

Evacuated Tube Commercial Solar Pre-Heat Systems 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 system.



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
- Plumbing Code of Australia (PCA)
- Local Regulations and Municipal Building Codes including local OH&S requirements

The solar hot and cold pipes between the solar storage tank and the solar collector(s) must be suited to the high water temperatures and pressures that may occur. 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 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



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WARNINGS AND IMPORTANT INFORMATION

SAFETY AND 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 manufacturer's 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.

SCALD 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.

SAFETY DEVICES

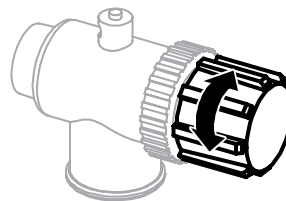
The water heating system is supplied with various safety devices including temperature sensors, overheat sensors and switches and a Pressure & Temperature Relief (PTR) valve. These devices must not be tampered with or removed. The water heating system must not be operated unless each of these devices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

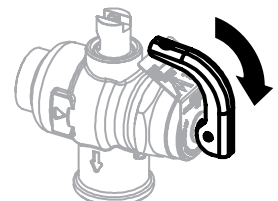
Pressure & Temperature Relief (PTR) Valve

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 it's 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.

HYDROGEN GAS



During this procedure there **MUST** be no smoking, open flame or any electrical appliance operating nearby.

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. If hydrogen is discharged through the tap, it will probably make a sound like air escaping.

WATER TEMPERATURE

The solar control unit and pump ensure water circulates between the solar collectors and storage cylinder until the water at the base of the cylinder reaches approximately 65°C. Under these conditions water at the hot outlet may exceed 85°C. During periods of low solar gain supplementary heating occurs as required.



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 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.

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 in the section 'Safety Devices' on page 6.

The overflow tray (supplied by installer) and drain underneath the storage cylinder (if fitted) should be periodically checked to ensure there are no blockages.

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 fitted to Glass Lined cylinders be inspected every 5 years or more frequently in areas where there is a high incidence of water deposits. This does not apply to Stainless Steel cylinders. 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.

INSTALLATION

REGULATIONS AND OCCUPATION HEALTH AND SAFETY (OH&S)



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

Solar collectors 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 - GENERAL INFORMATION

All system components must be in an accessible location. The storage cylinder must be accessible without the use of a ladder or scaffold. Sufficient clearances shall allow access to, and removal of, all serviceable parts. Ensure the PTR valve, pump kit, drain lines and 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. In the case of vitreous enamel lined cylinders, leave a clearance of the height of one storage cylinder above the cylinder being installed so the sacrificial anode can be inspected and replaced. This does not apply to stainless steel cylinders.

Select suitable areas of roof on which to install the solar collectors as close as practicable to the cylinder. Ensure that the area is even and without cracked or damaged tiles. Collectors should be positioned for optimum solar benefit.



Not suitable for use in cyclone areas.

HI RISE KITS IN CONJUNCTION WITH SPLIT SYSTEM FLAT ROOF FRAMES

For buildings higher than 10 metres the specifications for securing solar panel frames to the building structure need to be determined on a case by case basis for each building by a person qualified to do so in accordance with the Building Code of Australia (BCA). Such specifications relate to the type of fastenings, the number of fastenings and their embedment into the building structure. They are determined from factors including the geographical location and topography, the prevailing wind conditions, building dimensions, rooftop form and structural materials, and the intended location of the solar panels relative to building internal, edge and corner zones. The BCA references AS1170.2 "Structural Design Actions Part 2: Wind Actions", AS3600 "Concrete Structures" and AS4100 "Steel Structures" in relation to these specifications.

STORAGE CYLINDER LOCATION

The solar storage cylinders have an ingress protection rating of IPX4 making them suitable for internal or external installation. Rinnai 'external' gas boosters are suitable for external installation only.

Storage cylinders must be installed in freestanding mode on a level and stable base. For external installations, storage cylinders should be mounted on a concrete base at least 50mm thick or on well seasoned, evenly spread hardwood slats with a thickness of at least 25mm. Where property damage can occur, storage cylinders should be installed with an approved safe tray (overflow tray).

Ensure the cylinder does not stand on wet surfaces.

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. Rinnai recommend insulation to achieve an R value of 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 external pipework MUST be insulated to prevent frost damage.

WATER SUPPLY

The maximum water pressures for the various systems are listed in “Specifications” on page 26. 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 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 below.



It is the responsibility of the installer to comply with all local regulations. Hot Water delivery temperature requirements may differ from those stated above

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. 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.
- Fittings as shown in the tables on pages 17, 26 and 29.

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.
- Solar collector flow and return pipes and storage cylinder connections.
- An isolating valve and connection union for the gas supply to the gas booster.
- An approved pressure limiting valve is required if the maximum rated water supply pressure in the table in “Specifications” on page 26 is exceeded.

INSTALLATION PROCEDURE

1. Install Solar Collectors

Position and install collectors in accordance with the section the section 'Installation - Evacuated Tubes' on page 12.

2. Position Storage Cylinders

Position storage cylinders on a level base.

3. Connect PTR Valves

Connect PTR valves in the location shown on the diagrams shown on pages 27 and 28.

- a. Leave the valve body pointing down. Tighten the valve using the spanner flats - never use the valve body.
- b. The PTR must be adequate for the load being applied to the storage cylinder. As any gas boosting is done after the storage cylinders the only heat input to the tank is from the solar collectors. The potential solar output for the solar collectors at PTR relief conditions is listed in "Specifications" on page 12.

Example: if each tank has 2 EVT25A solar collectors, then the maximum input is $2 \times 1.63 \text{ kW} = 3.26 \text{ kW}$. This is less than the 10kW capacity of the supplied PTR valve and therefore is OK.

- c. Use Teflon 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 blocking the water passage from the valve.

4. Connect Flow and Return Pipework

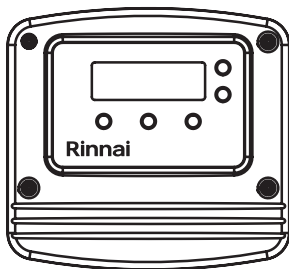
Connect the flow and return pipework as shown in the diagrams on page 25, or using a suitable alternative layout that ensures the flow and return piping is balanced.

5. Connect Pump and other Pipework

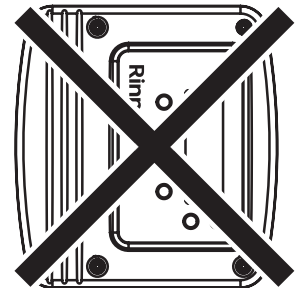
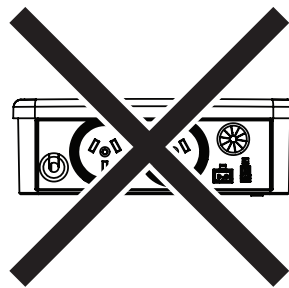
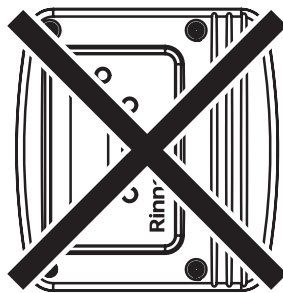
Connect the pump, pipework between collectors and cylinders, cold inlet, hot outlet and remaining pipework and gas boosting choice as shown in the relevant diagram on pages 31 to 33, or other suitable layout.

6. Connect the Solar Controller

With power off, mount the controller per the instructions provided taking particular note of the correct mounting orientation shown in the picture. **DO NOT** supply power to the solar controller until the system is filled with water.



The controller **MUST** be installed in an up-right and vertical orientation **ONLY!**



DO NOT install the controller on its side or back!

7. Connect Temperature Sensor Leads

Connect temperature sensor leads as shown on page 24 and 30. Ensure the leads are protected from sunlight. The sensors must be sealed in place with thermoplastic putty or silicon.

It is important that these leads are installed as specified. Failure to do so will lead to malfunction or lack of hot water.

8. Fill the System

Ensuring the power supply to the pump is off; turn on a hot water outlet tap(s). Remove the screw from the pump to allow air to bleed out. Open the stop cock in the cold water mains supply line. The entire system will fill with cold water. Once the pump is no longer bleeding air, replace the screw and continue to bleed the air through the taps. Air will be displaced through the tap and some air needs to be bled off using the air bleed valve on the collector near the hot sensor lead.

Turn off the hot tap at the sink when water flows freely without air bubbles or air bursts.

9. Adjust Pump Speed

Adjust the pump to the speed specified on page 14.

10. Check for Leaks

Check all connections for leakage and tighten if necessary. This is especially important for all fittings in positions not easily accessed such as near the solar collectors. Operate the easing gear of both PTR and ECV valve at the storage cylinders 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, 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

11. Power up the Controller

Power up the controller, which should be factory set to the desired operating parameters, and observe for any unlikely immediate errors. An error at this point usually refers to something that has been missed during the installation procedure. Refer to the separate manual supplied with the controller for more details

12. Finishing the Installation

Ensure that the set temperature on the gas boosting (Demand Duo or Manifold Pack) is set to 60°C or above.

Ensure that the delivered temperature of the water to the building complies with all relevant regulations.

INSTALLATION - EVACUATED TUBES

REGULATIONS AND OCCUPATION 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
- Local Occupational Health and Safety (OH&S) regulations

