

Operation Installation Manual Flat Plate Commercial Solar Pre-Heat Systems



This system shall be installed in accordance with:

- Manufacturer's Installation Instructions
- Current AS/NZS 3500
- All applicable local rules and regulations including local OH&S requirements

This system must be installed, commissioned and serviced by an Authorised Person.

The solar hot and solar cold pipes between the solar storage tank and the solar collectors must be suited to the high water temperatures and pressures that may occur. As such, plastic pipe must not be used. Components used to join pipes must use metallic materials to achieve sealing.

NOT SUITABLE AS A POOL OR SPA HEATER



Certified
Product



WaterMark
AS3498 Lic W169
SAI Global



N10378

Certified
Product



WaterMark
AS3498 Lic W208
SAI Global



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



TABLE OF CONTENTS

Warnings and Important Information	3
Safety and Regulatory Information	3
Scald Hazards	4
Safety Devices	5
Hydrogen Gas	6
Water Temperature	6
Water Quality	6
Draining and Filling the Water Heating System	6
Maintenance and Regular Care	6
Servicing and Repair	6
Installation	7
Regulations and Occupation Health and Safety (OH&S)	7
Location - General Information	7
Hi Rise Kits in Conjunction with Split System Flat Roof Frames	7
Water Pipes and Supply	7
Hot Water Delivery Temperature	8
Storage Cylinder Location	8
Valves and Fittings	8
Installation Procedure	9
Installation - Solar Collectors	11
Regulations and Occupation Health and Safety (OH&S)	11
Solar Collector Specifications	11
System Orientation and Inclination	12
Pipe and Pump Sizing	12
Components	13
Collector Mounting Rail Pre Assembly	14
Installation on a Pitched Tile Roof	15
Installation on a Pitched Metal Roof	16
Installation on a Flat Roof Frame	17
Collector Spacing Requirements	18
Flow and Return Line Layout	19
Collector Fitting Details	19
Storage Cylinders	21
Specifications	21
Components Supplied With Cylinders	21
Dimensions	22
Pump and Controller	24
Components Supplied in Solar Controller Kits	24
Solar Controller	25
Gas Boosting	28
Solar Preheat with Manifold Pack	28
Solar Preheat With Demand Duo	29
Solar Preheat with Demand Duo and Warm Water Valve	30
Save a Service Call	31

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.

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.

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.

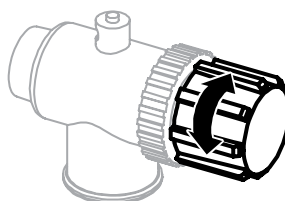
Pressure & Temperature Relief (PTR) Valve

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.

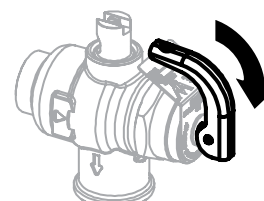
However, continuous leakage of water from the valve and its drain line may indicate a problem with the water heater. If it discharges more than a bucket of water during a 24 hour period or discharges continuously there may be another problem.

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).



Twist cap until water flows from drain line



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



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



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.

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

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

WATER TEMPERATURE

The 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 the separate 'Warranty Terms and Conditions' booklet 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 5.

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.

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. For tiled roofs, ensure that the area is even and without cracked or damaged tiles. Collectors should be positioned for optimum solar benefit. Refer to the section 'Installation - Solar Collectors' on page 11 for more information.



NOT SUITABLE FOR USE IN CYCLONE AREAS.

HI RISE KITS IN CONJUNCTION WITH SPLIT SYSTEM FLAT ROOF FRAMES

For buildings higher than 10 metres additional collector mounting components must be used to secure the collector to the rail/frame. See the section 'Collector Mounting Rail Pre Assembly' on page 14 for full details. For buildings higher than 10 metres using a flat roof frame, the mounting of the frame to the roof must be carried out in accordance with the instructions "Installation Manual - Rinnai Commercial High Rise Kit".

WATER PIPES AND SUPPLY



The solar hot and solar cold pipes between the solar storage tank and the solar collectors must be suited to the high water temperatures and pressures that may occur. As such, plastic pipe must not be used. Components used to join pipes must use metallic materials to achieve sealing.

Capillary silver solder is a suitable joining method.

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 0.6 K.m²/W or higher depending on location. All external pipework MUST be insulated to prevent frost damage.

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

The maximum water pressures for the various systems are listed on page 21. 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

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.

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 on all installations.
- Fittings as shown in the tables on pages 13 and 24.

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 on page 9 is exceeded.

