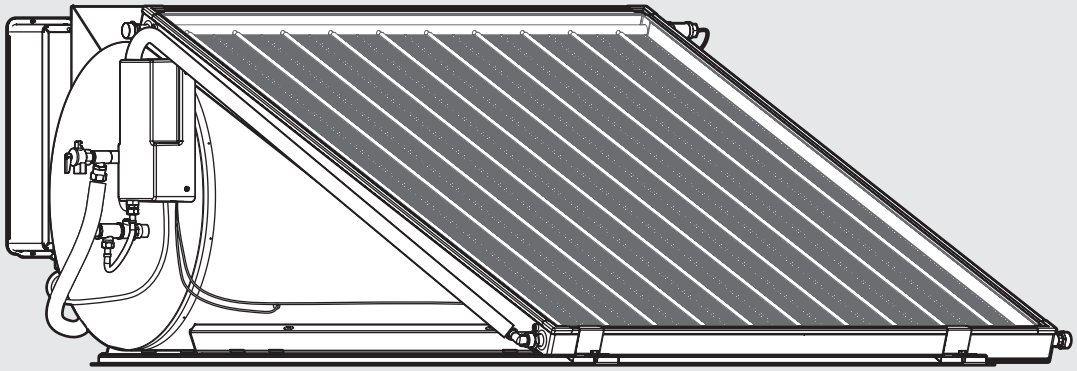


Low Profile Roof Mounted Solar Hot Water System

Operation & Installation Manual

Rinnai

Congratulations on the purchase of your Rinnai Solar Hot Water System. We trust you will have many years of comfort and enjoyment from your appliance.

IMPORTANT

BEFORE USING THIS APPLIANCE

Before proceeding with the operation or installation read this manual thoroughly and gain a full understanding of the appliance, to ensure safe and correct use.

This appliance must be installed in accordance with:

- Manufacturer's Installation Instructions
- Current AS/NZS 3000, AS/NZS 3500 & AS/NZS 5601
- Local Regulations and Municipal Building Codes including local OH&S requirements

This system is fuly certified in it's own right. Given the unique nature of the installation for this system it is reccomended to discuss any additional site requirements with the Building Inspector / Surveyor.

The solar hot and cold pipes between the solar storage tank and the solar collector(s) must be copper tube. Fittings used to join these pipes must use metallic materials to acheive sealing. Plastic pipe and fittings must not be used as they are not suitable for the high temperatures and pressures that may occur.

Failure of plastic pipe and/or fittings can lead to the release of high temperaature water and cause severe flooding and water damage.

This appliance must be installed, maintained and removed by an Authorised Person.

For continued safety of this appliance it must be installed and maintained in accordance with the manufacturer's instructions.

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

Certified Product
WaterMark
AS3498 Lic W208
SAI Global

Certified Product
Australian Standard
AS/NZS 2712
Lic No.1849
SAI Global

TABLE OF CONTENTS

WARNINGS AND IMPORTANT INFORMATION

BEFORE USING THE SYSTEM

Before proceeding with the operation or installation read this manual thoroughly and gain a full understanding of the system, to ensure safe and correct use.

Always comply with the following precautions to avoid dangerous situations and to ensure optimum performance.

Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury and/or death.

DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in personal injury or death.

WARNINGS: Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or death.

CAUTIONS: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to the appliance. It may also be used to alert against unsafe practices.

REGULATORY INFORMATION

Your Rinnai solar hot water system has been certified by SAI global. The certification number is shown on the data plate of the solar collector and tank.

The system must be installed correctly by an appropriately licensed trades person. The installation of gas, water, and electricity must conform to local regulations.

The installation of gas, water, and electricity must conform to local regulations, including local OH&S requirements.

The installation must also comply with the instructions supplied by Rinnai in all manuals relevant to the installation.

Please keep this instruction booklet in a safe place for future reference.

All dimensions referred to in these instructions are in millimetres, unless otherwise specified.

Notice to Victorian Consumers

This appliance must be installed by a person licensed with the Victorian Building Authority.

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 Victorian Building Authority on 1300 815 127.

HAZARDS

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. Components used to join pipes must use metallic materials to achieve sealing.

DO NOT place articles on or against any system components.

DO NOT store chemicals or flammable materials near any system components.

DO NOT operate with covers removed from any system components.

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.

Warning About Hot Water

Hot water can cause scalding. Those most at risk are children and disabled, elderly and infirm persons. (65°C water can severely burn a child in half a second).

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.

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

ALWAYS supervise children whenever they are in the bathroom or near other sources of hot water. Ensure any hot water taps are closed firmly after use.

OPERATION PRINCIPLE

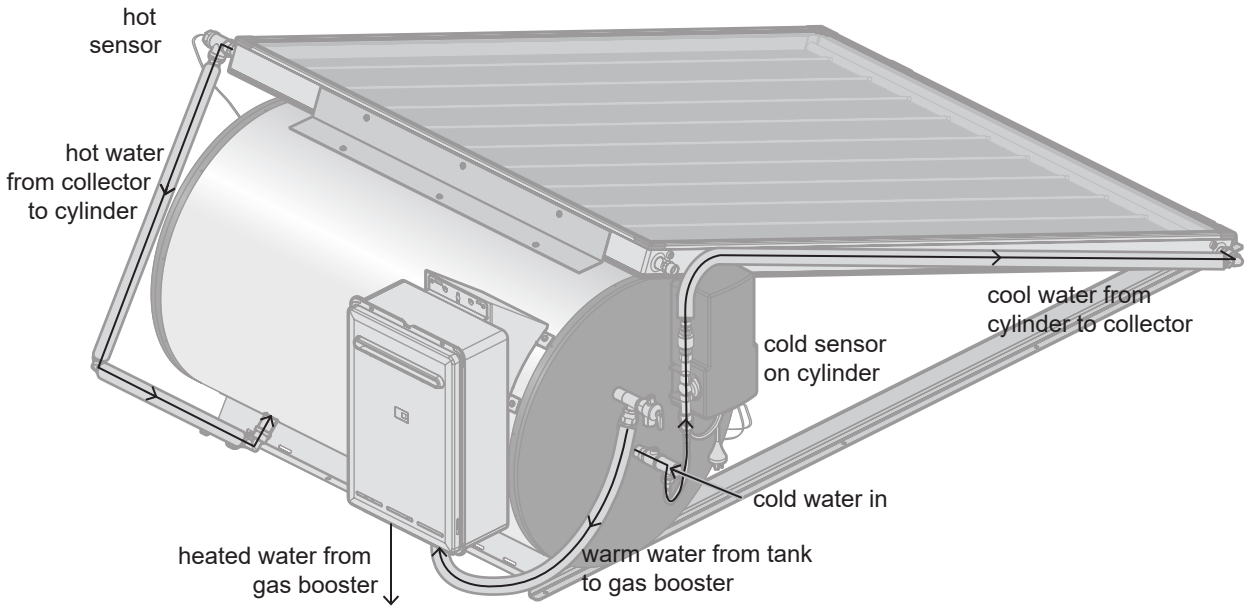
Rinnai pumped low profile roof mounted systems are designed to have all components mounted on a flat roof.

The system comprises a hot water storage cylinder, solar collector, pump, controller, temperature sensors and a gas booster.

Water is pumped from the storage tank to the solar collectors when there is enough energy available from the sun. The solar controller utilises information from the sensors to manage this process.

Supplementary heating is provided using a gas booster if insufficient heat is available from the sun (such as during cloudy or rainy weather or during winter months).

The following diagram illustrates the operation principle.



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.

WARNING

DO NOT tamper with or remove safety devices.