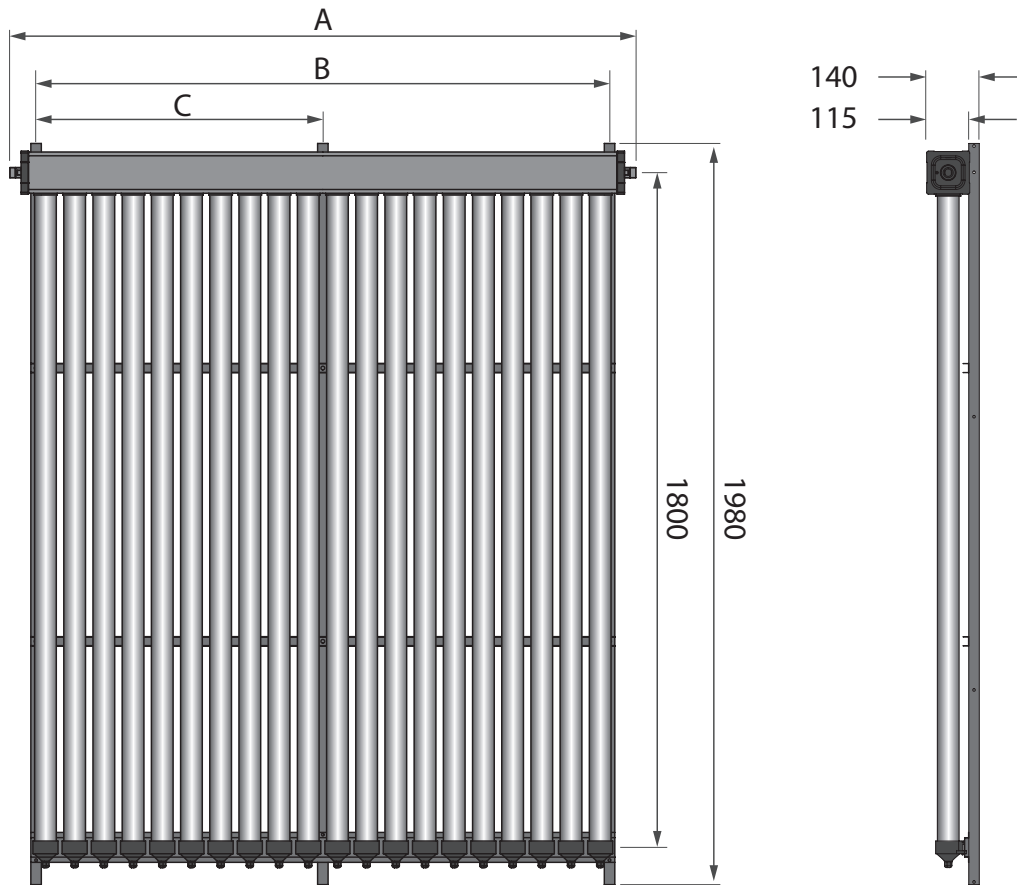


Solar collectors are heavy and bulky items and are usually positioned on the roofs of buildings. Each Australian State and Territory has a principal Occupational Health and Safety (OH&S) Act which contains requirements relating to the handling of large, bulky or awkward items and the prevention of falls 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.

SPECIFICATIONS

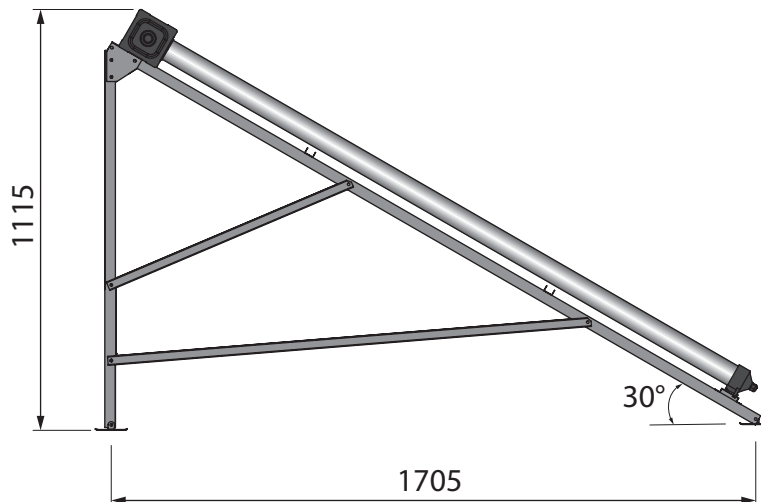
	EVT20A	EVT25A	EVT30A
Number of tubes	20	25	30
Waterways	Copper	Copper	Copper
Threaded Connections	R $\frac{3}{4}$	R $\frac{3}{4}$	R $\frac{3}{4}$
Maximum operating pressure	1000 kPa	1000 kPa	1000 kPa
Frame material	Aluminium	Aluminium	Aluminium
Overall dimensions	1980 x 1692 x 145	1980 x 2082 x 145	1980 x 2472 x 145
Weight empty	80 kg	100 kg	120 kg
Potential solar output at PTR relief conditions	1.30 kW	1.63 kW	1.96 kW
Frost Protection	Frost Protection to -12 °C. Power must be on at the pump, and the solar controller must be in frost protection mode. See page 30. For more information on frost protection, refer to the warranty booklet.		

Dimensions - Base Frame



Model	Dimension (mm)		
	A	B	C
EVT20A	1670	1530	765
EVT25A	2060	1920	960
EVT30A	2450	2310	1155

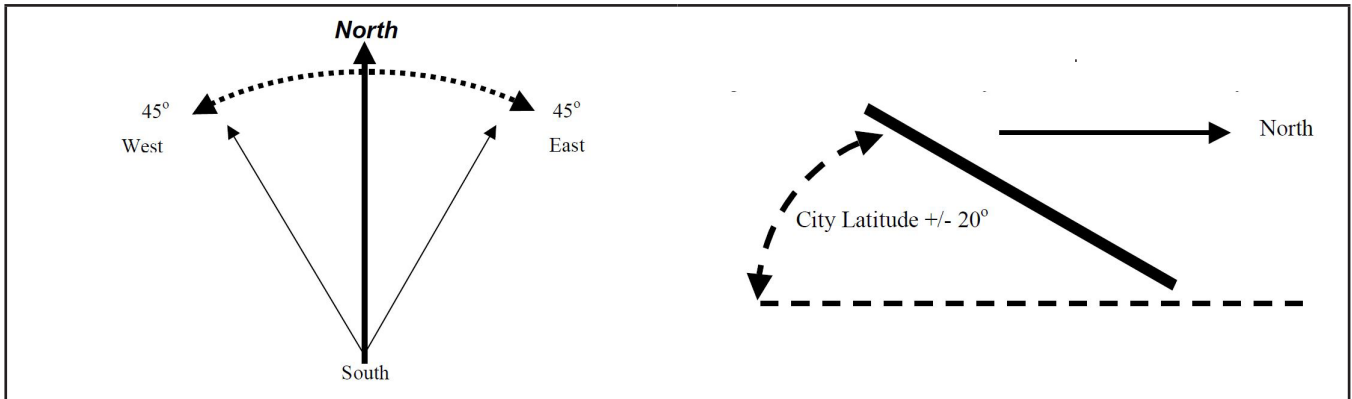
Dimensions - Flat Roof Frame



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° from North (between North-East and North-West) are acceptable and will only slightly reduce efficiency.

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



Orientation and inclination of collectors

Installers must ensure they comply with relevant local regulations in regards to 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

PIPE AND PUMP SIZING



Ensure that the combined length of the flow and return piping for each collector set is approximately the same. This will result in even flow to all collectors and optimise performance.

Total Collectors in array	Up to	10	20	30	40	50	60	70	80	90	100
Piping sizing for solar flow and return manifolds		DN20	DN20	DN25	DN32	DN32	DN32	DN40	DN40	DN40	DN50
Pump		20-60N	20-60N	20-60N	25-80N	25-80N	25-80N	25-80N	25-80N	25-80N	25-80N
Maximum pipe run in collector circuit (m)											
Pump Speed	1	30	-	-	-	-	-	-	-	-	-
	2	60	40	20	-	-	-	-	-	-	-
	3	100	100	100	100	100	100	100	100	100	100

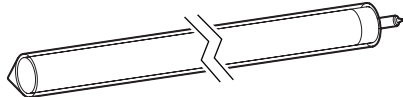
COMPONENTS

Evacuated Tube Collector Components

Each evacuated tube collector installation requires several components packaged within different boxes. Please ensure you have all the relevant boxes before starting installation



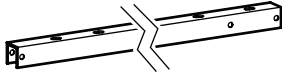
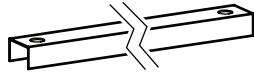


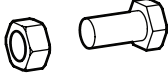

Component	Part Number	PITCH ROOF			FLAT ROOF		
		30 tubes	40 tubes	50 tubes	30 tubes	40 tubes	50 tubes
Manifold, base frame and "Tail Stock"	EVTMAN20R5A		2			2	
	EVTMAN25R5A			2			2
	EVTMAN30R5A	1			1		
	EVTFRM20R5A		2			2	
Pitch Roof Mounting Kit	EVTPIT20R5A			2			
	EVTPIT25R5A		2				
	EVTPIT30R5A	1					
Flat Roof Frames	EVTFRF20R5A						2
	EVTFRF25R5A					2	
	EVTFRF30R5A				1		
Evacuated Tubes	EVTUBE10R5A		4	2		4	2
	EVTUBE15R5A	2		2	2		2
Additional Installation Components	EVTRFBRKTSS	1	1				
	DDEVTCPKIT		1	1		1	1

Evacuated Tubes


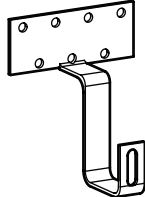


Part Number	Number of tubes in pack *	Item
EVTUBE10R5A	10	 <p>Evacuated Tube (including heat pipe)</p>
EVTUBE15R5A	15	

*NOT AVAILABLE INDIVIDUALLY

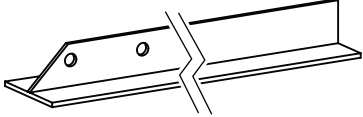

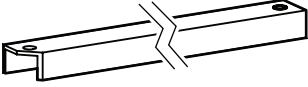
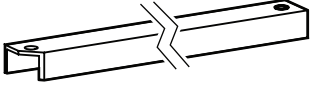
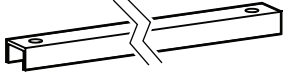

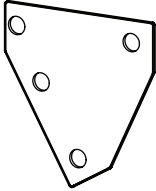


Manifold, Base Frame and Bottom Support Assembly Kit Components

EVTMAN20R5A	EVTMAN25R5A	EVTMAN30R5A	EVTFRM20R5A	Item	EVTMAN20R5A	EVTMAN25R5A	EVTMAN30R5A	EVTFRM20R5A	Item
1	1	1	-	 <p>Manifold Header (to suit required number of tubes)</p>	1	1	1	-	 <p>Bottom Support Assembly (CAP TUBES M&F EV - 40011214)</p>
-	3	3	3	<p>1980 mm long</p>  <p>Base Frame Rail A-</p>	-	2	2	2	<p>EVT20A 1560 mm EVT25A 1950 mm EVT30A 2340 mm</p>  <p>Base Frame Rail B</p>
20	25	30	-	 <p>CAP DUST EV - 40011220</p>	1	1	1	-	 <p>PASTE HEAT EV - 40011222</p>
6	6	6	-	 <p>M8-16 Nut and Bolt</p>	9	9	9	-	 <p>M6-12 Nut and Bolt</p>

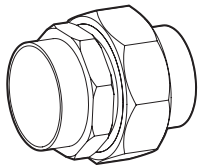
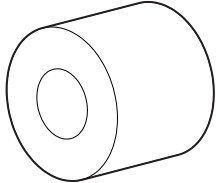
Pitch Roof Mounting Kits

