to be fixed to the roof rafters. Expose the roof rafters so that the collector straps are evenly spaced as much as possible on each collector rail across the roof for the bottom of the first row. Then repeat the procedure 1,940 mm up the slope of the roof to complete the top of the first row. Then leaving approximately 750 mm in between rows, repeat the procedure for each subsequent row. A maximum of 8 collectors per bank can be interconnected together using the collector connector assembly supplied.

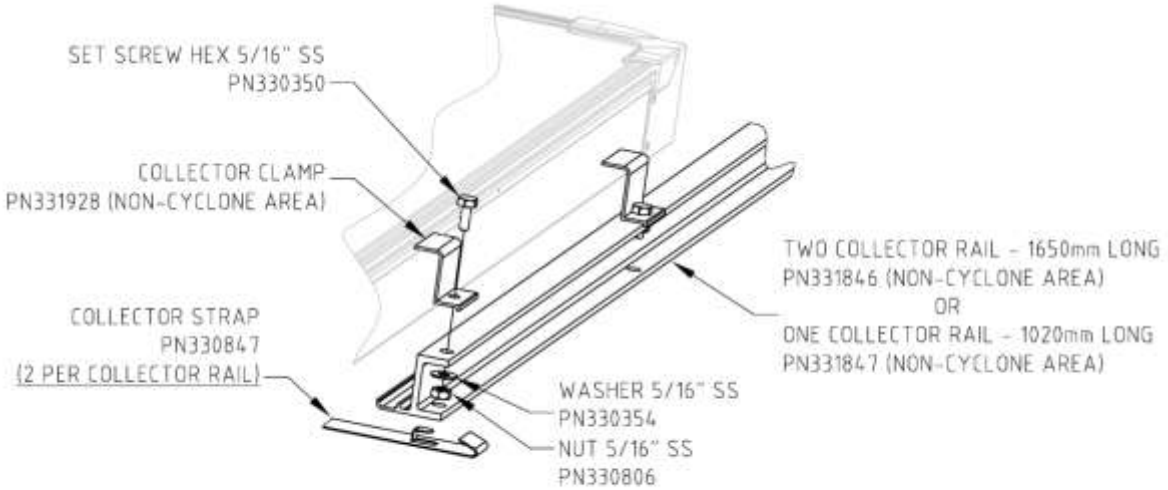
Fasten the stainless steel straps to the roof rafters and fix the collector bottom and top mounting rails into the straps. Maintain a gap between the top and bottom rails sufficient to fit the collectors. Ensure that each parallel bank in the collector array slopes towards the bottom collector connection pipe. A minimum slope of 2.5 mm per collector (20 mm per bank of 8 collectors) is recommended. Replace the roof tiles and position the collectors on the mounting rails, allowing approximately 100 mm between adjacent collectors for the collector connector assy.

### Collector Installation on Pitched Metal Deck Roofs

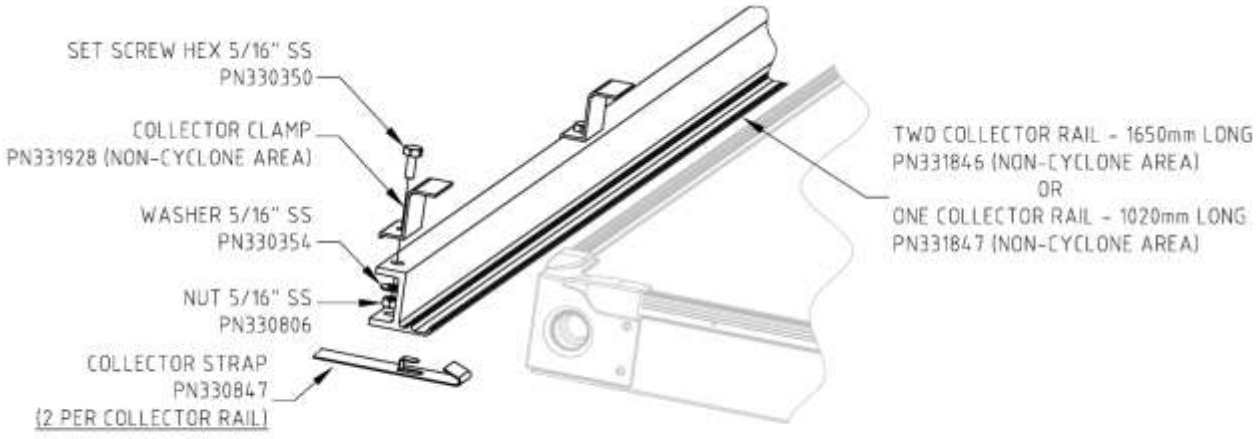
Fasten the stainless steel straps to the high points of the metal deck using stainless steel metal thread screws with weatherproof seals, so that the collector straps are evenly spaced as much as possible on each collector rail across the roof and fix the collector bottom and top mounting rails into the straps. Maintain a gap between the top and bottom rails sufficient to fit the collectors. Ensure that each parallel bank in the collector array slopes towards the bottom collector connection pipe. A minimum slope of 2.5 mm per collector (20 mm per bank of 8 collectors) is recommended. Position the collectors on the mounting rails, allowing approximately 100 mm between adjacent collectors for the collector connector assy.

Then leaving approximately 750 mm in between rows, repeat the procedure for each subsequent row. A maximum of 8 collectors per bank can be interconnected together using the collector connector assembly supplied.

Care should be taken to not mark metal roof sheet with a marking pen and to remove all swarf from the metal roof as these can cause deterioration of the metal roofing material.




DETAIL 'F'
COLLECTOR RAIL - BOTTOM




DETAIL 'G'
COLLECTOR RAIL - TOP

## Collector Installation on Flat Roofs

Variable pitch frames are available from Rheem to suit collector only installations on flat or near flat structures. The variable pitch frames can be set at 15°, 20° or 25° inclination. Care **MUST BE** taken when spacing out the collector arrays to ensure no occurrences of self shading between collector banks, particularly in the winter months.

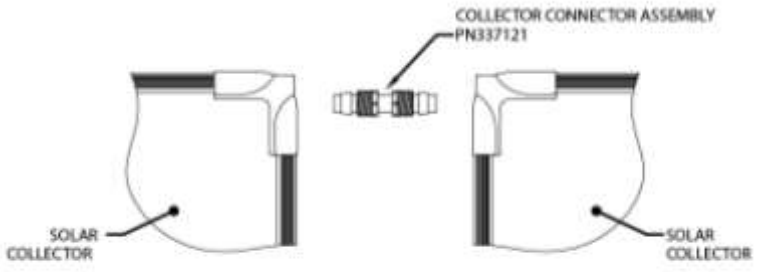
Determine the location of the Variable Pitch frame(s). Assemble and fix the frame(s) to the roof, following the installation instructions provided with the frames(s).

Position the collectors on the mounting rails, allowing approximately 100 mm between adjacent collectors for the collector connector assy.

## Collector Connector

Insert the collector connector assembly between the collectors and slide into place before fitting the collector clamps, to complete the installation.

**Hint:** To aid with fit up, loosely join all collectors in an array before final tightening of connector nuts.




DETAIL 'B'
COLLECTOR CONNECTOR ASSEMBLY

**Collector Connector Assembly (between collectors)**

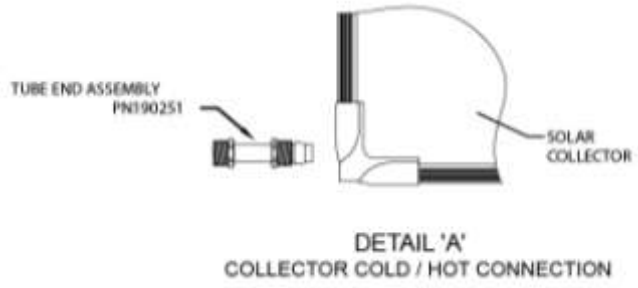
## Collector Pipe Work

A maximum of 8 collectors per bank can be interconnected together using the collector connector assy supplied. Each bank is to be installed to ensure Equa-flow between banks. Refer to diagram on page 25

### Tube End Assembly

The solar cold connection to the collector array **SHALL BE** at the lowest corner of the collector array and the solar hot connection at the diagonally opposite highest corner to ensure all banks have equal flow resistance.

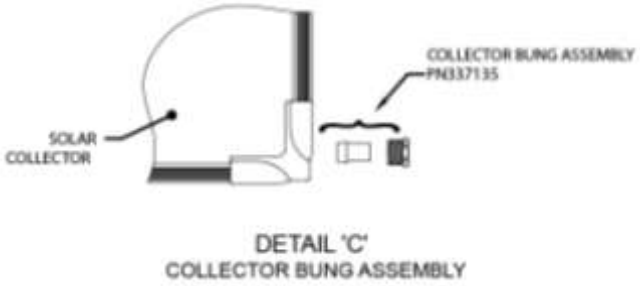
Fit a Tube End Assembly to the inlet and outlet of each bank.




**Solar Cold (Inlet) Connection**
**(same connection type is used on solar hot (outlet) of collector array)**

### Collector Bung Assembly

Fit the Collector Bung Assembly to the remaining two fittings on each bank of collectors.

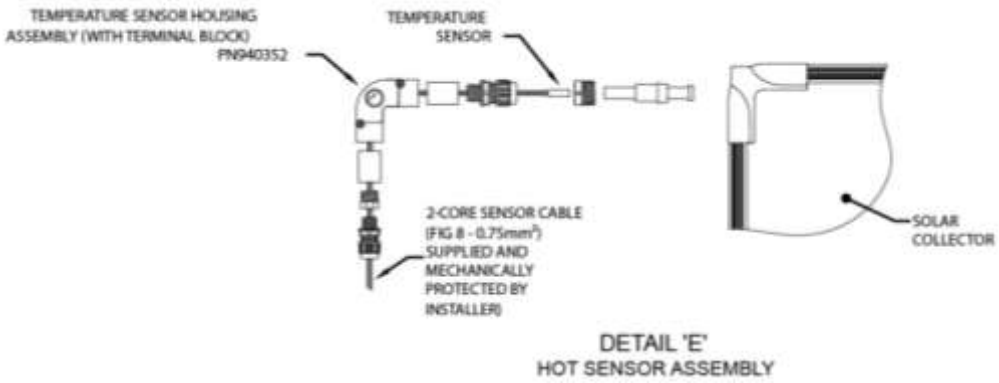



**Collector Bung Assembly (cone type)**

### Collector Sensor Assembly

Fit the collector sensor (FKP6 – black cable) to the collector sensor assembly by removing the cover and terminating the wires at the terminal strip provided. Polarity of wires is not required.

Fit the collector sensor assembly into the fitting above the cold water inlet of one of the banks. It will be necessary to remove one of the collector bungs. It is necessary to ensure the hot sensor probe receives similar radiation to that of the main collector array and that it is not shaded at any time, either by adjacent buildings or other collectors.



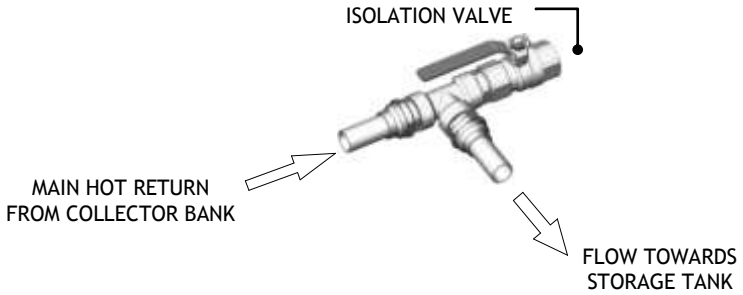

**Hot/Collector Sensor Connection**

## Plumbing Between Collector Banks

Connect each bank of collectors into a parallel group using reverse return connections to ensure equal flow through each bank. Fit a ball valve at the inlet of each bank **ONLY** to facilitate balancing. Isolating a bank by fitting an isolation valve to the inlet and outlet may lead to catastrophic failure of the solar circuit.

The solar flow (cold) and solar return (hot) pipes to and from the collectors **MUST HAVE** a continuous fall back to the Heat Store Series 2 tank to ensure the drain back of the closed circuit fluid. The pipe work must have a continuous grade of 1 in 10 or 5°. This will prevent the closed circuit fluid collecting in dips in pipe runs, which may cause the pipes to fatigue and split on freezing. The water treatment used in the closed circuit is not an antifreeze agent. It's function is to act as a corrosion inhibitor only.

Install an appropriately sized tee piece and isolation valve (not supplied) as shown below at the highest point of the main solar return pipe work to facilitate collector array pressure test during commissioning and servicing.