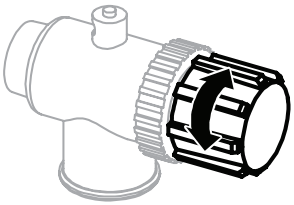
DO NOT operate the water heater unless all safety devices are fitted and in working order.

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

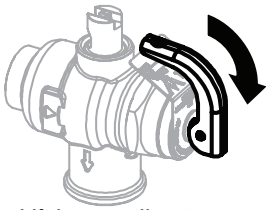
Pressure & Temperature Relief (PTR) Valve

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!)

WARNING

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 PTR valve is not easily and safely accessible, arrange for the Rinnai service team or an authorised person to carry out this task. This person must comply with all regulatory requirements that exist including those related to working at elevated heights.

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).

WARNING

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.

GAS BOOSTERS

- 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

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 solar control unit and pump circulate water between the solar collectors and the storage cylinder until the water at the base of the cylinder is 65°C. Under these conditions water at the top of the tank may exceed 85°C. During periods of low solar gain, supplementary heating occurs.

IMPORTANT

To meet Australian regulatory requirements, supplementary heating must be operational.

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 the separate warranty 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 document. The system is not suitable as a pool or spa heater.

MAINTENANCE AND REGULAR CARE

Operate the easing gear of the PTR as described in the section ‘Safety Devices’ on page 7.

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 the supplied warranty booklet).

It is recommended that the sacrificial anode be inspected every 5 years or more frequently in areas where there is a high incidence of water deposits. Anodes suited to hard and soft water, are available from Rinnai.

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. The power supply cord and plug (if fitted) must be replaced by a genuine replacement part available from Rinnai.

SAVE A SERVICE CALL

Before contacting Rinnai for service, please follow the fault finding guide. If the problem persists 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 product or components may be chargeable.

INSUFFICIENT OR NO HOT WATER	
Excessive hot water consumption	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. Consider discussing with your installer, fitting water saving fixtures and/or flow control or pressure limiting valves to reduce consumption.
Incorrect solar system size	The system may not have been adequately sized to suit the household.
Gas booster not operating or insufficient gas supply for gas boosted heating system	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 for the gas booster to light. Check if there is gas supply to other appliances in the rest of the house
NO WATER FROM THE HOT TAP	
Restriction in the hot tap or failure of the cold water supply to the heater	Check for water flow at the other hot taps and that the cold water isolation valve is fully open
HIGH GAS BILL	
Temperature and pressure relief valve / expansion control valve discharging water continuously	PTR Valves & ECV Valves (if fitted) It is normal and desirable that these valves allows a small quantity of water to be discharged during the heating cycle. If they discharges more than a standard bucket of water during a 24 hour period or discharges continuously there may be another problem If water continuously dribbles from the valve, try easing the valve gear for a few seconds as described in the section 'Maintenance and Regular Care' on page 8. This may dislodge any foreign matter and alleviate the problem. If the valve discharges at high flows, contact your installer or Rinnai to discuss.
Solar controller unit switched off	If the controller is switched off there will be no solar pre-heating of water, resulting in the water being heated entirely by gas boosting. Check the power outlet to the solar control unit is switched on.
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 the section 'System Orientation and Inclination' on page 16.
CONDENSATION IN COLLECTORS	
Condensation in solar collectors	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 or reliability of the system.
NOISY SOLAR COLLECTORS	
Noise from solar collectors	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.
WATER HAMMER	
Hot and cold water plumbing in the premises	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

SPECIFICATIONS

GENERAL

Flow and return pipework	½"
PTR valve setting	850 kPa
Rating of PTR Valve supplied	10 kW
Expansion Control Valve (ECV) setting (supplied by installer if required)	700 kPa
Max supply pressure with ECV	500 kPa
Max supply pressure without ECV	700 kPa
Pressure limiting valve rating (supplied by installer if required)	500 kPa

Flow Control

A variable speed pump controls the water flow rate through the collectors and storage cylinder to optimise the performance of the system.

Solar Controller

The solar controller operates the pump to optimise solar energy collection and stop energy collection when the cylinder is full of hot water. It also has an option to enable pumped frost protection.

For full details see the solar controller manual.

GAS BOOSTERS

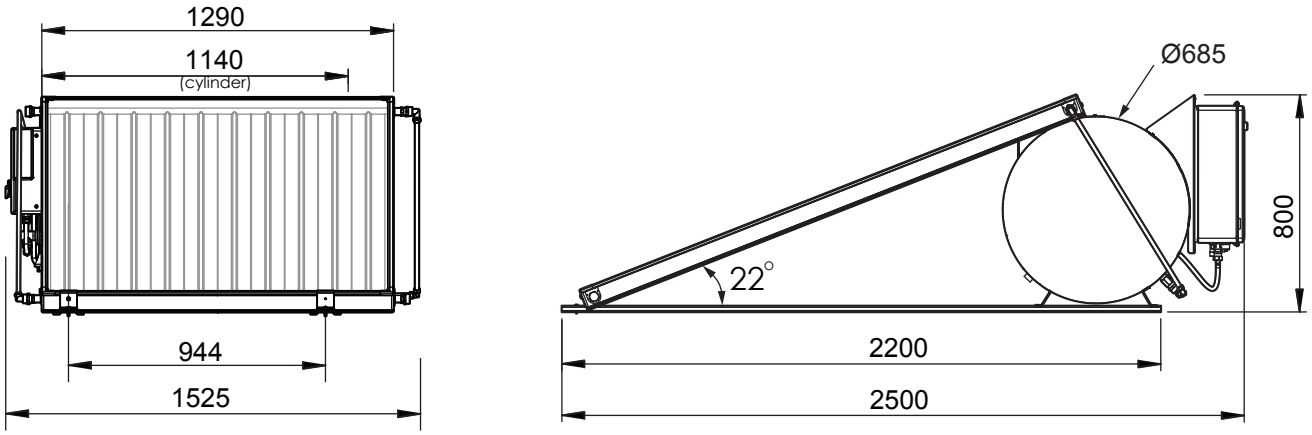
Model Name	**S20**	**S26**
Boost capacity at 20°C rise (l/min)	20	26
Boost capacity at 25°C rise (l/min)	16	26
Maximum rated flow (l/min)	20	26
Minimum water supply pressure for maximum rated flow (kPa) [1]	120	200
Frost protection	Yes	
Gas consumption maximum (MJ/h)	124	199
Gas consumption minimum (MJ/h)	16	16
Hot water delivery temperature (°C) [2]	70	
Dimensions - height x width x depth (mm)	530 x 350 x 195	
Weight (kg)	13	15

1 Units will operate at lower pressures but the rated flow will not be achieved.

2 Gas boosters for Solar hot water applications will be set by Rinnai to deliver a minimum temperature of 70°C when the incoming water temperature is below 55°C. When the incoming water temperature is above 55°C due to solar heating, the burners of the gas booster will not operate.
Solar Gas boosters will be marked as Solar. Units not marked 'Solar' MUST NOT be used, and will invalidate warranty. See warranty booklet for more details.

Due to ongoing product improvement the specification of the gas booster may vary.
Refer to the documentation supplied with the gas booster for up to date specifications.

SYSTEM DIMENSIONS



STORAGE CYLINDER

Connections	Rp ¾
Weight Empty (kg)	77
Weight Filled (kg)	277

SOLAR COLLECTORS

	Enduro XL SP250B
Type	Flat plate
Waterways	Copper
Absorber	Aluminium
Selective Surface	High Performance
Maximum Operating Pressure	1000 kPa
Casing Material	Aluminium
Overall Dimensions (L x W x H) (mm)	1960 x 1290 x 80
Weight empty (kg)	48
Water volume (litres)	2.4
Number of risers	10
Potential Solar Output at PTR relief conditions (kW)	1.4
Frost Protection	The Rinnai solar hot water warranty booklet specifies the locations and conditions that apply for flat plate collectors to be warranted against frost damage. For full warranty terms and conditions refer to the Rinnai solar hot water warranty booklet. This booklet is available from www.rinnai.com.au.

