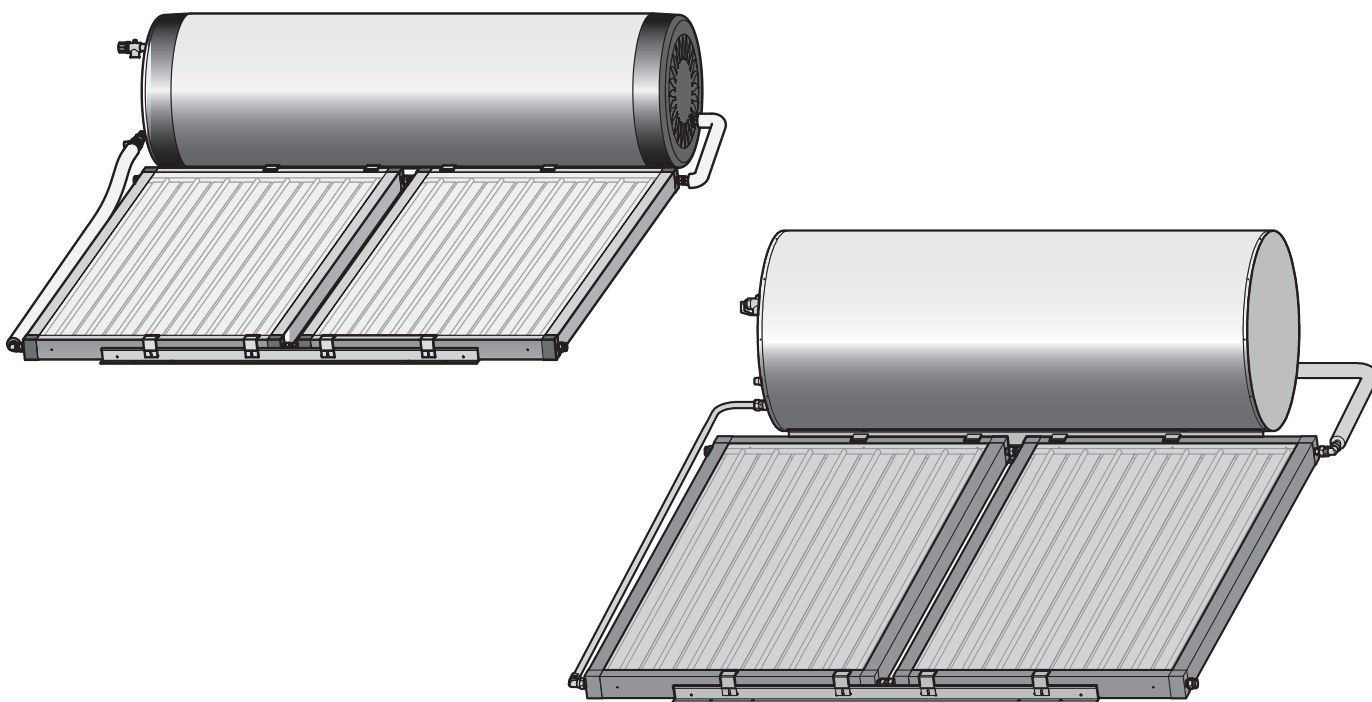


# Rinnai

## Operation / Installation Manual

### RINNAI CLOSE COUPLED SOLAR HOT WATER SYSTEMS



NOTE

The appliance must be installed, commissioned and serviced by an authorised person in accordance with all applicable local rules and regulations.



NOTE

Certain systems may require some components to be supplied by the Installer.

NOT SUITABLE AS A POOL OR SPA HEATER.



The Australian  
Gas Association  
All Rinnai gas products  
are A.G.A. certified.

Certified  
Product



WaterMark  
AS3498 Lic W169  
SAI Global



N10378

Certified  
Product



WaterMark  
AS3498 Lic W208  
SAI Global

15401022

**This manual is applicable to:**

- Rinnai 'Prestige'® Stainless Steel Close Coupled Solar Hot Water Systems.**
- 'Equinox'® Stainless Steel and Glass Lined Close Coupled Solar Hot Water Systems.**
- Rinnai 'Sunmaster®' Glass Lined Close Coupled Solar Hot Water Systems.**

# TABLE OF CONTENTS

<b>IMPORTANT INFORMATION &amp; WARNINGS .....</b>	<b>1</b>
SAFETY & REGULATORY INFORMATION .....	1
SCALDS HAZARDS .....	2
OPERATION PRINCIPLE.....	3
SAFETY DEVICES.....	4
EXCESSIVE DISCHARGE FROM SAFETY DEVICES .....	4
WATER TEMPERATURE .....	5
TURNING ' <b>OFF</b> ' THE WATER HEATING SYSTEM .....	5
TURNING 'ON' THE WATER HEATING SYSTEM.....	5
WATER QUALITY.....	5
DRAINING AND FILLING THE WATER HEATING SYSTEM.....	6
MAINTENANCE AND REGULAR CARE .....	6
SERVICING AND REPAIR .....	6
<b>SAVE A SERVICE CALL.....</b>	<b>7</b>
SYSTEM SPECIFICATIONS .....	9
<b>SPECIFICATIONS .....</b>	<b>9</b>
SYSTEM DIMENSIONS - STAINLESS STEEL CYLINDERS .....	10
COLLECTOR SPECIFICATIONS .....	12
GAS BOOSTER SPECIFICATIONS.....	12
REGULATIONS AND OCCUPATIONAL HEALTH AND SAFETY (OH&S).....	13
LOCATION .....	13
WATER PIPES .....	13
<b>INSTALLATION INFORMATION .....</b>	<b>13</b>
WATER SUPPLY .....	14
HOT WATER DELIVERY TEMPERATURE.....	14
VALVES AND FITTINGS .....	15
SYSTEM ORIENTATION AND INCLINATION.....	16
ROOF MOUNTING OPTIONS .....	17
<b>INSTALLATION OF SOLAR COLLECTORS &amp; CYLINDERS.....</b>	<b>19</b>
STANDARD INSTALLATION .....	19
STANDARD INSTALLATION CONTINUED.....	23
ROOF PITCH GREATER THAN 30° .....	24
FRAMED INSTALLATIONS - FLAT, REVERSE AND SIDE PITCH.....	25
<b>INSTALLATION OF SOLAR COLLECTORS &amp; CYLINDERS.....</b>	<b>25</b>
GAS BOOSTER LOCATION .....	40
GAS SUPPLY .....	40
HOT WATER DELIVERY TEMPERATURE.....	40
SMARTSTART® .....	40
<b>INSTALLATION &amp; MAINTENANCE - GAS BOOSTED SYSTEMS .....</b>	<b>40</b>
CLEARANCES .....	42
INSTALLATION PROCEDURE.....	43
FILLING THE SYSTEM .....	44
PRE SOLAR HEATING CHECKS .....	44
SOLAR HEATING.....	45
FINISHING THE INSTALLATION .....	45
DRAINING INSTRUCTIONS .....	45
<b>INSTALLATION &amp; MAINTENANCE - ELECTRIC SYSTEMS.....</b>	<b>46</b>
INSTALLATION PROCEDURE.....	46
FILLING THE SYSTEM .....	47
PRE SOLAR HEATING CHECKS .....	48
SOLAR HEATING.....	48
FINISHING THE INSTALLATION .....	48
DRAINING INSTRUCTIONS .....	48
<b>CONTACT INFORMATION.....</b>	<b>52</b>

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# IMPORTANT INFORMATION & WARNINGS

## SAFETY & REGULATORY INFORMATION



**DO NOT** operate this system before reading the manufacturers instructions.

This appliance must be installed, commissioned and serviced by an authorised person in accordance with all applicable local rules and regulations.

Access covers of water heating system components will expose 240V wiring and **MUST** be removed by an authorised person.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

For continued safety of this appliance it must be installed, operated and maintained in accordance with the manufacturers instructions.

Children should be supervised to ensure they **DO NOT** play with the appliance.

Any power leads from the water heater system components **MUST BE** plugged into an external weatherproof electrical outlet. If the power supply cord of any water heating components is damaged, it **MUST BE** replaced by an authorised person in order to avoid a hazard, using genuine replacement parts available from Rinnai. Take care not to touch the power plugs with wet hands.

Care should be taken not to touch the pipe work as it may be **HOT!** The pipes between the solar collectors and storage cylinder **MUST BE** copper, or alternative material pipes that may be supplied by Rinnai. Plastic pipe is **NOT** suited to the water temperatures and pressures that may occur in the system.

**DO NOT** place articles on or against this appliance.

**DO NOT** store chemicals or flammable materials near this appliance.

**DO NOT** operate with collectors or covers removed from this appliance.

**DO NOT** activate pump unless cylinder is full of water.

**NEVER** use a flammable spray such as hair spray, lacquer, paint, etc near this unit as this may cause a fire.

## NOTICE TO VICTORIAN CONSUMERS

This appliance must be installed by a person licensed with the Plumbing Industry Commission.

Only a licensed person will have insurance protecting their workmanship.

So make sure you use a licensed person to install this appliance and ask for your Compliance Certificate.

For Further information contact the Plumbing Industry Commission on 1800 015 129.

# IMPORTANT INFORMATION & WARNINGS

## SCALDS HAZARDS



**HOT WATER CAN CAUSE SCALDS.**

**CHILDREN, DISABLED, ELDERLY AND THE INFIRM ARE AT THE HIGHEST RISK OF BEING SCALDED.**

**FEEL WATER TEMPERATURE BEFORE BATHING OR SHOWERING.**

**SCALDS FROM HOT WATER TAPS CAN RESULT IN SEVERE INJURIES TO YOUNG CHILDREN.**

**SCALDS OCCUR WHEN CHILDREN ARE EXPOSED DIRECTLY TO HOT WATER WHEN THEY ARE PLACED INTO A BATH WHICH IS TOO HOT.**

### **ALWAYS.....**

**Test the temperature of the water with your elbow before placing your child in the bath, also carefully feel water before bathing or showering yourself.**

**Supervise children whenever they are in the bathroom.**

**Make sure that the hot water tap is turned off tightly.**

### **CONSIDER.....**

**Installing child proof tap covers or child resistant taps (both approaches will prevent a small hand being able to turn on the tap).**

**Installing tempering valves or thermostatic mixing valves which reduce the hot water temperature delivered to the taps. Your local plumbing authority may already require that these be fitted. Contact your installer or local plumbing authority if in doubt.**

### **NEVER.....**

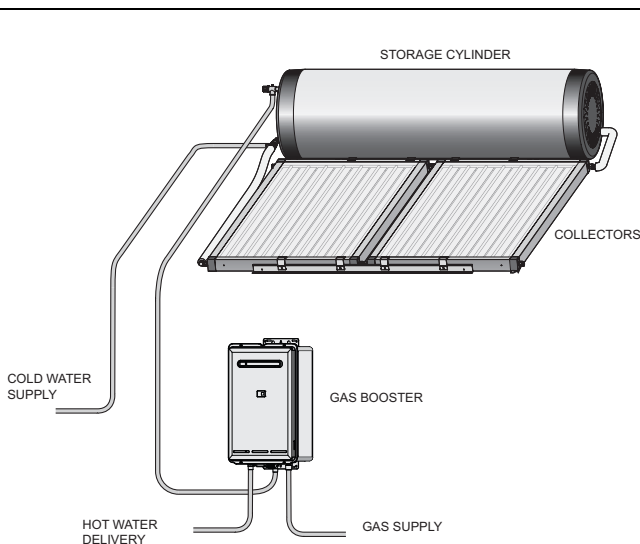
**Leave a toddler in the care of another child. They may not understand the need to have the water temperature set at a safe level.**

# IMPORTANT INFORMATION & WARNINGS

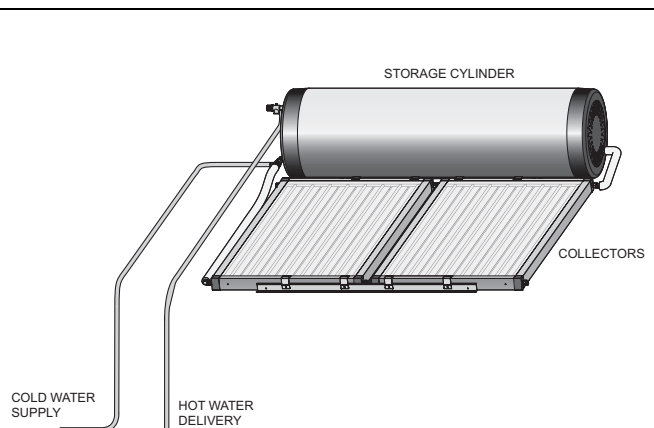
## OPERATION PRINCIPLE

Close Coupled systems are designed to have the solar collectors on the roof and the storage cylinder above the collectors, all mounted using available mounting brackets. Electric and Gas boosted models are available. The system comprises of a hot water storage cylinder and solar collectors. The Close Coupled Solar System uses thermo-syphoning principle to circulate the water through the collectors and then to the storage cylinder without the need for a pump.

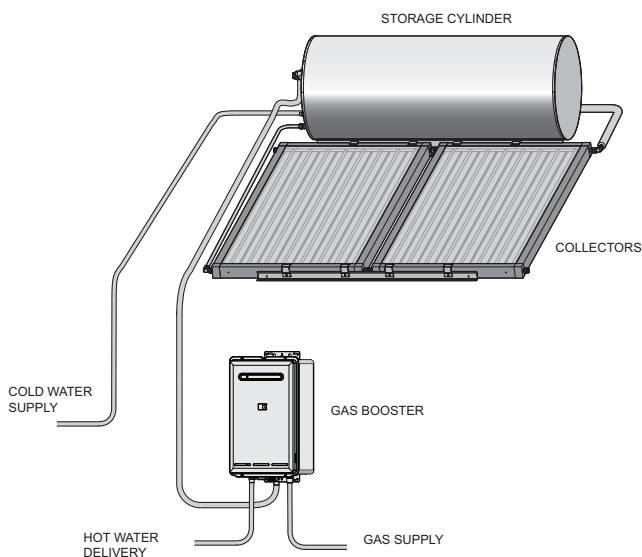
Supplementary heating is provided if insufficient heat is available from sun (such as during cloudy or rainy weather or during winter months) either via an electric heating element located inside the storage cylinder or via a Gas booster located external to the storage cylinder. The following diagrams illustrates the Close Coupled Solar Hot Water System set up for both the Electric and Gas boosting.



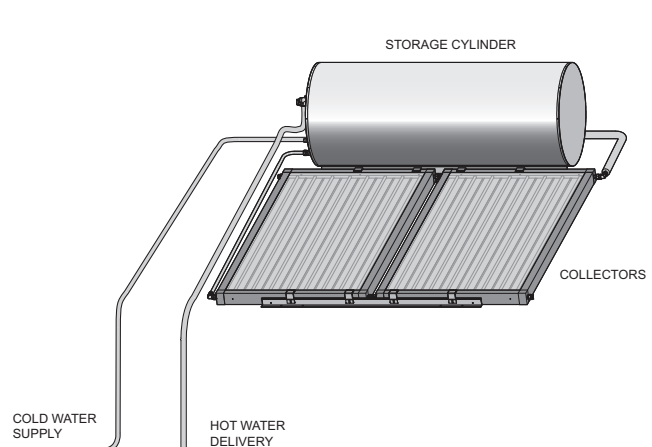
**Figure 1. Close Coupled Stainless Steel Gas Boosted Solar Hot Water Systems**



**Figure 2. Close Coupled Stainless Steel Electric Boosted Solar Hot Water Systems**



**Figure 3. Close Coupled Glass Lined Gas Boosted Solar Hot Water Systems**



**Figure 4. Close Coupled Glass Lined Electric Boosted Solar Hot Water Systems**

# IMPORTANT INFORMATION & WARNINGS

## SAFETY DEVICES

The water heating system is supplied with various safety devices including temperature sensors, overheat sensors and switches and a Pressure & Temperature Relief (PTR) valve. These devices must not be tampered with or removed. The water heating system must not be operated unless each of these devices is fitted and is in working order.



**DO NOT tamper with or remove safety devices.**

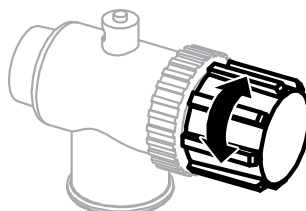
**DO NOT operate the water heater unless all safety devices are fitted and in working order.**

**DO NOT block or seal the PTR Valve and drain pipe.**

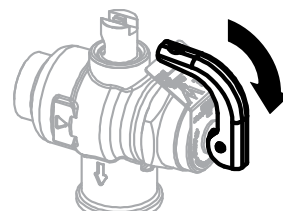
### Pressure & Temperature Relief (PTR) Valve

This valve is located near the top of the water heater and is essential for safe operation. It is normal for the valve to release a small quantity of water through the drain line during heating.

However, continuous leakage of water from the valve and its drain line may indicate a problem with the water heater.



Twist cap until water flows from drain line



Lift lever until water flows from drain line  
(Lower lever gently!)



**Never block the outlet of the PTR valve or its drain line for any reason. The easing gear must be operated at least every 6 months to remove lime deposits and verify that it is not blocked. Failure to do this may result in the water heater failing.**

**If the valve does not discharge water when the easing gear lever is opened, or does not seal again when the easing gear is closed, attendance by an authorised person must be arranged without delay. The PTR valve is not serviceable.**

## EXCESSIVE DISCHARGE FROM SAFETY DEVICES

### Pressure & Temperature Relief (PTR) Valve

It is normal and desirable that this valve allows a small quantity of water to be discharged during the heating cycle. If it discharges more than a bucket of water during a 24 hour period or discharges continuously there may be another problem.

If the valve dribbles continuously, try easing the valve gear for a few seconds as described above. This may dislodge any foreign matter and alleviate the problem.

If the valve discharges at high flows, especially at night, it may be as a result of the water pressure exceeding the design pressure of the water heater. Ask your installer to fit a Pressure Limiting Valve (PLV).



**NEVER replace the PTR valve with one which has a higher pressure rating than is specified for your water heater.**

### Expansion Control Valve (ECV) - if fitted

It is normal and desirable that this valve allows a small quantity of water to be discharged during the heating cycle. If it discharges more than a bucket of water during a 24 hour period or discharges continuously there may be another problem.