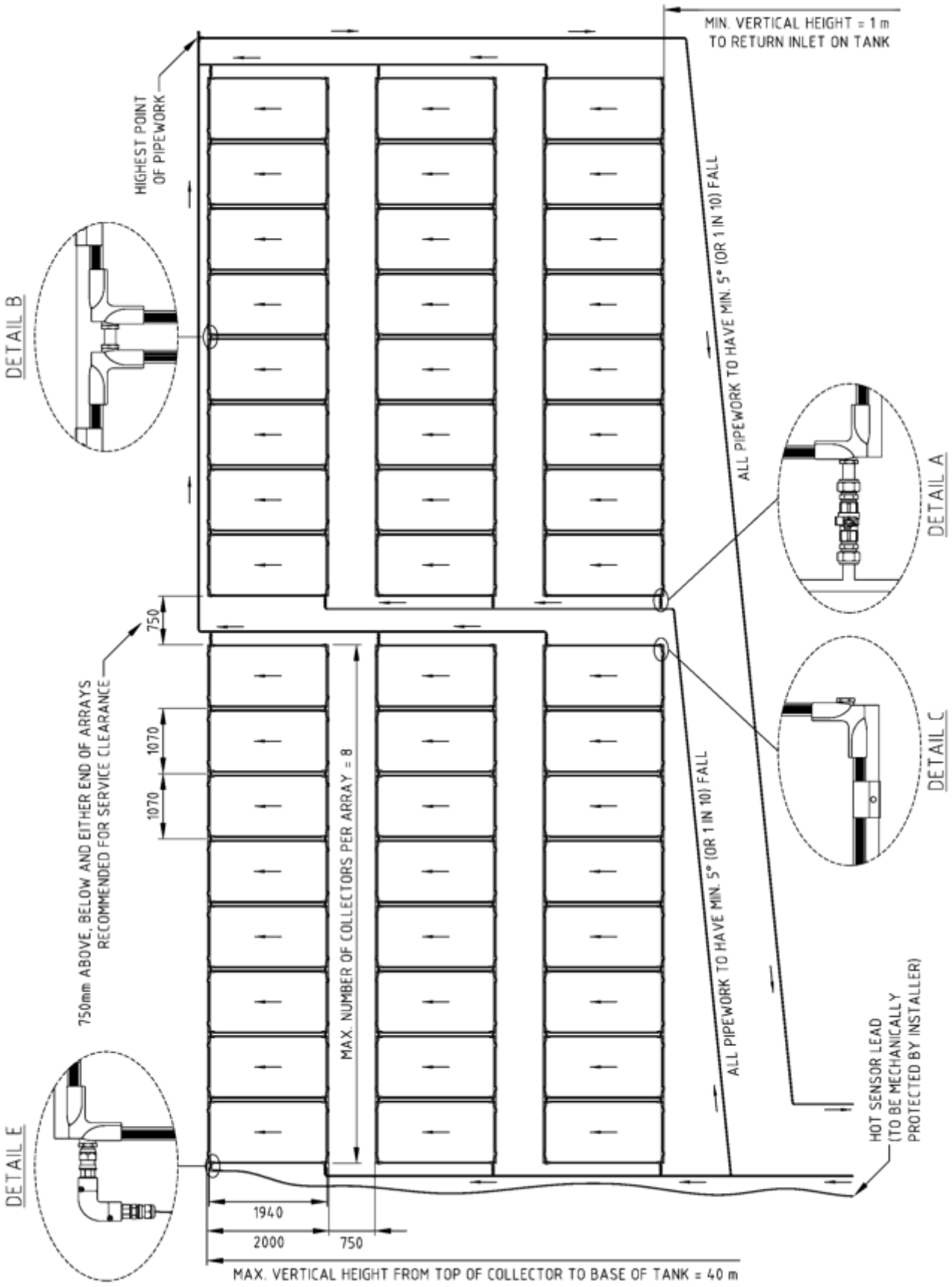


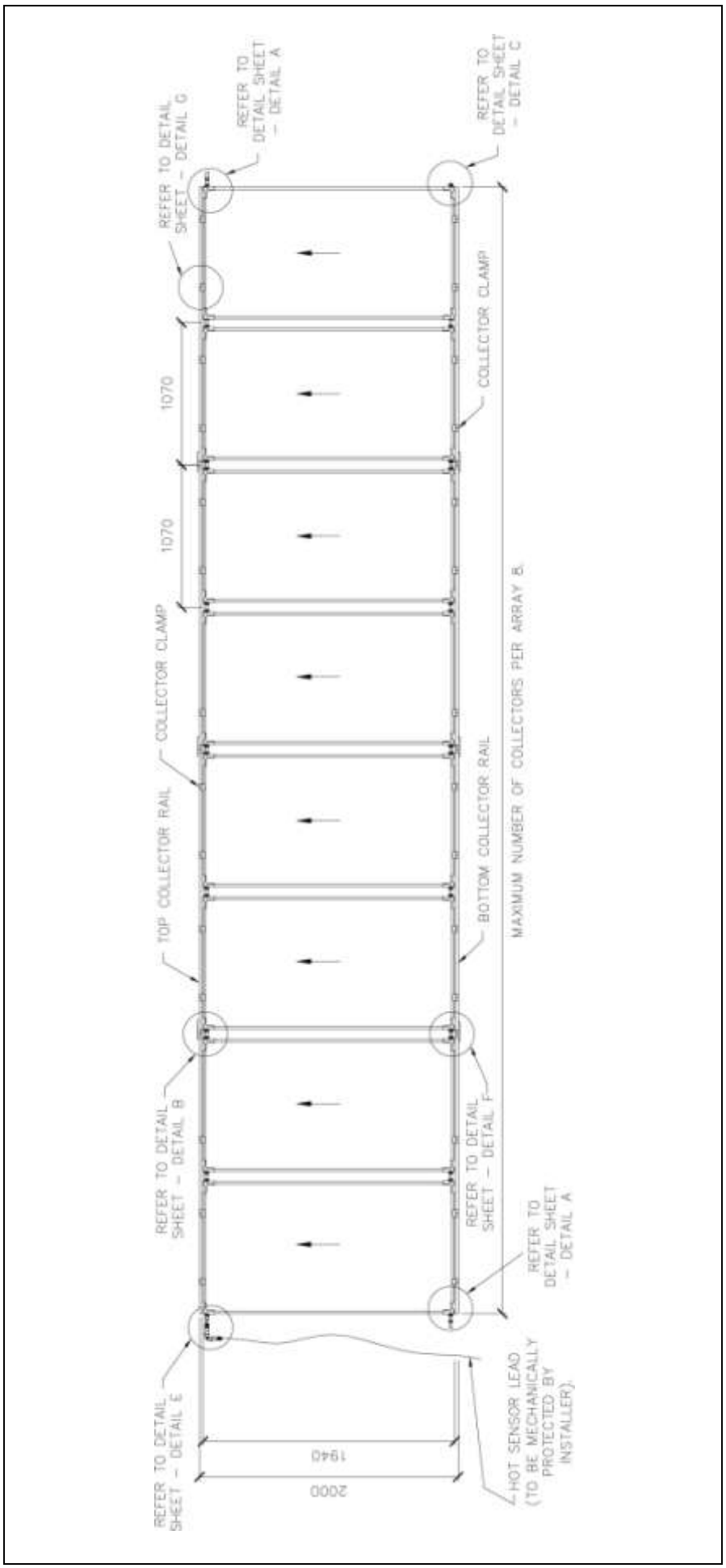

## Pipe Insulation

All pipe work **MUST BE** insulated with a minimum of 13 mm thick fibreglass insulation or similar. Thicker insulation may be required to comply with the requirements of AS/NZS 3500.4. The insulation **MUST BE** weatherproof and UV resistant if exposed. The insulation offers corrosion protection to a metal roof against water runoff over the copper pipe, reduces pipe heat losses, and also assists in avoiding accidental contact with the solar pipe work. The insulation **MUST BE** fitted up to the fitting connections, as very high temperature water can flow from the solar collectors to the Heat Store Series 2 under certain conditions.

Closed cell polymer insulation should not be used as it may not be able to withstand the temperature of the water generated by the solar collectors under stagnation conditions.

## Typical Collector Array Arrangement






**Collector Array Installation Schematic**

# Mains Pressure Water Connections

## Important Plumbing Details

Before starting on the water supply connections there are some overriding plumbing details that need to be considered to effect a successful installation.

### Water Quality

The saturation index is used as a measure of the water's corrosive or scaling properties.

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

Where the saturation index is less than –1.0, the water is very corrosive and warranty does not apply to the copper heat exchanger in the Heat Store Series 2 water heater.

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

Where the saturation index exceeds +0.40, the water is very scaling. An expansion control valve must be fitted on the cold water line after the non-return valve to protect and for warranty to apply to the copper heat exchanger in the Heat Store Series 2 water heater.

Where the saturation index exceeds +0.80, warranty does not apply to the copper heat exchanger in the Heat Store Series 2 water heater.

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

Heat Store Series 2 can still be used if the potable water has a high saturation index but it may be necessary to de-scale the heat exchange coils periodically.

Refer to the de-scaling procedures on page 55 for specific details. Alternatively, contact Rheem for guidance regarding limitations on water quality and the preferred flushing agent. A water analysis can be obtained from your water supply authority.

It is important to sample the quality of the water intended to be used in the closed circuit prior to commissioning the system. The report should be referred to Rheem to confirm the particular water treatment that may be required for optimal long term performance of the system.

Refer to page 51 for full details on water supplies

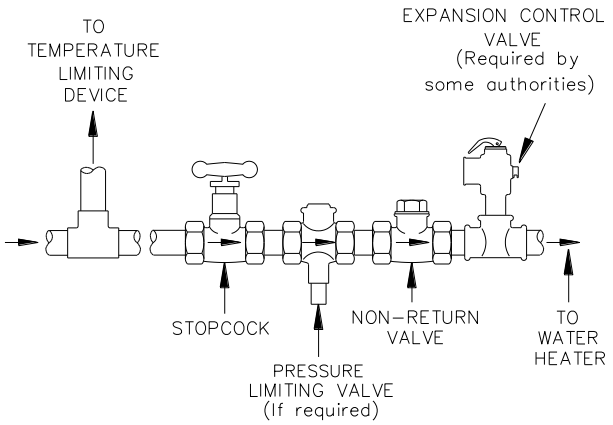
## Mains Water Supply

### Cold Water Supply

An isolation valve and non return valve must be installed on the cold water line to the Heat Store Series 2 storage tank. An acceptable arrangement is shown in the diagram below.

### Expansion Control Valve

Two 850kPa expansion control valves (ECV), model H50, are supplied with the Heat Store Series 2 drain-back pipe work, and one **MUST BE** installed in the potable cold water supply just prior to the storage tank to provide pressure relief in the potable water circuit during a heating cycle.




Where the Heat Store Series 2 storage tank will be used in conjunction with in line booster water heaters, the relief valve setting must not exceed that shown in the table on page 28.

The maximum supply pressure can be increased to 960kPa if a 1200kPa expansion control valve is used in lieu of the supplied 850kPa valve. Operating pressure must not exceed the rating of any

appliance in the hot water circuit downstream of the ECV.

The expansion control valve must always be installed after the non return valve and be the last valve installed prior to the water heater (refer to diagram opposite). A copper drain line must be run separately from the drain of the relief valve.

### Pressure Limiting Valve

The maximum allowable mains supply pressure to the system is governed by the type of booster plant used and the method of connection, ie in line boost or in tank heating. Where the mains water supply exceeds that shown in the table below for the Rheem or Raypak booster type, an approved pressure limiting valve is required and should be fitted as shown in the installation diagram (page 27.)

**Valve Pressure Setting Table**

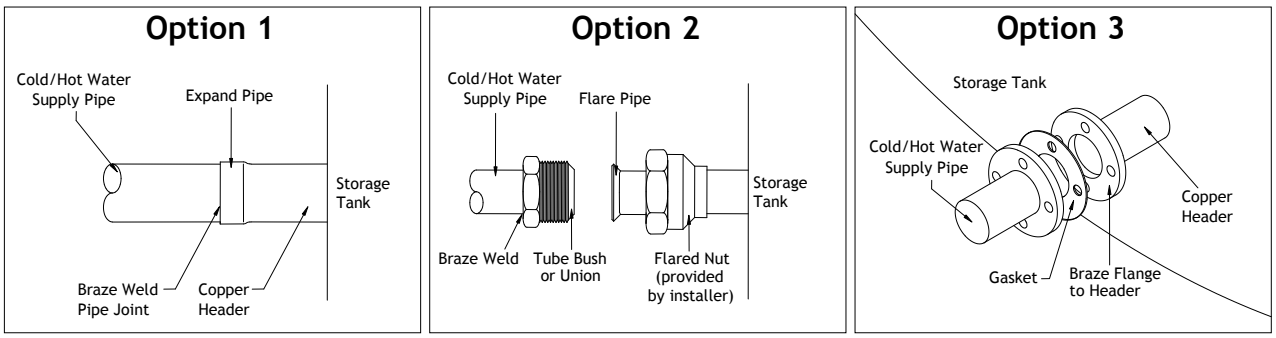
| Model | Heat Store | Booster Type | | |
|---|---|---|---|---|
| | 1500DBs<br>2200DBs<br>3500DBs<br>5000DBs | Heat Store In-Tank Heating with Heat Pump, Raypak or Commpak | In Line Boosting with Rheem Tankless models such as Commpak and Multipak | In Line Boosting with Rheem Storage models incl. Raypak, Heat Pump and Tankpak |
| **Relief valve setting (potable water)** | NA | NA | 1000 kPa | 1000 kPa |
| **Expansion control valve setting* (potable water)** | 850 kPa | 850 / 1200kPa** | 850 kPa | 850 kPa |
| **Max. mains supply pressure** With expansion control valve | 680 kPa | 680 / 960 kPa** | 680 kPa | 680 kPa |
| **Min. mains supply pressure** | 140 kPa | 140 kPa | 140 kPa | 140 kPa |

* 850 kPa ECV is supplied with the Heat Store Series 2 water heater.

** A 1200kPa ECV may be used. Operating pressure must not exceed the rating of any appliance in the hot water circuit downstream of the ECV.

- Size the incoming cold water pipe in accordance with the guidelines provided in AS/NZS 3500.1. If the full flow capacity of the storage tank is required, then it is recommended that the pipe be sized the same as the cold water connection supplied with the storage tank (fitting B at bottom of tank).
- In some installations where high water throughput is required at low pressure, separate control valves (with larger diameter) may be necessary to suit the larger diameter pipe work.

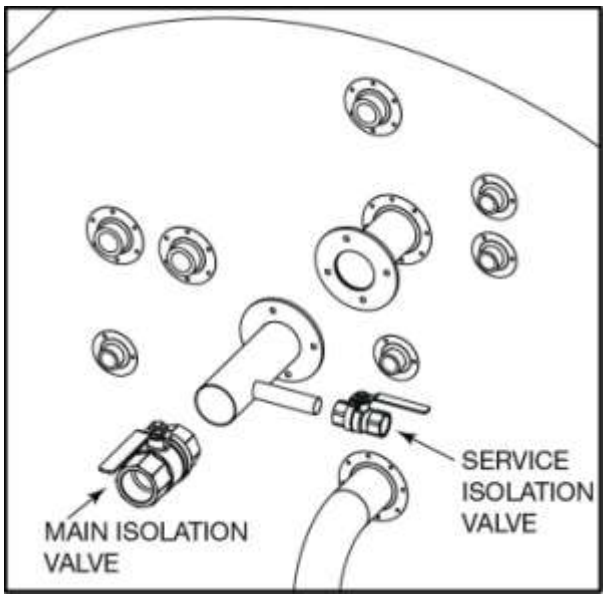
### Hot and Cold Supply Connection




Plain copper pipe is provided for the mains pressure cold water inlet and hot water outlet connections of the storage tank. There are a number of options available to connect the cold and hot water copper header. Three options are shown above.

### Service Valve

Rheem recommends the installation of a main isolation valve (not supplied) and a 20 mm (¾" BSP) service isolation valve (not supplied) to the cold water inlet and hot water outlet connections as shown to facilitate servicing and maintenance works (eg. de-scaling of the heat exchange coils):




## Tank Water Supply

If the water heater is supplied with water from a tank supply and a minimum water supply pressure of 140 kPa at the potable inlet to the water heater cannot be achieved, then a pressure pump system may be required. Care must be taken to avoid air locks. The cold water line from the supply tank should be adequately sized and fitted with a full flow gate valve or ball valve.

## Rain Water Tank

If the solar collectors and solar pipe work are to be installed on a section of roof which is part of a rain water run off collection system, then it is recommended this section of roof and its gutter be isolated from the rain water collection system. The gutter should be isolated to a width greater than the solar collectors and pipe work and must have suitable drainage. The installer should ensure in the event of a leak from the solar collectors or pipe work, a rainwater tank cannot be contaminated with closed circuit fluid.

The section of roof and gutter should be isolated from the rainwater collection system before the commissioning of the solar water heater, so that any leak or spillage during commissioning does not make its way into the rainwater tank.

This section of roof and guttering can be isolated by either:

- Blocking this section of gutter from the remaining gutter and fitting two separate down pipes, one to take any run-off water from that section of roof away to drain and the other to the rainwater collection side of the gutter to take the rain water run off to the rain water tank.
- Blocking this section of gutter from the remaining gutter and fitting a tube or pipe of a material compatible with the gutter material in this section of the gutter and penetrating the separation pieces at either end to allow rainwater runoff to pass from one part of the rainwater collection system to the other. It may be necessary to fit a down pipe to the section of blocked gutter to take any run-off water from that section of roof away to drain.
- Installing a false gutter inside of the existing gutter, with a down pipe penetrating the existing gutter to take any run-off water from that section of roof away to drain. The false gutter should be no deeper than half of the depth of the existing gutter, so as to enable rain water run off to flow under the false gutter.
- Installing a flashing from the underside of the roofing material, with a continuous fall, to over the outside lip of the gutter. The flashing should extend wider than the collectors and pipe work and turned up at the ends so if there is leakage of closed circuit fluid, it cannot enter the gutter.

If any of these solutions are not practical, then the installer should discuss alternative options to suit the installation with the building owner.

Any alterations to the roof drainage system must comply with the relevant building regulations, codes and standards.

## Hot Water Delivery

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, ensuite or public area, 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 so that scalding water temperatures are not delivered to a bathroom, ensuite or other ablution and public areas.

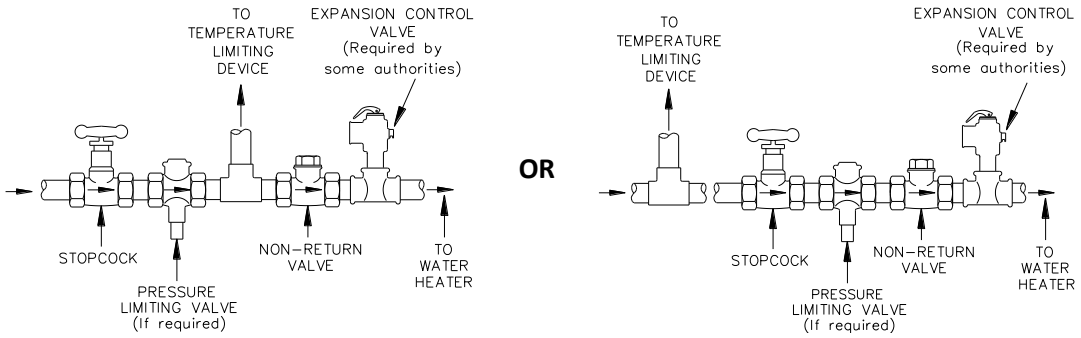
The temperature limiting device used with a solar water heater should have a specified "minimum temperature differential" between the hot water inlet and the tempered water outlet of no greater than 10°C. Refer to the specifications of the tempering valve.

### Temperature Limiting Device

⚠ **Warning:** A non return valve **MUST BE** installed on the cold water line to the solar storage tank(s) **AFTER** the cold water branch to a temperature limiting device.

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. 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.

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, 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.

**Note:** If this installation is a solar conversion of an existing water heater system and the cold water line to a temperature limiting device branches off the cold water line after the non return valve to the existing water heater, then the cold water branch **MUST BE** relocated to before the solar storage tanks and the solar preheat system non return valve.

### Circulated hot water and temperature limiting device

A temperature limiting device cannot be installed in circulated hot water flow and return pipe work unless it is specifically designed to do so, such as the Rheem Guardian warm water system.

The tempered water from a temperature limiting device cannot be circulated. Where a circulated hot water flow and return system is required in a building, a temperature limiting device can only be installed on a dead leg, branching off the circulated hot water flow and return pipe.

If circulated tempered water were to be returned back to the water heater, depending on the location of the return line connection on the water supply line to the water heater or storage tank, then either:

- water will be supplied to the cold water inlet of the temperature limiting device at a temperature exceeding the maximum recommended water supply temperature, or
- when the hot taps are closed no water will be supplied to the cold water inlet of the temperature limiting device whilst hot water will continue to be supplied to the hot water inlet of the temperature limiting device.

These conditions may result in either water at a temperature exceeding the requirements of AS/NZS 3500.4 being delivered to the hot water outlets in the ablution areas, or the device closing completely and not delivering water at all, or the device failing. Under either condition, the operation and performance of the device cannot be guaranteed.

## Reducing Heat Losses

The hot water line from the solar storage tank must be insulated in accordance with the requirements of AS/NZS 3500.4. The insulation must be weatherproof and UV resistant if exposed. Additionally, where temperatures reach -4ºC for greater periods than 8 hours, the potable cold water supply pipes shall be adequately insulated with at least 13 mm of closed-cell polymer insulation or equivalent.

Keep temperature settings down. Lower temperatures reduce heat losses and prolong cylinder life. Do not set the controlling thermostats on the booster water heater(s) above 70°C unless it is necessary.

### Circulated Hot Water Supply System

If the building has a secondary or ring main return, it can be connected in one of the three following methods:

- In Series Boost – back into the inlet of the in series boost
- In Series Boost with 3 –Way valve (solar hot water secondary return) – back into the 3-way valve which in turn has each of the outlets connected into the coil bridge at the centre of the Heat Store Series 2 storage tank and the inlet of the in series boost plant.
- In Tank Heating – back into the coil bridge at the centre of the Heat Store Series 2 storage tank.