INSTALLATION INFORMATION

REGULATIONS AND OCCUPATION HEALTH AND SAFETY (OH&S)

WARNING

Installation and commissioning must be performed by authorised persons.

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 system is fully certified is its own right. Given the unique nature of the installation for this system, it is recommended to discuss any additional site requirements with the site building inspector / surveyor.

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

WARNING

These systems are only suitable for use on buildings up to 10 metres tall.

These systems are only suitable to be used with a roof pitch of up to 10 deg.

Select suitable areas of roof on which to install the system. 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 the section ‘System Orientation and Inclination’ on page 16 for more information.

Sufficient clearances shall allow access to, and removal of, all serviceable parts. Ensure the PTR valve, drain lines, thermostats and elements have sufficient clearances and are accessible for service and removal. The information on any data plates must also be readable.

This system is designed to have the gas booster mounted to the storage cylinder using the supplied mounting components. The location on the roof of the gas booster must meet the requirements of the gas installation code (AS/NZS 5601)

IMPORTANT

Clause 6.3.12 and 6.3.13 of AS/NZS 5601 specify requirements for access to a gas appliance. It is the responsibility of the installer to ensure these requirements are followed.

GAS SUPPLY

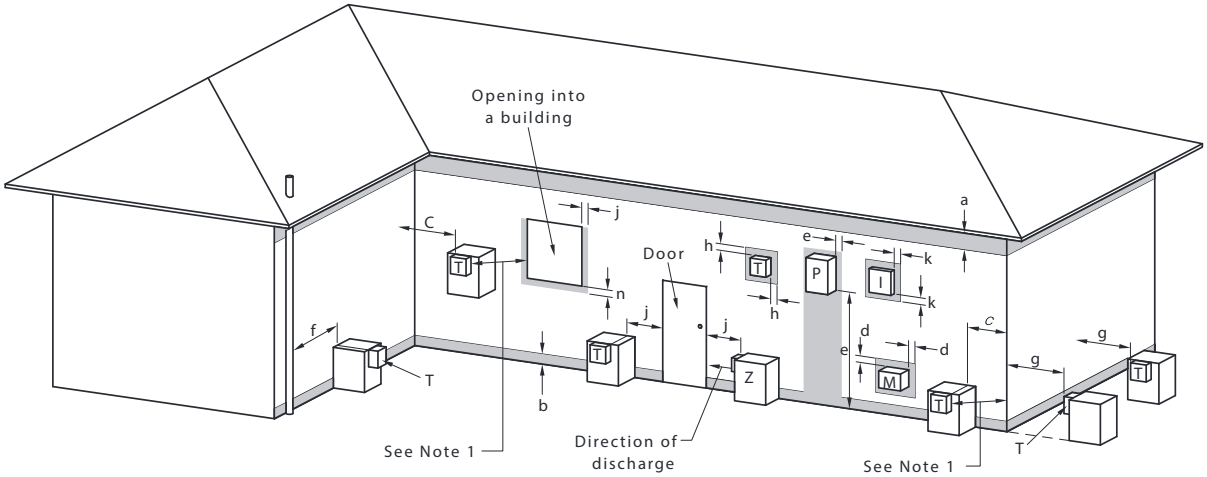
The maximum gas consumption of the gas booster and the required gas pressure are shown on the appliance data plate. If the gas pipe sizing is insufficient the customer will not get the full performance benefit.

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 to the booster.

GAS BOOSTER CLEARANCES

Figure 6.2 from AS/NZS5601 is reproduced below. It was current at the time of printing, but may have been superseded. It is the installer's responsibility to ensure that current requirements are met.



Ref.	Item	Min. clearances (mm) Fan assisted
	Below eaves, balconies and other projections:	
a	• *Appliances* up to 50 MJ/h input	200
	• *Appliances* over 50 MJ/h input	300
b	From the ground, above a balcony or other surface *	300
c	From a return wall or external corner *	300
d	From a gas *meter* (M) (see Note 5) (see Clauses 5.11.5.9 for vent terminal location of regulator) (See Table 6.7 for New Zealand requirements)	1000
e	From an electricity *meter* or fuse box (P) † (see Note 5)	500
f	From a drain pipe or soil pipe	75
g	Horizontally from any building structure* or obstruction facing a terminal	500
h	From any other *flue terminal* , cowl, or combustion air intake *	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 *	300
	• *Appliances* over 150 MJ/h input up to 200 MJ/h input *	300
	• *Appliances* over 200 MJ/h input up to 250 MJ/h input *	500
	• *Appliances* over 250 MJ/h input *	1500
	• All fan-assisted *flue appliances* , in the direction of discharge	1500
k	From a mechanical air inlet, including a spa blower	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/h input	150
	• Other *appliances* up to 50 MJ/h input	500
	• *Appliances* over 50 MJ/h input and up to 150 MJ/h input	1000
	• *Appliances* over 150 MJ/h input	1500

* - unless *appliance* is *certified* for closer installation.

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

NOTES:

1 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.

2 See Clause 6.9.4 for restrictions on a *flue terminal* under a covered area.

3 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.

4 For *appliance* **s** not addressed above acceptance should be obtained from the Technical Regulator.

5 Minimum clearances *d* and *e* also apply to any combustion air intake openings of appliances.

FIGURE 6.2 (in-part) LOCATION OF FLUE TERMINALS OF BALANCED FLUE, ROOM SEALED, FAN-ASSISTED OR OUTDOOR APPLIANCES

WATER PIPES, FITTINGS AND INSULATION

IMPORTANT

The solar hot and solar cold pipes between the solar storage tank and solar collector(s) must be copper tube. Fittings used to join these pipes must use metallic materials to achieve sealing. Plastic pipe and fittings must not be used as they are not suitable for the high temperatures and pressures that may occur. Failure of plastic pipe and/or fittings can lead to the release of high temperature water and can cause severe flooding and water damage.

All hot water pipework should be insulated with sealed polyethylene foamed or equivalent insulation to optimise performance and energy efficiency, and to protect against frost damage. Such insulation may also be mandatory under local regulations.

Rinnai recommend insulation on all pipes to achieve at least R 1.0 K.m²/W.

With the exception of solar collector flow and return pipes, water pipe sizing should be performed in accordance with AS/NZS 3500.

All supplied insulation materials must be fitted as shown to minimise heat losses. In frost prone areas this insulation will also protect against frost damage.

FROST PROTECTION MODE

Information on Pumped Frost Protection is available in the solar controller manual

WATER SUPPLY

The maximum water pressures for the various systems are listed on page 10. 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 booklet. 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.

VALVES AND FITTINGS

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

- A combined pressure and temperature (PTR) relief valve, capacity 10 kW. This valve is fitted near 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.
- A non-return valve is fitted on the solar pump outlet to prevent backflow through the pump from the solar collectors. This valve is factory fitted.
- Elbow connections for the hot, cold and gas supply are fitted at the bottom of the gas booster.
- Fittings as shown on page 20.

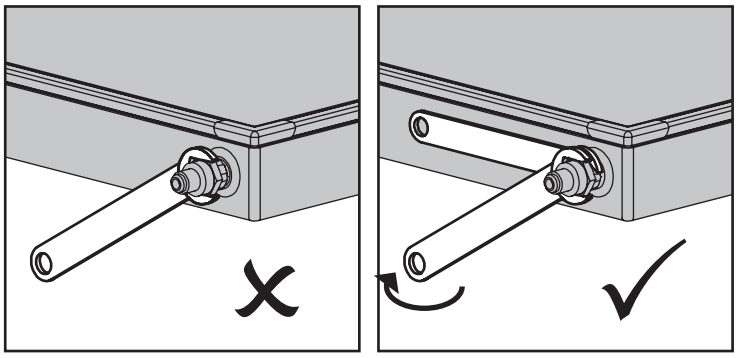
The following valves & fittings are to be supplied by the installer:

- 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.
- An approved pressure limiting valve (supplied with some systems) is required if the maximum rated water supply pressure on page 10 is exceeded.