EVTPI20R5A	EVTPI25R5A	EVTPI30R5A	EVTFRBKTSS	Item	EVTPI20R5A	EVTPI25R5A	EVTPI30R5A	EVTFRBKTSS	Item
2	2	2	-	 <p>Pitch Roof Rail</p>	-	-	-	4	 <p>Tiled Roof Mounting Hook</p>
-	-	-	4	 <p>Tiled Roof Mounting Clips</p>	-	-	-	8	
-	-	-	20	<p>M6 Screws</p>	-	-	-	8	 <p>M8-16 Nut and Bolt</p>

Flat Roof Frame Kits

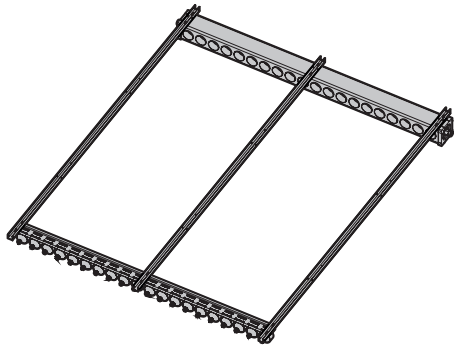
EVTFRF20R5A	EVTFRF25R5A	EVTFRF30R5A	Item	EVTFRF20R5A	EVTFRF25R5A	EVTFRF30R5A	Item
1	1	1	 FRF Leg Mid	2	2	2	 FRF Leg Side
3	3	3	 FRF Side Brace Short	3	3	3	 FRF Side Brace Long
4	4	4	 FRF Back Brace	6	6	6	 FRF Foot
3	3	3	 FRF Bracket	2	2	2	 M6-25 Nut and Bolt
				39	39	39	 M6-12 Nut and Bolt

Collector Joining Kits

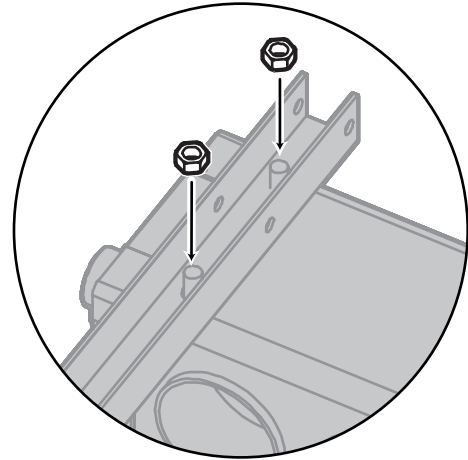
DDEVTCPLKIT	Item	DDEVTCPLKIT	Item
1	 3/4 Rp Barrel Union 32201105		 Insulation for Barrel Union 14601214

ASSEMBLY INSTRUCTIONS

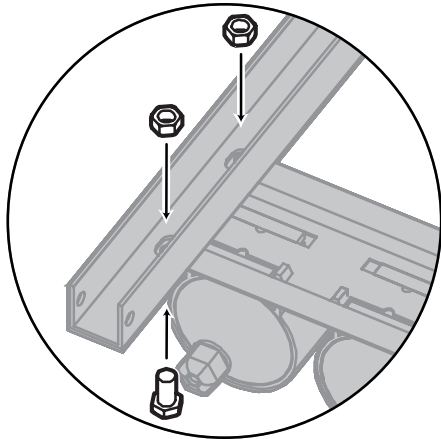
Assemble Base Frame



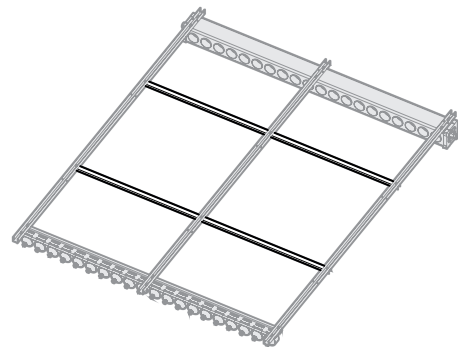
Step 1. Place the manifold header and the bottom support assembly upside down. Place the three Base Frame Rail A as shown in the diagram.



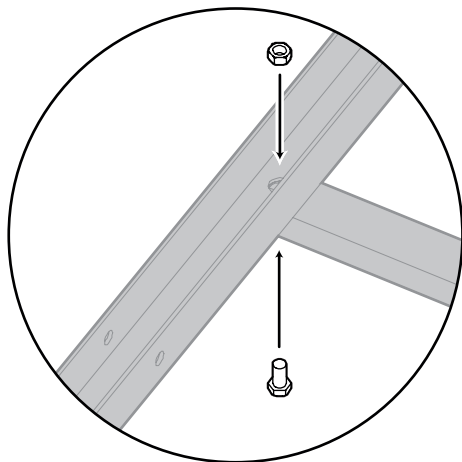
Step 2. Fasten the rails to the header using the nuts supplied with the header.



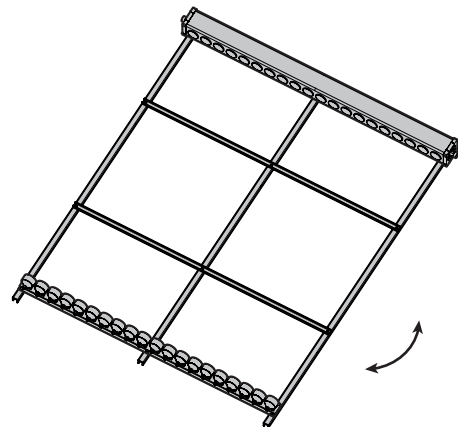
Step 3. Fasten the rails to the bottom support assembly using the M8 nuts and bolts supplied.



Step 4. Position the two Base Frame B rails under the existing components

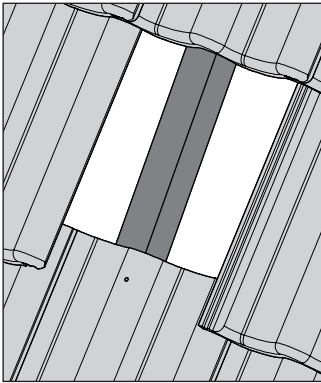


Step 5. Fasten using the M6 nuts and bolts supplied.

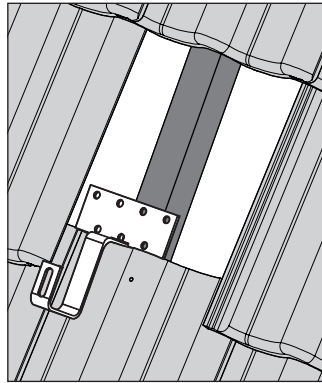


Step 6. Turn assembly up correct way

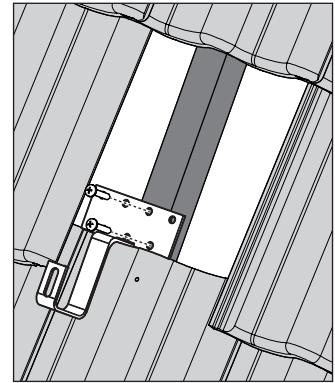
Installation on a Pitched Tile Roof



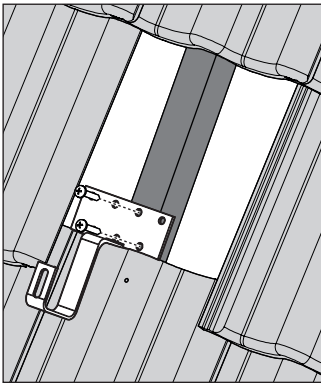
Step 1. Carefully remove a roof tile.



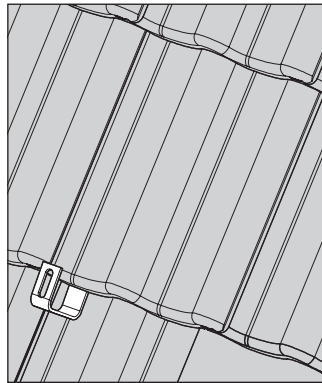
Step 2. Position the mounting bracket as shown.



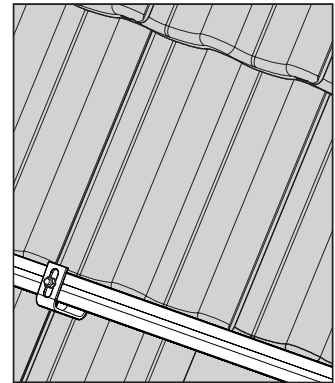
Step 3. Fasten the bracket to roof structure using suitable screws.



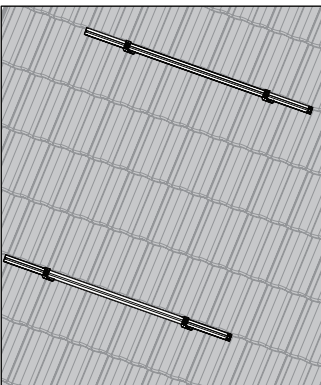
Step 4. Fasten the bracket to roof structure.



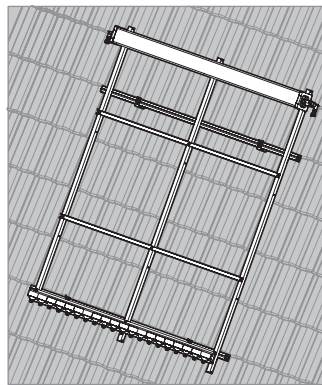
Step 5. Replace the roof tile.



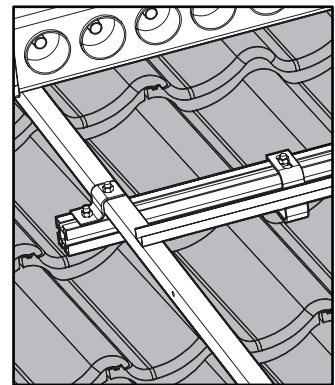
Step 6. Fit the mounting rail in bracket and fasten



Step 7. Repeat steps 1 to 6 for the remaining brackets and rail.