The ring main circulation pump and 3-way valve shall have isolating valves fitted at all inlets and outlets for servicing purpose. A check valve shall be fitted immediately downstream of the circulation pump.

### In Series Boosting

Connect the outlet of the circulation pump into the inlet of the in series boost plant.

### Solar Hot Water Secondary Return

It is possible to return the building secondary hot water through the Heat Store Series 2 storage tank to maximise the amount of solar energy use.

The solar controller can be used to monitor the temperature of water in the Heat Store Series 2 storage tank and activate a 3-way motorised valve to divert return water through the Heat Store Series 2 storage tank if sufficient energy is available, or through the in series boosters if insufficient energy is available.

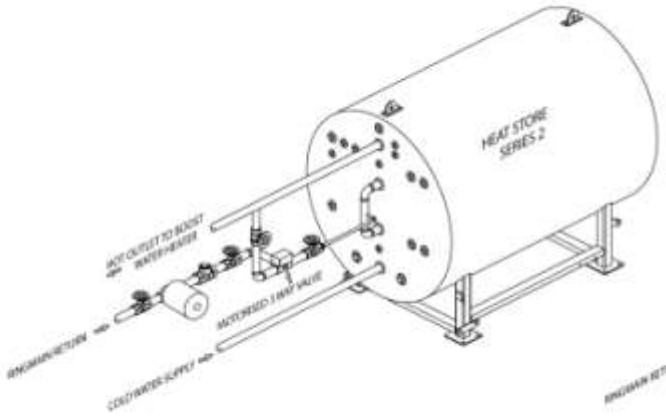
### 3-Way motorised valve

The port size of the 3 way motorised valve should be selected to match the building secondary return pipe size.

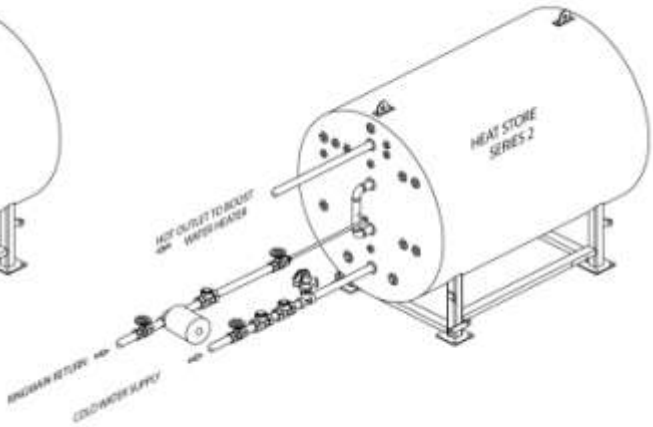
The valve must have a minimum operating pressure of 1000kPa and be suitable for outdoor installation if installed outdoors. Install the motorised 3-way valve as shown in the diagram on page 32 and in accordance with the instructions supplied with the valve.

### In Tank Heating

If In Tank Heating is employed the return water may be connected directly into the Heat Store Series 2 storage tank. Install the circulator as shown in the diagram below.




**Solar Hot Water Secondary Return with 3-Way Valve**




**In Tank Heating**

## Electrical Connections

### Installation of the Solar Control Unit

The Heat Store Series 2 solar control unit is suitable for indoor or outdoor installation and is recommended to be installed in an easily accessible location on a solid wall as close as practicable to the storage tank, solar pump and secondary recirculation 3-way valve (if installed). The solar control unit contains a master controller, motor starter relay and a thermal-overload relay suited to the range of solar pumps supplied by Rheem and an auxiliary device relay. If other than a Rheem pump is supplied, check the specifications of the pump and controller to ensure compatibility with the motor starter relay and thermal-overload relay.

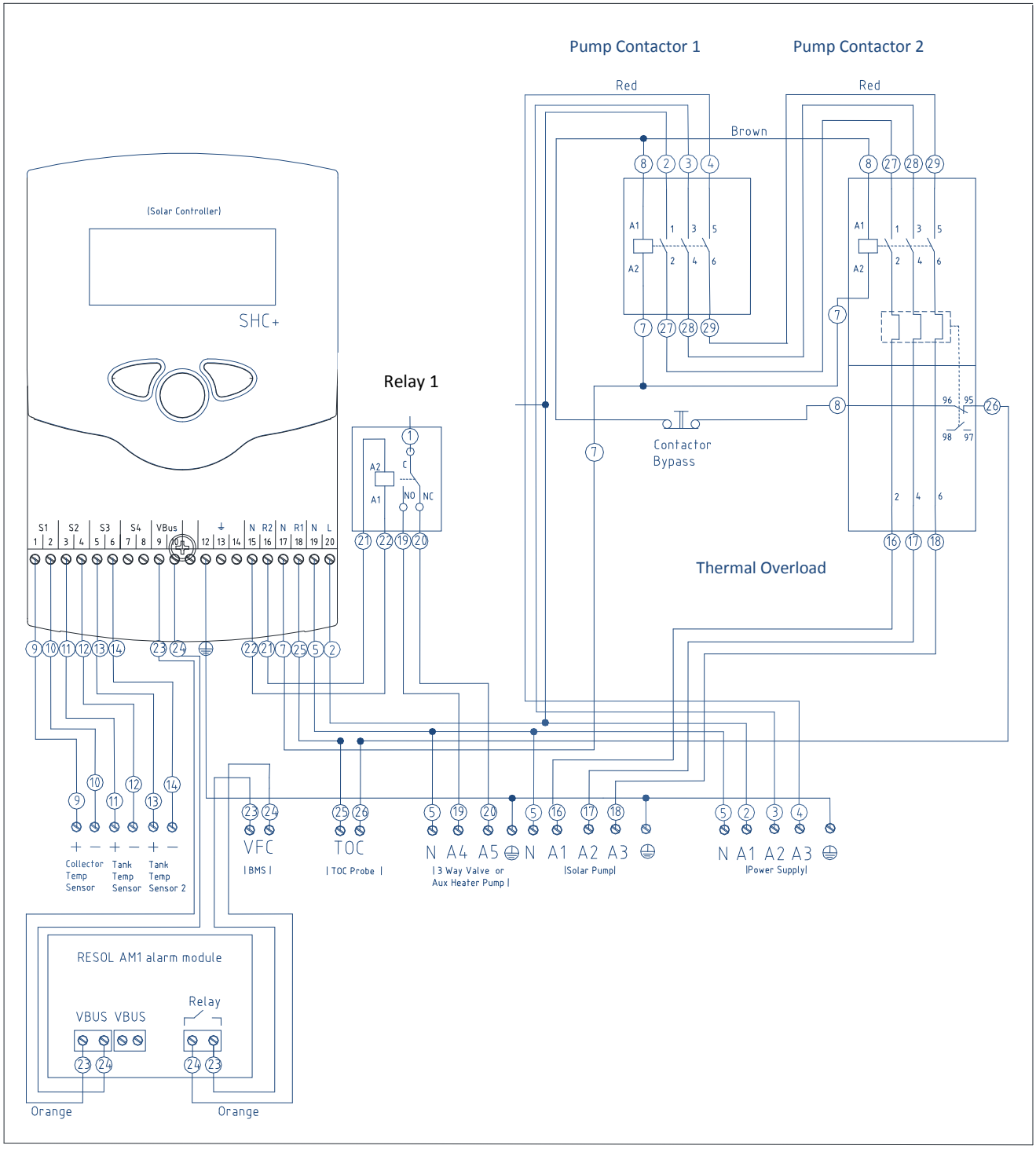
It is important to install the control unit on a solid wall that is not subject to vibration.

The solar control unit will only operate on a sine wave at 50 Hz. Devices generating a square wave cannot be used to supply power to the system.

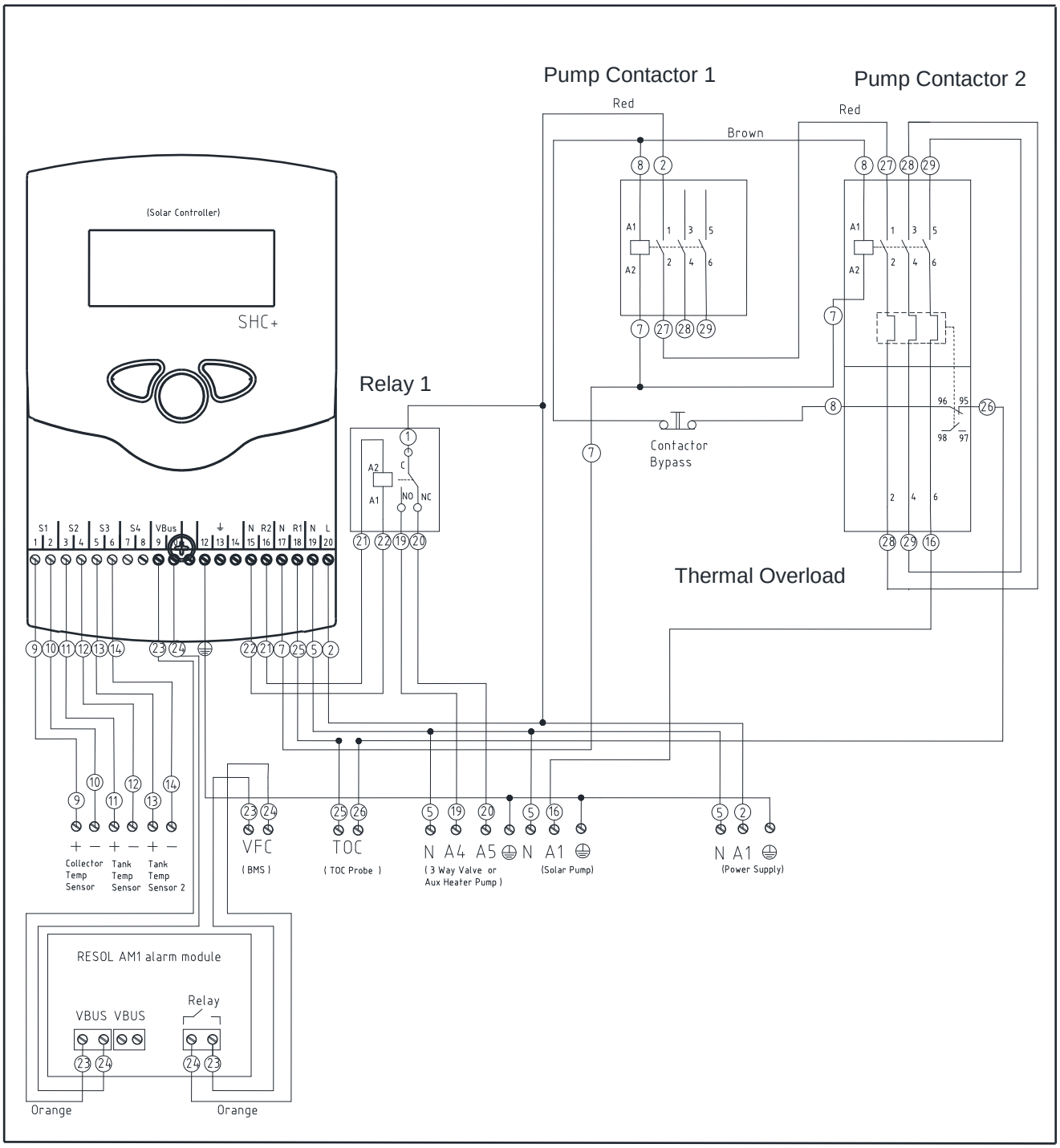
### Connections

Refer to the diagram on page 33 and 34 for connection terminals within the solar control unit. Two models are available, one for three-phase pumps and one for single-phase pumps. Ensure the correct controller is used with the appropriate pump.

**NOTE: a three-phase controller MUST NOT be used to operate a single phase pump.**




**Heat Store Series 2 Controller Wiring Diagram – Three Phase Pump**




**Heat Store Series 2 Controller Wiring Diagram – Single Phase Pump**

## Power Supply

For operation, the solar control unit requires connection of a correctly sized **three-phase or single-phase power supply including neutral and earth.** This power supply **SHALL BE** supplied from a distribution board (not supplied) that contains a circuit breaker and a main isolation switch to cut power to the solar control unit for servicing purposes. If the distribution board is not located close to the solar control unit, then a separate isolation switch (suitable for outdoor installation if installed outdoors) **SHALL BE** installed in the power supply directly before the solar control unit.

For three-phase units, wire the power supply to the terminals A1, A2, A3 N and Earth marked 'Power Supply' within the solar control unit.

For single-phase units, wire the power supply to the terminals A1, N and Earth marked 'Power Supply' within the solar control unit.

## Solar Pump

For three-phase pumps, wire the solar pump to the terminals A1, A2, A3, N and Earth marked 'Solar Pump' within the solar control unit.

For single-phase pumps, wire the solar pump to the terminals A1, N and Earth marked 'Solar Pump' within the solar control unit.

A flexible 20 mm conduit is required for the electrical cable from the solar control unit to the pump. The conduit is to be connected to the solar control unit and pump with a 20 mm terminator.

Check the current rating on the pump and adjust the overload trip to be just above this rating.

For three-phase, the rating label will provide current rating range data for 3 x 220V to 3 x 240V and 380V to 415V as per example shown adjacent. Use the bold data for 380V to 415V pumps supplied by Rheem.


For single-phase, the rating label will provide current rating range data for 1x 220V to 1 x 240V, 50Hz as per example shown adjacent.


## TOC

A TOC switch (thermal overload cut out) is provided with the solar control unit. This device **MUST** be installed and in operation for safe operation of the Heat Store Series 2 solar water heater.

Fit the TOC switch to the Heat Store storage tank at port (Q) (refer to page 15 for location of the port).

Wire the TOC to the terminals marked 'TOC Probe' within the solar control unit. The TOC is not polarity sensitive. A flexible 20 mm conduit is required for the electrical cable from the solar control unit to the TOC. The conduit is to be connected to the solar control unit and TOC with a 20 mm terminator.

## 3-Way Motorised Valve or Auxiliary Pump

The solar controller has provision for either a 3-way motorised valve (used for **Solar Hot Water Secondary Return**) or auxiliary pump (used to connect an auxiliary water heater for **In Tank Heating**) to be connected.

## Solar Hot Water Secondary Return

The 3-way motorised valve is used if Solar Hot Water Secondary Return is to be employed. Connect the 3-way motorised valve to terminals A4, A5, N and Earth marked '3 Way Valve or Aux Heater Pump' in the solar controller. Connect the valve such that the port which diverts ring main water to the Heat Store Series 2 is connected to terminal A4 and the port which diverts ring main water to the in-series boost is connected to terminal A5.

### In Tank Heating

The auxiliary pump is used if In Tank Heating is to be employed. Connect the pump to terminals A4, N and Earth marked '3 Way Valve or Aux Heater Pump' in the solar controller. Do not connect to terminal A5. If a three-phase pump is employed, connect via a three-phase contactor.

If a Rheem Commercial Heat Pump is being used and the operation of the heat pump is to be timer controlled via the solar controller, wire a 10amp general purpose outlet (GPO) to the terminals A4, N and Earth. The GPO must be weather proof if installed outdoors. See the installation instructions supplied with the heat pump for wiring of the heat pump and circulator.

**IMPORTANT:**

The temperature sensors are critical to the operation of this controller. They are sensitive devices and require careful handling. They should not be directly immersed in water or heated with a flame.

### Solar Collector Sensor Temperature Probe Pocket

Refer to Collector Sensor Assembly on page 23 for details on running and fitting the hot sensor to the collector array.

### Solar Collector Sensor Lead

It is recommended to carry the sensor lead through a conduit to the location of the collector sensor temperature probe to protect it from possible damage. The conduit may be of a flexible or rigid type, whichever is most suitable for the application. Fix the conduit to the adjacent building structure or pipe work insulation. Insert the sensor lead into the housing provided and fix to the terminal connections. A 2 core, 0.75 $mm^2$ figure 8 cable can be used to extend the collector sensor lead if additional length is required. Alternatively, extension leads are available from Rheem. Connect the collector sensor lead to the terminals marked 'Collector Temp Sensor' in the solar control unit. The leads are not polarity sensitive.

### Solar Cold Temperature Sensor

Fit one temperature sensor probe pocket into the solar probe port (F) (refer to page 15 for the location of the port) and insert the Solar Cold temperature sensor **(FRP6 - grey cable)** in the solar probe. Connect the sensor lead to the terminals marked 'Tank Temperature Sensor' in the solar control unit. The leads are not polarity sensitive. Ensure the sensor is securely mounted.

### Auxiliary Sensor

### Secondary Return Temperature / in Tank Heating Sensor (optional)

The auxiliary sensor is used when either Solar Hot Water Secondary Return or In Tank Heating is being used. Fit one temperature sensor probe pocket into the solar probe port (R) (refer to page 15 for the location of the port) and insert the Auxiliary temperature sensor **(FRP6 - grey cable)** in the mid tank sensor. Connect the sensor leads to the terminals marked 'Tank Temperature Sensor 2 (optional)'. The leads are not polarity sensitive. Ensure the sensor is securely mounted.
If a heat pump is being used as the in-tank boost, insert the tank sensor from the heat pump master controller to the mid tank sensor port (R) as well as the FRP6 sensor.

### BMS

A set of voltage free contacts are supplied within the solar control unit to allow any system faults detected by the master controller to be remotely monitored. Connect to the terminals marked 'BMS' in the solar control unit. The switching capacity of the BMS is 1A @ 30V (DC); 0.5A @ 125V (AC).