CONNECTING FITTINGS TO COLLECTOR

WARNING

When connecting fittings to collectors ensure that the flats at the end of the collector header are held in place with one spanner, while another spanner is used to tighten fitting. Collector damage or leaks may occur if this isn't done correctly.



SYSTEM ORIENTATION AND INCLINATION

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

For Australian installations, solar collectors should face the equator (True North) for optimum performance. Installing solar collectors facing up to 45 degrees away from North (between North-East and North-West) will reduce efficiency by approximately 5%.

For Australian installations, the ideal collector orientation is the same as the latitude of the site. Inclination within 20 degrees of this will reduce the efficiency by approximately 5%. When installed as shown in this manual, the collectors will be at 22 degrees to the rails.

Installers must ensure they comply with relevant local regulations regarding solar collector inclination and orientation.

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

Latitudes of Australian Cities

ROOF MOUNTING OPTIONS

These systems are only suitable for use on buildings up to 10 metres tall.

These systems are only suitable to be used with a roof pitch of up to 10 degrees.

Mounting Location Suitability

The following table indicates which installation locations are suitable for these solar hot water systems.

Wind Region	Region A and B			Region C and D		
Roof Area	Area 1	Area 2	Area 3	Area 1	Area 2	Area 3
Suitability	✓	✓	×	×	×	×

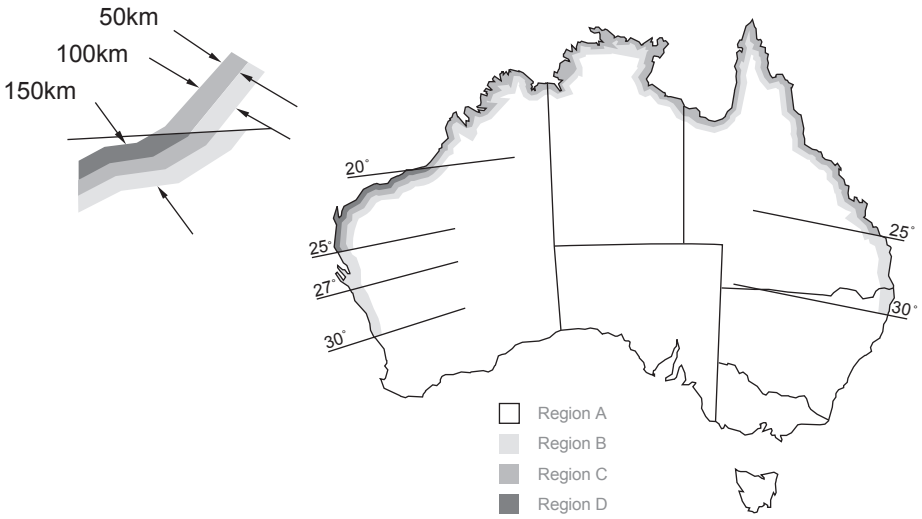
✓ Suitable × Not Suitable

Ensure the system location meets the requirements in AS/NZS 5601, in addition to the above requirements.

Clauses 6.3.12 and 6.3.13 of AS/NZS 5601 have specific requirements in regards to access to gas appliances on roofs.

Wind Region

Australia has been categorised into 4 wind regions. Each region has varying wind load parameters such as wind speed and wind direction multipliers. The diagram below illustrates the region locations. For more information on how to classify site specific wind loading parameters see AS/NZS 1170.2 - Wind Actions, or consult a certified structural engineer.

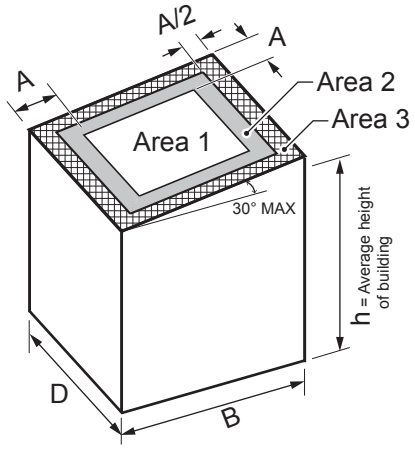


Region A	Region B		Region C		Region D
Callytharra Springs	Adelaide River	Ivanhoe	Borroloola	Mackay	Carnarvon
Gascoyne Junction	Atherton	Kyogle	Broome	Mareeba	Exmouth
Green Head	Biloela	Marble Bar	Bundaberg	Millstream	Karratha
Kununurra	Brisbane	Mullewa	Burketown	Moreton	Onslow
Lord Howe Island	Christmas Island	Norfolk Island	Cairns	Nhulunbuy	Port Hedland
Morawa	Collinsville	Torres Strait Islands	Cocos Islands	Normanton	
Toowoomba	Corindi	Wyndham	Darwin	Rockhampton	
Wittanoom	Geraldton		Derby	Townsville	
Bourke			Karumba		

Indicative selection of towns in Regions A,B,C &D

Roof Area

As per AS/NZS 1170.2, domestic pitched and flat roof areas are classified into working areas. The diagram below illustrate these areas.



A = minimum of 0.2 x B, 0.2 x D and 1 x h

Area 1 - Internal of roof.

Area 2 - Intermediate area, wind pressures increased by 1.5 times.

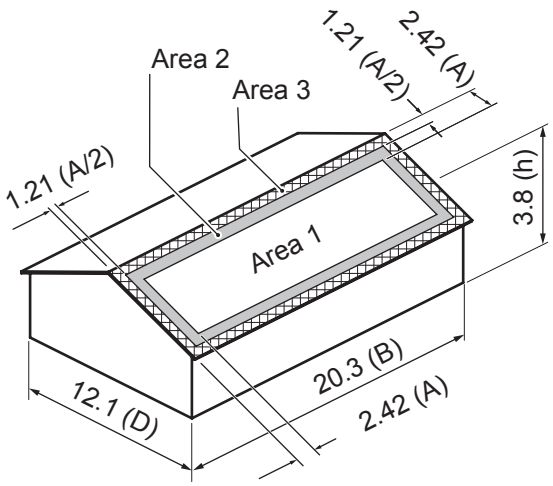
Area 3 - Roof edge including corners, wind pressures increased by 3 times. For installations in roof area 3, a minimum of 0.5m from the edge of the roof is recommended.

Height limit for all installations is 10 metres.

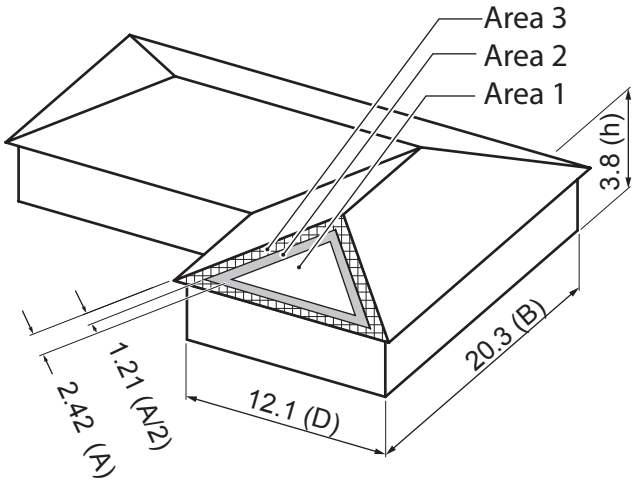
For more information on how to classify specific roof area installations, or for building heights exceeding 10 metres see AS/NZS1170.2 or consult a certified structural engineer.