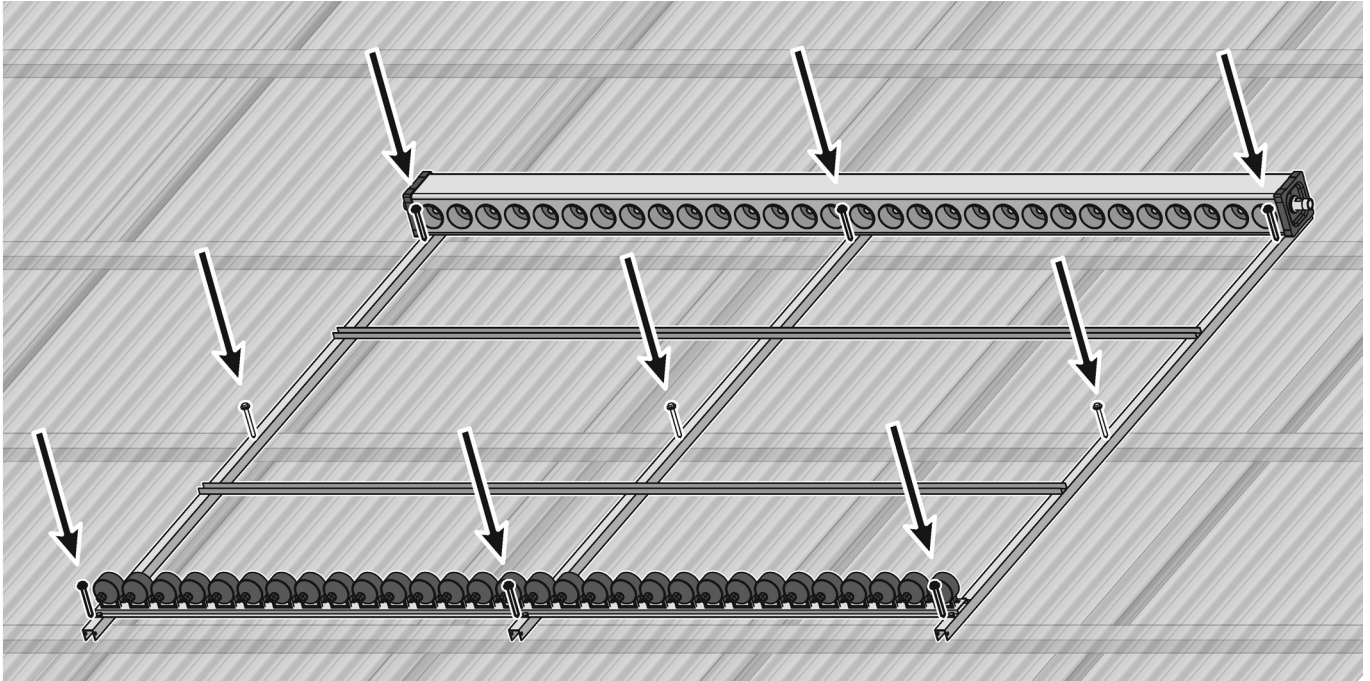
Step 8. Position the base frame on the rails.



Step 9. Fasten the assembly using the mounting clips

INSTALLATION ON A PITCHED METAL ROOF

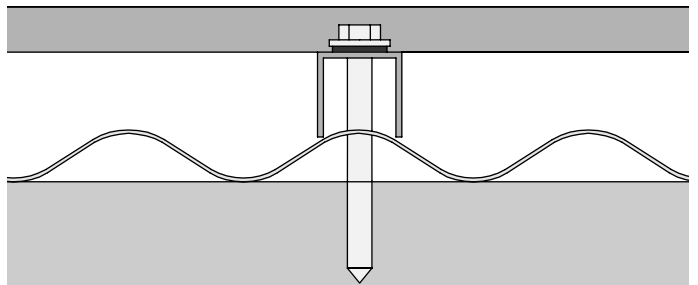
Fasten the base frame to the roof battens/purlins as shown in the diagram below. The base rails should sit on the peak of the roofing material to minimise the chance of water leaks. The frame must be fastened to the battens in at least 9 locations. Fasteners should be as close as possible to the header and the bottom support assemblies. It will be necessary to drill through the aluminium base frame.



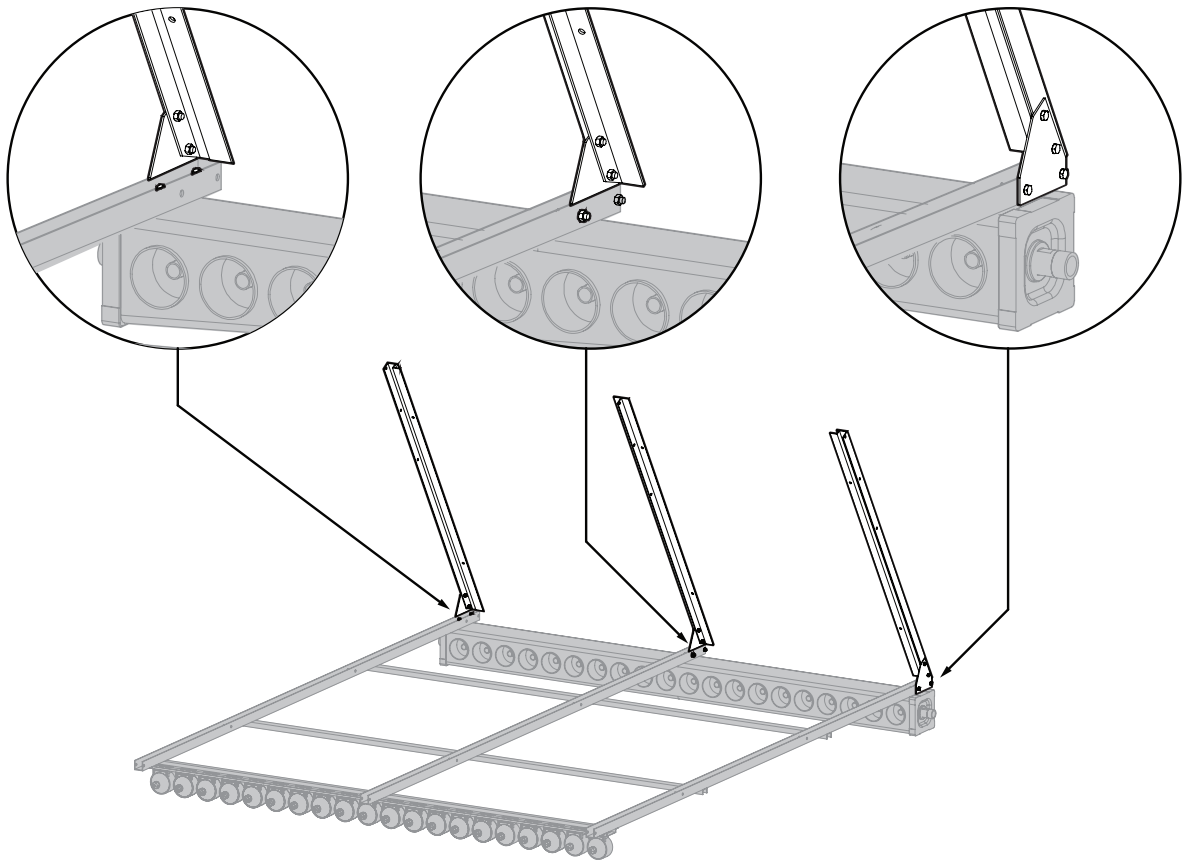
For timber battens/purlins use 14G, Ø6.3 timber screws (or equivalent) with a minimum embedment of 35 mm into the batten.

For a metal batten/purlin use 14G, Ø6.3 tek screws (or equivalent). Minimum steel thickness 0.75 mm, grade 550.

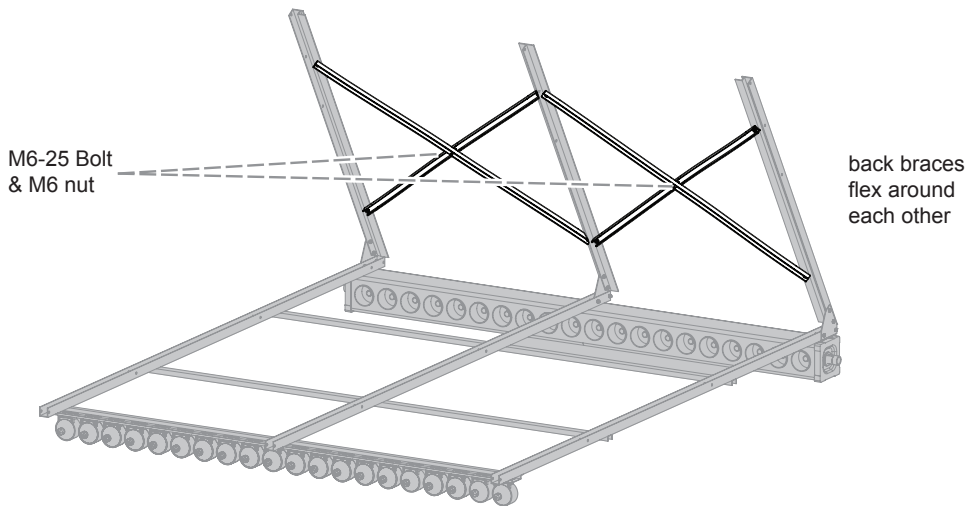
All penetrations into the roof material are to be sealed by the installer. It is the responsibility of the installer to ensure the installation is watertight.



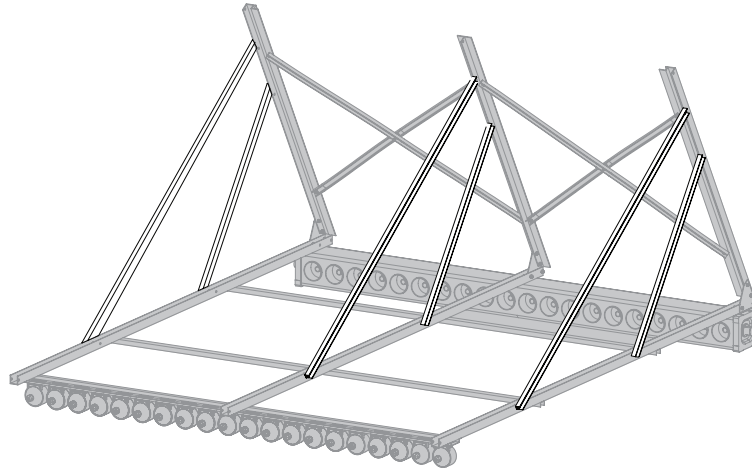
Flat Roof Frame



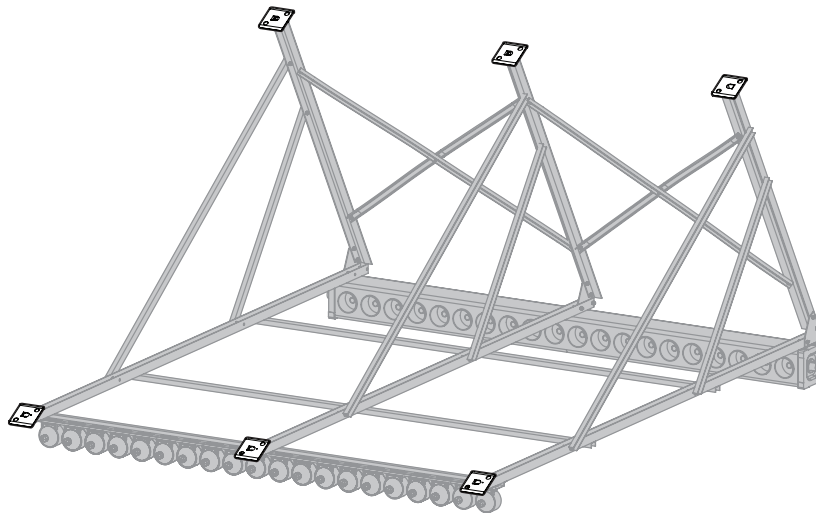
Step 1. Turn the complete base frame upside down and connect the rear legs and brackets using the M6-12 bolts and M6 nuts as shown.