# Master Solar Controller Set Up

The following information will assist in setting up and troubleshooting the master solar controller.

**1.0 System Configuration**

The master solar controller supplied with Rheem Heat Store Series 2 can be configured to perform many varied functions, depending on system design. Rheem promotes three system configurations. These are:

a) **Arrangement 1 - Standard Solar System with In-Series Boost**
This is the factory default set up and has 2 sensor inputs and 1 output. These are:
S1 – Hot Sensor at collector array
S2 – Cold Sensor in Heat Store
R1 – Solar Pump

Boosting is conducted by in-series water heaters and the building return temperature is maintained by the in-series water heaters.

b) **Arrangement 3 - In-Tank Boost**
This set up has 3 sensor inputs and 2 outputs. These are:
S1 – Hot Sensor at collector array
S2 – Cold Sensor in Heat Store
S3 – Auxiliary Sensor at mid point in Heat Store
R1 – Solar Pump
R2 – Auxiliary Heater Pump (or heat pump controller if timed operation required)

The temperature in the top half of the tank is maintained by an auxiliary water heater based on the temperature sensed at the mid point of the tank. The controller has the ability to limit the boosting based on the time of day and the temperature sensed at the mid point. Depending on the building requirements and system set up, the building return temperature is either permanently plumbed through the Heat Store or through an off line water heater designed to recover the ring main heat losses.

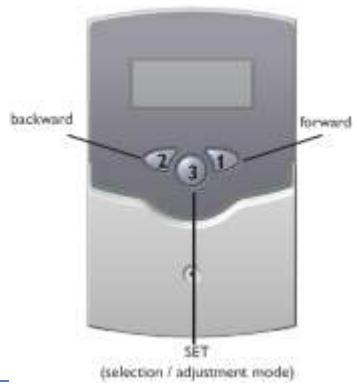
c) **Arrangement 3 - Solar Hot Water Secondary Return**
This set up has 3 sensor inputs and 2 outputs. These are:
S1 – Hot Sensor at collector array
S2 – Cold Sensor in Heat Store
S3 – Auxiliary Sensor at mid point in Heat Store
R1 – Solar Pump
R2 – 3-way Motorised Valve

Boosting is conducted by in-series water heaters and the building return temperature is diverted via the 3-way valve to draw energy from the Heat Store if available or maintained by the in-series water heaters if insufficient energy is available.

**2.0 Controller Operation and Function**

**2.1 Push Buttons for Adjustment**

The controller is operated by 3 pushbuttons below the display.
The forward key (1 or +) is used for scrolling forward through the indication menu or to increase the adjustment values. The reverse key (2 or -) is used for the reverse function. The set key (3 or OK) is used to enter input mode and accept changes.

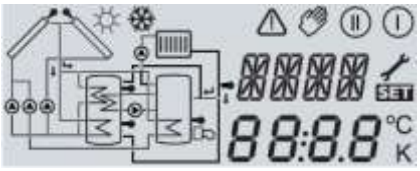


If an **adjustment value** is displayed, **SET** is indicated. hP1, hP2 and TIME can be accessed from the main menu. Adjustments to the value are made by first pressing the **SET** key (3 or OK) for 3 seconds to enter input mode. If no adjustments are made for 6 seconds, program will exit SET mode without saving.
For all other adjustments:

- Select the TIME channel using keys 1 and 2.
- Press key 1 and 2 simultaneously for 3 seconds, so that SET is blinking.
- Scroll through the menu using keys 1 and 2 until the desired parameter is displayed.
- Momentarily press key 3, so that SET is blinking.
- Adjust the value using keys 1 and 2.
- Momentarily press key 3 to save the setting. SET permanently appears.

## 2.2 System Monitoring Display

The system monitoring display consists of 3 blocks: Channel Indication, Tool Bar, System Screen (active system scheme)




**Full Monitoring Display**

### 2.2.1 Channel Indication

The indication channel consists of two lines. The upper line is an alphanumeric 16-segment indication in which mainly the channel names / menu items are shown. In the lower 7-segment indication, the channel values and the adjustment parameters are indicated. Temperature and temperature differences are shown in °C or K.


**Indication Channel Only**

### 2.2.2 Tool Bar

The additional symbols of the tool bar indicate the current system status. Functions are listed below

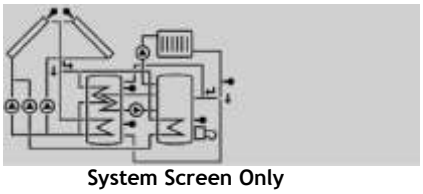

**Tool Bar Only**

**Tool Bar Functions**

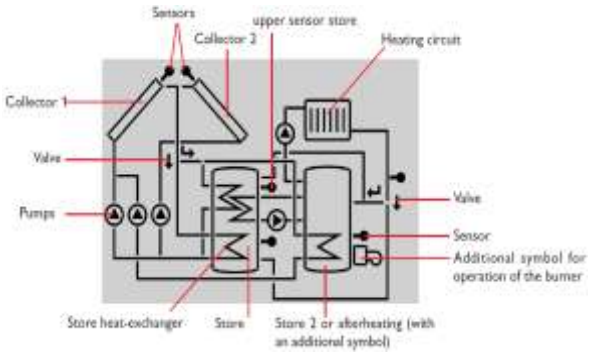
| Symbol | Normal | Blinking |
|---|---|---|
| ⏻ | Relay 1 active | |
| ⏻ | Relay 2 active | |
| ☼ | Maximum store limitation active / maximum store temperature exceeded | Collector cooling function active / recooling function active |
| ❄ | Optional antifreeze function active | Collector minimum limitation active / antifreeze function active |
| ⚠ | | Collector or storage security shutdown active |
| ⚠+🔧 | | Sensor defect |
| ⚠+✋ | | Manual operation active |
| SET | | SET mode |

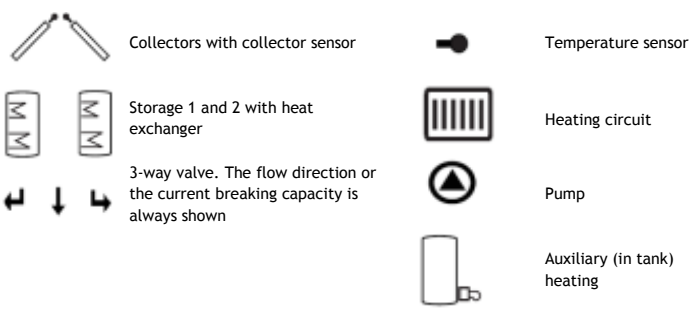
### 2.2.3 System Screen

The system screen (active system screen) shows the selected configuration. It consists of several system component symbols, which are, depending on the current status of the system, either flashing, permanently shown or hidden.



**System Screen Only**



**2.3 Blinking Codes**

2.3.1 System Screen Blinking Codes

- Pumps are blinking during starting phase.
- Sensors are blinking if the respective sensor indication channel is selected.
- Sensors will blink rapidly if a defect is detected.
- Burner symbol will blink if in tank heating is activated.

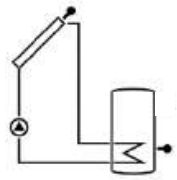
2.3.2 LED blinking Codes

| | |
|---|---|
| Constantly Green | OK |
| Red/Green blinking | Initialisation phase / Manual operation |
| Red blinking | Sensor defect (sensor symbol is also rapidly blinking) |

**Note: the one LED will flash either green or red or both depending on the operation status. The LED is located on the front of the Master Controller, above the adjustment push buttons.**

**3.0 Primary Set Up**

3.1 AC power supply must be available to the controller. The controller will pass an initialisation phase during which the control lamp will blink red and green. Once complete, the controller will be in automatic operation mode with the factory settings. The preset configuration is Arrangement 1 - Standard Solar System.



**Arr 1 – Standard Solar System: In-Series Boost**

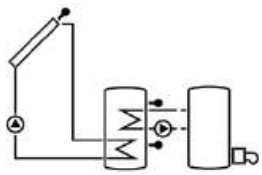
If solar hot water secondary return or in tank heating are not to be used, then no further adjustments are required to the system arrangement. Refer to page 44 for system parameter settings for each arrangement

3.2 Set Clock

- Scroll using keys 1 and 2 until TIME is displayed.
- Press SET key (3) to adjust the hours. Note: 24 hour time
- Use keys 1 and 2 to adjust the time
- Press SET again to adjust the minutes.
- Press SET again to save settings.

3.3 Configuration Adjustment

- Scroll until TIME is displayed.
- Press and hold keys 1 and 2 simultaneously for 3 seconds to select Arr channel.
- Press SET key (3)
- Use keys 1 and 2 to select the desired arrangement (Arr 3):



**Arr 3 – In-Tank Heating / Solar Hot Water Secondary Return**

- Press SET to save setting.

**IMPORTANT:**

NOTE: Program settings are lost when changing between system arrangements.

The controller defaults to a pump speed control of 30%. This will cause the contactor to chatter violently. **Ensure the pump speed control (nMN) is set to 100%.**

Before changing arrangements, press and hold the pump manual override switch. Release when complete and pump speed setting nMN is set to 100%

The system is now ready for operation and should enable optimum operation of the solar system with the factory settings. Refer to page 44 for system parameter settings.

Ensure sensors and outputs are connected as described on page 33 to 35.

## 4.0 Control Parameter and Indication Channels

### 4.1 Channel Overview

| | Channel | Arr 1 | Arr 3 | Description | Ref |
|---|---|---|---|---|---|
| **Display** | **COL** | **x** | **x** | **Temperature Collector 1** | **4.1.1** |
| **Display** | **TST** | **x** | | **Temperature Store 1** | **4.1.2** |
| **Display** | **TSTL** | | **x** | **Temperature Store 1 Lower** | **4.1.2** |
| **Display** | **TSTU** | | **x** | **Temperature Store 1 Upper** | **4.1.2** |
| Display | S3 | x | | Temperature Sensor 3 | 4.1.3 |
| Display | TRF | 1 | 1 | Temperature Return Sensor | 4.1.4 |
| Display | S4 | 2 | 2 | Temperature Sensor 4 | 4.1.3 |
| **Display** | **n%** | **x** | | **Pump Speed Relay 1** | **4.1.5** |
| Display | n1% | | x | Pump Speed Relay 1 | 4.1.5 |
| Display | hP | x | | Operating Hours Relay 1 | 4.1.6 |
| Display | h P1 | | x | Operating Hours Relay 1 | 4.1.6 |
| Display | h P2 | | x | Operating Hours Relay 2 | 4.1.6 |
| Display | kWh | 1 | 1 | Heat Quantity kWh | 4.1.7 |
| Display | MWh | 1 | 1 | Heat Quantity MWh | 4.1.7 |
| Display | Time | x | x | Time | 4.1.6.1 |
| | Arr | x | x | System Arrangement | 3.1 – 3.3 |
| | DT O | x | x | Switch-on Temperature Diff **Set to 6°C** | 4.1.8 |
| | DT F | x | x | Switch-off Temperature Diff 1 **Set to 4°C** | 4.1.8 |
| | DT S | x | x | Nominal Temperature Difference | 4.1.8 |
| | RIS | x | x | Increase | 4.1.8 |
| | S MX | x | x | Maximum Temperature Store 1 **Set to 75°C** | 4.1.9 |
| | EM | x | x | Emergency Temperature Collector 1 | 4.1.11 |
| | OCX | x | x | Option Collector cooling Collector 1 | 4.1.12 |
| | CMX | x* | x* | Maximum Temperature Collector 1 | 4.1.12 |
| | OCN | x | x | Option Min. Limitation Collector 1 | 4.1.13 |
| | CMN | x* | x* | Minimum Temperature Collector 1 | 4.1.13 |
| | OCF | x | x | Option Antifreeze Collector 1 | 4.1.14 |
| | CFR | x* | x* | Antifreeze Temperature Collector 1 | 4.1.14 |
| | OREC | x | x | Option Recooling | 4.1.16 |
| | OTC | x | x | Option Tube Collector | 4.1.17 |
| | AH O | | x | Switch-on Temp. For T'stat 1 **Refer to page 44 for settings** | 4.1.18 |
| | AH F | | x | Switch-off Temp. For T'stat 1 **Refer to page 44 for settings** | 4.1.18 |
| | t1on | | x | **Switch-on Time 1 T'stat** | 4.1.18 |
| | t1off | | x | **Switch-off Time 1 T'stat** | 4.1.18 |
| | t2on | | x | **Switch-on Time 2 T'stat** | 4.1.18 |
| | t2off | | x | **Switch-off Time 2 T'stat** | 4.1.18 |
| | t3on | | x | **Switch-on Time 3 T'stat** | 4.1.18 |
| | t3off | | x | **Switch-off Time 3 T'stat** | 4.1.18 |
| | OHQM | x | x | Option WMZ | 4.1.7 |
| | FMAX | 1 | 1 | Maximum Flow | 4.1.7 |
| | MEDT | 1 | 1 | Antifreeze Type | 4.1.7 |
| | MED% | MEDT | MEDT | Antifreeze Content | 4.1.7 |
| | nMN | x | | Minimum Pump Speed Relay 1 | 4.1.19 |
| | n1MN | | x | Minimum Pump Speed Relay 1 | 4.1.19 |
| | HND1 | x | x | Manual Operation Relay 1 | 4.1.20 |
| | HND2 | x | x | Manual Operation Relay 2 | 4.1.20 |
| | LANG | x | x | Language | 4.1.21 |
| | PROG | xx.xx | | Program Number | - |
| | VERS | x.xx | | Version Number | - |

**Legend**

**x** = Corresponding channel is available.

**x*** = Corresponding channel is available if the appropriate option is activated.

**1** = Corresponding channel is only available if the option heat quantity measurement is **activated** (OHQM).

**2** = Corresponding channel is only available if the option 'heat quantity measurement' is **deactivated** (OHQM). Note: OHQM is deactivated but S4 will be open circuit in arrangement 3

**MEDT** = The channel antifreeze content (MED%) is only shown if **the antifreeze is not water or Tyfocor LS / G-LS (MEDT 0 or 3).** Adjustments concerning the antifreeze content will only make sense if the antifreeze is used in the solar circuit.

**Note:** S3 and S4 are only indicated if sensors are connected.

**Note: If changing between arrangements, settings are lost and need to be reset.**

**4.1.1 Indication of Collector Temperatures**

**COL**
Collector temperature
Display range: -40 to +250°C


Shows the current collector temperature.
COL: collector temperature

**4.1.2 Indication of Store Temperatures**
**TST, TSTL, TSTU**
Store temperatures
Display range: -40 to +250°C


Shows the current store temperature. Use keys 1 and 2 to scroll.
TST: store temperature (1 store system)
TSTL: store temperature lower
TSTU: store temperature upper (displayed in Arr 3)

**4.1.3 Indication of Sensor 3 and 4**
**S3, S4**
Sensor temperatures
Display range: -40 to +250°C


Shows the current temperature of the corresponding additional sensor (without control function)
S3: temperature sensor 3
S4: temperature sensor 4
Note: S3 and S4 are only shown if the temperature sensors are connected. Arr 1

**4.1.4 Indication of Other Temperatures**
**TRF (return)**
Other measured temperatures
Display range: -40 to +250°C


Shows the current temperature of the corresponding sensor. Only shown if OHQM is activated.
TRF: temperature return flow

**4.1.5 Indication of Current Pump Speed**
**n%, n1%**
current pump speed
Display range: 30 to 100%


Shows the current speed of the corresponding pump.
n%: current pump speed (1 pump system). Arr 1
n1%: current pump speed, pump 1. Arr 3

**4.1.6 Operating Hours Counter**
**hP / hP1 / hP2**
Operating hours counter
Indication channel


The operating hours counter adds up the solar operating hours of the respective relay (hP / hP1 / hP2). Full hours are shown on the display.

After the operating hours are added up, they can be reset. As soon as one operating hours channel is selected, symbol SET is permanently shown on the display. The button SET (3) must be depressed for approx 2 seconds in order to get back into the RESET mode of the counter. The display symbol SET will be blinking and the operating hours will be set to 0. Press the SET button to confirm the setting.

If no buttons are pressed for 5 seconds, the controller will return to the indication mode and the counter will not be reset.

**4.1.6.1 Time**


The current time is indicated in 24 hour time.
By pressing button "SET" for 2 seconds the hours, by pressing it again, the minutes are displayed blinking. The time can be set by buttons 1 and 2 and saved by pressing the "SET" button.

**4.1.7 Heat Quantity Balancing**
**OHQM:** Heat quantity measurement
Adjustment range: OFF / ON
Factory setting: OFF


A heat quantity balancing is possible for the basic systems (Arr 1, 3, 4 and 5 in conjunction with a flow meter. To activate, select the heat quantity balancing option in channel **OHQM.**

**FMAX:** Volume flow in l/min
Adjustment range: 0 to 20 in 0.1 increments
Factory setting: 6.0


The volume flow readable at the flow meter (l/min) must be adjusted in the channel FMAX. Antifreeze type and concentration of the heat transfer medium are indicated on channels **MEDT** and **MED%.**

**MEDT:** Antifreeze
Adjustment range: 0 to 3
Factory setting: 1


**Type of antifreeze:**
0 = water
1: propylene glycol
2:ethylene glycol
3: Tyfocor® LS / G-LS

**MED%:** Concentration of antifreeze in (Vol-) %
MED% is blinded out by MEDT 0 and 3.
Adjustment range: 20 to 70
Factory setting: 45


**kWh/MWh:** Heat quantity in kWh / MWh
Display channel


The heat quantity transported is measured by the indication of the volume flow and the reference sensor of feed flow S1 and return flow T-. It is shown in kWh-parts in the indication channel kWh and in the MWh- parts in the indication channel MWh. The sum of both channels forms the total heat output.