Some examples are shown below.

Example 1



Example 2

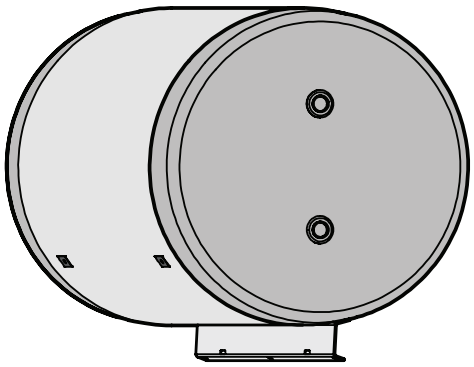


In both examples :

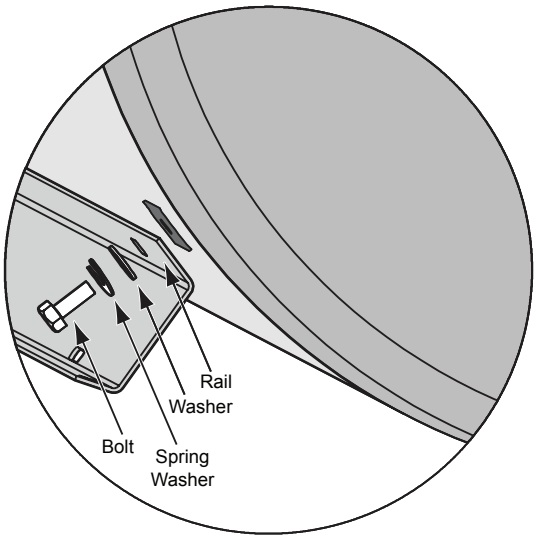
A = min of 0.2 x 20.3 = 4.06
0.2 x 12.1 = 2.42
1 x 3.8 = 3.8

→ A = 2.42
A/2 = 1.21 m

ATTACHING MOUNTING RAIL TO CYLINDER



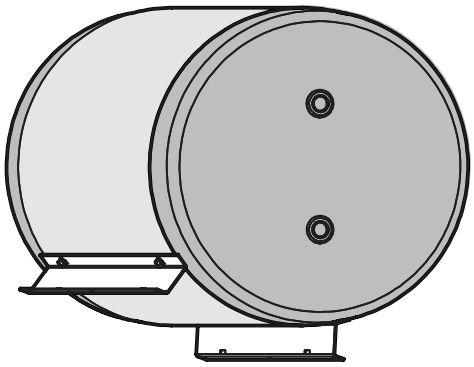
The extra rail and fastenings are packed with the cylinder. They are screwed into the rail mounting holes in the cylinder.



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.



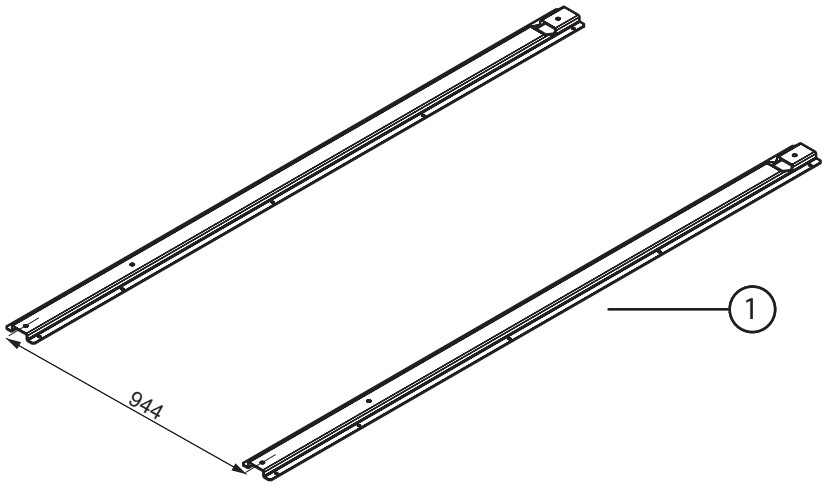
Once the rail is attached and suitably tightened, continue the installation as shown on the next pages.

KIT COMPONENTS - BIKV200CCP1XL

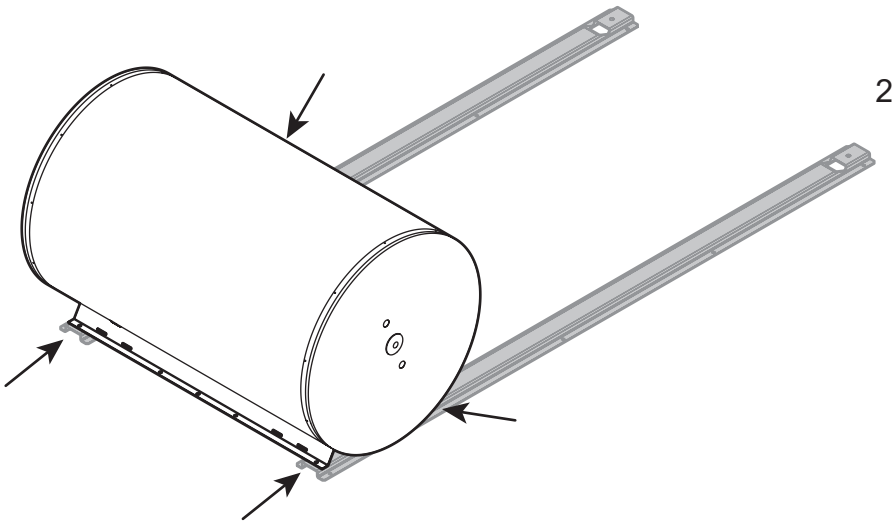
200 Litre Glass Lined Cylinder with 1 SP250B Collector, Gas Boosted

	Qty	Item / Part Number	
1	2	Support Rails	14201180
2	2	Collector Support Bracket	14201181
3	1	Bracket Cylinder - Collector	26601083
4	6	M10 x 16 Bolt	22601120
5	6	M10 Washer	17401019
6	16	Self Drilling Screw	22601086
7	1	Gas Booster Mounting Bracket	26601084
9	1	T adaptor Hot Outlet (Supplied with Cylinder)	92501117
10	1	PTR Valve 850 kPa (Supplied with Cylinder)	92501192
11	1	Reducing Bush G¾ x Rp½	19801004
12	1	Hose Braided (inc washers)	20001020
13	1	T ¾ Rp	19001011
14	1	Temperature Sensor Sheath	S111079
15	1	Nipple R¾ x G½ kinco	32201738
16	1	Insulated ½ Copper Pipe 735 mm	31601802
17	1	Elbow G½ kinco	21201076
18	1	Insulated ½ Copper Pipe 465 mm	31601803
19	2	Elbow Rp¾ x G½ kinco	21201071
20	1	R¾ nipple (long)	17201011
21	1	Insulated ½ Copper Pipe 180 x 1800 mm approx	31601800
22	1	Pump and Controller Assembly Includes: Non return valve 27801713 Pump 30001755 Standard Controller S111226 (23) Cold temp sensor lead 31002710	S111487
24	1	Temperature Sensor Lead Hot	31002715
25	1	Braided Flexihose 225 mm	S111093
26	1	Tee Brass G¾ x G½	S111091
27	2	Cap Rp¾	16001011
28	1	Bleed Valve R¾	S111090
-	1	Manual 15401119 Solar Controller Manual S111415 STC form 15401023 Warranty Booklet 15401041	