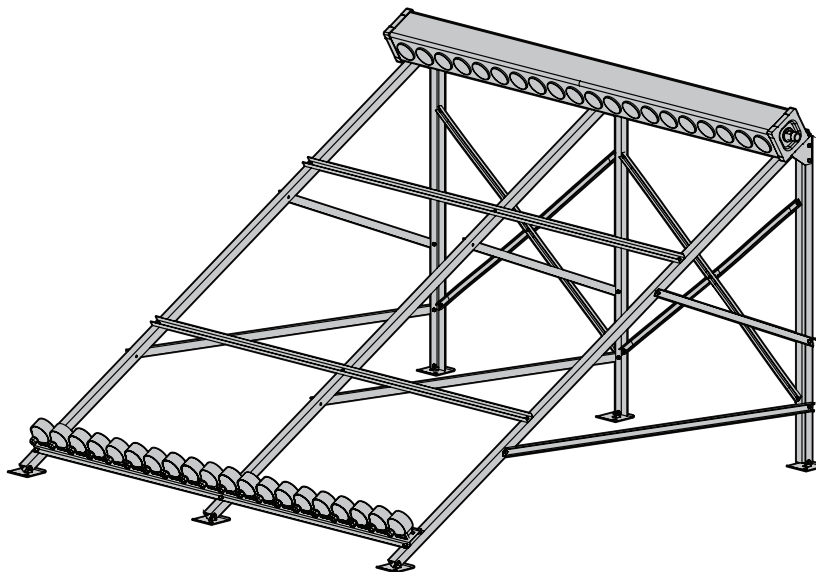
Step 2. Connect the back braces as shown. Attach with M6-12 bolts and M6 nuts except where shown otherwise in image.



Step 3. Connect the side braces as shown. Attach with M6-12 bolts and M6 nuts.



Step 4. Connect the feet as shown. Attach with M6-12 bolts and M6 nuts.

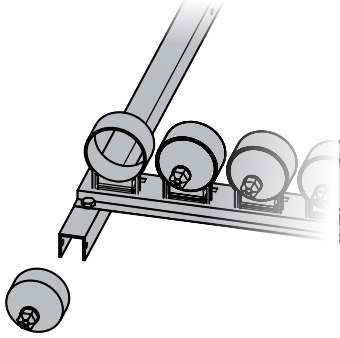
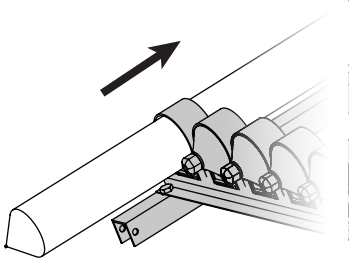
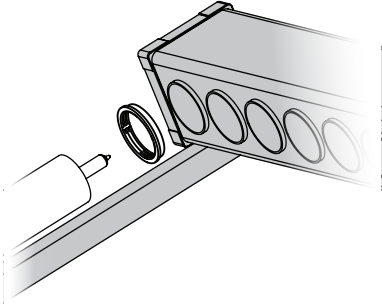
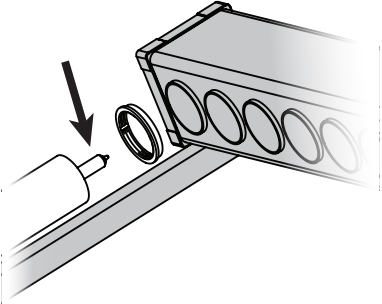
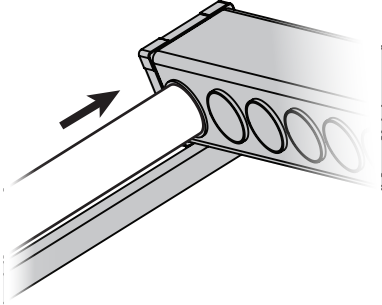
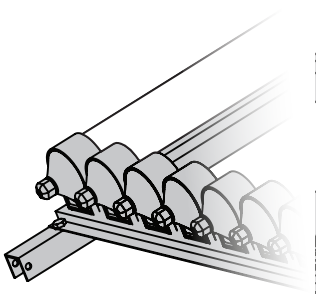


Step 5. Turn frame over. Fasten to roof using suitable fasteners (not supplied).

Fitting the Evacuated Tubes

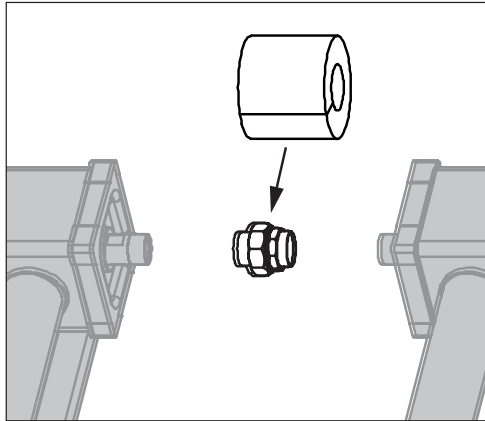


The fin and bulb on the evacuated tube will become hot when exposed to sunshine. Take care when handling to prevent burns.

 <p>Step 1. Unscrew the tube cap as shown</p>	 <p>Step 2. Slide the evacuated tube through the tube cap.</p>
 <p>Step 3. Position the dust cap into the header</p>	 <p>Step 4. Apply heat transfer paste to heat pipe bulb.</p>
 <p>Step 5. Slide the tube into the header. Soapy water around the outside of the glass will make this easier</p>	 <p>Step 6. Replace the tube cap.</p>
<p>Step 7. Repeat steps 1 to 6 for the remaining tubes</p>	

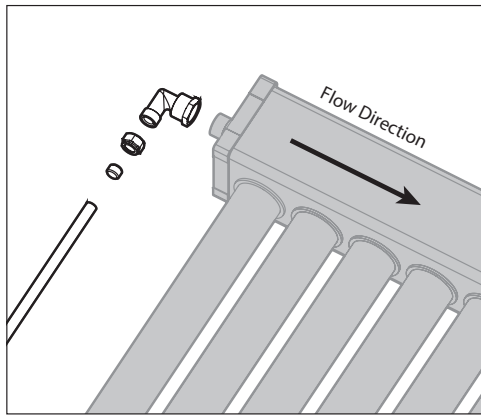
JOINING TWO COLLECTORS

Two EVT20A or EVT25A collectors can be joined together for a 40 or 50 tube system, using kit DDEVTCPLKIT. Ensure insulation covers all exposed fittings.

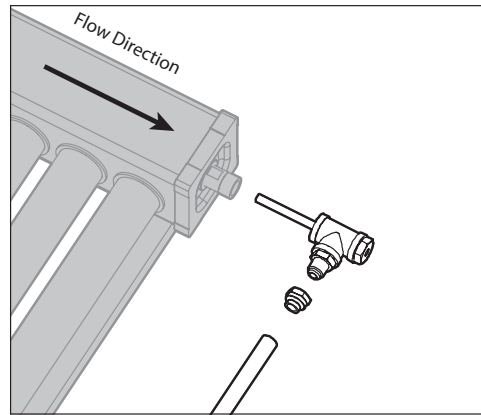


PLUMBING CONNECTIONS AND TEMPERATURE SENSOR

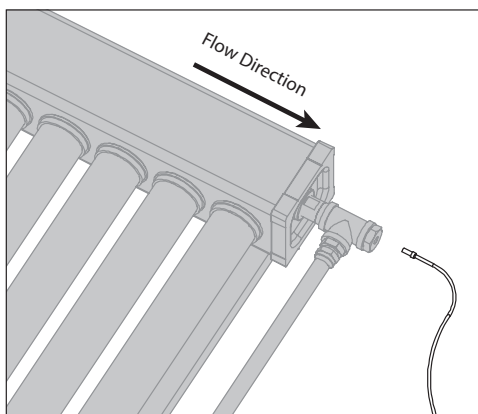
The flow direction can be reversed from how it is shown in the diagrams below. Always ensure that the hot sensor lead and the air bleed valve are positioned at the outlet end of the header.



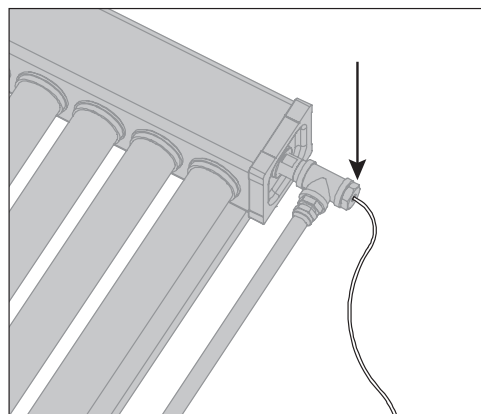
Step 1. Connect fittings to cold water side of header. Copper flow pipework is supplied by installer.



Step 2. Connect hot sensor assembly to hot water side of header. Copper return pipework is supplied by installer.



Step 3. Connect temperature sensor lead into hot sensor assembly. Ensure that the lead is pushed all the way into the pocket.



Step 4. Secure the lead to the header using silicone to ensure it will not come loose. Connect the plug end to the solar controller as described in the Operation / Installation Manual - Rinnai Split Solar Hot Water Systems.

Step 5. Insulate all exposed fittings and pipework as described in the section 'Water Pipes' on page 9.

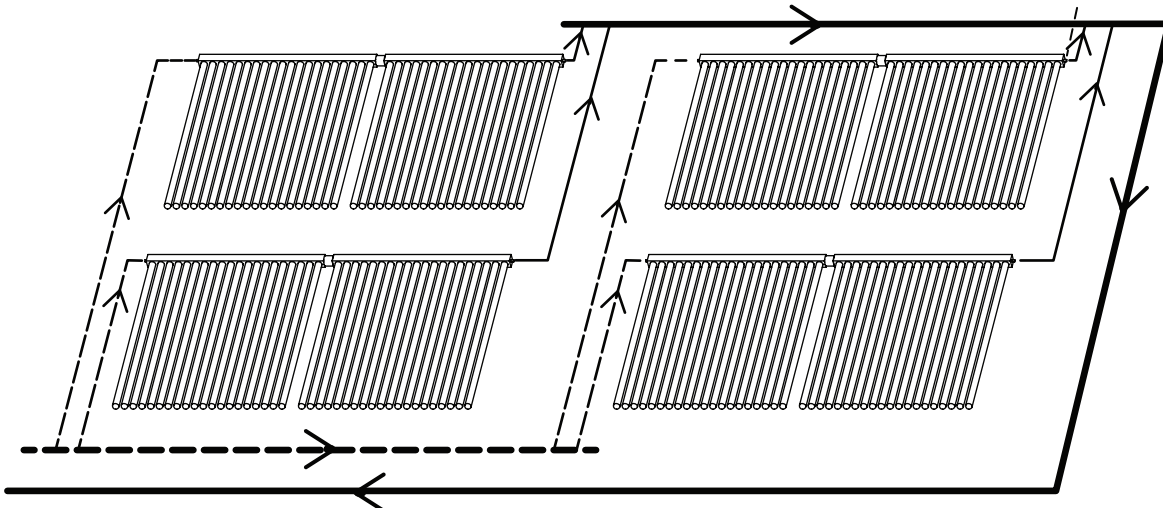
FLOW AND RETURN LINE LAYOUT



Ensure that the combined length of the flow and return piping for each collector set is approximately the same. This will result in even flow to all collectors and optimise performance.