INSTALLATION PROCEDURE

1. Install Solar Collectors

Position and install collectors in accordance with the section 'Installation - Solar Collectors' on page 11.

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 22 and 23.

- Leave the valve body pointing down. Tighten the valve using the spanner flats - never use the valve body.
- 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 on page 11.

Example: if there are 3 SP200B solar collectors per tank, then the maximum input is $3 \times 1.25 \text{ kW} = 3.75 \text{ kW}$. This is less than the 10kW capacity of the supplied PTR valve and therefore is OK.

- 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 19, 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 28 to 30, or other suitable layout.

6. Connect the Solar Controller

With power off, remove the clear cover on the solar controller. Mount the control using screws in the mounting points shown in the picture. DO not supply power to the solar controller until the system is filled with water.

7. Connect Temperature Sensor Leads

Connect temperature sensor leads as shown on page 19 and 27. 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.

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

Air should be bled from the collectors by temporarily loosening a fitting at the outlet of each collector array.

9. Adjust Pump Speed

Adjust the pump to the speed specified on page 12.

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. Adjust Dip Switches *

With the power OFF to the solar controller, adjust all the dip switches using the guides shown on page 27 to achieve desired error, state, pump configuration and frost protection.

12. Replace Cover of Solar Controller ***13. Connect Power and Check Display ***

Connect the 240 V power and observe the control display. Check that the display reflects the dipswitch settings.

START UP/RUNNING STATE

- Line one on the display will show the temperature of the cold sensor (in storage cylinder) and the hot sensor (on the collector).
- Line two on the display will scroll through the following:
 - Software version
 - Maximum tank temperature set point
 - Pump configuration and operation
 - Pump errors and accumulative error times
 - Pump 1 accumulative run hours
 - Pump 2 accumulative run hours
 - Run hours since last reset
- The control then switches the circulation pump in response to the temperature differential between the solar collector and storage cylinder temperature sensors. The pump has a maximum run time of approximately 10 minutes and then it stops for approximately 8 seconds to clear any air locks. It then restarts if conditions require.
- Frost protection may be enabled when the conditions require. (See page 27). When the collector temperature falls below 4°C, the control will switch the pump on to circulate water through the collectors. When the collector temperature reaches 8°C the control switches the pump off.

14. Finishing the Installation

Ensure that the set temperature on the gas boosting is set to 60°C or above for a Demand Duo or 70°C or above for a Manifold Pack.

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

* Depending on the model of solar controller supplied, the instructions may. If separate instructions are provided with solar controller, refer to these for the steps marked with an *.

INSTALLATION - SOLAR COLLECTORS

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.

SOLAR COLLECTOR SPECIFICATIONS

	ENDURO SP200B
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 1050 x 80
Weight empty (kg).	40
Water volume (litres)	1.95
Number risers	9
Potential Solar Output at PTR relief conditions (kW)	1.25 kW
Frost Protection	<p>The Rinnai solar hot water warranty booklet specifies the locations and conditions that apply for flat plate collectors to be warranted against frost damage.</p> <p>For full warranty terms, conditions and exclusions refer to the Rinnai solar hot water warranty booklet. The booklet is available at www.rinnai.com.au.</p>

SYSTEM ORIENTATION AND INCLINATION

The performance of any solar hot water system is determined by the way that 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 from North (between North-East and North-West will reduce efficiency by approximately 5%.

For Australian installations, the inclination of the solar collectors should be the same as the latitude of the site for optimum performance. Inclinations within 20 degrees of the latitude of the site will reduce efficiency by approximately 5%. Many roofs in Australia have a slope between 20° and 25° and provide an appropriately angled mounting surface.

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

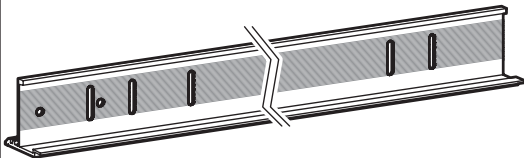
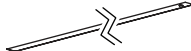
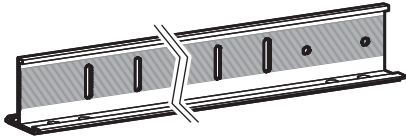

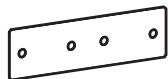
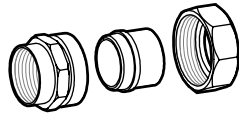

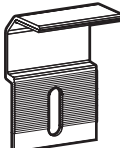
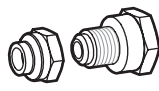
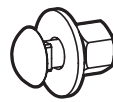
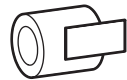
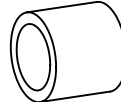
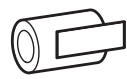
PIPE AND PUMP SIZING