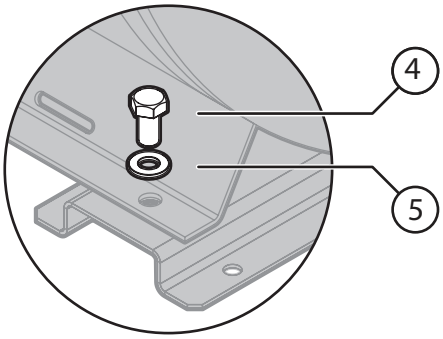
INSTALLATION PROCEDURE

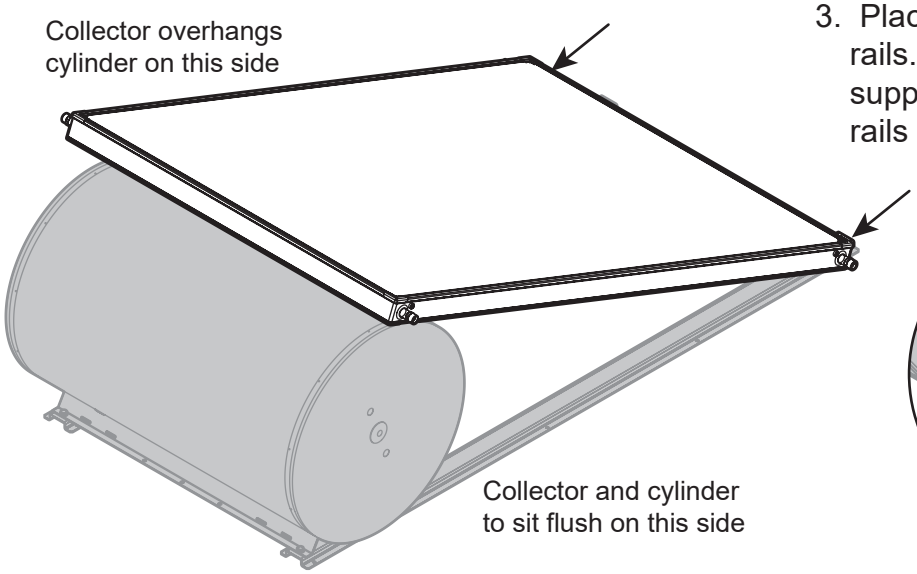


1. Position rails on roof in suitable location and fasten to roof using suitable fasteners.
   Ensure rails are not sitting in lower channels of roofing profile.
   Adjust angle slightly if necessary, ensuring orientation still complies with any regulations.

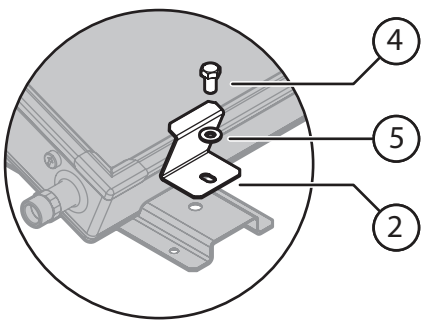


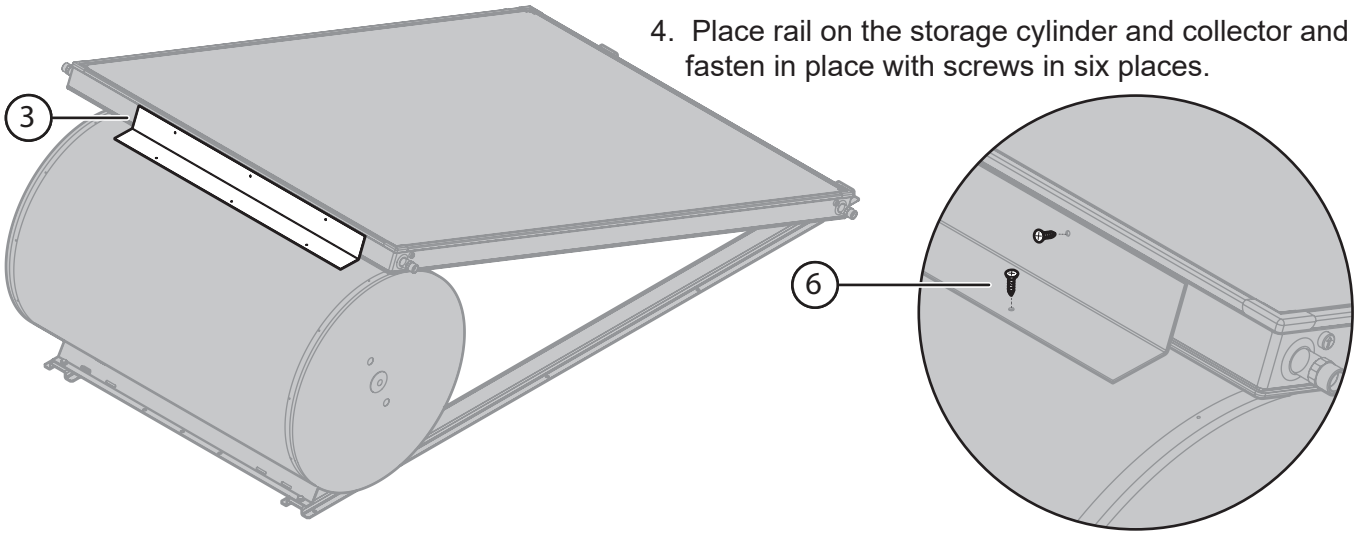
2. Position cylinder on rails and fasten in four locations using screws and washers.



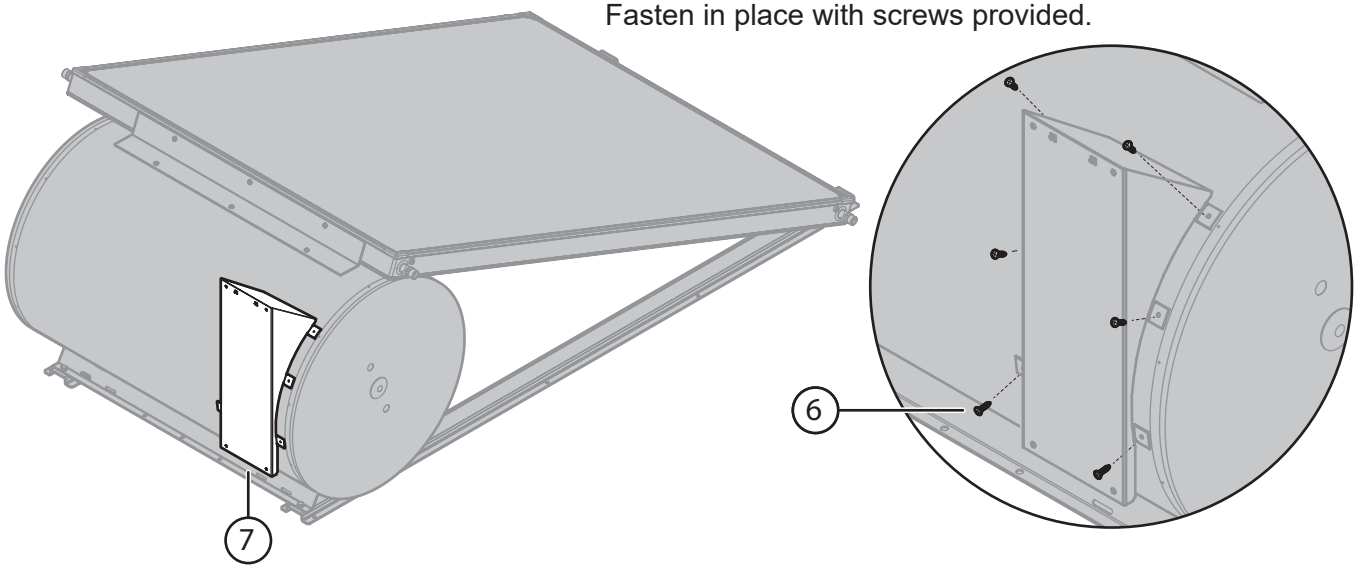


3. Place collector on cylinder and rails. The collector should be supported by the cutout in the rails until it is secured.