The total heat quantity can be reset. As soon as one operating hours channel is selected, symbol SET is permanently shown on the display. The button SET (3) must be pressed for approx 2 seconds in order to get back into the RESET mode of the counter. The display symbol SET will be blinking and the value for heat quantity will be set to 0. Press the SET button to confirm the setting.

If no buttons are pressed for 5 seconds, the controller will

Note: Heat Quantity Balancing is only available if appropriate equipment has been installed.

return to the indication mode.

**4.1.8 ΔT-regulation**

**DTO / DT1O / DT2O / DT3O:** Switch on temperature diff.
Adjustment range: 1.0 to 20.0K
Factory setting 6.0


First, the controller works in the same way as a standard differential controller. If the switch on temperature difference **(DTO / DT1O / DT2O)** is reached, the pump is activated and after having reached a start impulse (10 sec) a minimum pump speed (nMN = 30%) is run.

**Adjust setting to 6°C.**

**DTF / DT1F / DT2F / DT3F:** Switch off temperature diff.
Adjustment range: 0.5 to 19.5K
Note: switch on temperature difference DO must be at least 1K higher than the switch off temperature difference DF.


If the temperature difference reaches the set nominal value **(DTS / DT1S / DT2S / DT3S)**, the pump speed is increased by one step (10%). If the difference is increased by 2K **(ANS / ANS1 / ANS2 / ANS3)**, the pump speed is increased by 10% in each case until the maximum pump speed of 100% is reached. The response of the controller can be adjusted by means of the parameter "rise". If the adjusted switch off temperature is underrun **(DTF / DT1F / DT2F / DT3F)**, the controller switches off.

**Adjust setting to 4°C.**

**DTS / DT1S / DT2S / DT3S:** Nominal temperature difference
Adjustment range: 1.5 to 30.0K
Factory setting: 10.0


**DTO** and **DTS** are locked against each other. **DTS** has to be at least 0.5 above **DTO**.

**RIS / RIS1 / RIS2 / RIS3:** Rise
Adjustment range: 1 to 20K
Factory setting 2K


**4.1.9 Store Maximum Temperature**

**SMX / S1MX / S2MX:** Maximum store temp.
Adjustment range: 2 to 95°C
Factory Setting: 60°C


If the adjusted maximum temperature is exceeded, a further loading of the store is stopped so that a damaging overheating can be avoided. If the maximum store temperature is exceeded, symbol ✷ is shown in the display.
**Note:** the controller is equipped with a security switch off of the store, which avoids a further loading of the store if 95°C is reached at the store.

**Adjust setting to 75°C.**

**4.1.11 Collector Temperature Limitation Emergency Shut Down of the Collector**

**EM / EM1 / EM2:** Temperature limitation collector.
Adjustment range: 110 to 200°C
Factory setting: 140°C


If the adjusted collector limit temperature **(EM / EM1 / EM2)** is exceeded, the solar pump (R1/R2) is deactivated in order to avoid a damaging overheating of the solar components (collector emergency shutdown). The factory setting for the temperature limitation is 140°C. It can be changed within the adjustment range of 110 to 200°C. Symbol Δ is shown (blinking) in the display.

**4.1.12 System Cooling**

**OCX / OCX1 / OCX2:** Option system cooling
Adjustment range: OFF / ON
Factory setting: OFF


**CMX / CMX1 / CMX2:** Collector maximum temperature.
Adjustment range: 100 to 190°C
Factory setting: 120°C


If the adjusted maximum store temperature is reached, the solar system switches off. If now the collector temperature rises to the adjusted maximum collector temperature **(CMX / CMX1 / CMX2)**, the solar pump remains activated until this temperature limitation value is again underrun.

The store temperature might continue to rise (subordinated active maximum store temperature), but only up to 95°C (emergency shutdown of the store). If the store temperature is higher than the maximum store temperature **(SMX / S1MX / S2MX)** and the collector temperature is by at least 5K lower than the store temperature, the solar system remains activated until the store is cooled down again by the collector below the adjusted maximum temperature (SMX / S1MX / S2MX) (only by activated OREC function).

If the system is activated symbol ✷ is shown blinking in the display. Due to the cooling function, the solar system can be kept operable for longer periods on hot summer days and a thermal release of the collector and the heat transfer fluid is ensured as well.

**4.1.13 Option Collector Minimum Limitation**

**OCN / OCN1 / OCN2:** Collector minimum limitation.
Adjustment range OFF / ON
Factory Setting: OFF


The minimum collector temperature is a minimum switching temperature which must be exceeded so that the solar pump (R1/R2) is switched on. The minimum temperature shall avoid a steady starting up of the solar pump (or solid fuel boiler charging pumps) for low collector temperatures. If the minimum temperature is underrun, symbol ❄ is shown blinking in the display.

**CMN / CMN1 / CMN2:** Collector minimum temperature.
Adjustment range: 10 to 90°C
Factory setting: 10°C


**4.1.14 Option Antifreeze**

**OCF / OCF1 / OCF2:** Antifreeze function.
Adjustment range: OFF / ON
Factory setting: OFF


The antifreeze function activates the loading circuit between collector and store if the adjusted antifreeze function is underrun in order to protect the medium against freezing or "thickening". If the adjusted frost protection temperature is exceeded by 1°C, the loading circuit will be deactivated.

**CFR / CFR1 / CFR2:** Antifreeze temperature.
Adjustment range: -10 to 10°C
Factory setting: 4.0°C


**Note:** As there is only a limited heat quantity of the store available for this function, the antifreeze function should only be used in regions with few days of temperatures around freezing point.

**4.1.16 Re-cooling Function**

**OREC:** option re-cooling
Adjustment range: OFF / ON
Factory setting: OFF


If the adjusted maximum store temperature **(SMX / S1MX / S2MX)** is reached, the solar pump remains activated in order to avoid an overheating of the collectors. The store temperature might continue to increase but only up to 95°C. (emergency shutdown of the store).
In the evening, the solar system continues running until the store is cooled down to the adjusted maximum store temperature via collector and pipes.

**4.1.17 Tube Collector Special Function**

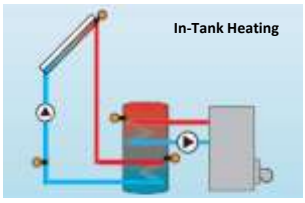
**OTC:** Tube collector special function
Adjustment range: OFF / ON
Factory setting: OFF

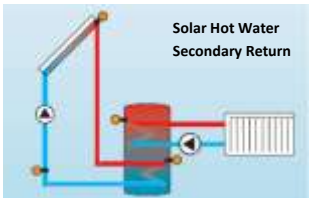

If the controller measures an increase of 2K compared to the collector temperature stored at last, the solar pump is switched on to 100% for about 30 seconds. After the expiration of the solar pump runtime the current collector temperature is stored as a new reference value.

If the measured temperature (new reference value) is again exceeded by 2K, the solar pump again switches on for about 30 seconds. If the switch on difference between the collector and store is again exceeded during the runtime of the solar pump or the standstill of the system, the controller automatically switches over to solar charging.

If the collector temperature drops by 2K during standstill, the switch on value for the special tube collector function will be recalculated.

**4.1.18 Thermostat Function**






**AHO:** Thermostat switch on temperature
Adjustment range: 0.0 to 95.0°C
Factory setting: 40°C

AHF: Thermostat switch off temperature.
Adjustment range: 0.0 to 95.0°C
Factory setting: 45°C

The thermostat function works independently from the solar operation and can e.g. be used for the use of surplus energy (solar hot water ring main) or after heating (in tank heating).

**AHO < AHF**
The thermostat function is used for **after heating (In Tank Heating).**
**Set AHO to 59°C. Set AHF to 65°C.**

**AHO > AHF**
The thermostat function is used for use of **surplus energy (Solar Hot Water Secondary Return).**
**Set AHO to 65°C. Set AHF to 59°C.**

Symbol ⏸ will be shown in the display if the second relay output is activated.



**t1 E / t2 E / t3 E:** Thermostat switch on time.
Adjustment range: 00:00 to 23:45
Factory setting: 00:00

**t1 A / t2 A / t3 A:** Thermostat switch off time.
Adjustment range: 00:00 to 23:45
Factory setting: 00:00

In order to block the thermostat function for a certain time span, there are 3 time frames, t1-t3. If the function should be activated only between e.g. 6:00 and 9:00, 6:00 should be set for **t1E** and 9:00 should be set for **t1A**. The factory setting for the thermostat function is in continuous operation.
If all time frames are set at 00:00 o'clock, the thermostat function is continuously in operation (factory setting)

**4.1.19 Pump Speed Control**
**nMN / n1MN / n2MN:** Pump speed control.
Adjustment range: 30 to 100%
Factory setting: 30.

**Adjust setting to 100.**
**Not speed regulated**


A relative minimum pump speed is specified for pumps connected at the outputs R1 and R2 via adjustment channels **nMN, n1MN and n2MN.**

Note: When using other devices (e.g. valves) which are not speed controlled, the value must be set to 100% in order to deactivate the pump speed control.

**4.1.20 Operating Mode**
**HND1 / HND2:** Operating mode
Adjustment range: OFF / AUTO / ON
Factory setting: AUTO

**Note: switching to OFF allows pump to be de-energised whilst setting controller**



For control- and service works the operating mode of the controller can be manually adjusted by selecting the adjustment value MM in which the following adjustments can be made:
**HND1 / HND2**
Operating mode
OFF: relay off Δ (blinking) +
AUTO: relay in automatic operation
ON: relay on Δ (blinking) +

**4.1.21 Language (LG)**
**LANG:**
Adjustment of language
Adjustment range: dE / En
Factory setting: En


The menu language can be adjusted in this channel.
dE = German
En = English

The following settings are recommended and will need to be set on site.

Note: Factory settings will be restored if power is disconnected from the controller.

## System Parameter Setting

| Parameter | Reference | Arrangement 1: Standard Solar with In-Series Boost | Arrangement 3: In-Tank Heating | Arrangement 3: Solar Hot Water Secondary Return |
|---|---|---|---|---|
| | | Recommended Setting | | |
| ΔT-regulation DTO, DT1O, DT2O, DT3O | 4.1.8 | 6°C | 6°C | 6°C |
| ΔT-regulation DTF, DT1F, DT2F, DT3F | 4.1.8 | 4°C | 4°C | 4°C |
| Store Maximum Temperature SMX, S1MX, S2MX | 4.1.9 | 75°C | 75°C | 75°C |
| Thermostat Function | 4.1.18 | NA | Gas or Electric In-Tank Heating AHO: 59°C AHF: 65°C | 3 Way Valve with Gas or Electric In-Series Boost AHO: 65°C AHF: 59°C |
| | | NA | Heat Pump In-Tank Heating AHO: 55°C AHF: 58°C | 3 Way Valve with Heat Pump In-Series Boost AHO: 58°C AHF: 56°C |
| Thermostat Switch on Time | 4.1.18 | NA | Refer to page 42 for instructions | NA |
| Pump Speed Control nMN, n1MN, n2MN | 4.1.19 | Relay 1:100% Relay 2: NA | Relay 1:100% Relay 2: 100% | Relay 1:100% Relay 2: 100% |

# Chapter 3 - Commissioning Procedures

## Commissioning Overview

Commissioning of the Rheem Heat Store Series 2 system involves:

- Pressure testing of the collector array.
- Pressure testing of the storage tank.
- Filling and dosing the closed circuit storage tank with corrosion inhibitor.
- Simulating and testing the solar circuit.
- Balancing the collector array.
- Commissioning boosting plant.

## Solar Collectors

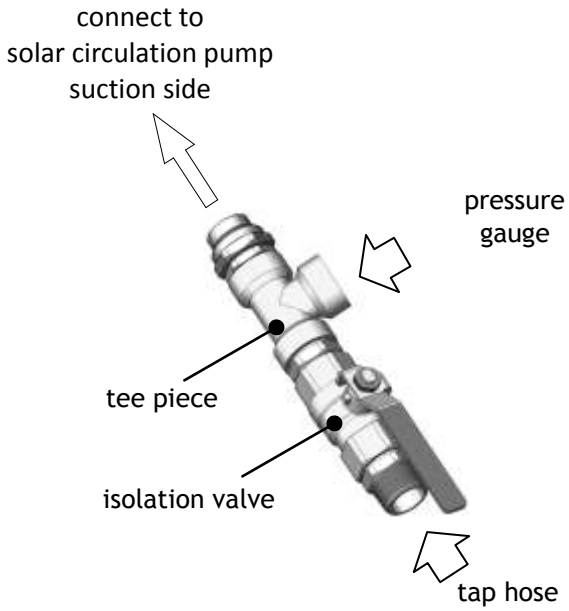
### Pressure Test the Collector Array

For best results, pressure test of the collector array is conducted late in the evening when there is little solar radiation and the collector array can be left flooded under pressure for around 60 minutes. As the collector array will be pressure tested with mains pressure, make sure the mains pressure falls within the range of 350 - 680 kPa. Otherwise, a pressure testing pump (not supplied) shall be used for this purpose.

**LEAVE THE FILL LEVEL PORT (L) ON THE STORAGE TANK OPEN UNTIL COMMISSIONING IS COMPLETED.**

Strict adherence to the following steps will ensure a successful pressure test is accomplished:

- Disconnect the flexible hose from the solar circulation pump suction side and fit a tap hose with an appropriate sized tee piece and isolation valve (not supplied) as shown below, to the solar circulation pump.
- Fit a pressure gauge capable of measuring mains pressure with an appropriate fitting onto the tee piece.
- Connect a hose to the ball valve



- Open all isolation valves fitted at the inlet of each bank of collectors.
- Open all isolation valves leaving/returning to the storage tank so that water can be drained through the storage tank.
- Slowly open the isolation valve next to the pressure gauge and begin to fill the collector array.
- Let the air in the collector array expel through the isolation valve at the highest point of the main solar return pipe work (see page 24)
- When water overflows from the isolation valve at the highest point of the solar return pipe work, reduce the incoming water flow rate by slightly closing the isolation valve next to the pressure gauge. Also close the isolation valve in the solar return pipe work at the storage tank to stop water draining down to the storage tank.
- Continue filling until there are no air bubbles in the overflowing water.

Slowly close the isolation valve at the highest point of solar return pipe work and allow the pressure to stabilise. Close the isolation valve next to the pressure gauge. Slowly bleed off water until a pressure of 350kPa is achieved.

**INSPECT EVERY CONNECTION OF THE COLLECTOR ARRAY AND ALL PIPE WORK TO AND FROM THE COLLECTOR ARRAY FOR LEAKS.**

**SHOULD A LEAK BE OBSERVED, RELEASE THE PRESSURE IN THE COLLECTOR ARRAY BY OPENING THE ISOLATION VALVE AT THE HIGHEST POINT OF THE SOLAR RETURN PIPEWORK.**

**ATTEND TO ANY LEAK, REPEAT THE PRESSURE TEST, REPEAT THE LEAK INSPECTION, AND RECTIFY AS DESCRIBED PREVIOUSLY.**

**REPEAT THE PRESSURE TEST UNTIL THE PRESSURE IN THE COLLECTOR ARRAY IS STEADY FOR AROUND 60 MINUTES.**

- Release the pressure after successful completion of the collector array pressure test.
- Disconnect the tap hose from the water supply and direct it to drain. Open all isolation valves to allow the collector array to drain completely through the storage tank and solar circulation pump.
- Disconnect the pressure gauge, tee piece, and isolation valve that were fitted before the test.
- Reconnect the flexible hose back to the solar circulation pump.

## Storage Tank

**WARNING:**

**DO NOT** turn the power on until the storage tank is filled with water.

Always fill the heat exchanger coil with mains or full pressure water before you start filling the main tank. Otherwise you could damage the heat exchange coil by partially crushing it. Failure to follow this instruction will void the warranty.

### Potable Water Circuit

Fill the potable water circuit by opening the isolation valve at the cold water inlet connection. Open a hot tap so air may be purged from within the system whilst filling. Close hot tap when all air has been expelled.

When full operational pressure is reached, ensure that all connections on the potable circuit are free of leaks. The potable water circuit **MUST BE** full and pressurised before any other tests are conducted.

### Pressure Test the Closed Circuit

**WARNING:**

At no stage in the filling of the closed circuit should mains pressure be applied to the Heat Store closed circuit.

To prevent any pressure greater than the relief valve setting being applied to the storage tank, the following fill procedure **MUST** be used:

- Remove the closed circuit fill level plug at the fill level port (L) (refer to page 15 for location of the port). Keep this port open at all times until the fill procedure is complete.
- Close the solar cold, solar hot and process flow and return isolation valves (if fitted) before commencing closed circuit filling. Keep these valves closed until the closed circuit tank is filled and pressure tested.
- A 25 mm (1" BSP) fill/drain isolation valve (not supplied) should be fitted to the fill/drain port (T) (refer to page 15 for location) for convenience of filling or draining operations. To fill the closed circuit reservoir, connect an isolation valve, appropriate sized tee piece and a tap hose (not supplied) to the fill/drain valve. Note, tee piece is to be upstream (before) the isolation valve and tank.
- Fit a pressure gauge (capable of measuring 80 kPa pressure, not supplied) to the tee piece.