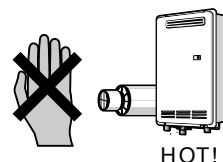
If the valve leaks continuously, try easing the valve gear for a few seconds. This may dislodge any foreign matter and alleviate the problem. If this does not alleviate the problem contact Rinnai.

Operate the easing gear regularly to remove any lime deposits and to verify that it is not blocked.

# IMPORTANT INFORMATION & WARNINGS

## Gas boosted models

- Do not touch the flue outlet or do not insert any objects into the flue outlet.
- Keep flammable materials, spray cans, fuel containers, trees, shrubs and pool chemicals etc. well clear of the flue outlet.
- Do not use the gas types other than those designated on the data plate. For example, do not use Propane/Butane gas mixtures on appliances marked Propane Gas.
- Do not use Propane gas on appliances marked as Natural gas and vice versa.



## Hydrogen Gas

In the case of systems using a vitreous enamelled lined cylinder, if the hot water unit is not used for two weeks or more, a quantity of hydrogen gas, which is highly flammable, may accumulate in the water heater. To dissipate this safely, it is recommended that a non electrically operated hot tap be turned on for two minutes at a sink, basin, or bath, but not a dishwasher or other appliance. During this procedure there must be no smoking, open flame or any electrical appliance operating nearby. If hydrogen is discharged through the tap, it will probably make a sound like air escaping.

## WATER TEMPERATURE

The water gets heated by the solar energy contributed from the sun and heats the water until the water at the base of the storage cylinder reaches approximately 65°C. At this time water at the hot outlet can be up to 88°C. Continued heating is prevented by the 'No Load' protection, a Thermo-arrestor (TA) valve that prevents water passing from the cylinder to the collectors. During periods of low solar gain, supplementary heating occurs to a minimum of 60°C as required.



**To meet Australian regulatory requirements, supplementary heating temperature settings must be at least 60°C.**

## TURNING 'OFF' THE WATER HEATING SYSTEM

If you plan to be away for only a few nights, we suggest you leave the water heating system switched on. If it is necessary to switch off the water heater, do so as outlined below:

### Electric Boosted systems

- Switch off the electric supply to the supplementary heating element. The switch is usually marked and located in the electricity meter box of the dwelling.
- Switch off the electric supply to the solar controller and pump.

### Gas Boosted systems

- Switch off the electric supply to the gas booster.
- Switch off the electric supply to the solar controller and pump.

## TURNING 'ON' THE WATER HEATING SYSTEM

### Electric Boosted system

- Switch on the electric supply to the supplementary heating element(s). The switch is usually marked and located in the electricity meter box of the dwelling.
- Electric and solar water heating will now occur as required. It may take a number of hours before hot water is available.

### Gas Boosted systems

- Switch on the electric supply to the gas booster.
- Solar water heating will now occur. Hot water is available immediately from the gas booster when hot water tap is opened, irrespective of solar heat gain.

## WATER QUALITY

The water quality of most public supplies is suitable for the water heating system. The water quality from bore wells is generally unsuitable for the water heating system. Refer to separate 'Warranty Terms and Conditions' document for water quality parameters and how they affect the warranty conditions. If in doubt about the water quality, have it checked against the parameters listed in the warranty conditions. The system is not suitable as a pool or spa heater.

# IMPORTANT INFORMATION & WARNINGS

## **DRAINING AND FILLING THE WATER HEATING SYSTEM**

- Draining or filling normally occur only during installation or servicing and must be carried out by an authorised person.

## **MAINTENANCE AND REGULAR CARE**

Operate the easing gear of the PTR as described under "SAFETY DEVICES" on page 4.

## **SERVICING AND REPAIR**

Our Servicing network personnel are fully trained and equipped to give the best service on your appliance. If your appliance needs service, ring one of the service contact numbers on the back of this booklet.

It is recommended that the system be serviced at least every 5 years.

The pressure and temperature relief valve and expansion control valve must be checked for performance or replaced by an authorised person at intervals not exceeding 5 years or more frequently in areas where the water is classified as scaling water (refer to 'Warranty Terms and Conditions' document - 'Water Quality').

If the electric conduit, power supply cord or plug to the water heater is damaged, they must be replaced by an authorised person in order to avoid a hazard.

# SAVE A SERVICE CALL

Before contacting Rinnai for service, follow the fault finding guide. If problems persist or this information doesn't answer your questions, contact Rinnai on the phone number on the back of this manual.

Service call outs attending to any condition or fault that is not related to Rinnai products or components may be chargeable.

CONDENSATION IN COLLECTORS	
<b>Condensation in solar collectors</b>	<ul style="list-style-type: none"> <li>There is a small amount of ventilation between atmosphere and the internals of the solar collector to ensure efficient operation. Under certain weather conditions, water vapour naturally present in the air may condense on the inside surface of the collector glass. This does not affect the performance of the system. If you are concerned contact Rinnai to discuss.</li> </ul>
NOISY SOLAR COLLECTORS	
<b>Noise from solar collectors</b>	<ul style="list-style-type: none"> <li>Occasionally on days of high solar gain, the water temperature in the collector may become very high. The noise may be similar to a boiling kettle, or an expanding contracting metallic sound. The collector is designed to withstand these conditions, and no action is needed, unless it is extreme. Contact Rinnai to discuss if you have any concerns.</li> </ul>
NO WATER FROM THE HOT TAP	
<b>Restriction in the hot tap or failure of the cold water supply to the heater</b>	<ul style="list-style-type: none"> <li>Check for water flow at the other hot taps and that the cold water isolation valve is fully open.</li> </ul>
WATER HAMMER	
<b>Hot and cold water plumbing in the premises</b>	<ul style="list-style-type: none"> <li>Contact your installer or a plumber to discuss checking the clipping of hot and cold water pipe work and install a pressure limiting valve or water hammer arrestor as required.</li> </ul>
INSUFFICIENT OR NO HOT WATER	
<b>Excessive hot water consumption</b>	<b>Electric Boosted Systems:</b> <ul style="list-style-type: none"> <li>Often people are surprised at the amount of hot water used, especially when showering. If the amount of hot water used during the day exceeds the storage capacity of the cylinder, it is likely that there will be insufficient hot water.</li> </ul>
	<b>Gas Boosted Systems:</b> <ul style="list-style-type: none"> <li>Insufficient flow may occur if multiple outlets are in use at the same time and exceed the rated flow capacity of the gas booster. If so, reduce the number of outlets in use.</li> <li>Consider discussing with your installer, fitting water saving fixtures and/or flow control or pressure limiting valves to reduce consumption.</li> </ul>
<b>Incorrect solar system size</b>	<ul style="list-style-type: none"> <li>The system may not have been adequately sized to suit the household.</li> </ul>
<b>Temperature and pressure relief valve / expansion control valve discharging water continuously</b>	<b>PTR Valves &amp; ECV Valves (if fitted)</b> <ul style="list-style-type: none"> <li>It is normal and desirable that this valve allows a small quantity of water to be discharged during the heating cycle. If it discharges more than a standard bucket of water during a 24 hour period or discharges continuously there may be another problem</li> <li>If the valve dribbles continuously, try easing the valve gear for a few seconds as described under 'Regular Care'. This may dislodge any foreign matter and alleviate the problem.</li> <li>If the valve discharges at high flows, contact your installer or Rinnai to discuss.</li> </ul>

# SAVE A SERVICE CALL

## INSUFFICIENT OR NO HOT WATER (cont)

**Booster heating not operating or insufficient gas supply for gas boosted heating system**

### Electric boosted Systems:

- Check to ensure the electric isolating switch(es) at the switchboard (usually marked "Hot water" or "water heater") is switched 'ON'.
- Check to ensure that the electric fuses for hot water at the switchboard are intact.
- If running on Off-Peak, discuss boosting times with electricity supplier.

### Gas Boosted Systems:

- Check to ensure the power cord of the gas booster is plugged in and switched 'on'
- Check gas is available and the isolation valve is opened.
- Close the hot tap and wait for 10 seconds and open it again. The hot tap must be opened enough to ensure that the flow rate is sufficient to light the gas booster.
- Check if there is gas supply to other appliances in the rest of the house.

**Booster thermostat settings**

### Electric Boosted Systems:

- Check the temperature of hot water delivered with a thermometer placed under the closest outlet (usually the kitchen sink) on a non-tempered hot water line.
- This test should be done early in the morning after overnight electrical boosting before any hot water is used. The temperature of the water delivered should be at least 55°C (allowing for heat losses in pipe work).
- If this is not the case or the temperature may need to be increased. Contact your installer or Rinnai to discuss adjusting the thermostat.

## HIGH ELECTRICITY OR GAS BILL

**Hot water usage patterns**

### Electric Boosted Systems:

- If using an electrically boosted system, the time of use of the water may affect whether heating is done by electric element or solar energy. This is because the same cylinder stores both solar heated water and electrically heated water stored in. As the element is in the middle half of the tank can be heated each night by the booster element.
- If the bulk of hot water is used in the morning, there will be cold water in the cylinder for the sun to heat during the day leading to lower electricity usage.
- If the bulk of the hot water is used in the evening, the electric element will reheat half of the water overnight. In the morning there will only be half a cylinder of water for the sun to heat.
- Consider changing your usage pattern to optimise solar energy usage.

**High electricity cost**

### Electric Boosted Systems:

- The electricity tariff will determine the running costs of the system.
- Contact the electricity supplier to confirm what these tariffs are.
- See entry under 'Insufficient or No Hot Water'

**Temperature and pressure relief valve / expansion control valve discharging water continuously**

**Lack of solar gain**

- Reduced sunlight due to overcast weather in summer or low solar contribution in winter will result in an increased dependence on electricity or gas boosting. Higher electricity or gas bills under these conditions, especially in winter, are normal.
- If the solar collectors are shaded by trees or other objects, or the glass is dirty, the effectiveness of the collectors is greatly reduced. Arrange for trimming of the trees or relocation of the solar collectors if the obstruction is permanent. Arrange for cleaning of the collector glass
- Solar collectors incorrectly positioned will also severely affect the solar gain. Check that positioning and alignment of solar collectors is in accordance with "System Orientation and Inclination" later in this manual

# SPECIFICATIONS

## SYSTEM SPECIFICATIONS

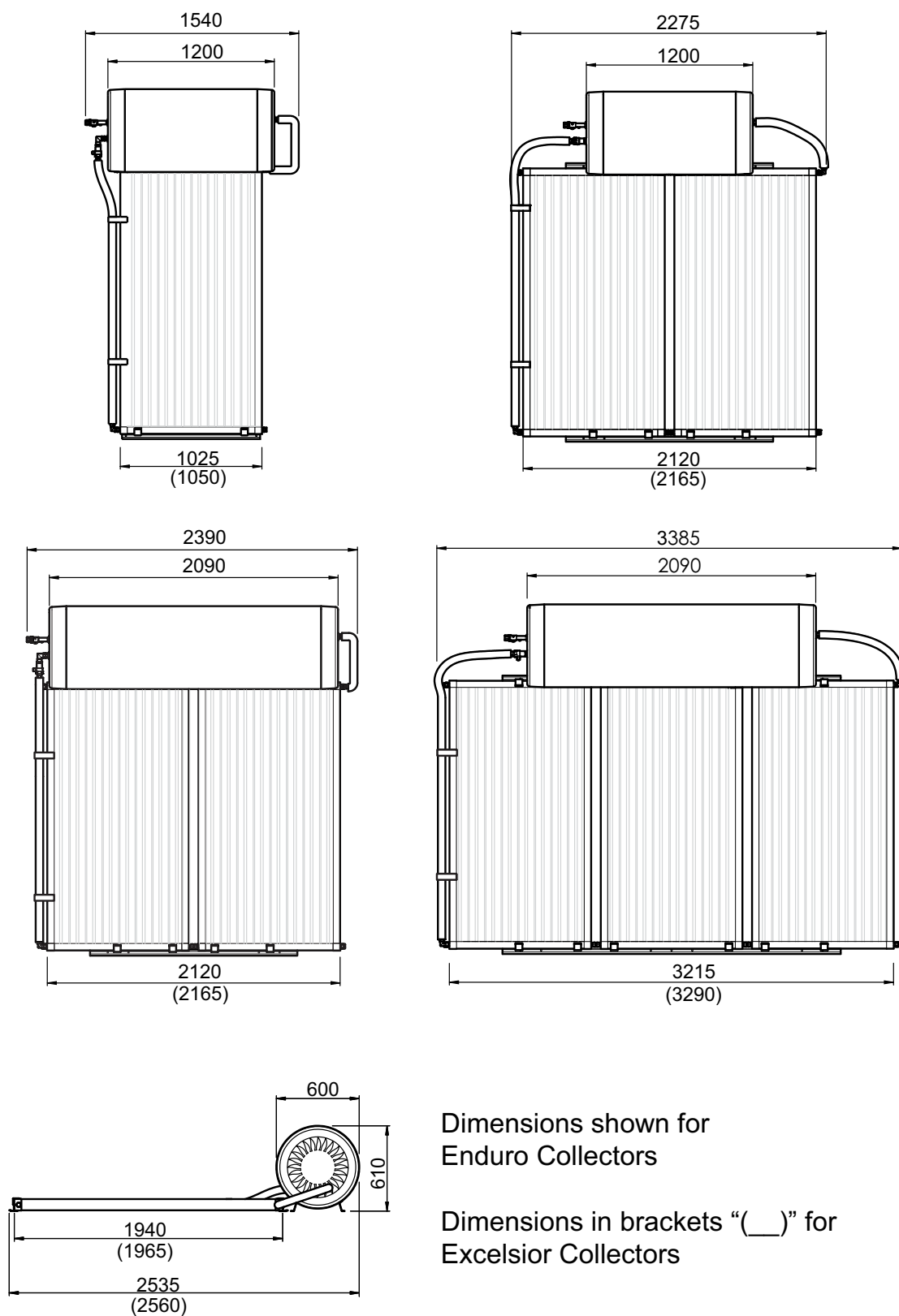
Close Coupled hot water systems are specified according to the cylinder capacity, number of solar collectors and boost type and capacity. Boost capacity for gas boosted system depends on the gas booster model selected. Boost capacity for electrically boosted systems depends on the power rating of the electric heating element.

Specifications and principal dimensions for the various systems are shown below:

<b>Table 2 - Systems Specifications</b>	
<b>Connections</b>	
- Solar flow and return	3/4"
- PTR Valve	3/4"
- Cold Inlet	3/4"
- Hot Outlet	3/4"
PTR Valve setting (kPa)	850
Rating of PTR Valve supplied (kW)	10
Expansion Control Valve (ECV) setting (kPa) - Supplied by Installer if required	700
Max supply pressure with ECV (kPa)	500
Max supply pressure without ECV (kPa)	700
Pressure limiting valve rating (kPa) - Supplied by Installer if required	500
Electric Element Power Rating for Electric Systems (kW)	2.4, or 3.6 standard 1.8 or 4.8 available separately for stainless steel cylinders. 4.8 available for glass lined cylinders.
Gas Booster	S20, S26, S26i (Internal), & S32 or other Rinnai INFINITY Models converted to Solar. * (Refer to section on gas booster specifications)

# SPECIFICATIONS

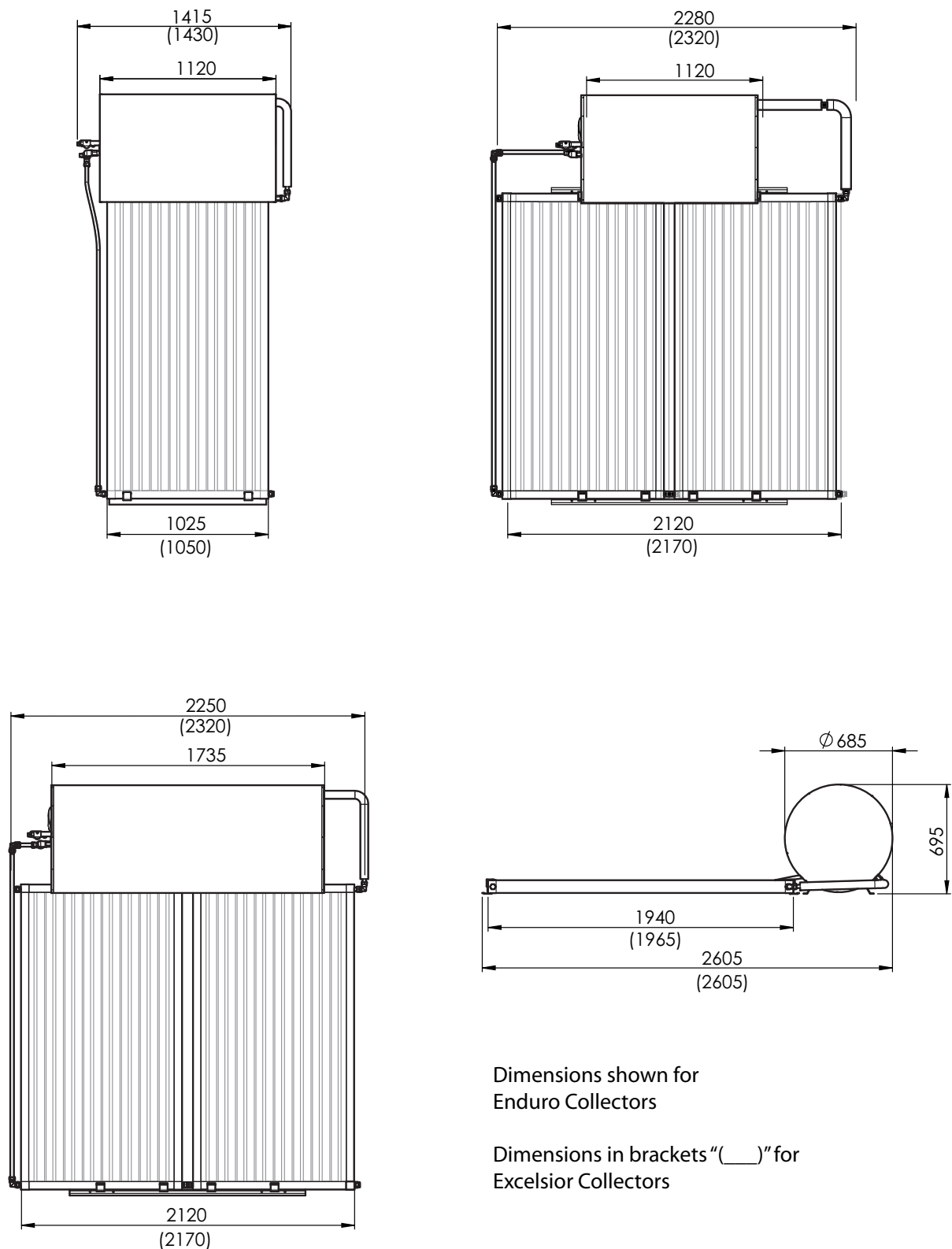
## SYSTEM DIMENSIONS - STAINLESS STEEL CYLINDERS



**Figure 5 - System Dimensions Stainless Steel Cylinders**

# SPECIFICATIONS

## SYSTEM DIMENSIONS - GLASS LINED CYLINDERS



**Figure 6 - System Dimensions Glass Lined Cylinders**

# SPECIFICATIONS

## COLLECTOR SPECIFICATIONS

**Table 4 - Collectors Specifications**

MODEL NUMBERS AND SPECIFICATIONS		
CHARACTERISTICS	ENDURO (SP200A) or (SP200A FTC)	EXCELSIOR (EXT OR EXT FTC)
TYPE	Flat plate	Flat plate
CONSTRUCTION		
- Waterways	Copper	Copper
- Absorber	Aluminium	Copper
- Selective Surface	High Performance	Sputtered Titanium Oxide
Maximum Operating Pressure	850 kPa	
Casing Material	Aluminium	
Overall Dimensions (L x W x H) (mm)	1940 x 1025 x 80	1964 x 1047 x 81
Weight empty (STD/FTC) (kg).	33 / 35	35 / 38
Water volume (Litres)	1.3	1.5
Number risers	8	10
Potential Solar Output at PTR relief conditions (kW)	1.25	
Frost Protection	* Standard version - no frost protection FTC Version - Frost Protection to -5°C	
	* FOR MORE INFORMATION ON FROST PROTECTION REFER TO WARRANTY BOOKLET	