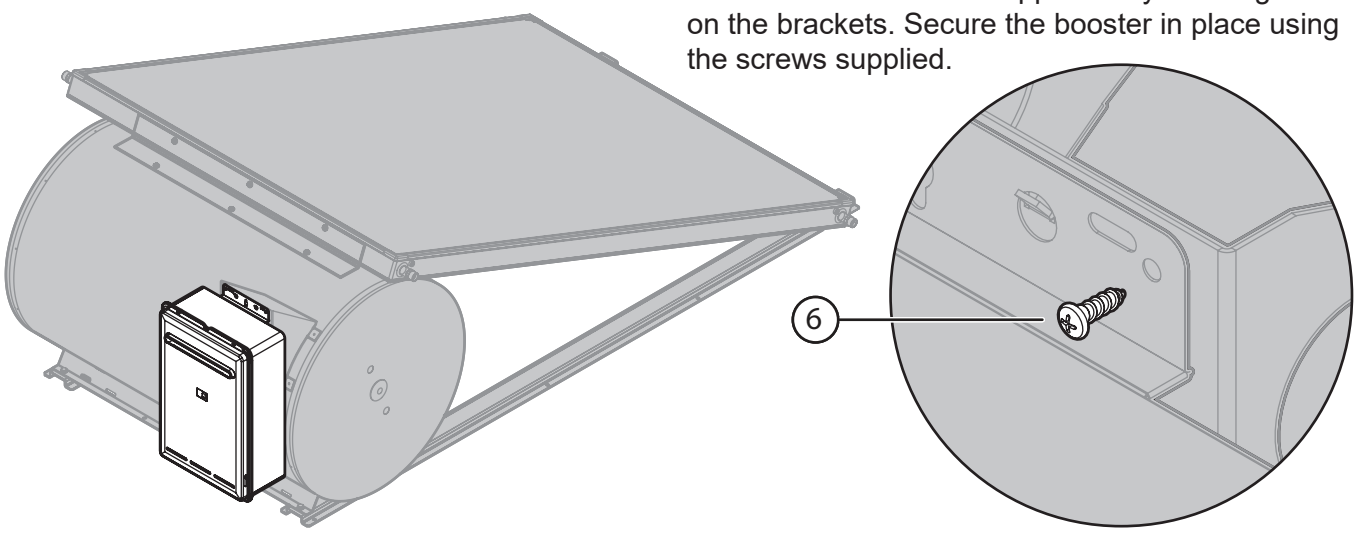




4. Place rail on the storage cylinder and collector and fasten in place with screws in six places.



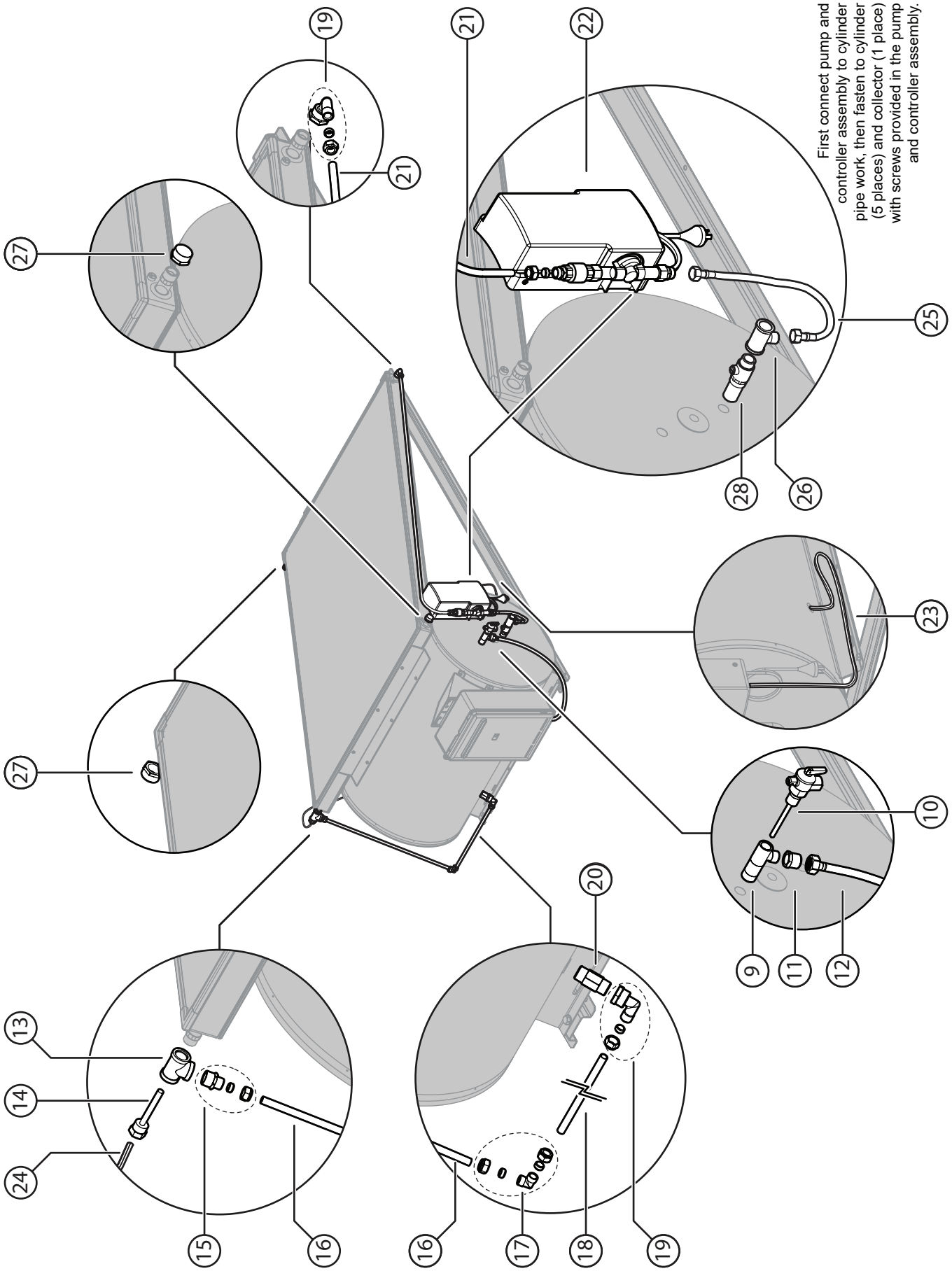
5. Position gas booster mounting bracket on storage cylinder. Align tabs with the edge of the cylinder end cap. CAUTION: Gas booster must sit vertically. Fasten in place with screws provided.



6. Place the gas booster onto the mounting bracket. The booster should be supported by the tongues on the brackets. Secure the booster in place using the screws supplied.

7. Connect Components

Connect all fittings and components as shown in the diagram below. Do not connect power to the pump at this stage.



8. Check PTR Valve

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 collector at PTR Valve relief condition is listed in the table on page 11

The PTR Valve pressure ratings vary according to the cylinder specifications. The maximum heat 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 1 x Enduro XL collector, the thermal load is 1 x 1.4 = 1.4 kW. This is less than 10.0 kW, hence the supplied PTR valve is of sufficient capacity.