**CAUTION IS ESSENTIAL AS THE HEAT STORE IS NOW READY FOR PRESSURISATION.**

- Slowly open the fill/drain valve to let water flow into the tank. Close the fill/drain valve when water begins to flow out from the fill level port.(L)
- Replace the plug at the fill level port (L).
- Slowly open the fill/drain valve and continue filling. Check the pressure gauge attached. When the pressure reaches 20 kPa, close the fill/drain valve and allow the pressure to stabilise.
- Repeat pressurising in steps of 10 kPa and allow to stabilise until 80 kPa is reached.
- Check for leaks at all the connections on the closed circuit. Should a leak be observed at any one of the connections, immediately release the pressure by slowly lifting the easing lever of the pressure relief valve (see the location of pressure relief valve on page 15). Rectify any leak that is observed and repeat the pressure test as described above.

**LEAVE THE HEAT STORE AT THE SET PRESSURE FOR AT LEAST 60 MINUTES.**

- After the pressure test, release the pressure by slowly lifting the easing lever of the pressure relief valve. Observe the pressure gauge and wait until pressure is completely released.
- Remove the pressure gauge and its fitting from the fill level port.

- Continue draining water through the pressure relief valve to make room for corrosion inhibitor. Refer table on page 48 for the volume of corrosion inhibitor required.

### Filling with Corrosion Inhibitor

The corrosion inhibitor supplied with the Heat Store Series 2 system is to be mixed with the water. The corrosion inhibitor is to be applied in accordance with the manufacturers' instructions.
Read the label and observe all safety directions.

**.IMPORTANT:**

Wear safety glasses and rubber gloves when handling the corrosion inhibitor. If, despite precautions, an accident should happen then First Aid is an eyewash station or a lot of water. Always refer to material MSDS for further advice

The required quantity of corrosion inhibitor required with each Heat Store Series 2 is listed below:

| Model | 1500DBs | 2200 DBs | 3500 DBs | 5000 DBs |
|---|---|---|---|---|
| Inhibitor amount (litres) | 1.5 | 2.2 | 3.5 | 5.0 |

- Pour the corrosion inhibitor supplied through the fill level port into the storage tank by using a funnel.
- Again, slowly open the fill/drain valve to let water flow into the tank. Close the fill/drain valve when water begins to flow out from the fill level port.
- Disconnect tap hose from the fill/drain valve and blank off the fill level port.

The potable circuit and the closed circuit of the Heat Store are at ambient condition and the system is now ready for simulation and testing.

**NOTE:** During the first heating cycle after commissioning, it is normal for the closed circuit pressure relief valve to discharge fluid as the temperature rises. After the closed circuit fluid level has stabilised, discharge should stop.

### Testing / Simulate the Solar Circuit

The commissioning of the solar circuit should be carried out on a sunny day where the temperature in the collectors will enable the circulation pump to be activated.

**Note:** Refer to the temperature controller section on page 44 to adjust user defined settings and prepare the temperature control unit for simulation and testing.

- Check the current rating on the pump and adjust the thermal overload setting to match this rating Refer to page 35.
- Remove both temperature sensors from their sensor pockets in the collector and storage tank. Allow the sensors to cool down to ambient temperature.
- Switch on the electric power supply to the temperature control unit. Observe that the controller display activates.
- Observe that the pump is not operating (with both temperature sensors at the same temperature, the temperature controller should not operate the solar circulation pump).

- Replace both temperature sensors into their respective sensor pockets. At this point, if there is sufficient solar radiation, the hot sensor will measure a higher temperature than the cold sensor, indicating that there is energy to be collected.
- The temperature controller should send a signal to the motor starter relay to activate the solar circulation pump when the temperature differential between the hot sensor and the cold sensor is greater than the user defined set point, typically 6 degrees differential.
- Observe that the solar circulation pump is operating. Ensure that the electric current drawn by the pump is the same or lower rating stated on its data label.
- Remove the hot sensor from its sensor pocket in the collector and allow the sensor to cool down to ambient temperature. Once the temperature differential between the hot sensor and the cold sensor falls below the user defined set point, the pump should once again stop operating.
- Should there be insufficient solar radiation, the desired conditions can be simulated as follows:

  **ENSURE THAT THE SENSOR DOES NOT COME INTO DIRECT CONTACT WITH THE WATER.**

  - Get two plastic bags (no leaks) capable of withstanding hot water. One plastic bag will be used for the hot sensor and the other for the cold sensor.
  - Two containers or flasks, such as thermos type, capable of holding hot water are required. Each container requires a thermometer with a range of 0 to 120ºC.
  - The temperature of water in “thermos 1” should be around 5 ºC greater than the maximum temperature set point of the storage tank, SMX (refer to page 44 ). The temperature of water in “thermos 2” should be around 5 ºC greater than the temperature of water in “thermos 1” plus the temperature differential set point DTO (refer to page 44).
  - To simulate the condition that there is enough solar energy to be collected, remove the hot sensor from the sensor pocket and insert the sensor into the plastic bag. Insert the plastic bag (with sensor) into “thermos 2”. The solar circulation pump should switch on.
  - To simulate the condition that there is little solar energy to be collected, remove the hot sensor (with plastic bag) from “thermos 2” and allow the sensor to cool down to ambient temperature. The solar circulation pump should switch off.
  - To simulate the condition that there is enough solar energy to be collected but the Heat Store has reached the maximum set temperature, put the hot sensor (with plastic bag) into “thermos 2”. The solar circulation pump should switch on. Remove the cold/tank sensor from the sensor pocket and place it into the second plastic bag. Place them into “thermos 1”. The solar circulation pump should switch off.
  - Remove the cold sensor (with plastic bag) from “thermos 1” and the solar circulation pump should restart after the sensor cools down below the maximum temperature set point of the storage tank SMX (refer to page 44).

### Booster Water Heater

Commission booster water heater plant in accordance with the manufacturer’s instructions.

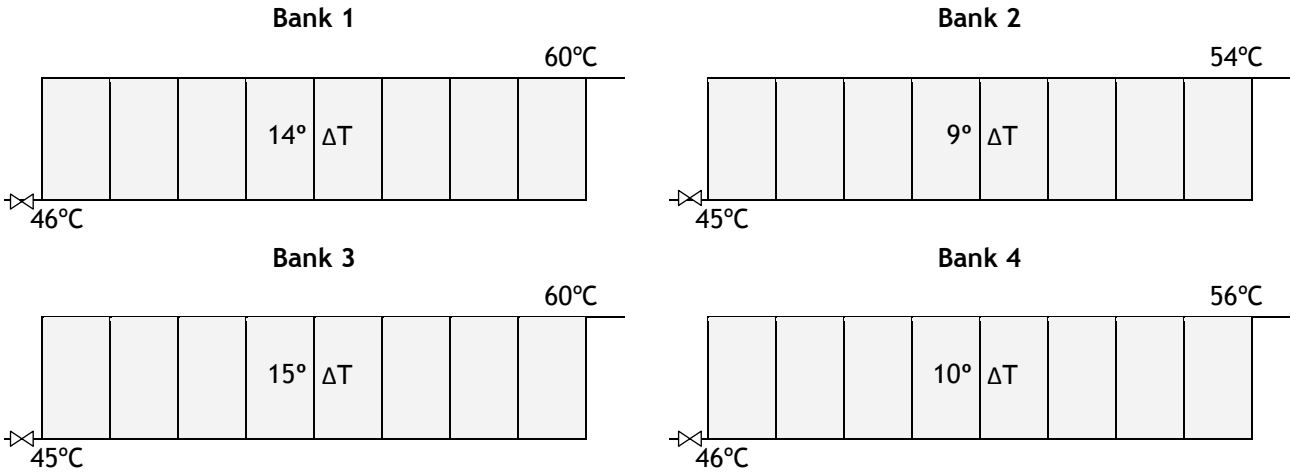
## Balancing the Collector Array

In order to establish full flow through the collector array, each bank of the collector array **MUST BE** balanced. This can be accomplished by installing a flow regulated valve (optional) at the inlet of each bank of collector or follow balancing instructions as follows:

- All collectors to be in direct sunlight during this procedure.

- Ensure that all isolation valves at the inlet of each bank of collector are fully open.
- With the solar circulation pump running, measure the temperature at the inlet and outlet of each bank of collectors by using a portable handheld thermometer (not supplied).
- Note down the temperature rise between the inlet and outlet of the bank of collectors.
- Repeat this measurement for all banks of the entire collector array.
- The temperature rise **SHALL BE** uniform for all banks of collectors.
- The temperature rise will depend on the level of solar radiation available.

If the temperature rise is not uniform across all the banks of collectors, it indicates that the flow is not uniform. A uniform flow across the banks can be achieved by adjusting the isolation valves as follows:
For example, in a collector array of 32 collectors installed in 4 banks of 8 collectors, the following temperatures were recorded.




- The temperature rise across each bank is as follows:
  (Bank 1 = 14ºC) (Bank 2 = 9ºC) (Bank 3 = 15ºC) (Bank 4 = 10ºC)
- The above temperature rises indicate that Banks 1 and 3 are suffering from less than full flow.
- The average temperature rise for all the banks is 12°C ((14+9+15+10) ÷ 4) and the objective is to obtain this temperature rise uniformly across all banks.
- Partially close the inlet isolation valves to Banks 2 and 4. Allow stabilising for 10 minutes.
- Measure the temperatures once again as described above and record the temperature rises.
- The temperature rises across each bank are now as follows:
  (Bank 1 = 13ºC) (Bank 2 = 11ºC) (Bank 3 = 13ºC) (Bank 4 = 11ºC)
- Partially close the inlet isolation valves to Banks 2 and 4. Allow stabilising for 10 minutes.
- Repeat the exercise until an equal temperature rise across each bank is obtained.

## IMPORTANT:

After the commissioning, the handle of isolation valves on the collector arrays **SHALL BE** removed to avoid unauthorised adjustment which may unbalance the arrays.

# Chapter 4 - Water Supplies

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

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

## Change of Water Supply

The changing or alternating from one water supply to another can have a detrimental effect on the operation and / or life expectation of a water heater cylinder, a temperature pressure relief valve and a gas booster's copper heat exchanger.

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

## Saturation Index

The saturation index is used as a measure of the water's corrosive or scaling properties.

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

Where the saturation index is less than –1.0, the water is very corrosive and warranty does not apply to the copper heat exchanger in the Heat Store Series 2 water heater.

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

Where the saturation index exceeds +0.40, the water is very scaling. An expansion control valve must be fitted on the cold water line after the non-return valve to protect and for warranty to apply to the copper heat exchanger in the Heat Store Series 2 water heater.

Where the saturation index exceeds +0.80, warranty does not apply to the copper heat exchanger in the Heat Store Series 2 water heater.

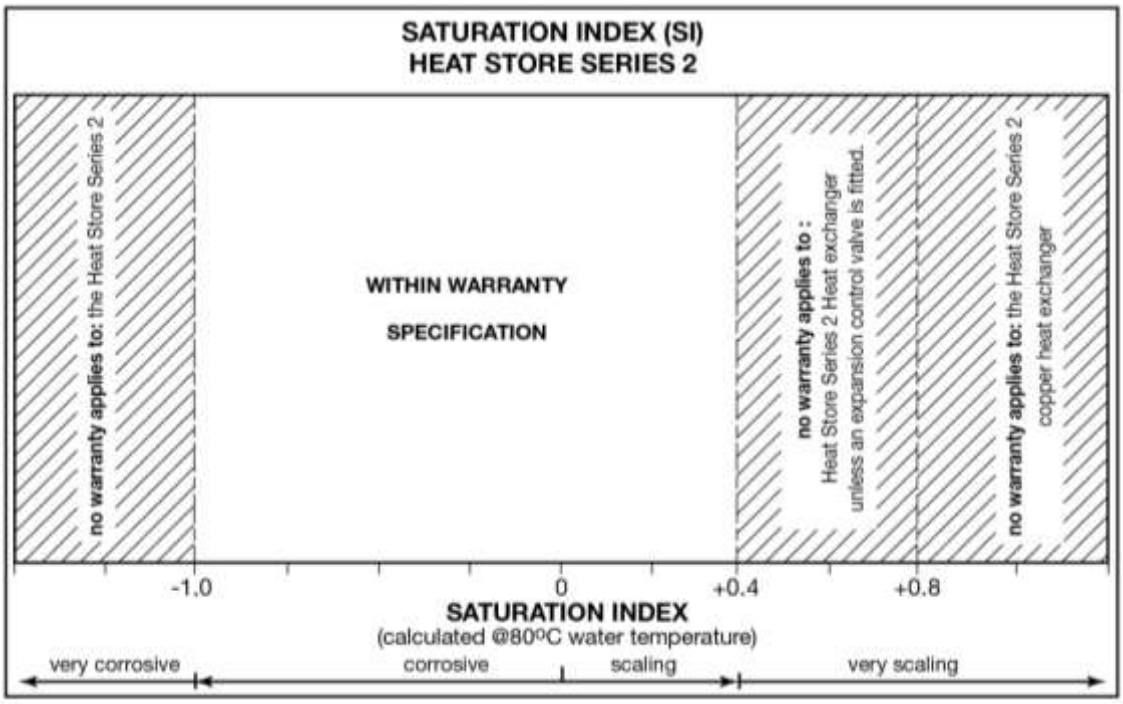
Water which is scaling may be treated with a water softening device to reduce the saturation index of the water.

Heat Store Series 2 can still be used if the potable water has a high saturation index but it may be necessary to de-scale the heat exchange coils periodically.

Refer to the de-scaling procedures on page 55 for specific details.

Refer to the Saturation Index chart on page 52.

Refer to the cold water connection detail on page 27 for the position of the expansion control valve.




## Summary of Water Chemistry Advice Affecting Warranty

The warranty of this water heater does not apply on the components listed below if the water heater is connected at any time to a water supply with water chemistry of:

| **Water Chemistry** | **Component** |
|---|---|
| Saturation Index (SI) < -1.0 | copper heat exchanger |
| Saturation Index (SI) > +0.4<br>(if an expansion control valve is not fitted) | copper heat exchanger |
| Saturation Index (SI) > +0.8 | copper heat exchanger |

# Chapter 5 – Troubleshooting & Maintenance

## Troubleshooting

***"Insufficient Hot Water"***

### Solar Boost

- Re-check that the flow and return pipe work to and from collectors are correctly connected.
- Re-check correct phase rotation of the solar pump.
- Confirm the temperature differential thermostat is operating as described in Chapter 3 - Commissioning Procedures. An hour-run meter may be fitted to the solar circulation pump to monitor its operation.
- Ensure that all collectors are being completely filled with closed circuit fluid. This is achieved by recording flow and return temperatures at each bank of collectors. Adjustment, if necessary, **SHALL BE** conducted as described in Chapter 3 - Commissioning Procedures.
- Confirm closed circuit fluid level at the fill level port. If the level is low, check system for leakage, repair, and top up to the closed circuit fill level port. Check pump seals for leakage.
- Ensure the collectors are not being shaded by trees, adjacent structures or other collectors.
- Ensure the Site Manager understands the Heat Store system operation and that the control switches and any timers are in the correct positions for automatic operation.
- Check for leakage of hot water plumbing circuit in the building.

### Booster Water Heater

- Ensure power supply and/or gas supply is available.
- Are the safety cut-outs tripped?
- Thermostat setting altered or thermostat faulty.
- Refer to water heater manual for more specific information on fault-finding.

***"Excessive discharge from Expansion Control Valve (ECV)"***

During a heating cycle, it is normal for the ECV to discharge water as the potable water temperature rises. Approx 3 - 5% of the total potable water circuit volume could be relieved per day through the ECV. At the completion of heating cycle, the discharge from the ECV should stop. If discharge continues, the valve seat should be checked for obstructions. Raise the lever located on top of the ECV and allow water to flow freely for a few seconds to clear the seat. If the leakage continues, check the pressure within the system to confirm that the system pressure has not exceeded the maximum allowable for the ECV pressure rating. If incoming water pressure is within the required range, then it will be necessary to replace the ECV.

***"Insufficient Water Pressure"***

- Check line strainer for blockage (if fitted).
- Check water pressure before and after pressure limiting valve. If possible, adjust pressure setting if too low. Replace valve if necessary.
- Ensure pressure limiting valve is of sufficient capacity to meet the requirements of the application.
- Is pipe sizing adequate to suit the application?
- Check all valves and pipe work for fouling or blockage.

***"Closed Circuit Relief Valve Discharging"***

After commissioning has been completed and the closed circuit stabilised, discharge from this valve should stop. Continual discharge may indicate a leak in the heat exchange coils.

**Note:** The closed circuit contains a corrosion inhibitor. Although it is non-toxic, the solution, particularly when hot, **SHOULD NOT** be drained onto lawns, gardens etc., but directly into a floor waste.

## Maintenance

### 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 collectors adequately clean. It is recommended that the collector glass be washed clean at least every three months should adequate rain have not fallen in this period. Collector washing may be completed with water and a soft sponge. This should be undertaken at a time when the 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.

**Note:** Have any trees trimmed which may shade the solar collectors.

### Collector Glass Breakage

The collector glass is not offered as a replacement part. Should the solar collector require replacement, contact your nearest Rheem Service Department or Accredited Service Agent.