## GAS BOOSTER SPECIFICATIONS

**\* Table 5 - Gas Boosters Specifications**

Model Name		S20	S26	S26i *	S32 *
Boost Capacity:	(L/min)				
- L/min. @ 20°C rise		20	26	26	37
- L/min @ 25°C rise		16	24	24	32
Maximum Rated Flow:	(L/min)	20	26	26	37
Minimum Water Supply Pressure for Maximum rated flow: <sup>(1)</sup>	(kPa)	120	200	200	180
Frost Protection:		Yes			
Gas Consumption (Maximum / Minimum):	(MJ/ Hr)	125 - 18	188 - 23	188 - 14	250 - 21
Hot Water Delivery Temperature: <sup>(2)</sup>		70°C			
Dimensions: Height x Width x Depth:	(mm)	530 x 350 x 194			600 x 470 x 244
Weight:	(Kg)	15	21	15	29

<sup>(1)</sup> - Units will operate at lower pressures but the rated flow will not be achieved.

<sup>(2)</sup> - Gas boosters for Solar hot water applications must be set by Rinnai to deliver a minimum temperature of 70°C. Solar Gas boosters will be marked as Solar. Units not marked 'Solar' MUST NOT be used.

\* These models are made to order.

# INSTALLATION INFORMATION

## REGULATIONS AND OCCUPATIONAL HEALTH AND SAFETY (OH&S)



Installation and commissioning must be performed by authorised persons. Rinnai solar systems must be installed in accordance with these instructions and all regulatory requirements which exist in your area including those in relation to manual lifting, working at heights and on roofs. Applicable publications and regulations may include:

- AS/NZS 5601 Gas Installations
- AS/NZS 3500 National Plumbing and Drainage
- AS/NZS 3000 Wiring rules
- Building Codes of Australia (BCA)
- Local Occupational Health and Safety (OH&S) regulations

This appliance is not suitable for use as a domestic spa pool or swimming pool heater.

Solar collectors and cylinders are heavy and bulky items and are usually positioned on the roofs of buildings. Australian State and Territories have a principal Occupational Health and Safety (OH&S) Act which contains requirements relating to the handling of large, bulky or awkward items and the prevention of falls from elevated surfaces. Persons installing solar collectors must be aware of their responsibilities and be adequately trained and qualified, in accordance with local OH&S requirements.

## LOCATION

### System Location

Select suitable areas of roof on which to install the solar collectors and cylinder. It is essential that the roof structure is suitable for the solar collector/cylinder combination and can support the weight of these items when full of water. It is the installers responsibility to ensure the roof can safely support the system and to visually check the roof, and if there is any damage that requires attention (such as cracked tiles etc.), to inform the owner. If this affects the safe installation of any part of the system, installation should not proceed until the damage has been rectified. Collectors should be positioned for optimum solar benefit. Refer to section "SYSTEM ORIENTATION AND INCLINATION" on page 16 for more information.

All system components must be in an accessible location. Sufficient clearances shall allow access to, and removal of, all serviceable parts. Ensure the PTR valve, drain lines, thermostat and elements for electric systems have sufficient clearances and are accessible for service and removal. The information on any data plates must also be readable.

All electrically boosted solar hot water heating elements must be connected to an independent, fused, AC 240V 50 Hz power supply with an isolating switch installed at the switch board.

### Gas Booster Location (where applicable)

The S20, S26, S26i or S32 gas boosters are designed for 'Outdoor' Installation only. As such, it must be located in an above ground open air situation with natural ventilation, without stagnant areas, where gas leakage & products of combustion are rapidly dispersed by wind and natural convection.

If an internal model which has been converted to a solar gas booster follow information supplied with the unit for location, mounting and flueing requirements.

## WATER PIPES

All hot water pipework should be insulated with sealed Polyethylene foamed or equivalent insulation to optimise performance and energy efficiency. Such insulation may also be mandatory under local regulations. With the exception of solar collector flow and return pipes, water pipe sizing and insulation thickness should be accordance with AS/NZS 3500.



- The collector flow and return pipes must be 3/4" copper tube or alternative material pipe supplied by Rinnai. Plastic pipe must not be used between collectors and cylinder or booster. Plastic pipe is not suited to the high water temperatures and pressures that may occur in the collector flow and return system.

# INSTALLATION INFORMATION

## WATER SUPPLY

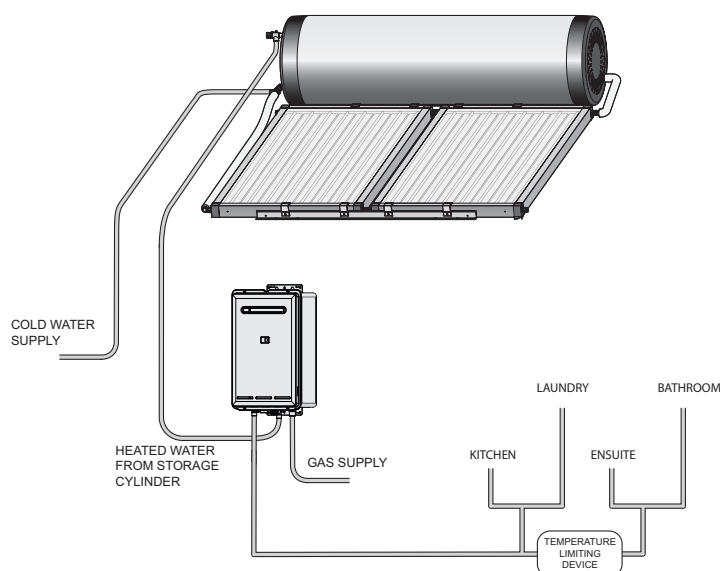
The minimum and maximum water pressures for the various systems are listed in **Table 5**. Approved pressure limiting valves may be required if the 'Maximum' rated water supply pressures are exceeded. For gas boosted systems to achieve the rated flow through the outlet of the continuous flow water heater, the minimum water supply pressures must be supplied.

The systems will operate at lower pressures but the rated flow will not be achieved.

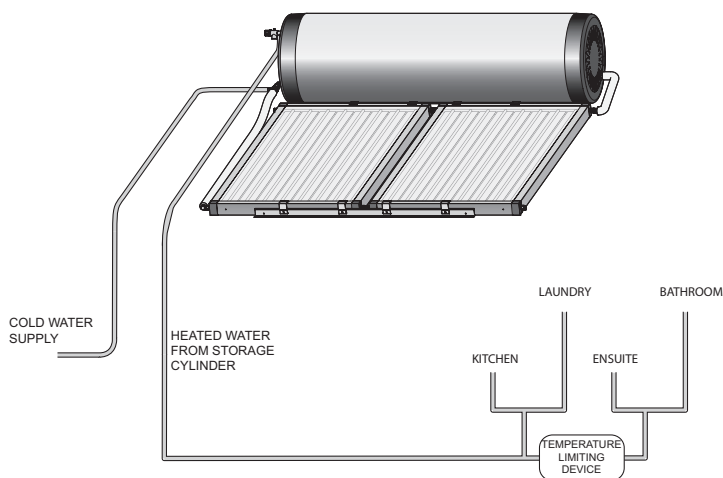
Water chemistry and impurity limits are detailed in the separate 'Warranty conditions' document. Most metropolitan water supplies fall within these requirements. If you are unsure about water quality, contact your water authority. If sludge or foreign matter is present in the water supply, a suitable filter should be incorporated in the water supply to the storage cylinder.

## HOT WATER DELIVERY TEMPERATURE

Local regulations and/or the requirements of AS/NZS 3500.4 must be considered regarding the temperature limitations of hot water supplied to areas used primarily for personal hygiene. The temperature of water to these areas is limited to 45°C for early childhood centres, primary and secondary schools and nursing homes or similar facilities for young, aged, sick or people with disabilities and 50°C for all other buildings. To comply with these requirements, a temperature limiting device, such as a thermostatic mixing or tempering valve, will be required on all solar hot water systems as detailed in **Figures 7 and 8**.



**Figure 7 - Tempered Gas hot water systems**



**Figure 8 - Tempered Electric hot water systems**

# INSTALLATION INFORMATION

## VALVES AND FITTINGS

### Components Supplied by Installer

The following valves & fittings are to be supplied by the installer:

- A cold water expansion control valve (ECV). An ECV must be fitted in Western Australia and South Australia to the cold water supply to the storage cylinder to comply with local regulations. An ECV is recommended in all other geographical areas where the water supply has a tendency to cause scaling. This will reduce hot water discharge from the Pressure and Temperature Relief (PTR) valve which minimises wear on this valve.
- A stop cock, non return valve and line strainer. Combination valves incorporating two or more of these functions (such as 'Trio' valves) are suitable. These are fitted to the cold water supply to the storage cylinder by the installer.
- Cold water supply and hot water discharge pipework to and from the storage cylinder.
- An isolating valve and connection union for the gas supply to the gas booster.
- A approved pressure limiting valve is required if the maximum rated water supply pressure in **Table 2** is exceeded.

### Components Supplied with System

The following valves are supplied with your solar hot water system:

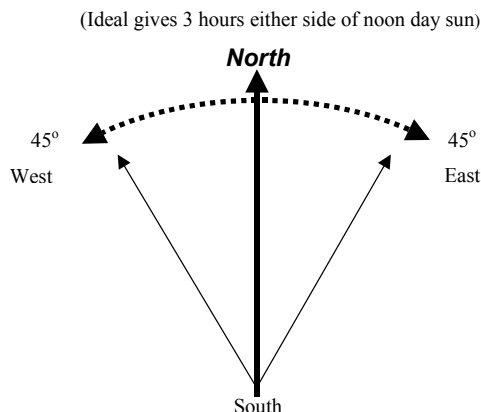
- A combined pressure and temperature (PTR) relief valve, capacity 10 kW.  
Relief valve pressure settings vary with models. This valve is fitted at the top of the storage cylinder. The PTR valve is a safety device and it is mandatory that it is fitted by the installer in all installations.
- Thermo-Arrestor (TA) valve. This valve is fitted on the inlet pipe to the Solar Collectors.
- For gas boosted systems, elbow connections for the hot, cold and gas supply are fitted at the bottom of the gas booster.
- Fittings as shown in **Figures 27 to 34**.

# INSTALLATION INFORMATION

## SYSTEM ORIENTATION AND INCLINATION

The performance of any solar hot water system is determined by the way that the system is installed.

In Australia, the solar collectors ideally should face the equator (North) as shown below. Where this orientation is not practical, collectors facing within 45 degrees from North (between North-East and North-West) area acceptable, will only reduce efficiency by approximately 5%.

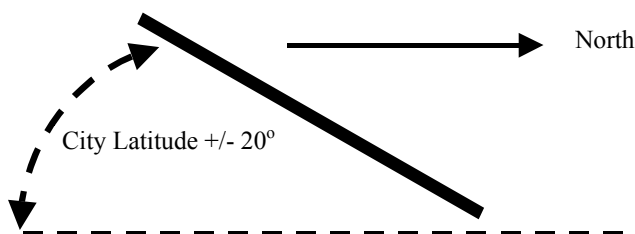


**Figure 9 - Orientation angle of Collectors**

The inclination of the solar collectors should ideally be the same as the latitude angle of the site. Inclinations within 20 degrees of the latitude angle of the site will only reduce efficiency by approximately 5%. Most roofs within Australia have a slope of between 20° and 25° and provide an appropriately angled mounting surface.

To ensure operation of the system the inclination **MUST NOT** be less than 10°.

Installers must ensure they comply with relevant regulations in regards to inclination and orientation. In some instances adding extra collectors may allow flexibility in orientation.



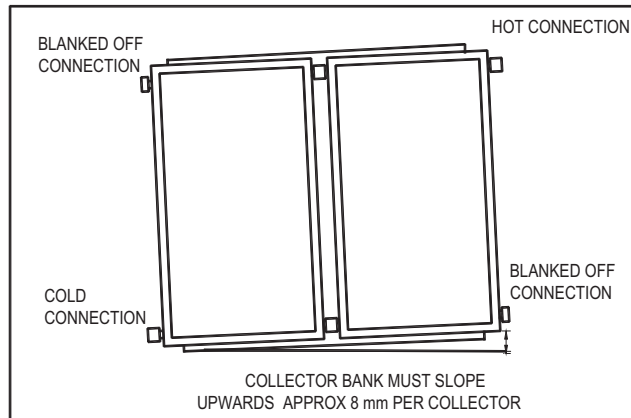
**Figure 10 - Inclination of Collector**

**Table 7: Latitudes of Australian Cities**

City	Latitude	City	Latitude	City	Latitude	City	Latitude
Adelaide	35°S	Cairns	17°S	Hobart	42°S	Port Hedland	20°S
Alice Springs	24°S	Canberra	35°S	Mildura	34°S	Rockhampton	24°S
Brisbane	27°S	Darwin	12°S	Melbourne	38°S	Sydney	34°S
Broken Hill	31°S	Geraldton	28°S	Perth	32°S	Townsville	19°S

# INSTALLATION INFORMATION

For all installations the collector bank must slope upwards approximately 8 mm per collector from inlet to outlet as shown below:



**Figure 11 - Collector Banks**

## ROOF MOUNTING OPTIONS

For mounting options not shown in **Figure 12**, for example in areas where the cyclone frame can not be used, consult your nearest Rinnai Branch or Rinnai Representative.

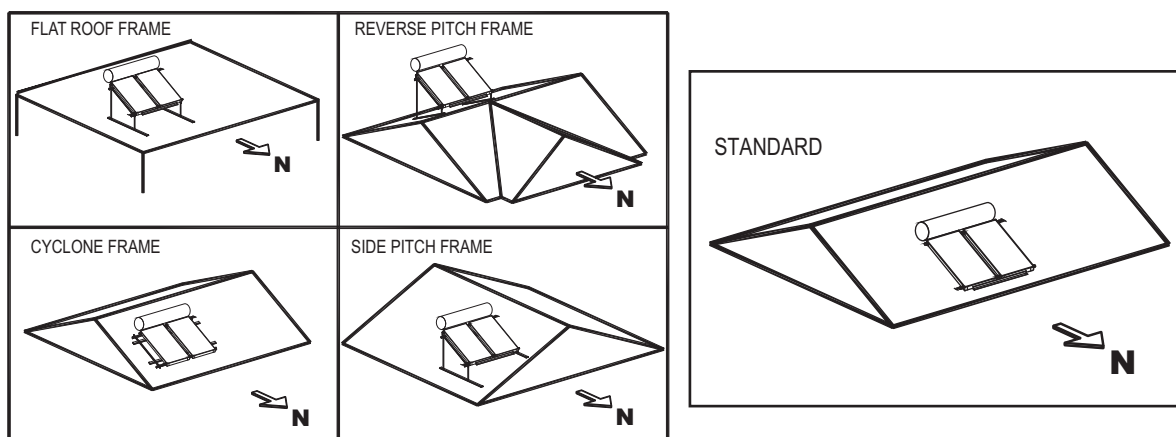
For roofs with a slope of 10° or less a flat roof frame must be used.

Rinnai do not recommend installing Close Coupled systems on roofs with a pitch greater than 30°. An additional strap should be used to prevent the cylinder from tipping over if a system is installed in this manner. Refer page 24.

It is normal to mount the solar collectors down close to the gutter. Roof construction must be checked to ensure that the roof timbers are capable of supporting the additional load. (Refer to AS 3500.4 Appendix H).

For tiled roof installations. Check for cracked or damaged tiles in the area of proposed installation. Replace any faulty tiles.

If spare tiles are not available, swap damaged tiles with good ones from along the gutter line.






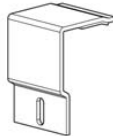



**Figure 12 - Solar Collector Roof Mounting Options**

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

**TABLE 8 - CYLINDER AND COLLECTOR MOUNTING COMPONENTS** (supplied in Installation Kit).

These components are used to mount the cylinder and collector(s) on the roof. Components used to connect collectors and plumb together are detailed later in this manual.