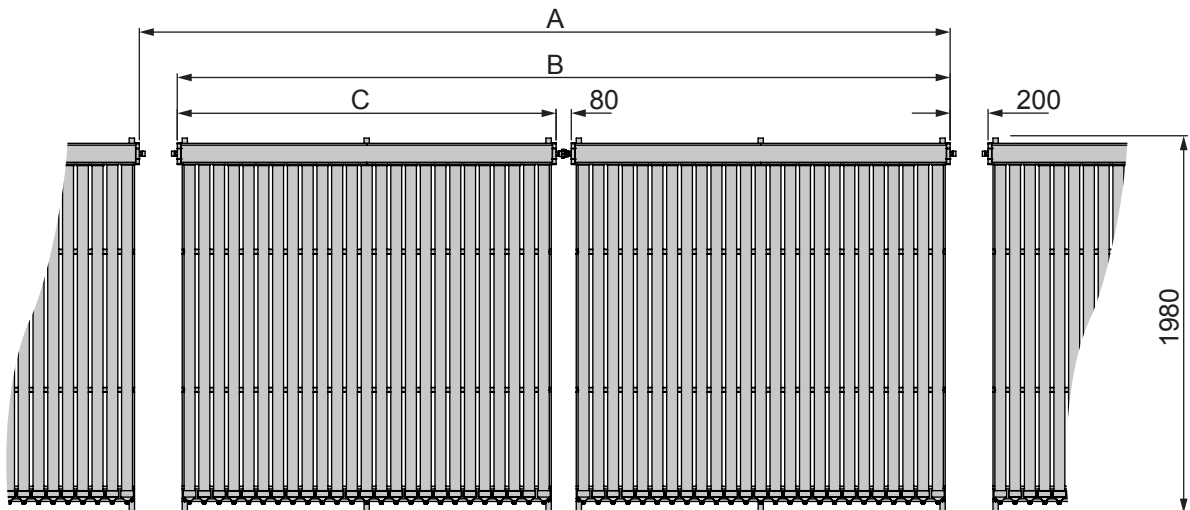
- cold flow to collector
- heated flow from collector
- cold flow manifold
- heated flow manifold

Temperature sensor lead fitted to header on one set of collectors



Pipework to collectors is 1/2". Pipe sizing for manifolds shown in the section 'Pipe And Pump Sizing' on page 14.

COLLECTOR SPACING REQUIREMENTS



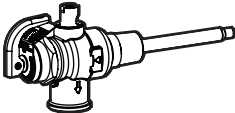
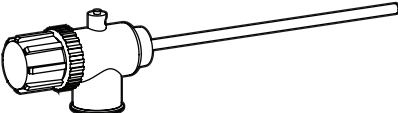






Number of collectors per storage tank	Collector	DIM A	DIM B	DIM C
30	1 x EVT30A	-	-	2472
40	2 x EVT20A	3664	3464	1692
50	2 x EVT25A	4444	4244	2082

STORAGE CYLINDERS

SPECIFICATIONS

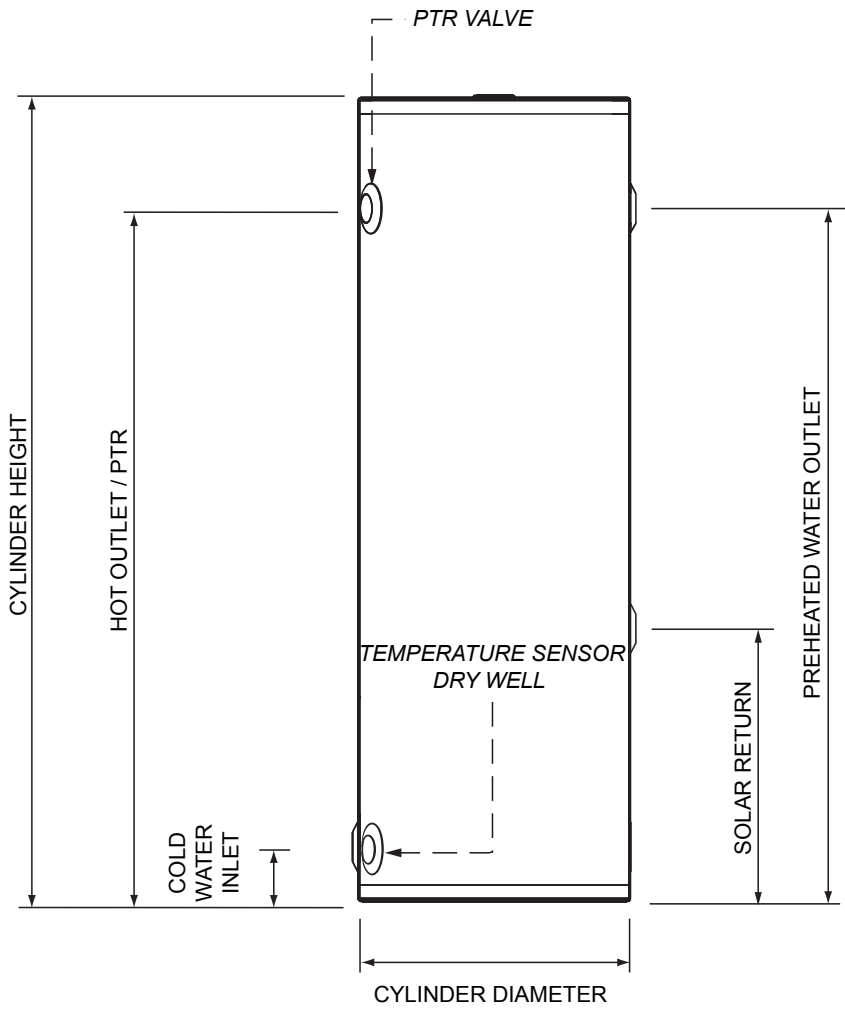
System Type	Stainless Steel Cylinders	Vitreous Enamel Cylinders
PTR valve setting	850 kPa	1000 kPa
Rating of PTR Valve supplied	10 kW	10 kW
Expansion Control Valve (ECV) setting (supplied by installer if required)	700 kPa	850 kPa
Max supply pressure with ECV	550 kPa	680 kPa
Max supply pressure without ECV	700 kPa	800 kPa
Pressure limiting valve rating (supplied by installer if required)	500 kPa	500 kPa

COMPONENTS SUPPLIED WITH CYLINDERS

Items Supplied with Vitreous Enamel Cylinders		Items Supplied with Stainless Steel Cylinders	
1	 PTR Valve 95110048	1	 PTR Valve 11004785
1	 Adaptor R $\frac{1}{2}$ x Rp $\frac{1}{2}$	1	 Adaptor R $\frac{3}{4}$ x Rp $\frac{1}{2}$ 19801004
3	 Adaptor R $\frac{3}{4}$ x Rp $\frac{3}{4}$	1	 Nipple R $\frac{1}{2}$ 17201021
		1	 Kinco Olive $\frac{1}{2}$ 33001012
		1	 Kinco Nut $\frac{1}{2}$ 16801012

DIMENSIONS
Glass Lined Cylinders

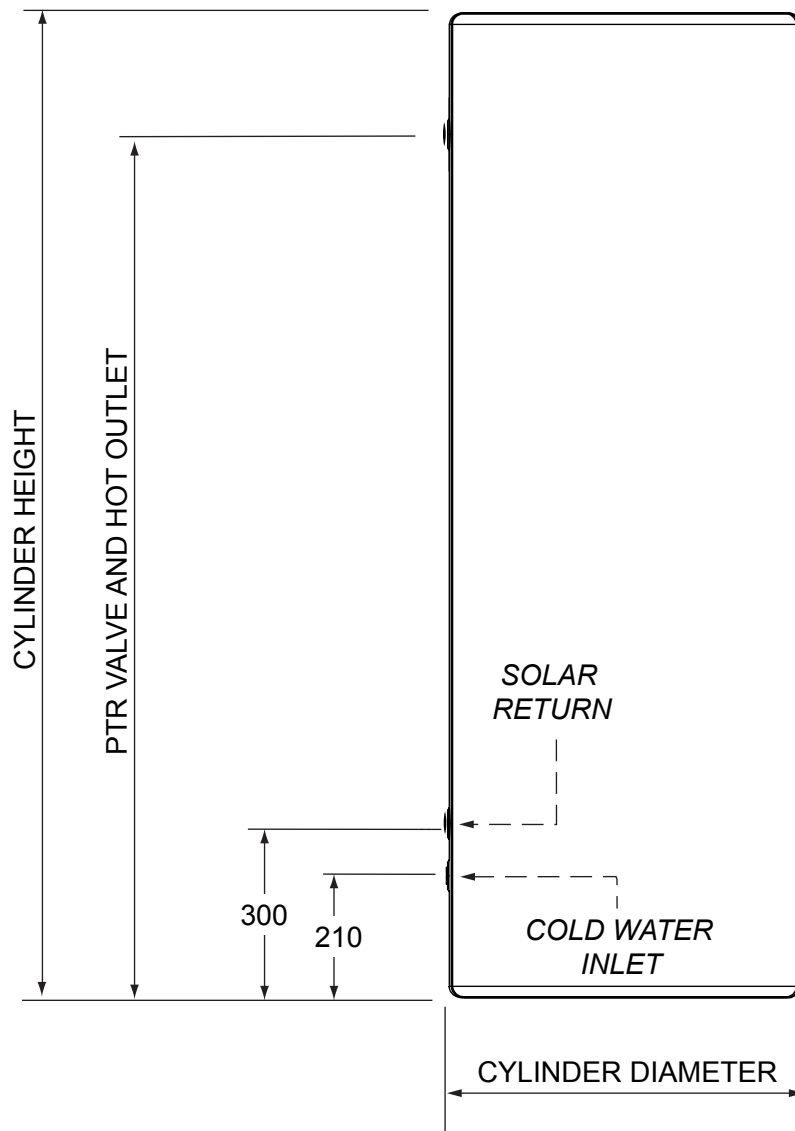
Dimension	SG270A	SG320A
Cylinder height (mm)	1470	1760
Cylinder diameter (mm)	610	641
Hot water outlet / PTR height (mm)	1250	1540
Cold water inlet height (mm)	210	210
Solar return height (mm)	515	620
Weight empty (kg)	91	107