**WARNING:**

**NO** attempt should be made to repair broken collector glass.

### Six Monthly Relief Valve Easing

It is recommended the easing gear of pressure or temperature relief valves fitted to the water heater system be operated every six months to assure their continuing function. The Heat Store series 2 is a closed circuit system and operating the relief valve easing gear will deplete some fluid from the closed circuit. The system should be depressurised and the fluid level checked and topped up if necessary following this procedure.

**IT IS VERY IMPORTANT THAT THE LEVER IS RAISED AND LOWERED GENTLY AND ONLY FOR A SHORT PERIOD TO MINIMISE FLUID LOSS.**

**WARNING:**

Failure to have the relief valve easing gear operated at least once every six months may result in the water heater failing.

**NEVER** block the outlet of a relief valve or its drain line for any reason.

**Note**: Continuous leakage of water from a relief valve or its drain line may indicate a problem with the water heater.

The pressure or temperature relief valve **SHALL BE** checked for performance, or replaced at intervals not exceeding 5 years.

## Servicing the System

Where possible, a service should be undertaken every 12 months to ensure the continued efficient operation of the Heat Store Series 2 system.

The service should include inspection of the following items:

- Pressure relief valves (where fitted)
- Automatic operation of controls including check of operation of contactors and relays
- Electric / gas booster operation
- Collector glazing and waterproofing
- Collector glass cleaning
- Insulation to the pipe work
- Solar circulation pump operation
- Water leakage in both the closed and potable water circuits.
- Closed circuit fluid condition and level.
- Temperature differential thermostat operation
- Temperature control valves (where fitted)

## Spare Parts

In areas where there may not be ready access to spare parts, it is recommended that a minimum range of spare parts be kept to carry out fast and effective repairs if necessary. This is particularly important, if the Heat Store Series 2 is the only source of hot water.

The following spare parts are recommended to be kept on site:

- Sensor lead wire
- Circulation pump for solar circuit
- Circulation pump for remote heat source (if fitted)
- Collector O rings
- Solar collector
- Collector connector assy x 4
- Collector bung assy x 2
- Tube end assy x 2
- Closed circuit pressure relief valve x 2
- Expansion control valve x 2

Spare parts may also be required for any booster water heaters. Refer to the specific user guide for a list of recommended spare parts for these heat sources.

## De-Scaling Procedures

It may be necessary to periodically flush the potable water heat exchange coils if the Heat Store Series 2 is installed in a hard or scaling water region.

The de-scaling solution is a mixture of flushing powder (sulphamic acid) and household dishwashing liquid. When made up at the requisite strength (a pH of 1.0 to 4.5), it is pumped through the heat exchanger coils to dissolve the carbonate scale build-up.

Ingredients: 100 grams/litre flushing powder (not supplied)
2 drops dishwashing liquid (not supplied)

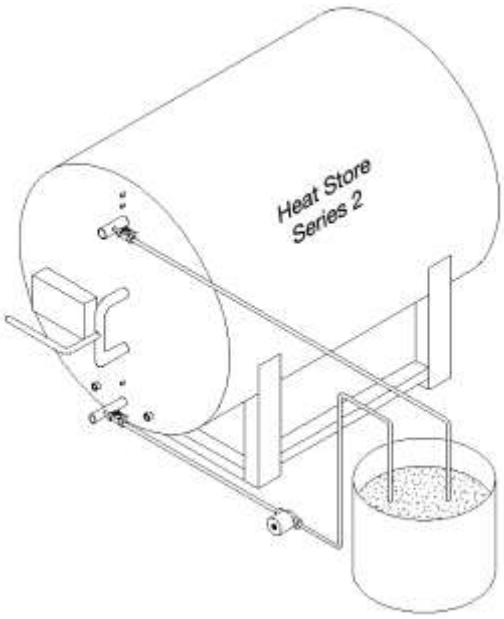
Method: Mix to a plastic 120 litre container (not supplied)
10kg flushing powder and
2 drops dishwashing liquid.

Make up to 100 litres with water.

**OR**

Mix to a plastic 70 litre container (not supplied)
5kg flushing powder and
1 drop of dishwashing liquid.

Make up to 50 litres with water.




## PRECAUTIONS:

Safety glasses, dust mask and rubber gloves are necessary when dispending the solid flushing powder. Gloves and safety glasses are further required when handling the final solution. Splashes in the eye or in cuts are painful and if despite precautions an accident should happen then First Aid is an eyewash station or a lot of water. Always refer to material MSDS for further advice.

Isolate the cold and hot water supplies to and from the Heat Store. Connect a flexible hose up to the side service isolation valves (not supplied).

The solution is pumped through the heat exchange coils as per diagram shown above. Using a pump (not supplied) to circulate the de-scaling solution through the heat exchange coils, run this pump cycle for 10 minutes and check pH. If the pH is 4.5 to 5.0, then add 1kg of flushing powder into the solution and operate pump for a further 5 minutes. Check pH after 5 minutes of extra pump cycle. If pH is 3.5 or less, then the de-scaling is completed. Empty and flush the system.

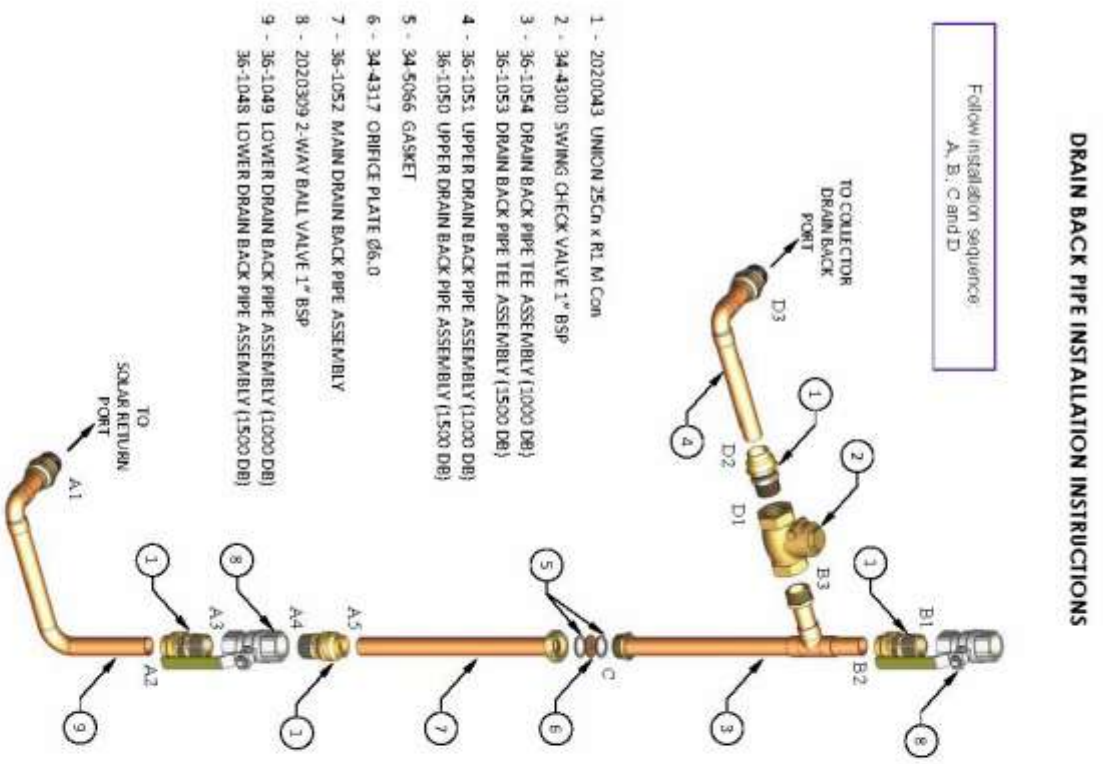
For larger systems, it is recommended to stop the pump after 10 minutes and allow the acid solution to soak, then recommence pump cycle for a further 5 minutes to dissolve and dislodge any remaining build-up.

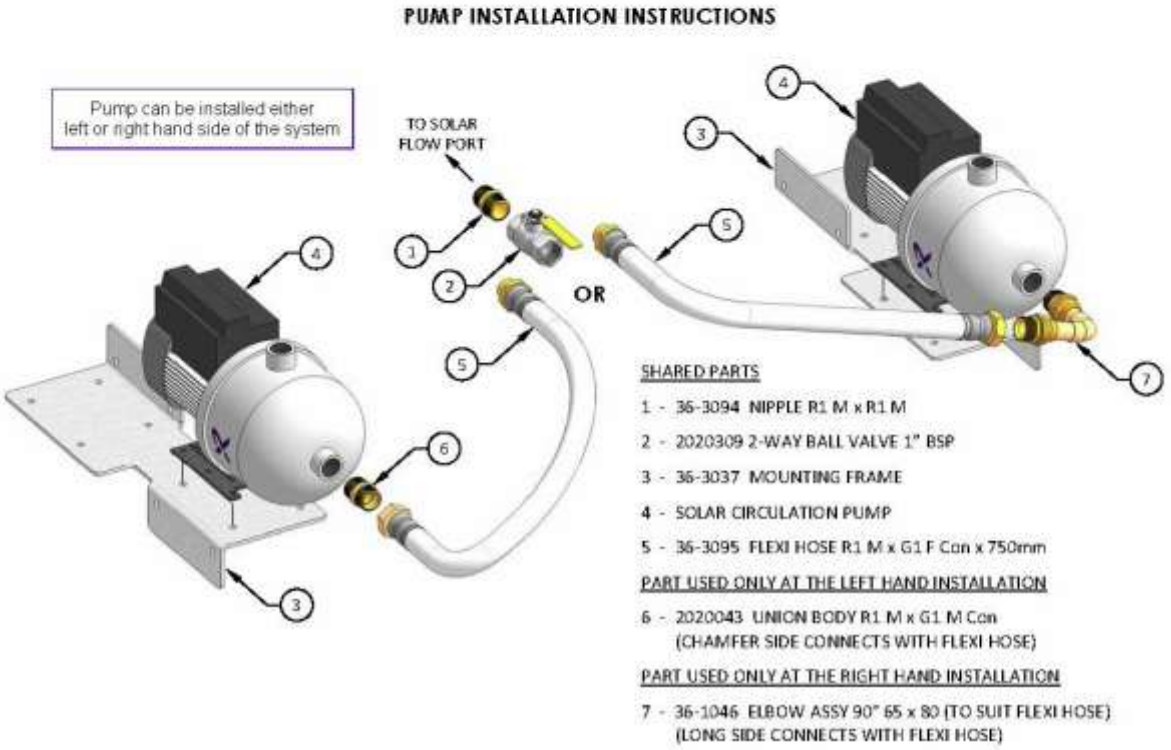
The system **MUST BE** thoroughly flushed with water to remove any residual de-scaling solution from within the potable water circuit. Check the pH of the water to confirm.

## IMPORTANT:

The used flushing solution **MUST BE** disposed of in accordance with local by-laws and regulations.

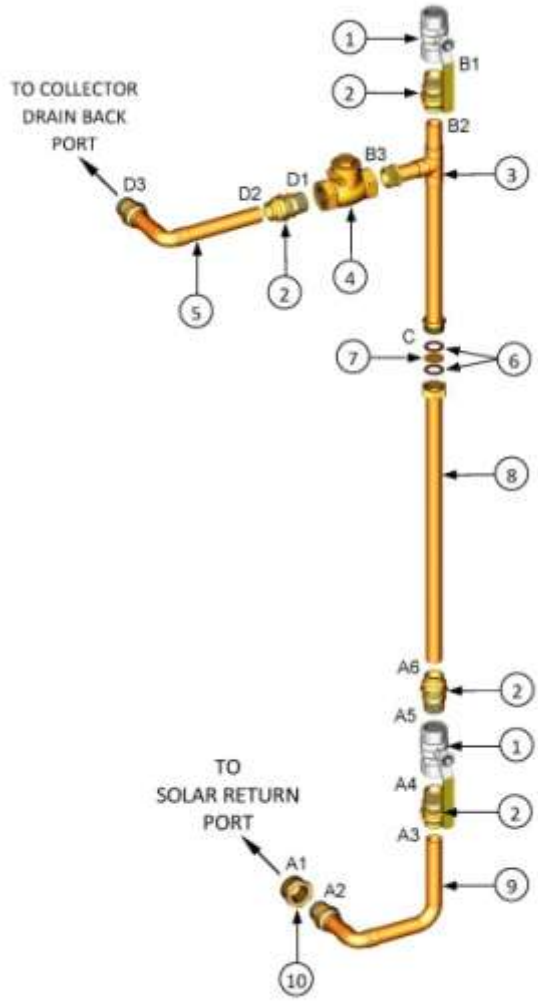
# Appendix 1 – 1000 DBs, 1500 DBs Kit Installation Instructions



# Appendix 2 – 2200 DBs Kit Installation Instructions

## DRAIN BACK PIPE INSTALLATION INSTRUCTIONS




**Follow installation sequence: A, B, C and D**

1 - 2020309 2-WAY BALL VALVE 1" BSP
2 - 2020043 UNION 25Cn x R1 M Con
3 - 36-1053 DRAIN BACK PIPE TEE ASSEMBLY (1500, 2200 DB)
4 - 34-4300 SWING CHECK VALVE 1" BSP
5 - 36-1064 UPPER DRAIN BACK PIPE ASSEMBLY (2200 DB)
6 - 34-5096 SILICONE RUBBER GASKET
7 - 34-4323 ORIFICE PLATE Ø6.5
8 - 36-1065 MAIN DRAIN BACK PIPE ASSEMBLY (2200 DB)
9 - 36-1049 LOWER DRAIN BACK PIPE ASSEMBLY (1000, 2200 DB)
10 - 36-3033 BUSH REDUCING R1¼ M x RP1 F

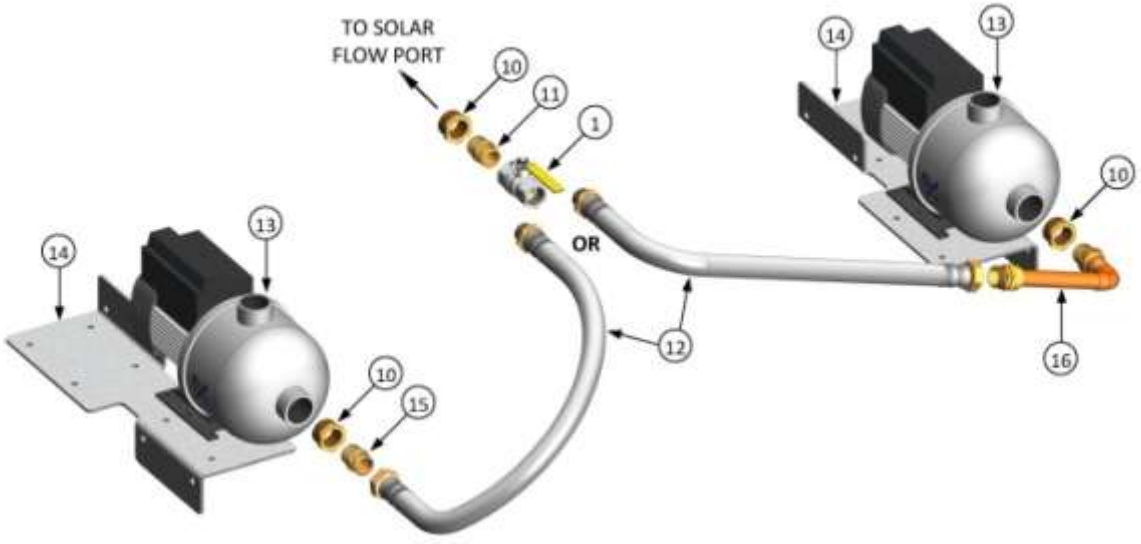
## PUMP INSTALLATION INSTRUCTIONS

**Pump can be installed either left or right hand side of the system**

SHARED PARTS
1 - 2020309 2-WAY BALL VALVE 1" BSP
10 - 36-3033 BUSH REDUCING R1¼ M x RP1 F
11 - 36-3094 NIPPLE R1 M x R1 M
12 - 36-3095 FLEXI HOSE R1 M x G1 F Con x 750mm
13 - SOLAR CIRCULATION PUMP
14 - 36-3037 MOUNTING FRAME