Type and Size of Cylinder / Number of Collectors						Part Name / Number
Stainless Steel Cylinder				Glass Lined Cylinder		
180 / 1	180 / 2	330 / 2	330 / 3	200/1	330 / 2	
IK180CC T01A	IK180CC T02A	IK330CC T02A	IK330CC T03A	IKV200C CT01C	IKV330C CT02C	
2	-	-	-	2	-	 Mounting Rail Small 14201196
-	2	2	-	-	2	 Mounting Rail Medium 14201197
-	-	-	2	-	-	 Mounting Rail Large 14201198
2* + 2#	4*	4*	6*	2* + 2#	4*	 Collector Mounting Strap * supplied with collectors, # supplied in collector installation kit 12401012
4	4	4	4	4	4	 M8 Bolt, Washer and Nut (used to bolt collector mounting strap to mounting rail) BOLT 22601052 WASHER 17401072 NUT 16801062
4	8	8	12	4	8	 Collector Retainer 26601706
4	8	8	12	4	8	 M6 Bolt, Washer and Nut (used with collector retainers) BOLT 22601073 WASHER 17401073 NUT 16801007

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

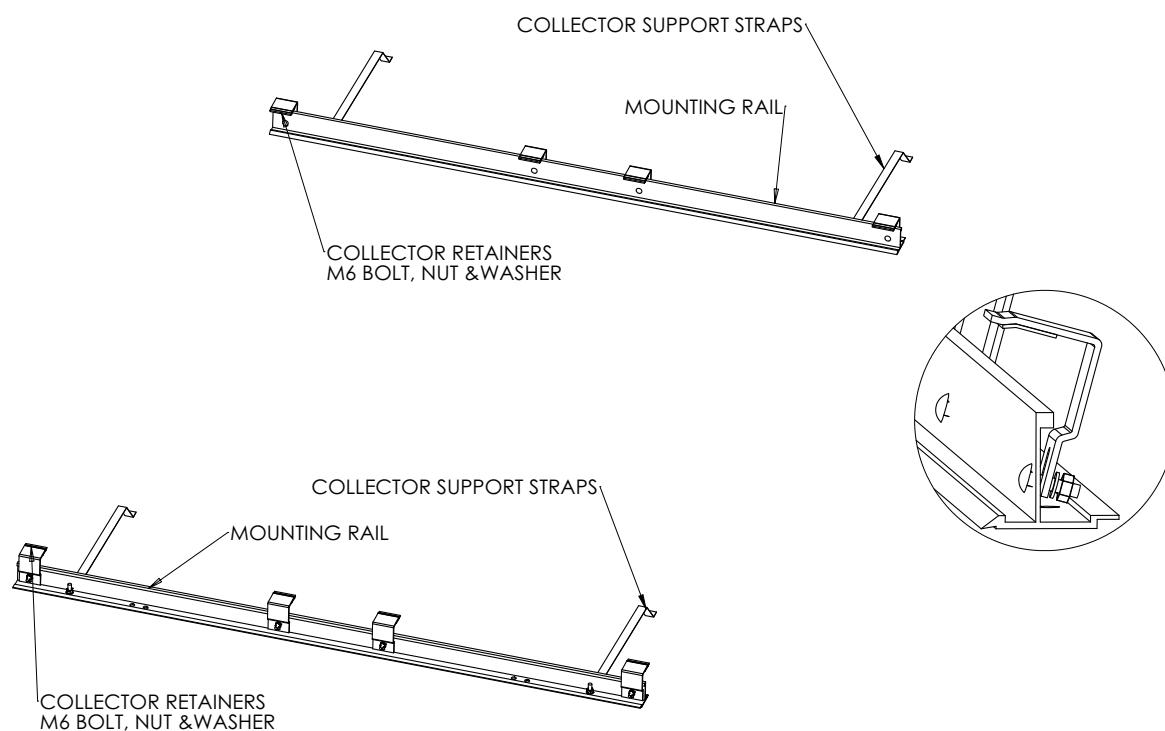
## STANDARD INSTALLATION

Collector Mounting Component Pre Assembly for a Standard Installation



**This installation is not suitable for use in cyclonic areas. For further details, please contact your local Rinnai Solar distributor.**

- Assemble the collector rail components as shown in **Figure 13**.
- Only loosely attach the collector retainers to the rails.



**Figure 13 - Collector Mounting**

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

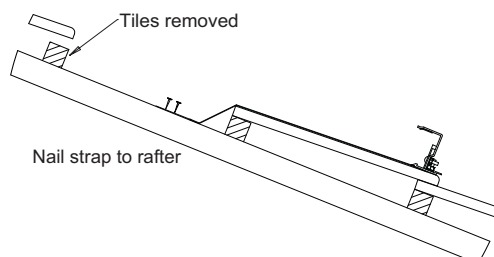
## STANDARD INSTALLATION CONTINUED

### Fastening (Collectors to a Tiled Roof)



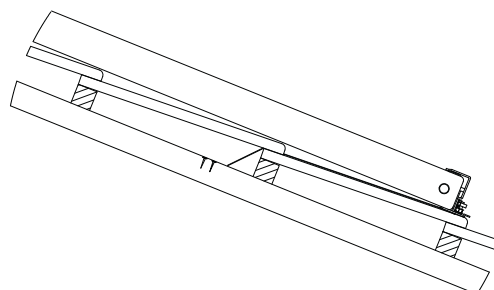
This installation is not suitable for in cyclonic areas. For further details, please contact your local Rinnai Solar distributor.

- Position the lower collector mounting rail assembly so that the rail is angled to ensure the collectors have an 8 mm / collector rise.
- Attach the collector mounting straps to the rafter or truss under the tiles as shown in **Figure 14**.



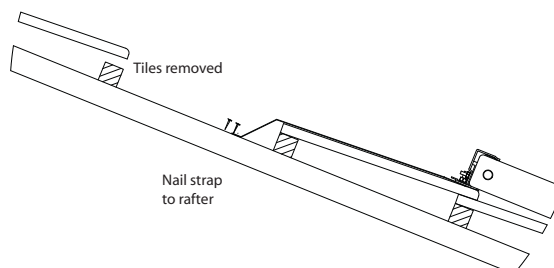
**Figure 14 - Mount Lower Collector Rail**

- Place the collector(s) onto the roof above the lower rail. If more than one collector is being installed then join them together using the compression fittings supplied.
- Push down on the collector retainers to clamp the collector and tighten the nuts as shown in **Figure 15**.



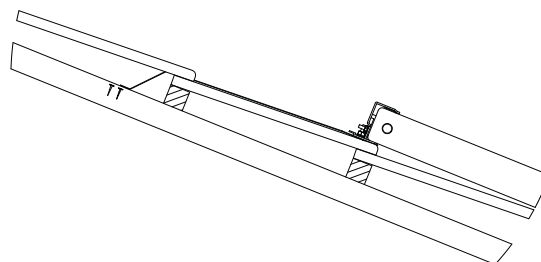
**Figure 15 - Mount collector on Roof**

- Position the upper collector rail above the collectors. Push down on the retainers to clamp the collector and tighten the nuts.
- Attach the collector mounting straps to the rafter or truss under the tiles as shown in **Figure 16**.



**Figure 16 - Attach Mounting Straps**

- Replace the tiles and ensure the collector is secure as shown in **Figure 17**.



**Figure 17 - Replace Tiles**

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

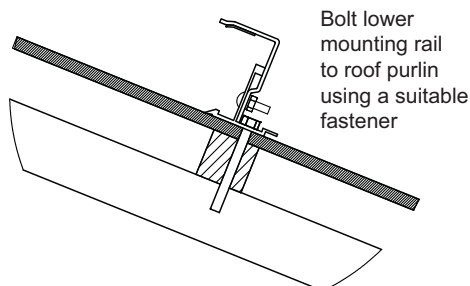
## STANDARD INSTALLATION CONTINUED

### Fastening (Collectors to a Metal Roof)



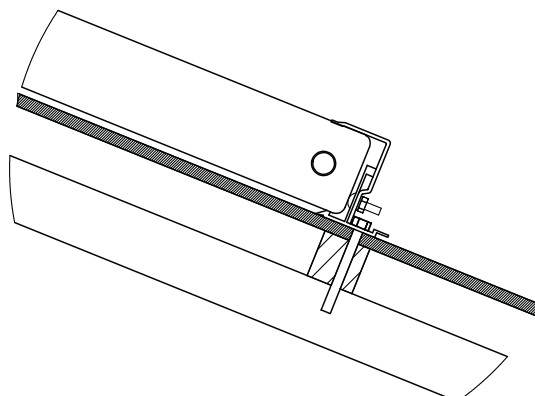
This installation is not suitable for use in cyclonic areas. For further details, please contact your local Rinnai Solar distributor.

- Position the lower collector mounting rail assembly so that the rail is over the roof purlin and the rail is angled ensure the collectors have an 8 mm / collector rise.
- Drill through the roof iron and purlin using the holes in the rail as a guide. Apply some silicone sealant down the holes to ensure no water leakage.
- Bolt the rail to the roof purlin using a suitable fastener as shown in **Figure 18**.



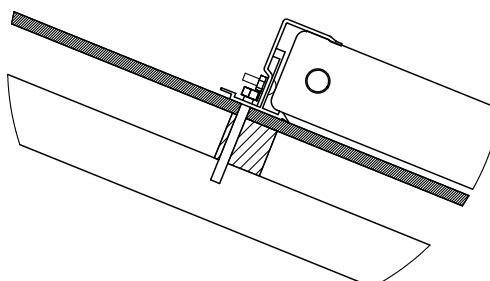
**Figure 18 - Mount Lower Collector Rail**

- Position the collector(s) onto the roof above the lower rail. If more than one collector is being installed, join them together using the compression fittings supplied.
- Push down on the collector retainers to clamp the collector and tighten the nuts.
- Place the upper collector mounting rail above the collectors. Push down on the collector retainers to clamp the collector and tighten the nuts.
- Drill through the roof iron and purlin using the upper mounting rail as a guide. Apply some silicone sealant down the holes to ensure no water leakage and secure with suitable fasteners as shown in **Figure 19**. Alternatively the rail can be attached to the roof using the collector mounting straps.



**Figure 19 - Mount Collector on Roof**

Bolt upper mounting rail to roof purlin using a suitable fastener

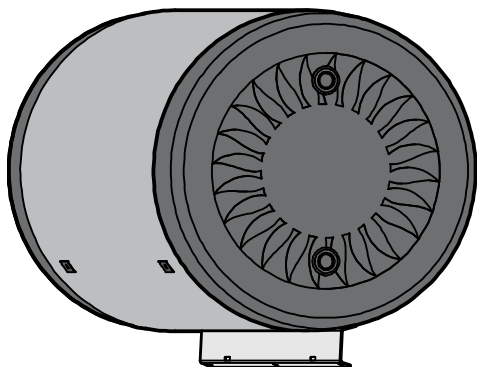


**Figure 20 - Attach Upper Rail**

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

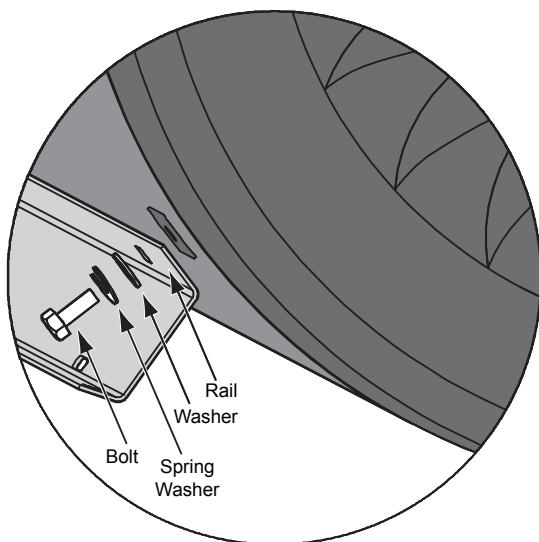
## ATTACHING MOUNTING RAIL TO CYLINDER ON STAINLESS STEEL CYLINDERS

Depending on the packaging, either one or two rails are attached to the cylinder.



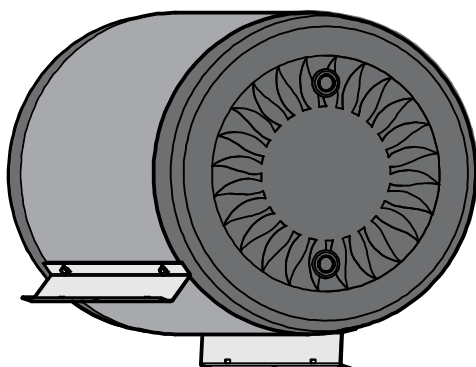
**Figure 21 - Cylinder with one rail**

- The extra rail and fastenings are packed with the cylinder. They are screwed into the rail mounting holes in the cylinder.



**Figure 22 - Attachment of rail**

- Attach the rail using the bolts, washers and spring washers in the order shown.
- Ensure the feet on the rails face outwards
- Ensure that the bolt is tightened sufficiently to flatten the spring washer. This ensures that the bolt is adequately tightened.



**Figure 23 - Cylinder with both rails**

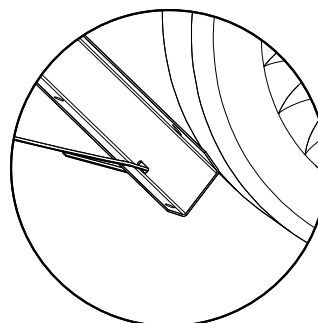
- Once the rail is attached and suitably tightened, continue the cylinder installation as shown on the next page.

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## STANDARD INSTALLATION CONTINUED

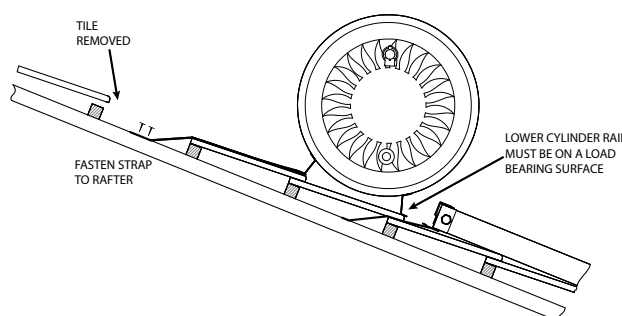
### Fastening Cylinder to a Tiled Roof

- Lift the storage cylinder onto the roof and locate it above the collector bank. The cylinder's position should be as central as possible to the collector bank. The lower rail must be on a load bearing surface.
- Slide the cylinder support strap into the slots located in the uppermost cylinder support bracket (shown in **Figure 24**) so that the strap are in line with the rafter or as close as possible to them.



**Figure 24 - Cylinder Support Strap**

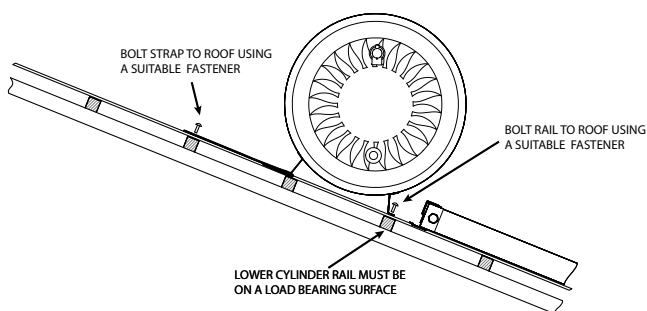
- Remove tiles one row up from the storage cylinder. Apply tension to the straps and attach them to the rafters using a suitable fastener.
- Replace the tiles



**Figure 25 - Cylinder Installation Tiled Roof**

### Fastening Cylinder to a Metal Roof

- Lift the storage cylinder onto the roof and locate it above the collector bank. The cylinder's position should be as central as possible to the collector bank. The lower rail must be on a load bearing surface.
- Slide the cylinder support strap into the slots located in the uppermost cylinder support bracket (shown in **Figure 24**) so that the strap are in line with a suitable fastening point.
- Bolt the lower support rail to the roof using a suitable fastener.
- Apply tension to the cylinder support straps and attach them to the rafters using a suitable fastener.
- Seal any holes in roof using a suitable sealant to ensure roof is water tight.