STORAGE CYLINDERS

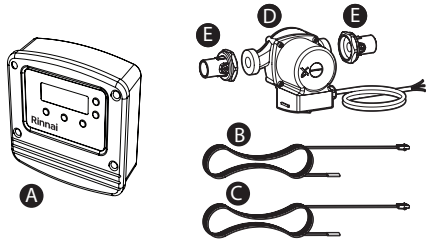
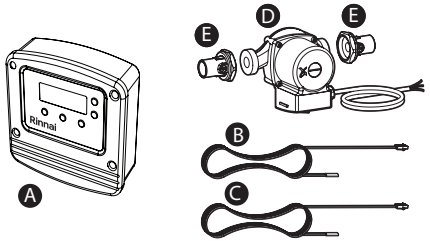
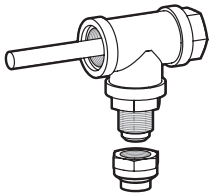



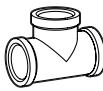
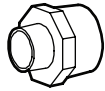

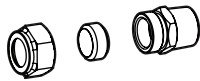
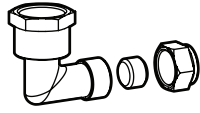
Stainless Steel Cylinders

Dimension	DDS250	DDS315
Cylinder height (mm)	1700	2090
Cylinder diameter (mm)	600	600
Hot water outlet / PTR height (mm)	1490	1880
Cold water inlet height (mm)	210	210
Solar return height (mm)	300	300
Weight empty (kg)	56	68



PUMP AND CONTROLLER

COMPONENTS SUPPLIED IN SOLAR CONTROLLER KITS

DDEVTS20	DDEVTS25	Item	DDEVTS20	DDEVTS25	Item
1	-	 <p>Control Box & Pump Assembly 39001732</p> <p>A Solar Controller * 39001748 B Cold Sensor Lead (2m) 31002710 C Hot Sensor Lead (20m) 31002715 D Pump DDUPS2060N E Valve Union Set 16601085</p>	-	1	 <p>Control Box & Pump Assembly 39001733</p> <p>A Solar Controller * 39001748 B Cold Sensor Lead (2m) 31002710 C Hot Sensor Lead (20m) 31002715 D Pump DDUPS2580N E Valve Union Set 16601080</p>
1	1	 <p>Hot Sensor Assembly 10204715</p>	-	2	 <p>G3/4 (Comp) x R 1 union 33201730</p>
			1	1	 <p>Temperature Sensor Sheath 125 mm 10204719</p>
1	1	 <p>1 1/4 nipple 17201046</p>	1	1	 <p>T 1 1/4 Rp 19001021</p>
1	1	 <p>Adaptor 3/2 to 3/4 17201047</p>	1	1	 <p>T 3/4 Rp 19001011</p>
3	1	 <p>G3/4 (Comp) x R 3/4 union 33201713</p>	1	1	<p>Warranty Booklet 15401041</p>
1	1	 <p>Elbow 21201071</p>	1	1	<p>Operation Installation Manual 15401105</p>

SOLAR CONTROLLER

The solar controller's function is to turn the solar pump on and off to enable the solar collectors to transfer heated water to the storage cylinder when there is capacity in the cylinder to store more energy and when the temperature difference between the cylinder and collector temperatures is suitable for energy collection.

A differential temperature between solar collector (hot sensor) and tank (cold sensor) of greater than 6°C causes the pump to be switched on. When differential falls to below 2°C the pump switches off.

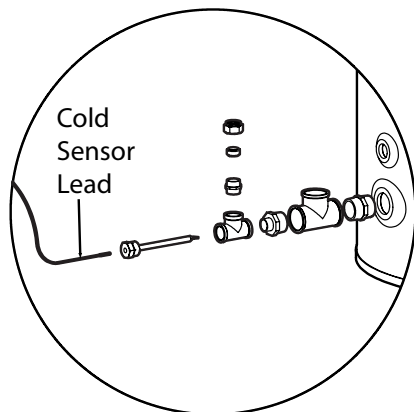
When the cold temperature sensor reaches 65°C the pump is switched off. This prevent water that is too hot returning from the solar collectors to the storage cylinder and activating the P&TR valve.

The other function of the controller is to pump water through the collectors when there are frost conditions to prevent the collector from freezing. When the hot temperature sensor (in collector) drops below 4°C the pump activates to prevent freezing. When this temperature reaches 8°C the pump stops. This option is selected via the menu screens on the controller. This function should be selected when the installation may be exposed to frost.

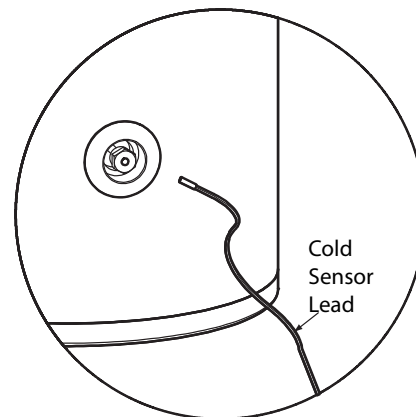
Refer to Commercial Controller Manual 15401117 for details on how to access these functions.

Location of Cold Temperature Sensor

Stainless Steel Storage Cylinder



Vitreous Enamel Storage Cylinder



Resistance of Temperature Sensor Leads

Both temperature sensor leads have approximately the following resistances. This information can be used to verify performance of the leads. Should hot sensor lead be extended, use equivalent cable joined to existing connection point. DO NOT cut cable near thermistor, as it is specifically designed for high operating temperatures.



Use of lower quality cable can result in false temperature readings. To ensure correct operation, connect extra cable and test that complete assembly delivers correct resistance readings relative to temperature (as per table below). Incorrect temperature readings due to under performing cable extension can result in poor solar performance, lack of frost protection and void warranty.

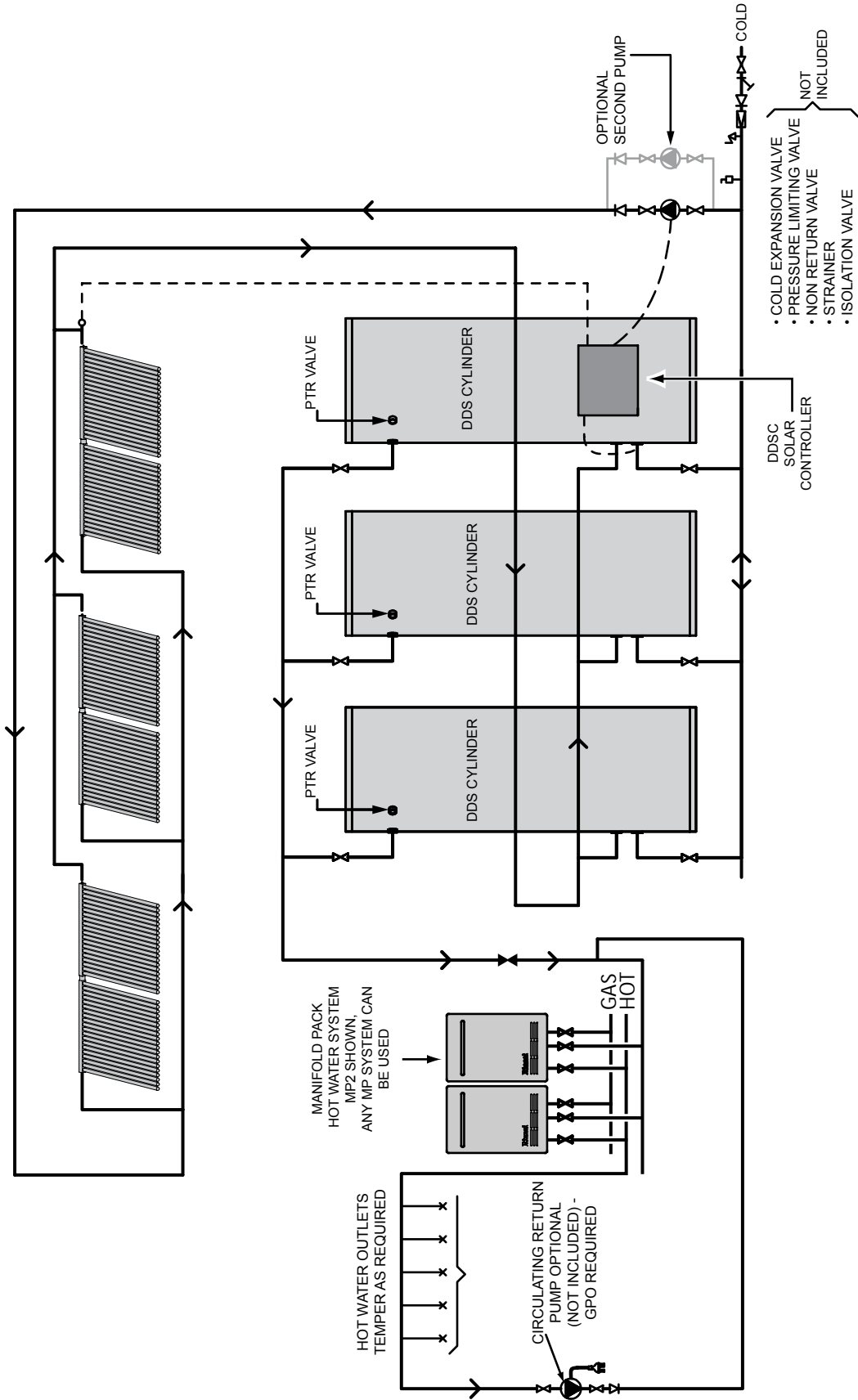
Temperature (°C)	Resistance (Ohms)	Temperature (°C)	Resistance (Ohms)
0	32500	60	2500
10	19800	70	1600
20	12500	80	1250
30	8000	90	900
40	5250	100	700
50	3500		