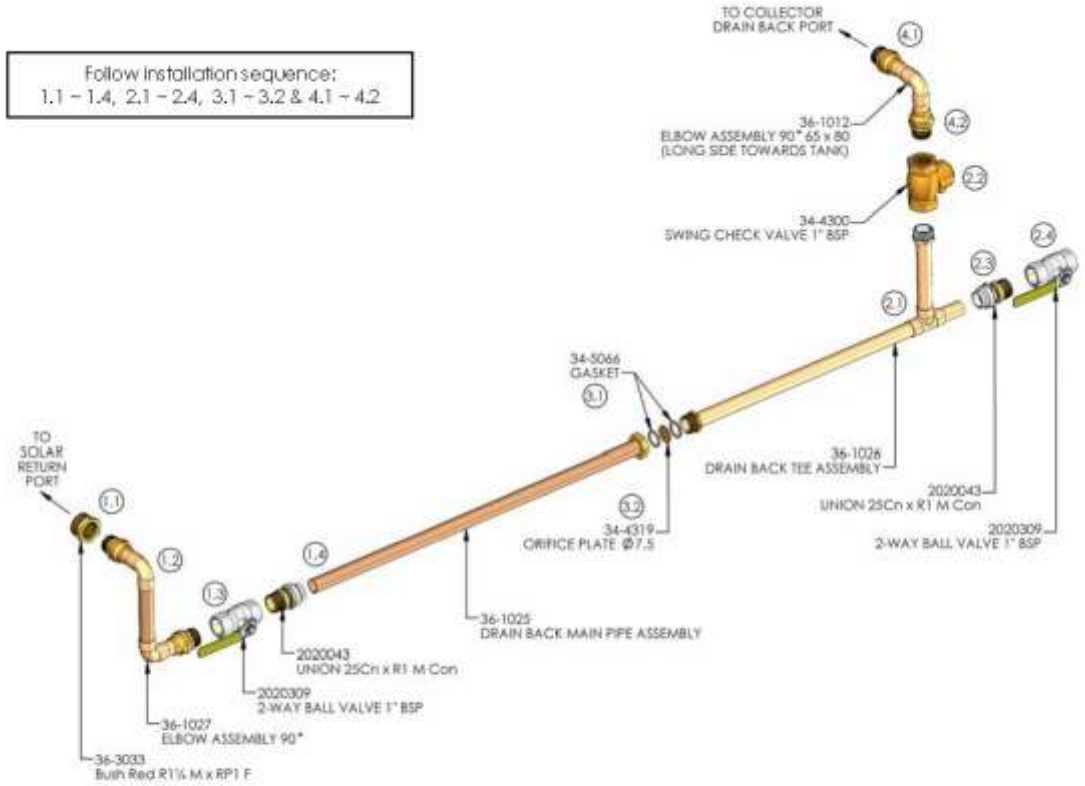
PART USED ONLY AT THE LEFT HAND INSTALLATION
15 - 2020043 UNION BODY R1 M x G1 M Con
(CHAMFER SIDE CONNECTS WITH FLEXI HOSE)

PART USED ONLY AT THE RIGHT HAND INSTALLATION
16 - 36-1063 ELBOW ASSY 90° 65 x 190 (TO SUIT FLEXI HOSE)
(LONG SIDE CONNECTS WITH FLEXI HOSE)

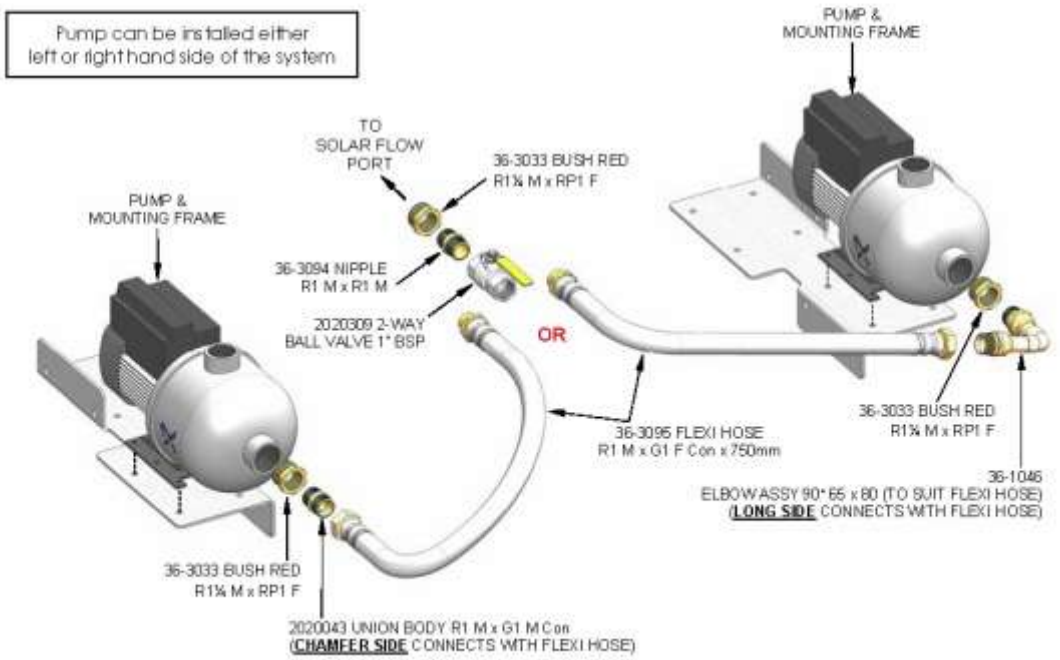


# Appendix 3 – 3500 DBs Kit Installation Instructions

## DRAIN BACK PIPE INSTALLATION INSTRUCTIONS

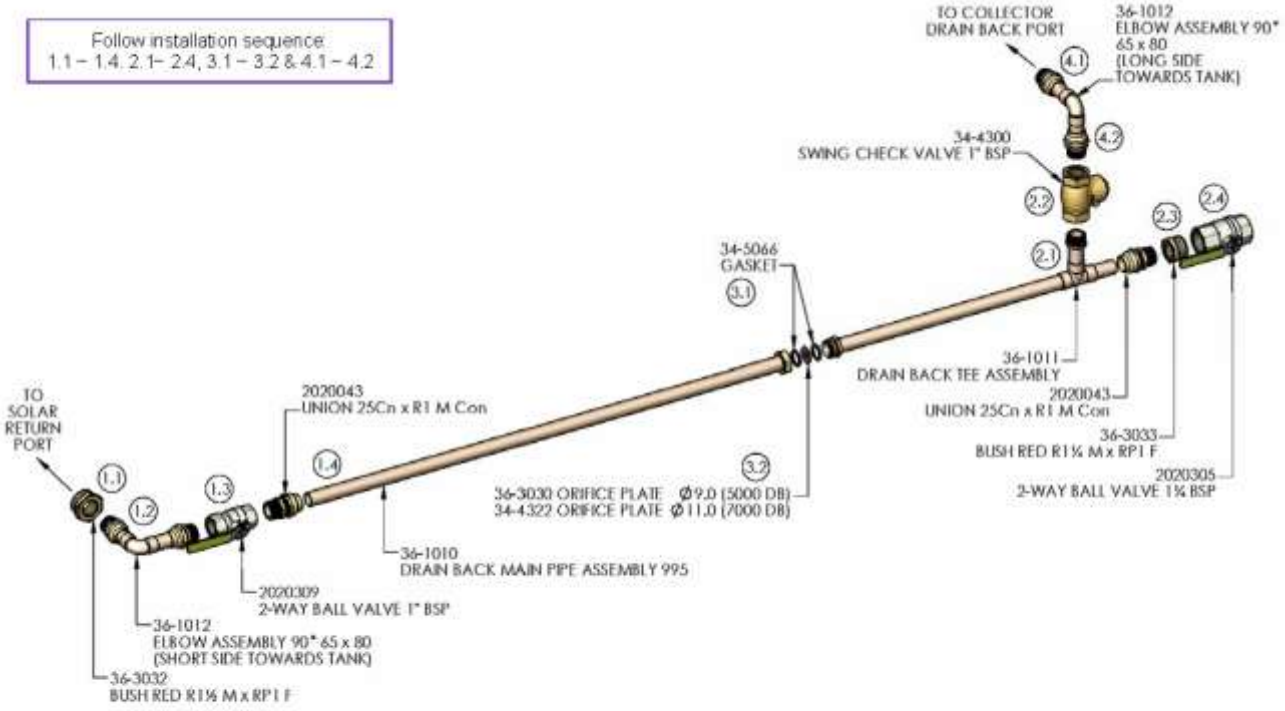



## PUMP INSTALLATION INSTRUCTIONS

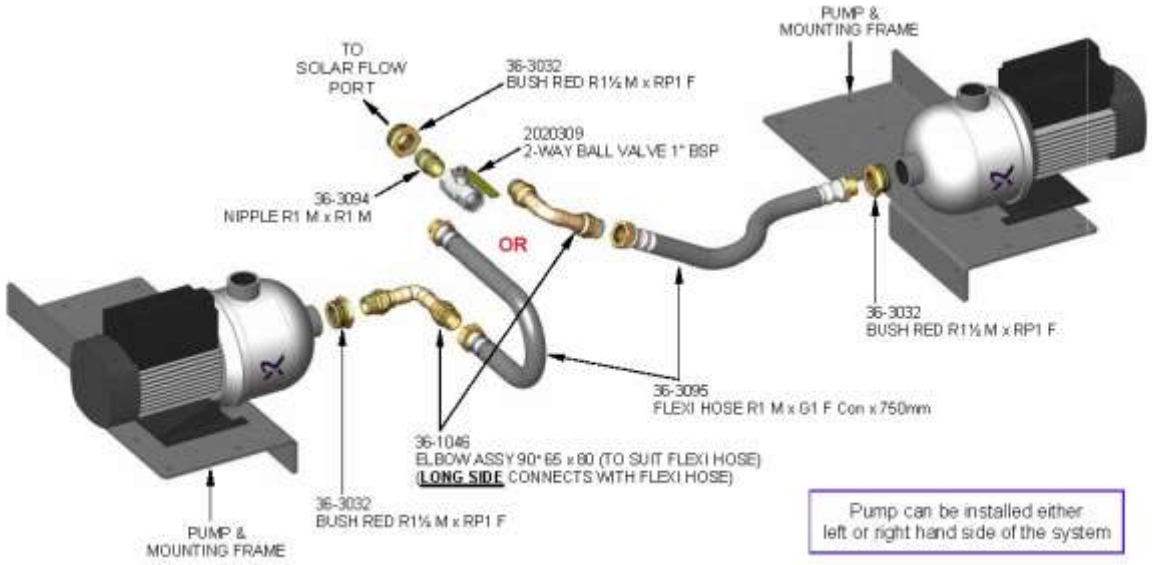


# Appendix 4 – 5000 DBs, Kit Installation Instructions

## DRAIN BACK PIPE INSTALLATION INSTRUCTIONS




## PUMP INSTALLATION INSTRUCTIONS



# Commissioning Checklist

The following information is to be completed by the installer at the time of installation:

| | | | |
|---|---|---|---|
| **System Model :** | | | |
| **Storage Tank Serial :** | | | |
| **Collector Details :** | Type: | Serial: | Manufacture Date: |
| | Type: | Serial: | Manufacture Date: |
| | Type: | Serial: | Manufacture Date: |
| | | | |
| **Date of Installation :** | | | |
| **Installer :** | | | |
| **Address :** | | | |
| **Suburb / State :** | | | |
| **Phone :** | | | |
| | | | |
| **Date of Commissioning :** | | | |
| **Commissioning Agent :** | | | |
| | | | |
| **Warranty Start Date :** | | | |
| **Warranty Expiry Date :** | | | |

**COMMISSIONING MAY ONLY BE DONE BY A QUALIFIED TRADESPERSON.**

**Parts Condition:**

| | | |
|---|---|---|
| Temperature control unit | Pass ☐ | Fail ☐ |
| Thermostats | Pass ☐ | Fail ☐ |
| Electric elements (if applicable) | Pass ☐ | Fail ☐ |
| Safety valves | Pass ☐ | Fail ☐ |

**Pressures:**

| | | | |
|---|---|---|---|
| Closed circuit pressure test | _____ kPa | Pass ☐ | Fail ☐ |
| Potable circuit pressure test | _____ kPa | Pass ☐ | Fail ☐ |

**Temperatures:**

| | | | |
|---|---|---|---|
| Water-in temperature (cold valve) | Gauge value _____ °C | Pass ☐ | Fail ☐ |
| Water-out temperature (hot valve) | Gauge value _____ °C | Pass ☐ | Fail ☐ |
| Cold fluid temperature (storage tank) | Gauge value _____ °C | Pass ☐ | Fail ☐ |
| Hot fluid temperature (collectors) | Gauge value _____ °C | Pass ☐ | Fail ☐ |

**Boost Type:** Electric ☐ Gas ☐ Heat Pump ☐ Others ☐

| | |
|---|---|
| Power rating | _____ kW |
| Cut-in temperature | _____ °C |
| Cut-out temperature | _____ °C |

**Controller Set Up (tick one)**

| | |
|---|---|
| Arr 1 – Standard Solar System | |
| Arr 3 – In Tank Heating | |
| Arr 3 –Solar Building Secondary Recirculation | |

**BEFORE ATTEMPTING TO OPERATE THE RHEEM HEAT STORE**

**ENSURE THAT THE CHECKLIST BELOW IS COMPLETED.**

| Checks | Pass | Fail | Remarks |
|---|---|---|---|
| 1. Water quality check | | | |
| 2. Solar circulation pump check, including phase rotation and thermal overload setting | | | |
| 3. Booster circulation pump check (if applicable) | | | |
| 4. Hot relief valves check | | | |
| 5. Cold relief valves check | | | |
| 6. System auto cut-off check | | | |
| 7. All mechanical fixings are secured, including sensors | | | |
| 8. Collector array pipe work is correct and as per diagram shown in the installation instructions | | | |
| 9. Solar flow and return pipes are copper, NOT plastic, and have continuous fall all the way to storage tank to ensure full drain-back function | | | |
| 10. Closed circuit is filled correctly with correct concentration of inhibitor. No leaks detected | | | |
| 11. Solar flow and return pipe work is adequately insulated | | | |
| 12. Closed circuit fluid flow through collector array is correctly balanced | | | |
| 13. Check that potable water connections and in-tank boost connections (if applicable) are correct | | | |
| 14. Potable water circuit is purged of air and fully flooded. No leaks detected | | | |
| 15. All isolation valves in the potable & closed circuit are opened | | | |
| 16. Power rating of in tank boost plant does not exceed the TPR rating of the Heat Store | | | |
| 17. Electrical supply is correctly sized to suit the load of the heating elements (if applicable) | | | |
| 18. Gas supply pipe work is adequately sized and at correct pressure (if applicable) | | | |
| 19. Correct gas type is available to suit gas appliance (if applicable) | | | |
| 20. All internal gas products are flued correctly (if applicable) | | | |
| 21. Temperature controller parameters are adjusted to the desired settings | | | |
| 22. Owner / Site Manager is correctly instructed on the system use | | | |

---------- ---------- ----------

Technician Manager Client Representative

# RHEEM HEAT STORE SERIES II WARRANTY
# – AUSTRALIA ONLY –

## 1. THE RHEEM WARRANTY – GENERAL

1.1 This warranty is given by Rheem Australia Pty Limited ABN 21 098 823 511 of 1 Alan Street, Rydalmere New South Wales.

1.2 Rheem offer a trained and qualified national service network who will repair or replace components at the address of the water heater subject to the terms of the Rheem warranty. Rheem Service, in addition can provide preventative maintenance and advice on the operation of your water heater. The Rheem Service contact number is available 7 days a week on 131031 with Service personnel available to take your call from 8am to 8pm daily (hours subject to change).

1.3 For details about this warranty, you can contact us on 131031 or by email at warrantyenquiry@rheem.com.au (not for service bookings).

1.4 The terms of this warranty are set out in section 2 and apply to water heaters manufactured after 1st May 2012.

1.5 If a subsequent version of this warranty is published, the terms of that warranty will apply to water heaters manufactured after the date specified in the subsequent version.

## 2. TERMS OF THE RHEEM WARRANTY AND EXCLUSIONS TO IT

2.1 The decision of whether to repair or replace a faulty component is at Rheem's sole discretion.

2.2 If you require a call out and we find that the fault is not covered by the Rheem warranty, you are responsible for our standard call out charge. If you wish to have the relevant component repaired or replaced by Rheem, 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 Rheem warranty.

2.4 Where the water heater is installed outside the boundaries of a metropolitan area as defined by Rheem or further than 25 km from either a regional Rheem branch office or an Accredited Rheem Service Agent's office, the cost of transport, insurance and travelling between the nearest branch office or Rheem Accredited Service Agent's office 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 Rheem water heater in its original installed location and any genuine Rheem replacement parts.

2.7 The Rheem 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 Rheem Service or a Rheem Accredited Service Agent.

f) Faulty plumbing or faulty 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.

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 If the water heater is not sized to supply the hot water demand in accordance with the guidelines in the Rheem water heater literature, any resultant fault will not be covered by the Rheem warranty.

## HEAT STORE SERIES 2 WARRANTY

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

3.1 Rheem 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 in which the fault must appear in order to be covered | What coverage you receive |
|---|---|---|
| **All** components | Year 1 | Repair and/or replacement of the faulty component, free of charge, including labour. |
| **The cylinder** (if the water heater is installed in a single-family domestic dwelling) | Years 2 & 3 | Repair and / or replacement of the cylinder, free of charge, including labour. |
| | Years 4 & 5 | Replacement cylinder, free of charge. Installation and repair labour costs are the responsibility of the owner. |
| **The cylinder** (if the water heater is not installed in a single-family domestic dwelling) | Years 2 & 3 | Replacement cylinder, free of charge. Installation and repair labour costs are the responsibility of the owner. |
| **The solar collector** (all installations) | Years 2 to 5 | Replacement solar collector, free of charge. Installation and repair labour costs are the responsibility of the owner. |

3.2 If a government rebate has been received for the water heater, the duration of the protection afforded by this warranty may be greater than what is set out above. Please call 131031 for details.

### 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 Rheem Service 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.

b) Is not installed in Australia.

### 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 Rheem on 131031 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).

b) Rheem will arrange for the water heater to be tested and assessed on-site.

c) If Rheem determines that you have a valid warranty claim, Rheem 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 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 Rheem warranty (set out above) is in addition to any rights and remedies that you may have under the Australian Consumer Law.

**RHEEM AUSTRALIA PTY LTD**, A.B.N. 21 098 823 511, www.rheem.com.au
For Service Telephone 131 031 AUSTRALIA or 0800 657 335 NEW ZEALAND