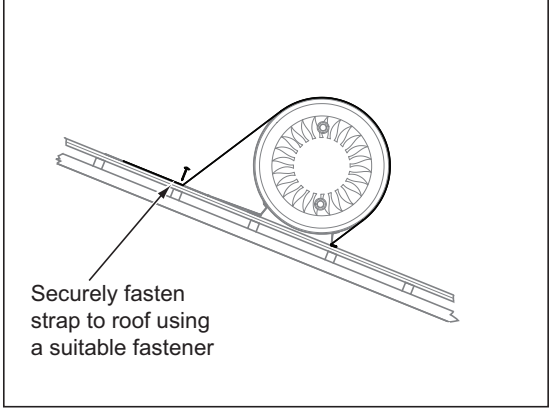
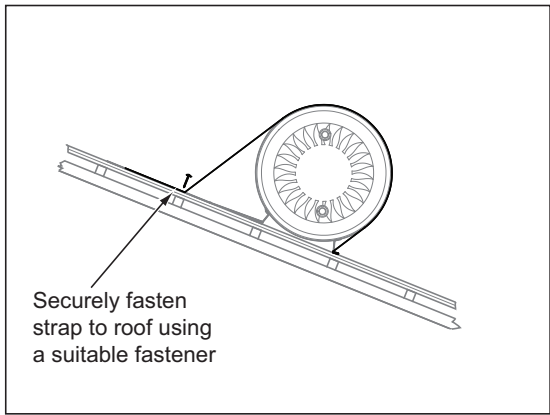
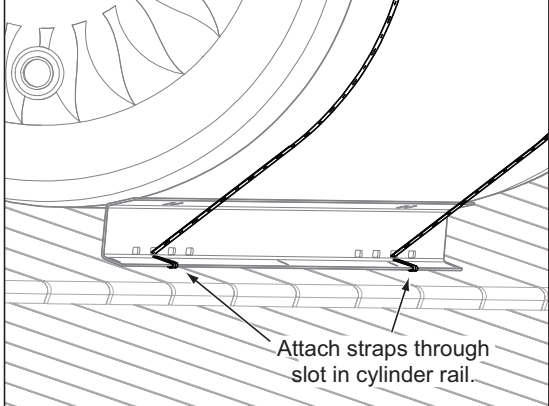
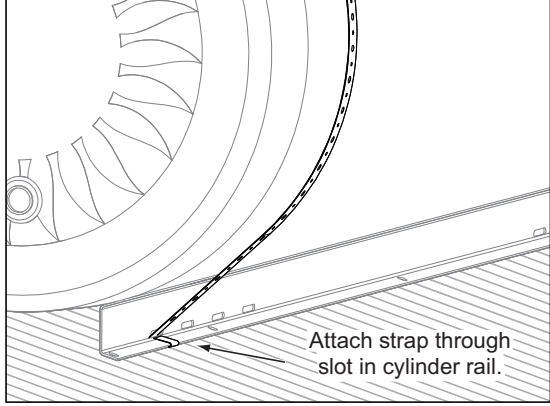
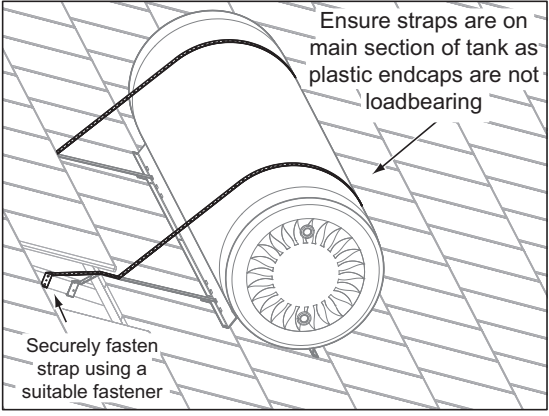
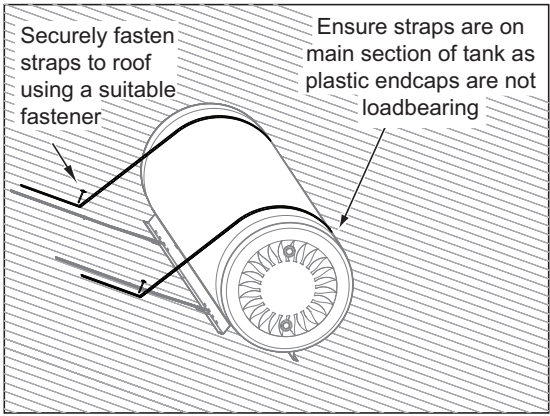


**Figure 26 - Cylinder Installation Metal Roof**

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## ROOF PITCH GREATER THAN 30°

In situations where a Close Coupled System is installed onto a roof with a pitch of 30° or greater, an additional strap must be used to prevent the cylinder tipping over. Builders strapping available from hardware stores is suitable for this. The strapping is attached through the slots in the front cylinder rail, goes over the tank and is then fastened to the roof behind the cylinder.

Tiled Roof	Metal Roof
 <p>Securely fasten strap to roof using a suitable fastener</p>	 <p>Securely fasten strap to roof using a suitable fastener</p>
 <p>Attach straps through slot in cylinder rail.</p>	 <p>Attach strap through slot in cylinder rail.</p>
 <p>Ensure straps are on main section of tank as plastic endcaps are not loadbearing</p> <p>Securely fasten strap using a suitable fastener</p>	 <p>Securely fasten straps to roof using a suitable fastener</p> <p>Ensure straps are on main section of tank as plastic endcaps are not loadbearing</p>

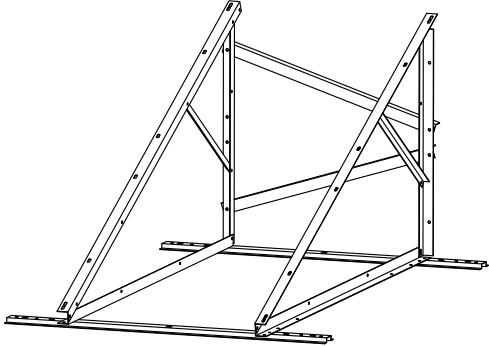
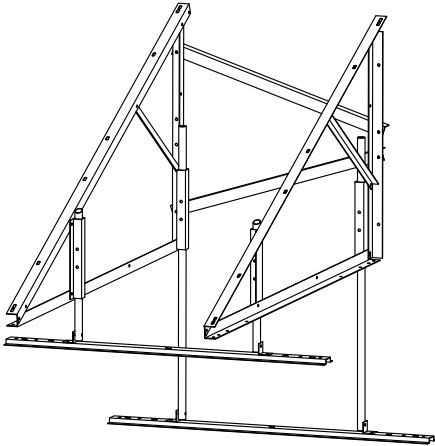
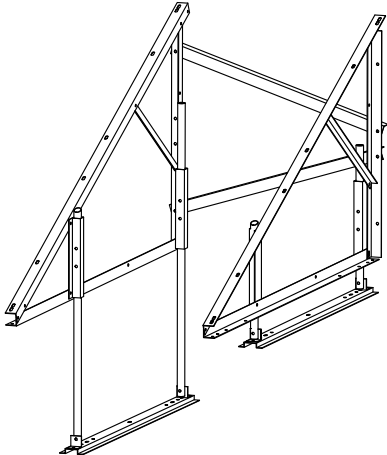
# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## FRAMED INSTALLATIONS - FLAT, REVERSE AND SIDE PITCH



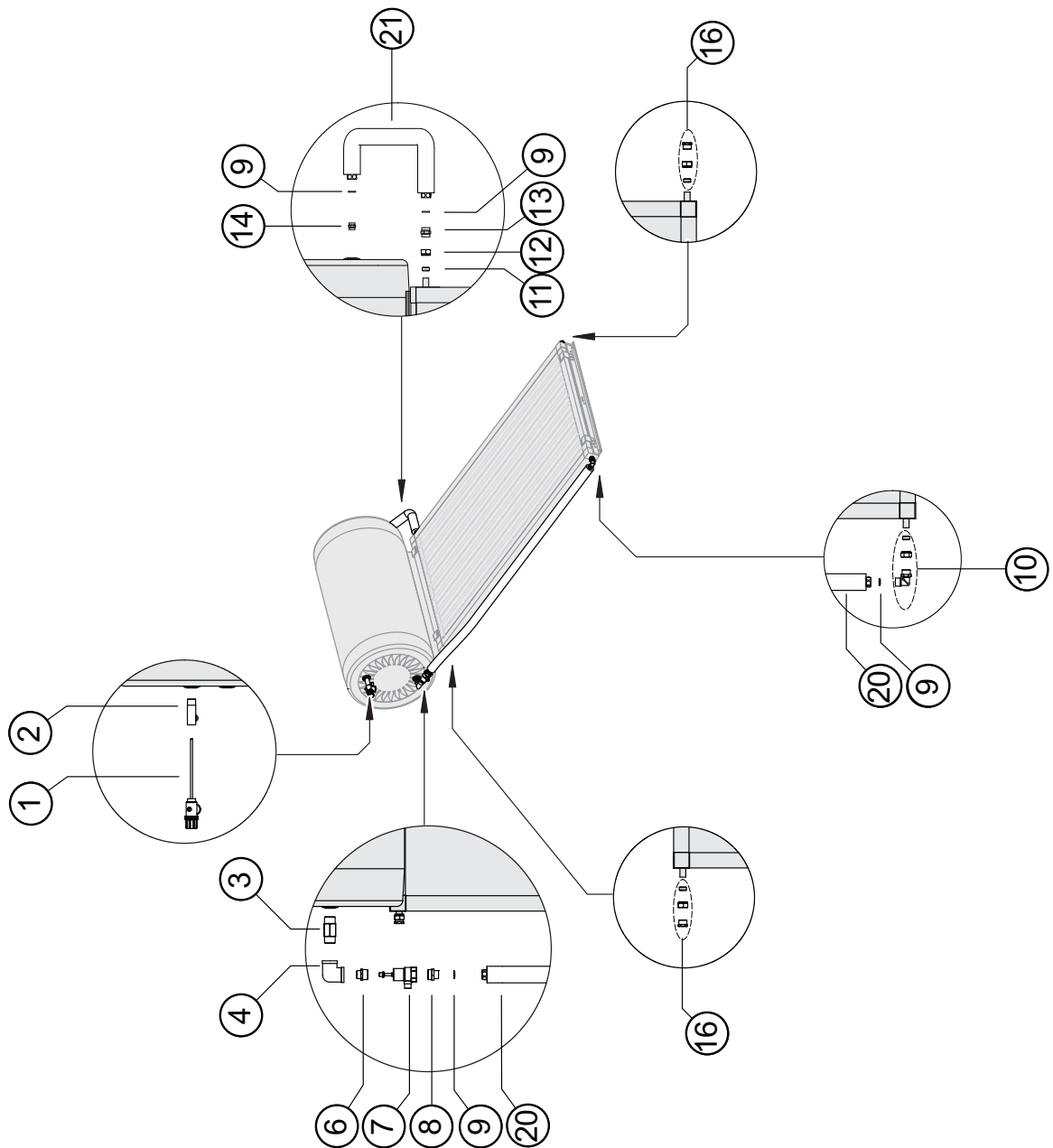
This installation is not suitable in cyclonic areas. For the correct frame for use in cyclone areas, contact your local Rinnai Solar distributor.  
Rinnai Frame Kits are not suitable to use with a 330 Litre glass lined cylinder and 3 collectors.

**Table 9 - Framed Installations**

 <p style="text-align: center;">FLAT ROOF FRAME</p>	<ul style="list-style-type: none"> <li>• For use on a flat roof or where the roof pitch is too low.</li> <li>• This frame allows the system to be installed at a suitable inclination.</li> <li>• Installations instructions are provided in the Rinnai Frame Installation Manual.</li> </ul>
 <p style="text-align: center;">REVERSE PITCH FRAME</p>	<ul style="list-style-type: none"> <li>• These comprise of a Close Coupled system flat roof frame and a side/reverse pitch kit.</li> <li>• They can be used when the system need to be installed in the reverse direction to the direction the roof is facing.</li> <li>• For example, using a reverse pitch frame on a South facing roof enables the system to be oriented to the North.</li> <li>• Installations instructions are provided in the Rinnai Frame Installation Manual.</li> </ul>
 <p style="text-align: center;">SIDE PITCH FRAME</p>	<ul style="list-style-type: none"> <li>• These comprise of a Close Coupled system flat roof frame and a side/reverse pitch kit.</li> <li>• They can be used when the system need to be installed side on to the direction the roof is facing.</li> <li>• For example, using a side pitch frame on an East or West facing roof to enables the system to be oriented to the North.</li> <li>• Installations instructions are provided in the Rinnai Frame Installation Manual.</li> </ul>
<p><b>FRAMED INSTALLATIONS - CYCLONE FRAME</b></p>	<ul style="list-style-type: none"> <li>• Assemble cyclone frame and mount components as described in instructions provide with cyclone frame kit.</li> </ul>

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS









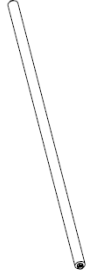







## 180 Litre Stainless Steel Cylinder with 1 Collector



**Figure 27 - 180 Litre Stainless Steel Cylinder with 1 Collector**

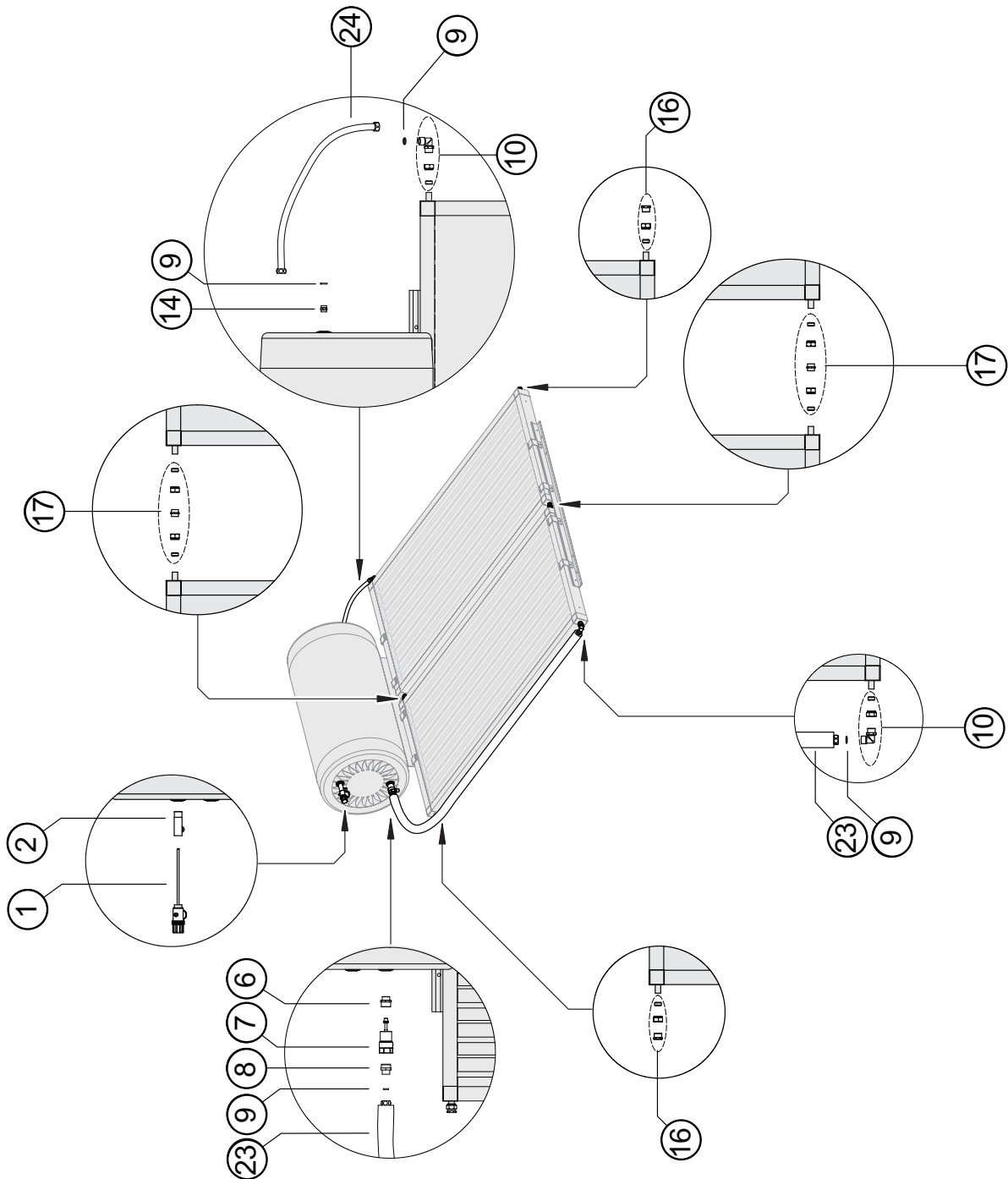
# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## 180 litre Stainless Steel cylinder with 1 collector Installation Kit IK180CCT01A

Qty	Item / Part Number	Qty	Item / Part Number	Qty	Item / Part Number
1	 P&TR Valve *supplied with cylinder 11004784	1	 Adaptor M33 x G 3/4 (Flexi) 16601065	1	 Adapting Nipple R 3/4 x G 3/4 (Flexi) 17201006
1	 T adaptor hot outlet *supplied with cylinder 19001018	4	 Fibre washer 3/4 17401008	2	 Stop end assembly - 1 G 3/4 plug - 1 3/4 Kinco nut + 1 3/4 Kinco olive) 28801025
1	 R 3/4 Nipple (long) 17201011	1	 Elbow assembly - 1 x Elbow G 3/4 (Flexi) x G 3/4 (Kinco) - 1 x Kinco nut and olive 3/4 21201013	1	 Flexi pipe 1930 mm with insulation 11601099
1	 Elbow Rp 3/4 x Rp 3/4 21201004	1	 Kinco nut 3/4 16801018	1	 Flexi Pipe 600 mm with insulation 11601097
1	 Reducing Nipple R1 x R 3/4 17201036	1	 Kinco olive 3/4 33001011		
1	 TA Valve 11007711	1	 Adapting Nipple G 3/4 (Flexi) x G 3/4 (Kinco) 17201007		