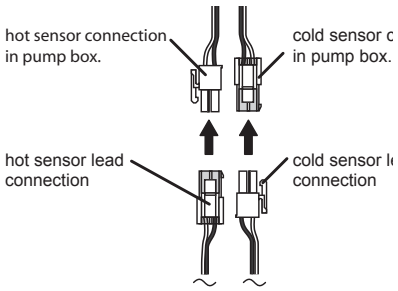
9. Set Frost Protection Mode

Adjust the solar controller to provide the appropriate level of pumped frost protection. Refer to the instructions provided in the solar controller manual.

10. Connect Temperature Sensor Leads

The hot (longer) temperature sensor lead should be fitted at the collector hot outlet and the cold (shorter) temperature sensor lead should be fitted in the drywell in the tank as shown in the diagram on page 23 Ensure the leads are protected from light. They must be sealed in place with thermoplastic putty or silicone. The plugs are then connected to the pump and controller assembly as shown in the diagram.

Replace pump assembly cover.



NOTE

IT IS IMPORTANT THAT THESE PROBES ARE INSTALLED AS SPECIFIED. FAILURE TO DO SO WILL LEAD TO MALFUNCTION OR LACK OF HOT WATER

11. Cold Water Supply

Connect cold water supply to the inlet T. Ensure that the relevant valves are fitted as described in the section ‘Valves and Fittings’ on page 15.

Purge the cold water supply lines to remove air and swarf before final connection.

12. 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.

13. Hot Water Discharge

Connect the hot water outlet of the gas booster 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’ on page 14.

14. 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.

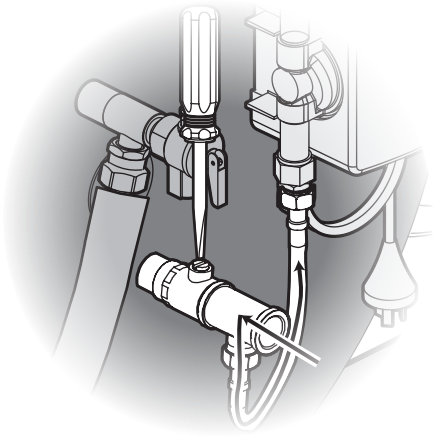
FILLING THE SYSTEM

CAUTION

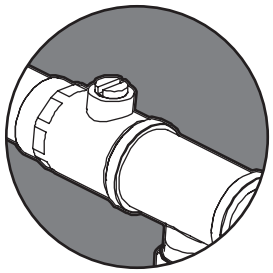
When filling the system with water, the installer must be careful as high temperature water and steam can be discharged from the system. Wear protective clothing such as long sleeves, gloves and safety glasses.

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.

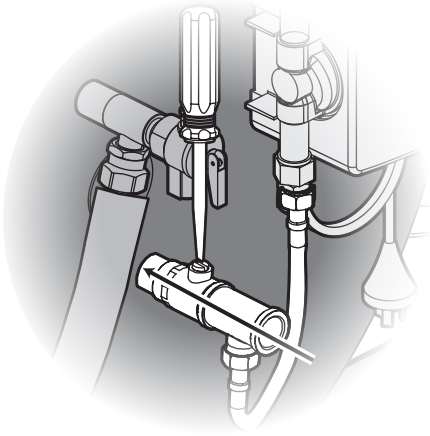
1. Ensure the electric power supplies to the water heater and pump kit are switched off.
2. Ensure the gas supply to the continuous flow water heater is isolated.
3. Turn on the hot water tap at the sink. Open the stop cock in the cold water mains supply line.
4. Using a large screwdriver close the air bleed valve to divert the cold water through the collector.



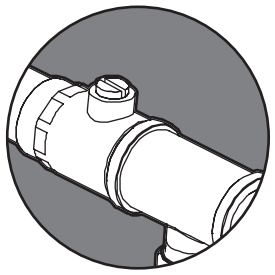
Bleed Valve Closed



5. Turn on the hot tap at the sink. Open the stop cock in the cold water mains supply line,
6. The entire system should fill with cold water. The air should be dispelled through the hot tap.
7. Once the tank is full of hot water, open the air bleed valve to direct the cold water from the mains back to the tank.



Bleed Valve Open



8. 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 accessed 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.

CAUTION

If leaks are detected the system must be drained and leaks repaired before the system is refilled. If this is necessary, 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..

9. Once the system is free from leaks, insulate all exposed pipework and fittings.

CHECKING SOLAR PUMP OPERATION

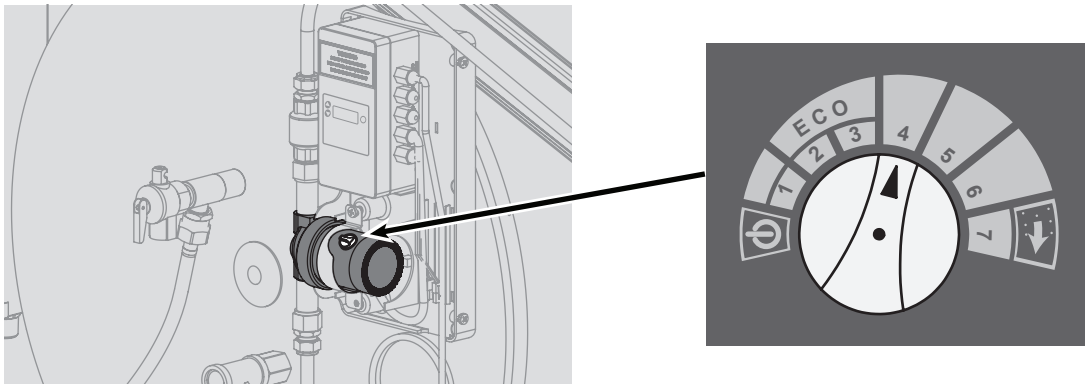
1. Ensure hot and cold sensors are connected as shown on page 23
2. Activate power supply.
3. Pumps will operate when solar energy is available to be collected.

ADJUSTING FLOW RATE

NOTE

If there is no solar energy available, the system can still be commissioned using the pump test function as detailed in the solar controller manual provided.

The purpose of controlling the water flow rate between the collectors and storage cylinder is to optimise the performance of the system. The optimum flow rate for the system is achieved by changing the setting on the pump as shown in the diagram below.



PRE SOLAR HEATING CHECKS

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

Solar Collectors

1. Is the solar collector installed with the correct orientation and inclination?
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. If leak testing completed and successful, have any covers been removed from the solar collectors?
5. Has operation of the solar pump been checked?
6. Have the hot and cold sensors and leads been positioned and connected correctly?
7. Has all the pipework and exposed fittings been correctly insulated?
8. Has the air bleed valve been opened?

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.

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.

5. Close the hot water taps including the shower.
6. 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.
7. 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 65°C & 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' on page 14.

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 both the gas booster and solar pump and controller. Solar heating of the water in the cylinder will now commence when sufficient solar radiation is available.

FINISHING THE INSTALLATION

1. After testing is completed explain to the householder the functions and operation of solar water heater components and the importance of carrying out maintenance.
2. Complete the installation record at the back of the manual.
3. Leave this manual and the warranty booklet with the householder.

Rinnai Australia Pty Ltd

ABN 74 005 138 769 | AU45204

100 Atlantic Drive, Keysborough, Victoria 3173
P.O. Box 460, Braeside, Victoria 3195
Tel: (03) 9271 6625
Fax: (03) 9271 6622

National Help Line
Tel: 1300 555 545* Fax: 1300 555 655
Monday to Friday, 8.00 am to 5.30 pm EST.

After Hours Hot Water Service Line
Tel: 1800 000 340*

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

For further information visit **www.rinnai.com.au**
or email **enquiry@rinnai.com.au**

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 service, please call our National Help Line. Rinnai recommends that this appliance be serviced every 3 years.

With our policy of continuous improvement, we reserve the right to change, or discontinue at any time, specifications or designs without notice.