GAS BOOSTING

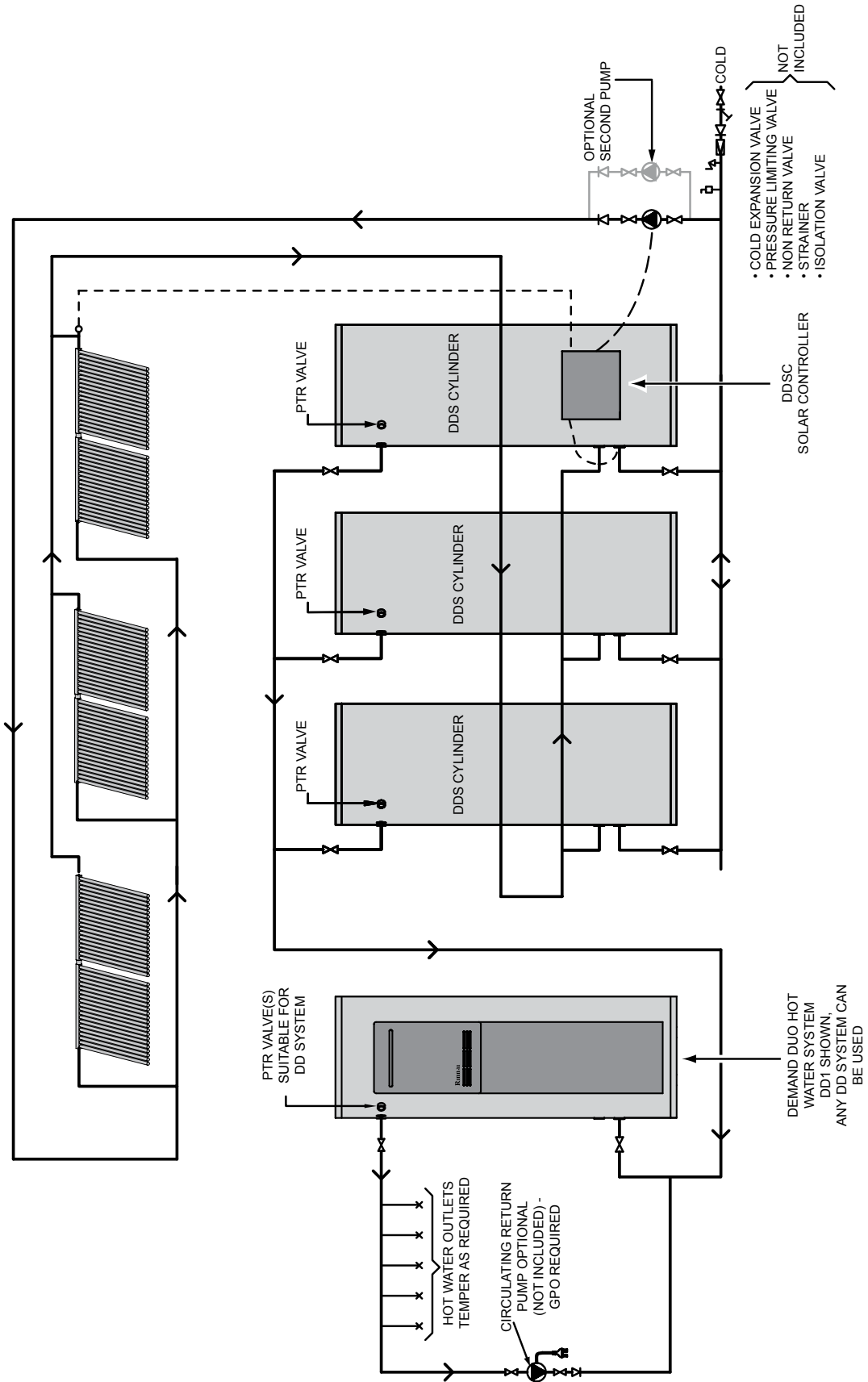
The installation of the Manifold Pack or Demand Duo must be carried out in accordance with instructions supplied with the system. Piping connections to the Solar Preheat must be carried out as shown on the following pages.

The temperature setting of the gas boosters must comply with plumbing regulations

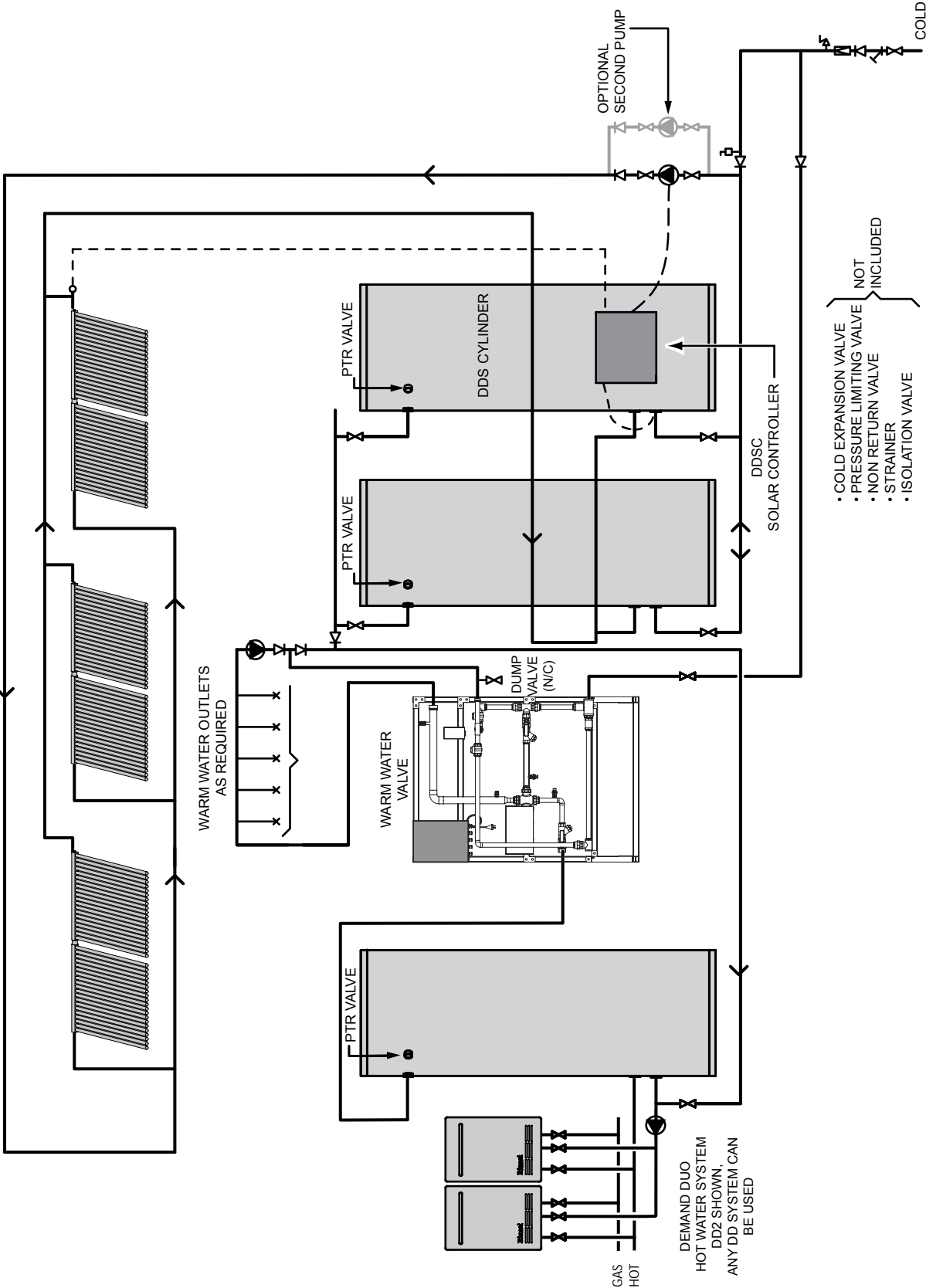
SOLAR PREHEAT WITH MANIFOLD PACK



SOLAR PREHEAT WITH DEMAND DUO



SOLAR PREHEAT WITH DEMAND DUO AND WARM WATER VALVE



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	
<p>Booster heating not operating</p> <p>OR</p> <p>Insufficient gas supply for gas boosted heating system</p>	<p>Check to ensure the power supply to the gas booster system is 'ON'.</p> <p>Check gas is available and turned ON'.</p> <p>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 cause the gas booster(s) to light.</p> <p>Check the isolation valve in the gas line is opened.</p> <p>If there is gas supply to other appliances in the building, try lighting another gas appliance.</p> <p>Refer to your plumber to ensure the gas line has been purged of air after installation.</p> <p>Refer to the manual supplied with your boosting system for more information.</p>
<p>Excessive hot water consumption</p>	<p>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.</p> <p>Consider discussing with your installer, fitting water saving fixtures and/or flow control or pressure limiting valves to reduce consumption.</p>
<p>Gas Booster Setting</p>	<p>The delivery temperature of the gas boosting system is normally 65°C. If the temperatures are higher than this, the flow of water through the gas booster will reduce and may result in insufficient flow rate. Ensure the boosting system is set for the temperature the system was designed for.</p>
<p>Temperature and pressure relief valve / expansion control valve discharging water continuously</p>	<p>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.</p> <p>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 7. This may dislodge any foreign matter and alleviate the problem.</p> <p>If the valve discharges at high flows, contact your installer or Rinnai to discuss.</p>
NO WATER FROM THE HOT TAP	
<p>Restriction in the hot tap or failure of the cold water supply to the heater</p>	<p>Check for water flow at the other hot taps and that the cold water isolation valve is fully open.</p>
GAS BOOSTER OPERATING TOO FREQUENTLY	
<p>Insufficient Sunlight / Collectors Shaded</p>	<p>Reduced sunlight due to overcast weather in summer or low solar contribution in winter will result in an increased dependence on gas boosting. Higher gas use bills under these conditions, especially in winter, are normal.</p> <p>Ensure the trees or other objects are not shading onto the collector surface (Trim the trees or relocate the solar collector if the obstruction is permanent).</p> <p>Make sure the glass on the collector is not dirty.</p> <p>Check that positioning and alignment of solar collectors is in accordance with the section 'System Orientation and Inclination' on page 14.</p>
<p>Solar control unit switched off</p>	<p>If the solar control unit is switched off there will be no solar pre-heating of water resulting in the water being heated entirely by electricity or gas' boosting'. Check the power outlet for the solar control unit is switched on.</p>

BROKEN OR DAMAGED EVACUATED TUBES	
Broken Evacuated Tubes	<p>If any of the evacuated tubes have a clear or white bottom this may indicate that the vacuum within the tube has gone and the tube will not be performing properly. The tubes are normally a silver colour.</p> <p>If the vacuum in the tube is gone or the tube is obviously broken, the system can still be used. The remaining tubes will still be fully operational. However the system performance will be reduced.</p> <p>If a tube is broken or damaged it should be replaced. Contact Rinnai to discuss.</p>
WATER FLOW FLUCTUATIONS	
High hot water usage	Higher than normal number of hot taps in use at the same time may cause a decrease in the hot water flow from the taps.
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.

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100 Atlantic Drive, Keysborough, Victoria 3173
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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 5.00 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.