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS









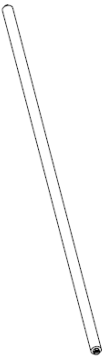



## 180 Litre Stainless Steel Cylinder with 2 Collectors



**Figure 28 - 180 Litre Stainless Steel Cylinder with 2 Collectors**

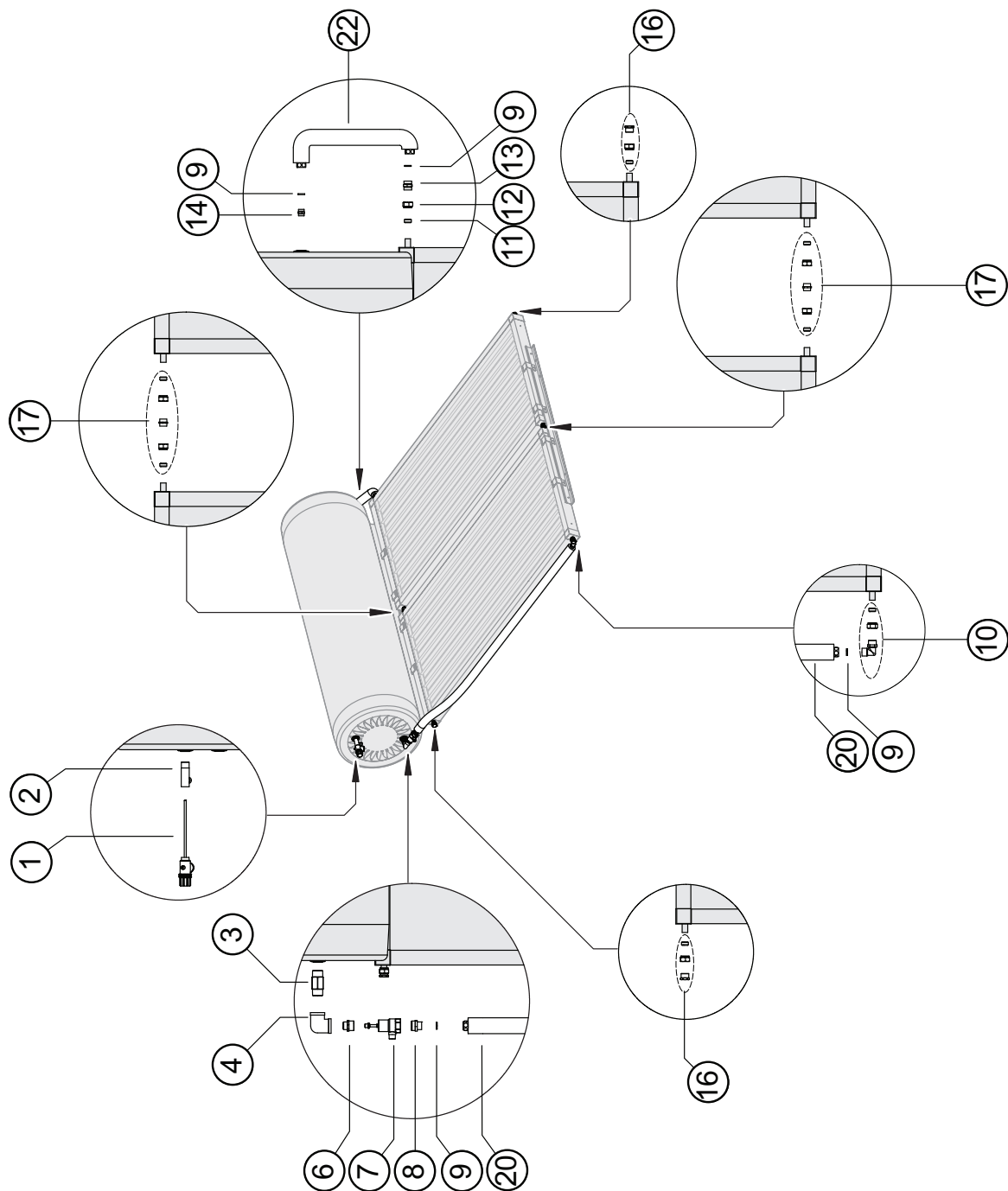
# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## 180 litre Stainless Steel cylinder with 2 collectors Installation Kit IK180CCT02A

	Qty	Item / Part Number	Qty	Item / Part Number	Qty	Item / Part Number
①	1	 P&TR Valve 11004784 <i>*supplied with cylinder</i>	⑧	1	 Adaptor M33 x G 3/4 (Flexi) 16601065	⑩⑥ 2  Stop end assembly 28801025 - 1 G 3/4 plug - 1 3/4 Kinco nut + 1 3/4 Kinco olive
②	1	 T adaptor hot outlet 19001018 <i>*supplied with cylinder</i>	⑨	4	 Fibre washer 3/4 17401008	⑩⑦ 2  Union compression 3/4 32201709 - 1 x nipple G3/4 - 2 x Kinco nut and olive 3/4
⑥	1	 Reducing Nipple R1 x R 3/4 17201036	⑩	2	 Elbow assembly 21201013 - 1 x Elbow G 3/4 (Flexi) x G 3/4 (Kinco) - 1 x Kinco nut and olive 3/4	⑩②③ 1  Flexi Pipe 2450 mm with Insulation 11601095
⑦	1	 TA Valve 11007711	⑭	1	 Adapting Nipple R 3/4 x G 3/4 (Flexi) 17201006	⑩④ 1  Flexi Pipe 670 mm with Insulation 11601098

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS












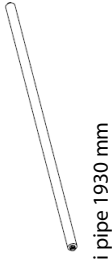





## 330 Litre Stainless Steel Cylinder with 2 Collectors



**Figure 29 - 330 Litre Stainless Steel Cylinder with 2 Collectors**

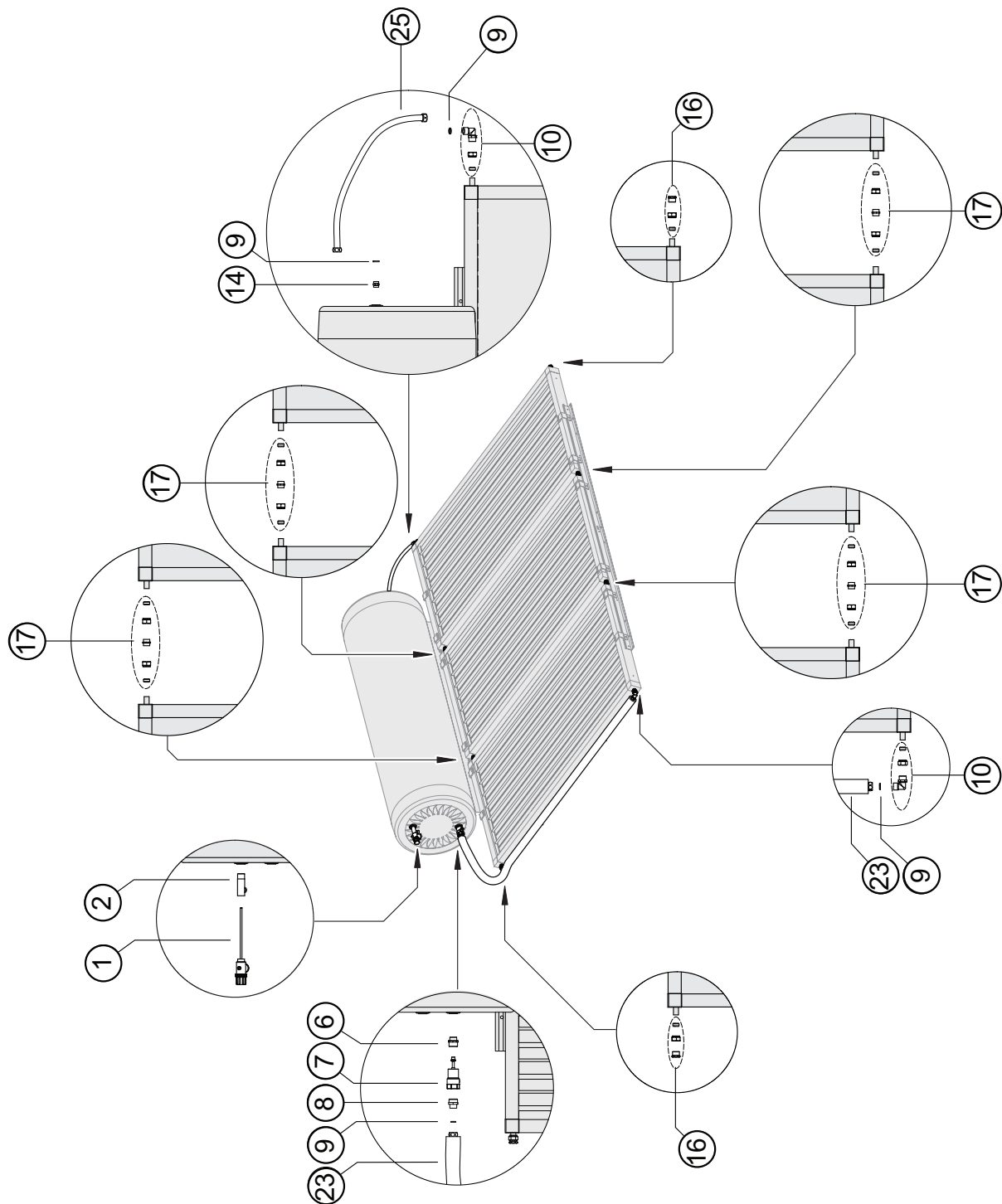
# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## 330 litre Stainless Steel cylinder with 2 collectors Installation Kit IK330CCT02A

Qty	Item / Part Number	Qty	Item / Part Number	Qty	Item / Part Number
1	 <p>P&amp;TR Valve 11004784 <i>*supplied with cylinder</i></p>	1	 <p>Adaptor M33 x G 3/4 (Flexi) 16601065</p>	1	 <p>Adapting Nipple R 3/4 x G 3/4 (Flexi) 17201006</p>
1	 <p>T adaptor hot outlet 19001018 <i>*supplied with cylinder</i></p>	4	 <p>Fibre washer 3/4 17401008</p>	2	 <p>Stop end assembly 28801025 - 1 G 3/4 plug - 1 3/4 Kinco nut + 1 3/4 Kinco olive)</p>
1	 <p>R 3/4 Nipple (long) 17201011</p>	1	 <p>Elbow assembly 21201013 - 1 x Elbow G 3/4 (Flexi) x G 3/4 (Kinco) - 1 x Kinco nut and olive 3/4</p>	2	 <p>Union compression 3/4 32201709 - 1 x nipple G 3/4 - 2 x Kinco nut and olive 3/4</p>
1	 <p>Elbow Rp 3/4 x Rp 3/4 21201004</p>	1	 <p>Kinco nut 3/4 16801018</p>	1	 <p>Flexi pipe 1930 mm with insulation 11601099</p>
1	 <p>Reducing Nipple R1 x R 3/4 17201036</p>	1	 <p>Kinco olive 3/4 33001011</p>	1	 <p>Flexi Pipe 480 mm with insulation 11601064</p>
1	 <p>TA Valve 11007711</p>	1	 <p>Adapting Nipple G 3/4 (Flexi) x G 3/4 (Kinco) 17201007</p>		

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS









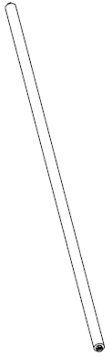



## 330 Litre Stainless Steel Cylinder with 3 Collectors



**Figure 30 - 330 Litre Stainless Steel Cylinder with 3 Collectors**

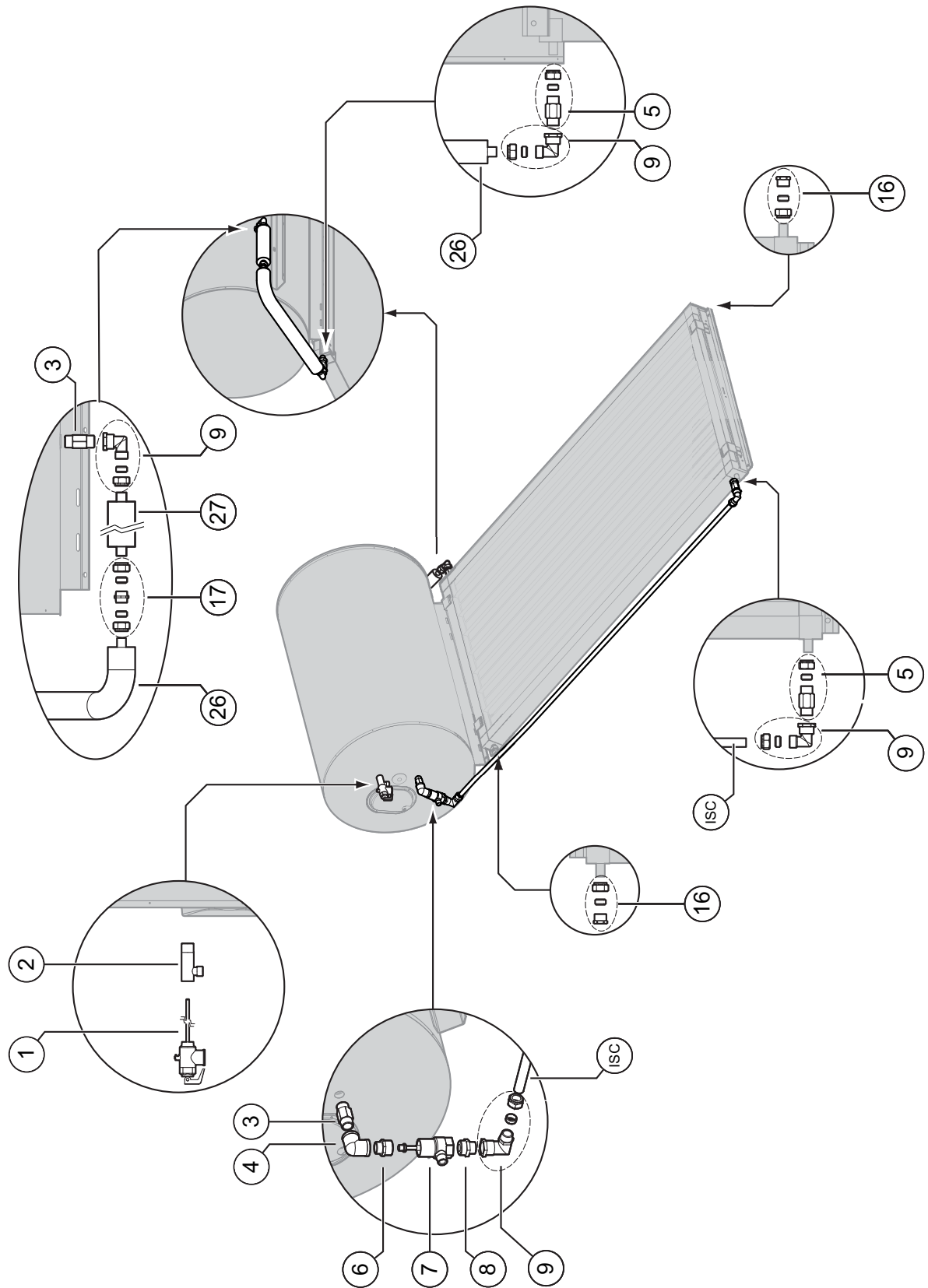
# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## 330 litre Stainless Steel cylinder with 3 collectors Installation Kit IK330CCT03A

	Qty	Item / Part Number		Qty	Item / Part Number		Qty	Item / Part Number
①	1	 P&TR Valve 11004784 <i>*supplied with cylinder</i>	⑧	1	 Adaptor M33 x G ¾ (Flexi) 16601065	⑩	2	 Stop end assembly – 1 G ¾ plug – 1 ¾ Kinco nut + 1 ¾ Kinco olive) 28801025
②	1	 T adaptor hot outlet 19001018 <i>*supplied with cylinder</i>	⑨	4	 Fibre washer ¾ 17401008	⑪	4	 Union compression ¾ – 1 x nipple G 3/4 – 2 x Kinco nut and olive ¾ 32201709
⑥	1	 Reducing Nipple R1 x R ¾ 17201036	⑩	2	 Elbow assembly – 1 x Elbow G ¾ (Flexi) x G ¾ (Kinco) – 1 x Kinco nut and olive ¾ 21201013	⑬	1	 Flexi Pipe 2450 mm with Insulation 11601095
⑦	1	 TA Valve 11007711	⑭	1	 Adapting Nipple R ¾ x G ¾ (Flexi) 17201006	⑮	1	 Flexi Pipe 770 mm with Insulation 11601096

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS




























200 Litre Glass Lined Cylinder with 1 Collector



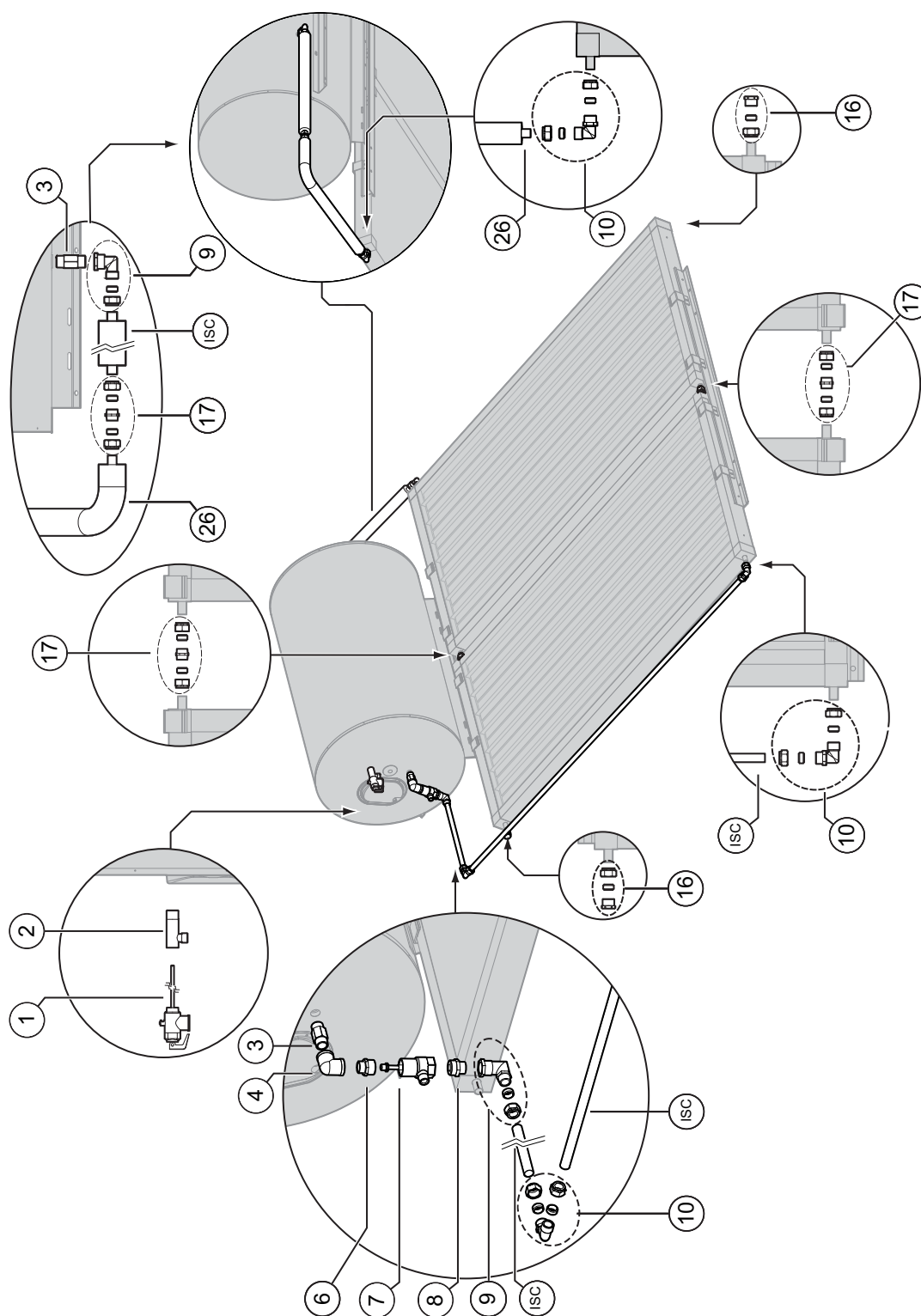
**Figure 31 - 200 Litre Glass Lined Cylinder with 1 Collector**  
**Installation Kit: IKV200CCT01C**

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## 200 litre glass lined cylinder with 1 collector Installation Kit IKV200CCT01C

	Qty	Item / Part Number		Qty	Item / Part Number		Qty	Item / Part Number		Qty
	1	 P&TR Valve * supplied with cylinder 92501190		1	 Reducing Nipple R1 x R3/4 17201036		1	 Union Compression 3/4 - 1 nipple G 3/4 - 2 x kinco nuts and olives 3/4 32201709		
	1	 T adaptor hot outlet * supplied with cylinder 92501117		1	 TA Valve 11007711		1	 Insulated Copper Pipe Approx 555 x 140 x DN20 31601764		
	2	 R 3/4 Nipple (long) 17201011		1	 Adaptor M33 x R 3/4 16601096		1	 Insulated Copper Pipe Approx 170 x DN20 31601767		
	1	 Elbow Rp 3/4 x Rp 3/4 21201004		4	 Elbow Assembly 1 x Elbow Rp 3/4 x G 3/4 (kinco) 1 x kinco nut and olive 3/4 21201026		1	<b>INSTALLER SUPPLIED COMPONENTS</b>  1 length of Copper Piping DN20 Approx length 2100 mm.  Exact length may vary slightly between installations and depending on collector type  This pipe may need to have a slight bend added to ensure a neat finish.		
	2	 Adaptor Assembly 1 x R 3/4 x G3/4 (kinco) Nipple 1 x kinco nut and olive 3/4 16601097		2	 Stop end Assembly 28801025	<b>FLOW AND RETURN PIPE INSULATION</b>  All pipe work on the hot side of the system must be insulated to minimise heat loss from the system.  Cold side pipe work should be insulated in colder climate areas.  In frost prone areas all pipe work and connection fittings must be well insulated to prevent frost damage. See AS3500.4 for suggested insulation levels.				














## 200 Litre Glass Lined Cylinder with 2 Collectors



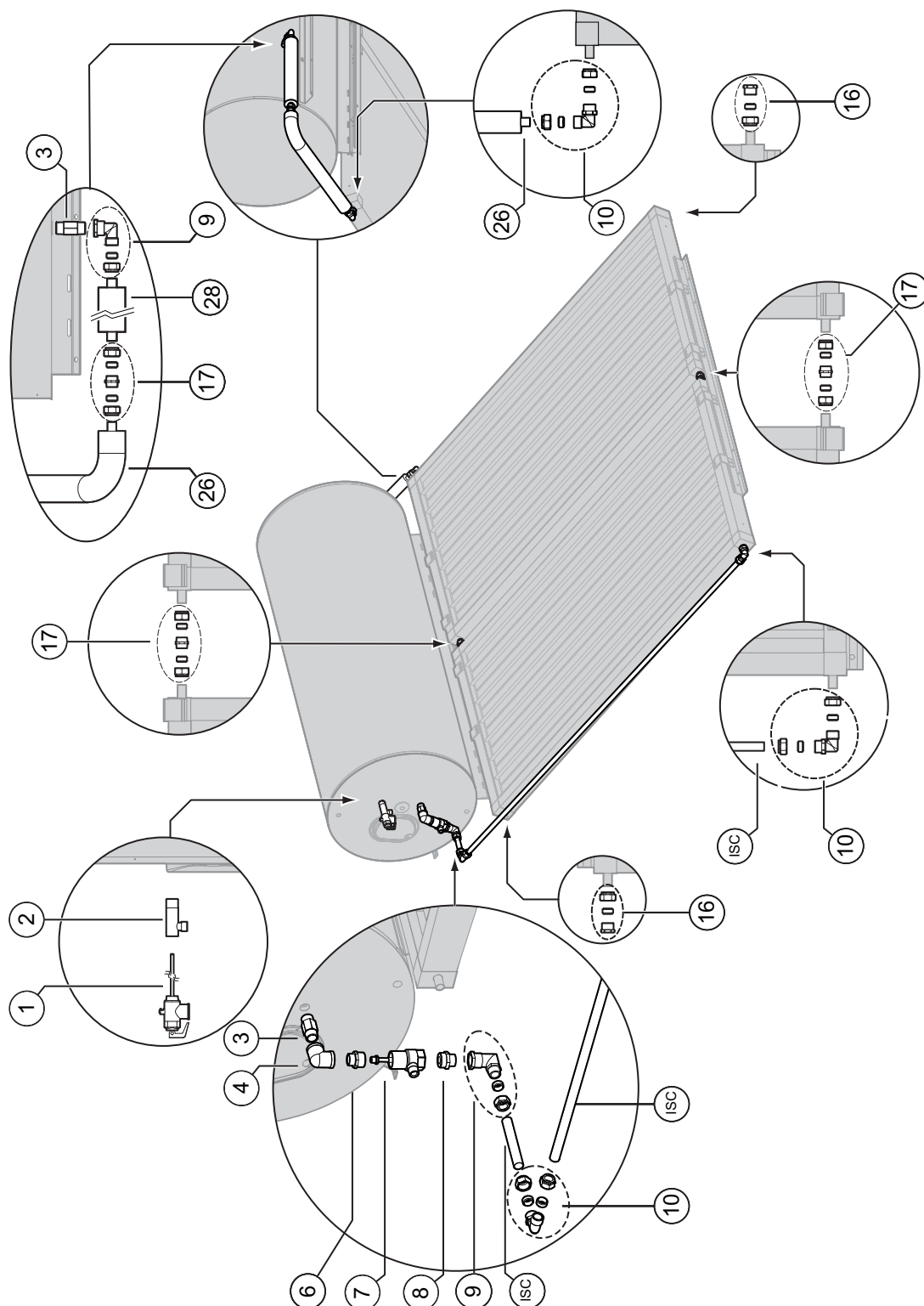
**Figure 32 - 200 Litre Glass Lined Cylinder with 2 Collectors**  
**Installation Kit IKV330CCT02C**

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## 200 litre glass lined cylinder with 2 collectors Installation Kit IKV330CCT02C

Qty	Item / Part Number	Qty	Item / Part Number	Qty	Item / Part Number
1	 P&TR Valve * supplied with cylinder 92501190	1	 TA Valve 11007711	3	 Union Compression 3/4 - 1 nipple G 3/4 - 2 x kincos nuts and olives 3/4 32201709
1	 T adaptor hot outlet * supplied with cylinder 92501117	1	 Adaptor M33 x R 3/4 16601096	1	 Insulated Copper Pipe Approx 555 x 140 x DN20 31601764
2	 R 3/4 Nipple (long) 17201011	2	 Elbow Assembly 1 x Elbow Rp 3/4 x G 3/4 (kincos) 1 x kincos nut and olive 3/4 21201026	1	 Insulated Copper Pipe Approx 370 x DN20 31601765
1	 Elbow Rp 3/4 x Rp 3/4 21201004	3	 Elbow Assembly 1 x Elbow G 3/4 (kincos) x G 3/4 (kincos) 2 x kincos nuts and olives 3/4 21201038	3	<b>INSTALLER SUPPLIED COMPONENTS</b> 3 straight lengths of Copper Piping DN20 Approx lengths 2100, 670 and 450 mm Exact length may vary between installations and collector type
1	 Reducing Nipple R1 x R3/4 17201036	2	 Stop end Assembly 28801025	<b>FLOW AND RETURN PIPE INSULATION</b> All pipe work on the hot side of the system must be insulated to minimise heat loss from the system. Cold side pipe work should be insulated in colder climate areas. In frost prone areas all pipe work and connection fittings must be well insulated to prevent frost damage. See AS3500.4 for suggested insulation levels	














## 330 Litre Glass Lined Cylinder with 2 Collectors



**Figure 33 - 330 Litre Glass Lined Cylinder with 2 Collectors  
Installation Kit IKV330CCT02C**

# INSTALLATION OF SOLAR COLLECTORS & CYLINDERS

## 330 litre glass lined cylinder with 2 collectors Installation Kit IKV330CCT02C

Qty	Item / Part Number	Qty	Item / Part Number	Qty	Item / Part Number
1	 P&TR Valve * supplied with cylinder 92501190	1	 Adaptor M33 x R 3/4 16601096	1	 Insulated Copper Pipe Approx 555 x 140 x DN20 31601764
1	 T adaptor hot outlet * supplied with cylinder 92501117	2	 Elbow Assembly 1 x Elbow Rp 3/4 x G 3/4 (kinco) 1 x kinco nut and olive 3/4 21201026	1	 Insulated Copper Pipe Approx 370 x DN20 31601765
2	 R 3/4 Nipple (long) 17201011	3	 Elbow Assembly 1 x Elbow G 3/4 (kinco) x G 3/4 (kinco) 2 x kinco nuts and olives 3/4 21201038	<b>COMPONENTS</b> 2 straight lengths of Copper Piping DN20 Approx lengths 2100 and 150 mm Exact length may vary between installations and collector type	
1	 Elbow Rp 3/4 x Rp 3/4 21201004				
1	 Reducing Nipple R1 x R3/4 17201036	2	 - Stop end Assembly 28801025	<b>FLOW AND RETURN PIPE INSULATION</b> All pipe work on the hot side of the system must be insulated to minimise heat loss from the system. Cold side pipe work should be insulated in colder climate areas. In frost prone areas all pipe work and connection fittings must be well insulated to prevent frost damage. See AS3500.4 for suggested insulation levels.	
1	 TA Valve 11007711	3	 Union Compression 3/4 - 1 nipple G 3/4 - 2 x kinco nuts and olives 3/4 32201709		

# INSTALLATION & MAINTENANCE - GAS BOOSTED SYSTEMS

## GAS BOOSTER LOCATION

The gas booster is designed for 'Outdoor' Installation only. As such, it must be located in an above ground open air situation with natural ventilation, without stagnant areas, where gas leakage and products of combustion are rapidly dispersed by wind and natural convection. The location must comply with the clearances specified in AS/NZS 5601.

The gas booster must be mounted on a vertical structure with the water and gas connections on the underside pointing downwards. The heated outlet of the cylinder is connected to cold water inlet of the gas booster.

Ensure that the wall or structure on which it is to be mounted are capable of supporting the weight of the appliance and associated pipe work. See **Table 5** for individual gas booster weights. For gas boosters installed on elevated structures or under floors specific requirements apply.

Refer to AS/NZS 5601 for details.

- Attach the gas booster to the wall using screws.
- Location of the gas booster flue terminal must be in accordance with **Figure 6.2 of AS/NZS 5601**.
- If an internal model which has been converted to a solar gas booster follow information supplied with the unit for location, mounting and flueing requirements.

## GAS SUPPLY

The maximum gas consumption of the gas booster and the required gas pressure are shown on the appliance data plate. If the gas pipe sizing is insufficient the customer will not get the full performance benefit. Gas pipe sizing must consider the gas input to the gas booster as well as all the other gas appliances on the premises. The gas meter and regulator must be specified for this gas rate. An approved sizing chart such as the one in AS/NZS 5601 should be used. An approved full flow isolation valve and disconnection union must be fitted to the gas supply inlet of the gas booster. Isolation valves must not be fitted directly.

## HOT WATER DELIVERY TEMPERATURE

Gas boosters for use in solar hot water systems are preset to deliver a fixed temperature of 60°C in accordance with plumbing regulations. In addition, they contain the warning stating "Rinnai Water Controllers are NOT compatible with solar hot water installations and MUST NOT BE USED" in the vicinity of the temperature controller connections inside the appliance.



- Gas Boosters other than models designated "S20", S26" "S26i", "S32" or "Solar" must not be used.
- Gas Boosters marked with the text: "THIS APPLIANCE DELIVERS WATER NOT EXCEEDING 50°C IN ACCORDANCE WITH AS 3498" are incompatible with solar hot water systems and must not be used.

## SMARTSTART®

### Smartstart® Function

The Smartstart® is a separate system that works in conjunction with the Rinnai solar hot water system.

When activated by the manual activation switch, water in the pipework connected between the solar hot water system and the hot water outlets is warmed before any outlets are opened. This results in water savings and added convenience. Refer the **Figure 34** for installation details.

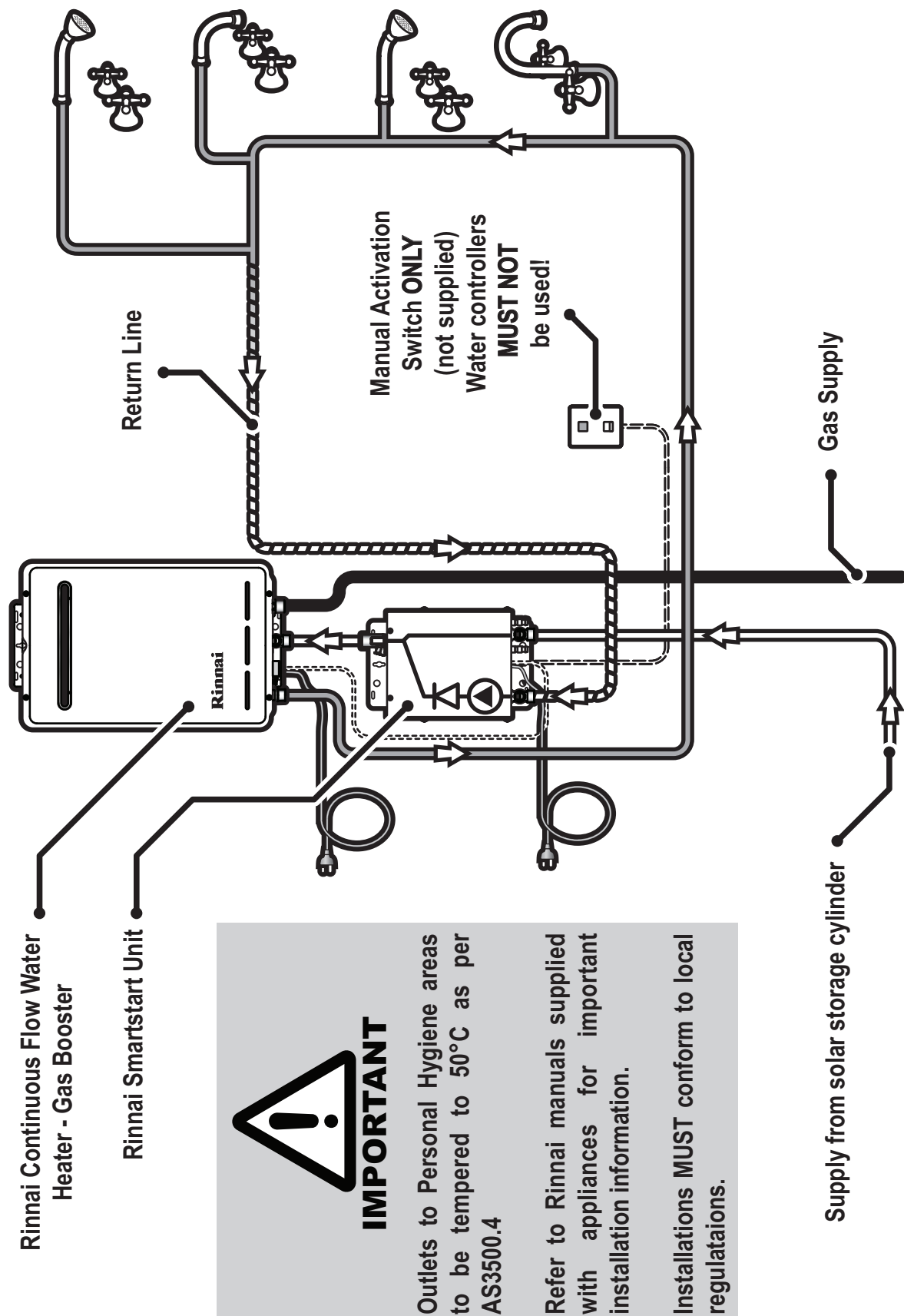
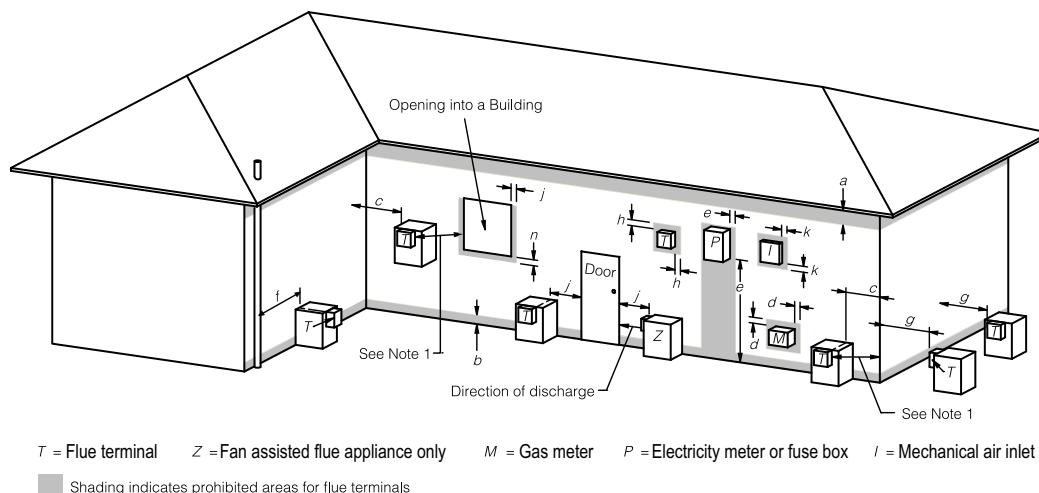


Figure 34 - Smartstart® Schematic

# INSTALLATION MAINTENANCE - GAS BOOSTED SYSTEMS

## CLEARANCES

**Figure 6.2** is reproduced below. Note that AS/NZS 5601 was current at time of printing but may have been superseded. It is the installer's responsibility to ensure current requirements **are met**.



Ref.	Item	Min. clearances (mm)	
		Natural draft	Fan assisted
	Below eaves, balconies and other projections:		
a	• Appliances up to 50 MJ/h input	300	200
	• Appliances over 50 MJ/h input	500	300
b	From the ground, above a balcony or other surface *	300	300
c	Front a return wall or external corner *	500	300
d	From a gas meter (M) (see 5.11.5.9 for vent terminal location of regulator) (see Table 6.6 for New Zealand requirements)	1000	1000
e	From an electricity meter or fuse box (P) †	500	500
f	From a drain pipe or soil pipe	150	75
g	Horizontally from any building structure* = or obstruction facing a terminal	500	500
h	From any other flue terminal, cowl, or combustion air intake †	500	300
	Horizontally from an openable window, door, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:		
j	• Appliances up to 150 MJ/h input *	500	300
	• Appliances over 150 MJ/h input up to 200 MJ/h input *	1500	300
	• Appliances over 200 MJ/h input up to 250 MJ/h input *	1500	500
	• Appliances over 250 MJ/h input *	1500	1500
	• All fan-assisted flue appliances, in the direction of discharge	-	1500
k	From a mechanical air inlet, including a spa blower	1500	1000
	Vertically below an openable window, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:		
n	• Space heaters up to 50 MJ/hr input	150	150
	• Other appliances up to 50 MJ/hr input	500	500
	• Appliances over 50 MJ/h input and up to 150 MJ/h input	1000	1000
	• Appliances over 150 MJ/h input	1500	1500

\* - unless appliance is certified for closer installation

† - Prohibited area below electricity meter or fuse box extends to ground level.

### NOTES:

- Where dimensions c, j or k cannot be achieved an equivalent horizontal distance measured diagonally from the nearest discharge point of the terminal to the opening may be deemed by the Technical Regulator to comply.
- See Clause 6.9.4 for restrictions on a flue terminal under a covered area.
- See Figure J3 for clearances required from a flue terminal to an LP Gas cylinder. A flue terminal is considered to be a source of ignition.
- For appliances not addressed above acceptance should be obtained from the Technical Regulator.

**FIGURE 6.2** (in-part) MINIMUM CLEARANCES REQUIRED FOR BALANCED FLUE TERMINALS, FAN-ASSISTED FLUE TERMINALS, ROOM-SEALED APPLIANCE TERMINALS AND OPENINGS OF OUTDOOR APPLIANCES

**AS/NZS 5601 - Figure 6.2 'Clearances' - Gas Booster Flue Terminal**

# INSTALLATION MAINTENANCE - GAS BOOSTED SYSTEMS

## INSTALLATION PROCEDURE

### 1. Install Solar Collectors and cylinders

- Position and install the solar collectors and cylinder in accordance with the section 'INSTALLATION OF SOLAR COLLECTORS AND CYLINDERS'.

### 2. Connect PTR Valve

- Connect the PTR Valve in the location shown in the relevant diagram of **Figures 27 to 33**. Leave the valve outlet pointing down. Tighten the valve using the spanner flats - never use the valve body.
- The PTR Valve must be adequate for the thermal loading applied to the storage cylinder. In the case of gas boosted systems, the thermal load is applied only by the solar collectors. The continuous flow hot water heater does not apply thermal load to the storage cylinder. The potential solar output for the solar collectors at PTR Valve relief conditions is listed in **Table 3**.
- The PTR Valve pressure ratings vary according the cylinder specifications. The maximum heater input rating is 10.0 kW. The PTR valve rating **MUST EXCEED** the total input from the solar collectors. If it does not, the PTR valve **MUST** be exchanged for a model of higher capacity.
- *For example, for a gas boosted solar system with 3 x SP200A collectors, the thermal load is  $3 \times 1.25 = 3.75 \text{ kW}$ . This is less than 10.0 kW, hence the supplied PTR valve is of sufficient capacity.*
- Use Teflon thread tape on the valve, never use hemp or other sealing materials. Ensure the tape does not protrude past the end of the thread, which could result in it hanging over the end of the thread and blocking the water passage through the valve.

### 3. Mount Gas Booster

- Mount the gas booster in accordance with the section 'GAS BOOSTER LOCATION & MOUNTING'.

### 4. Connect Water to Gas Booster

- Connect the outlet of the storage cylinder to the water inlet of the gas booster.

### 5. Connect Fittings

- Connect fittings and pipe work as shown in the relevant diagram in **Figures 27 to 33**.

### 6. Cold Water Supply

- Connect cold water supply to the inlet 'T'. Ensure that the relevant valves as described in the section "VALVES AND FITTINGS" are fitted.
- Purge the cold water supply lines to remove air and swarf before final connection.

### 7. Relief Drain Lines

- Independent 15 mm copper pipes must be fitted to the drain outlets of the PTR and ECV. Each pipe must be open to atmosphere and run with a continual downward grade in a frost free environment to a visible discharge point. Drain lines must not exceed 9 metres in length.
- Valves or other restrictions **must not** be placed in the relief valve drain outlet line.



**Some water will drip from the drain lines during heating of the water in the storage cylinder. It is recommended to discharge directly above a drain.**

### 8. Hot Water Discharge

- Connect the hot water outlet of the gas booster to the pipe work supplying hot water to the premises.



**A temperature limiting device may be required as detailed in the section "HOT WATER DELIVERY TEMPERATURE".**

### 9. Connect Gas to Booster

- Connect a suitable gas supply and isolating valve to the gas booster. Follow instructions supplied with gas booster. Keep gas booster isolated at this stage.

# INSTALLATION MAINTENANCE - GAS BOOSTED SYSTEMS

## FILLING THE SYSTEM



Ensure building occupants are warned to stay clear of the solar system components, building perimeter and roof since hot water or steam may be discharged from pipes or components.

1. Ensure the gas supply to the continuous flow water heater is isolated.
2. Turn on one or more hot water taps at the sink. Open the stop cock in the cold water mains supply line. The entire system will now be filled with cold water.
3. Turn off the hot tap at the sink when water flows freely without air bubbles or air bursts. Check all connections for leakage and tighten if necessary. This applies especially to fittings in positions not easily assessed such as near the solar collectors. Operate the easing gear of both the PTR and ECV valves at the storage cylinder to ensure these valves are functional.



If leaks are detected the system must be drained and leaks repaired before the system is refilled. If this is necessary, temporarily cover the solar collectors with packaging cardboard or a tarp to prevent them from heating which could result in steam or hot water being discharged from fittings.

## PRE SOLAR HEATING CHECKS

Before commencing solar heating of the water in the system ensure the following actions have been completed:

### Solar Collectors

1. Are the solar collectors installed with the correct slope and orientation to the sun?
2. Is the installation finished neatly with the roof made good, all tiles and flashings in place?
3. Are the bolts tight on the roof framework?
4. Are all solar collector straps fitted and correctly anchored to the roof structure?
5. If leak testing completed & successful, have any covers been removed from the solar collectors?

### Gas Booster

1. Ensure the gas supply is isolated. Remove the test point screw located on the gas inlet connection and attach a pressure gauge.
2. Turn on the electrical power to the gas booster and turn on the gas supply.
3. Ensure the cold water inlet ('trio') valve on the storage cylinder inlet is open. Open all available hot water taps.
4. Operate ALL other gas appliances at their maximum gas rate, in accordance with manufacturers instructions.



Ensure building occupants do not have access to hot water outlets during this procedure.

5. With all gas appliances in operation at the maximum gas rate, the pressure should read between 1.13 - 3.0 kPa on Natural Gas. On LPG the pressure should be 2.75 - 3.0 kPa. If the pressure is lower, the gas supply is inadequate and the appliance will not operate to specification. It is the installers responsibility to check the gas meter, service regulator and pipe work for correct operation/ sizing & rectify as required. Note that the gas regulator on the appliance is electronically controlled and factory pre-set. Under normal circumstances it **DOES NOT** need adjustment during installation. Make adjustments only if the gas booster is not operating correctly and all other possible causes for incorrect operation have been eliminated. Instructions for gas pressure setting are located in the pocket behind the front cover of the gas booster.
6. Close the hot water taps including the shower.

7. Close the cold water inlet ('trio') valve on the storage cylinder inlet and inspect and clean the strainer. Repeat for the strainer connected at the inlet of the gas booster. This procedure may need to be repeated to ensure the strainers remains clear, especially on new installations.
8. Confirm the hot water delivery temperature from the gas booster. This is done by checking the hot water delivery temperature at an untempered outlet close to the water heater. This is usually the hot water outlet in the kitchen. The untempered hot water delivery should be between 55°C & 60°C.

## Temperature Limiting Devices

1. Commission any temperature limiting devices in accordance with the instructions supplied by the manufacturer.
2. Confirm the hot water delivery temperature at a tempered water outlet. Tempered water outlets should be those supplying areas primarily used for the purposes of personal hygiene such as bathrooms. The hot water delivery temperature should not exceed 50°C or 45°C as detailed in the section '**Hot Water Delivery temperature**' refer to **page 40**.

## SOLAR HEATING

1. Remove any cardboard or tarp covers that may have been placed over the solar collectors to prevent them from heating water during installation and commissioning.
2. Activate electrical power to the Rinnai gas booster. Solar heating of the water in the cylinder will now commence when sufficient solar radiation is available.

## FINISHING THE INSTALLATION

- After testing is completed explain to the householder the functions and operation of solar water heater components. Also explain to the householder the importance of carrying out Maintenance as per separate 'Warranty Terms and Conditions' document.
- Leave this Manual with the householder.
- Remind the householder to complete the 'Warranty document' provided in a separate 'Warranty booklet'.

## DRAINING INSTRUCTIONS

1. The power supply to the gas booster must be switched off.
2. Close the cold water mains supply stop cock.
3. Open a hot tap to relieve pressure.
4. Disconnect the cold water connection to the Thermo-arrest (T/A) valve.
5. Remove the brass plug on the bottom right hand side of the collector bank.
6. Disconnect the 'water inlet' and 'water outlet' connections at the gas booster.
7. The system will now drain all water.

## INSTALLATION PROCEDURE

### 1. Install Solar Collectors and Cylinders

Position and install the solar collectors and cylinder in accordance with the section "INSTALLATION OF SOLAR COLLECTORS AND CYLINDER".

### 2. Connect PTR Valve

- Connect the PTR Valve in the location shown in the relevant diagram of **Figures 27 to 33**. Leave the valve outlet pointing down. Tighten the valve using the spanner flats - never use the valve body.
- The PTR Valve must be adequate for the thermal loading applied to the storage cylinder. In the case of gas boosted systems, the thermal load is applied only by the solar collectors. The continuous flow hot water heater does not apply thermal load to the storage cylinder. The potential solar output for the solar collectors at PTR Valve relief conditions is listed in **Table 3**.
- The PTR Valve pressure ratings vary according the cylinder specifications. The maximum heater input rating is 10.0 kW. The PTR valve rating **MUST EXCEED** the total input from the solar collectors. If it does not, the PTR valve **MUST** be exchanged for a model of higher capacity.
- *For example, for a gas boosted solar system with 3 x SP200A collectors, the thermal load is  $3 \times 1.25 = 3.75 \text{ kW}$ . This is less than 10.0 kW, hence the supplied PTR valve is of sufficient capacity.*
- Use Teflon thread tape on the valve, never use hemp or other sealing materials. Ensure the tape does not protrude past the end of the thread, which could result in it hanging over the end of the thread and blocking the water passage through the valve.

### 3. Connect Fittings

- Connect fittings and pipe work as shown in the relevant diagram in **Figures 27 to 33**.

### 4. Cold Water Supply

- Connect cold water supply to the inlet 'T'. Ensure that the relevant valves as described in the section "VALVES AND FITTINGS" are fitted.
- Purge the cold water supply lines to remove air and swarf before final connection.

### 5. Relief Drain Lines

- Independent 15 mm copper pipes must be fitted to the drain outlets of the PTR and ECV. Each pipe must be open to atmosphere and run with a continual downward grade in a frost free environment to a visible discharge point. Drain lines must not exceed 9 metres in length.
- Valves or other restrictions **must not** be placed in the relief valve drain outlet line.



NOTE

**Some water will drip from the drain lines during heating of the water in the storage cylinder. It is recommended to discharge directly above a drain.**

### 6. Hot Water Discharge

- Connect the hot water outlet of the storage cylinder to the pipe work supplying hot water to the premises.



WARNING

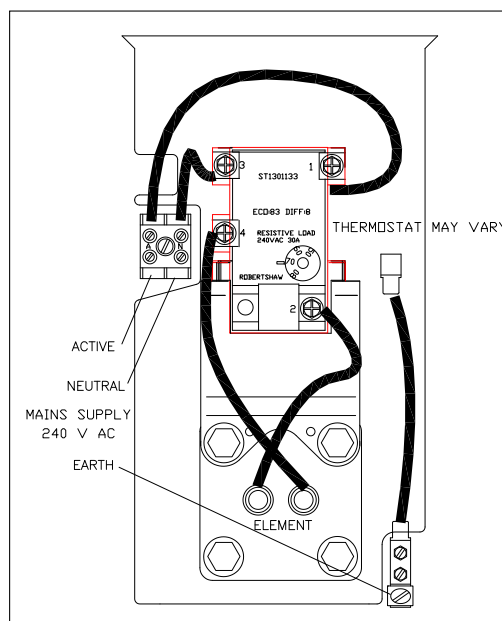
**A temperature limiting device may be required as detailed in the section "HOT WATER DELIVERY TEMPERATURE".**

## 7. ELECTRIC SUPPLY



The power supply to the heating elements must not be activated until the system is filled with water.

- The power supply can be either Off-Peak (overnight), Extended Off-Peak (overnight and day) or continuous, depending on the tariffs available from the local electricity supply authority. The Off-Peak (overnight) power supply minimises the cost of any required electric boosting. Discuss power supply requirements with the end user and electricity supply authority as required.
- Connections for elements **Figure 36** shows the wiring detail for the water heater.
- A flexible 20 mm conduit is required for the electrical cable to the storage cylinder. The conduit is to be connected to the unit with a 20 mm terminator. Connect the power supply wires directly to the terminal block and earth tab connections ensuring there are no excess wire loops inside the front cover.



**Figure 35 - Wiring detail**

### Heating Element Thermostat Temperature Settings

Australian Standards require a minimum thermostat set point of 60°C to inhibit the growth of Legionella Pneumophila bacteria.

## FILLING THE SYSTEM



Ensure building occupants are warned to stay clear of the solar system components, building perimeter and roof since hot water or steam may be discharged from pipes or components.

1. Ensure the electric power supply to the heating element is switched off and fuses removed.
2. Turn ON one or more hot water taps at the sink. Open the stop cock in the cold water mains supply line. The entire system will now be filled with cold water.
3. Turn OFF the hot tap at the sink when water flows freely without air bubbles or air bursts. Check all connections for leakage and tighten if necessary. This applies especially to fittings in positions not easily assessed such as near the solar collectors. Operate the easing gear of both the PTR and ECV valves at the storage cylinder to ensure these valves are functional.



If leaks are detected the system must be drained and leaks repaired before the system is refilled. If this is necessary, temporarily cover the solar collectors with packaging cardboard or a tarp to prevent them from heating which could result in steam or hot water being discharged from fittings.

## PRE SOLAR HEATING CHECKS

Before commencing solar heating of the water in the system ensure the following actions have been completed:

### Solar Collectors

1. Are the solar collectors installed with the correct slope and orientation to the sun?
2. Is the installation finished neatly with the roof made good, all tiles and flashings in place?
3. Are the bolts tight on the roof framework?
4. Are all solar collector straps fitted and correctly anchored to the roof structure?
5. If leak testing completed and successful, have any covers been removed from the solar collectors?

### Electric Heating Element

1. Has the thermostat set point been set to at least 60°C and no greater than 70°C?

### Temperature Limiting Devices

1. Commission any temperature limiting devices in accordance with the instructions supplied by the manufacturer.
2. Confirm the hot water delivery temperature at a tempered water outlet. Tempered water outlets should be those supplying areas primarily used for the purposes of personal hygiene such as bathrooms. The hot water delivery temperature should not exceed 50°C or 45°C as detailed in the section "Hot water delivery temperature" of these instructions.

## SOLAR HEATING

1. Remove any cardboard or tarp covers that may have been placed over the solar collectors to prevent them from heating water during installation and commissioning.

### Auxiliary Energy Supply

1. Connect the electrical element to the power supply (off peak if available).
2. When the system is fully of water turn on electrical supply to element.

## FINISHING THE INSTALLATION

- After testing is completed explain to the householder the functions and operation of solar water heater components. Also explain to the householder the importance of carrying out Maintenance as per separate 'Warranty Terms and Conditions' document.
- Leave this Manual with the householder.
- Remind the householder to complete the 'Warranty Certificate' provided in the separate 'Warranty Terms and Conditions' document.

## DRAINING INSTRUCTIONS

1. The power supply to the element must be switched off.
2. Close the cold water mains supply stock cock.
3. Open a hot tap to relieve pressure.
4. Disconnect 'cold water inlet' connection to the T/A valve.
5. Remove the brass plug on the bottom right hand side of the collector bank.
6. The system will now drain all water.

# NOTES

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# Rinnai

**Rinnai Australia Pty. Ltd.** ABN 74 005 138 769

## Head Office

10-11 Walker Street,  
Braeside, Victoria 3195  
P.O. Box 460  
Tel: (03) 9271 6625  
Fax: (03) 9271 6622

Rinnai has a Service and Spare Parts network with personnel who are fully trained and equipped to give the best service on your Rinnai appliance. If your appliance requires a service, please call our National Help Line.

Internet: [www.equinoxsolar.com.au](http://www.equinoxsolar.com.au)  
General: [www.rinnai.com.au](http://www.rinnai.com.au)  
E-Mail: [enquiry@rinnai.com.au](mailto:enquiry@rinnai.com.au)

## National Help Line

Spare Parts & Technical Info  
Tel: 1300 555 545\*  
Fax: 1300 300 141\*

*\*Cost of a local call Higher from mobile or public phones.*

Hot Water Service Line  
Tel: 1800 000 340

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