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

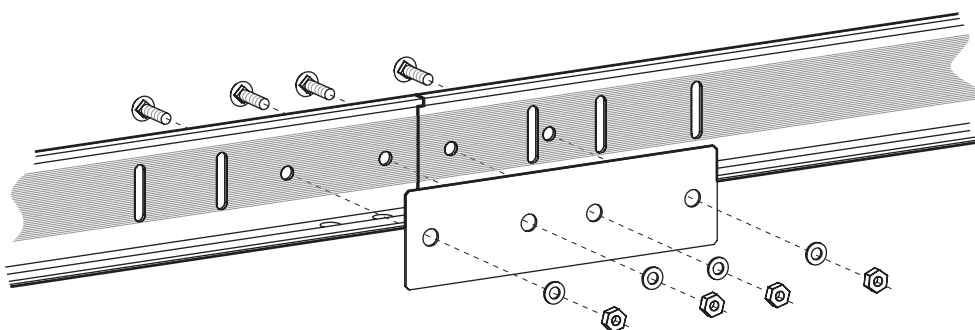
2 collector DDSP2B	3 collector DDSP3B		2 collector DDSP2B	3 collector DDSP3B	
2	2	 Mounting Rail 2100mm 14201211	4	4	 Collector Mounting Straps 12401012
-	2	 Mounting Rail 1000mm 14201210	4	4	 M8 Bolt, Washer and Nut (Used to fasten collector mounting straps to rail) Bolt 22601052 Washer 17401072 Nut 16801062
-	2	 Joining Plate 15201035	2	4	 Barrel Union $\frac{3}{4}$ - $\frac{3}{4}$ 32201105
-	2		2	2	 Cap 16001011
8	12	 Clamping Bracket 27201038	2	2	 Union $\frac{3}{4}$ - $\frac{1}{2}$ 32201736
8	20	 M6 Bolt, Washer & Nut (Used with clamping brackets and joining plates) Bolt 22601073 Washer 17401073 Nut 16801007	2	4	 Insulation and Foil Tape For use with Barrel Unions 14601217
4	6	 Sleeve Support (Only required for some High Rise Installations) 36201002	2	2	 Insulation and Foil Tape For use with caps 14601216

COLLECTOR MOUNTING RAIL PRE ASSEMBLY

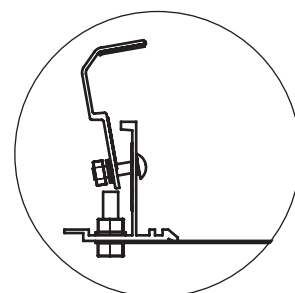
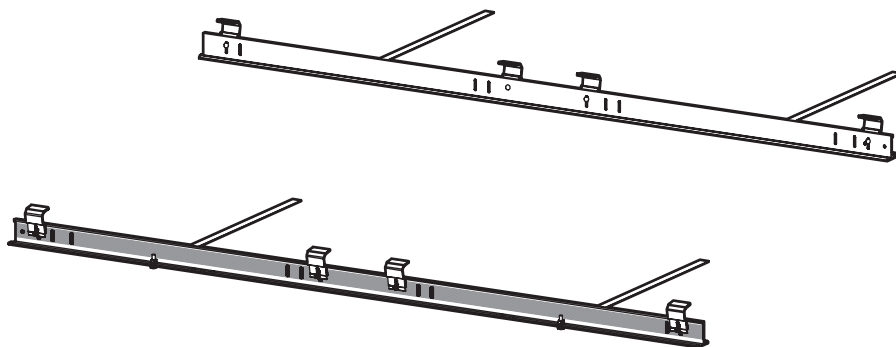


This type of installation is not suitable for use in cyclonic areas..

- For a three collector installation join the 2.1 and 1.0 m rails using the joining plate and 4 of the M6 nut, bolt and washers.



- Assemble the collector rail components as shown in the diagrams below.
- Loosely attach the clamping brackets using the M6 nuts, bolts and washers.
- If the collectors are to be mounted to a tiled roof, fasten the collector support straps (supplied with the collectors) using the M8 nut, bolt and washers.



When installing on a roof above 10 metres in height, the short clamping brackets are not used, and must be replaced with 900mm clamping brackets that are supplied in DDHRKIT2 and DDHRKIT3. The “Installation Manual - Rinnai Commercial High Rise Kit” (15401104) that is provided in these kits must be followed as well as this instruction.

If a flat roof frame is used on an installation above 10 meters in height then the frame must be mounted to the roof in accordance with the “High Rise Roof Mounting Frame Installation Instruction” (15401103).

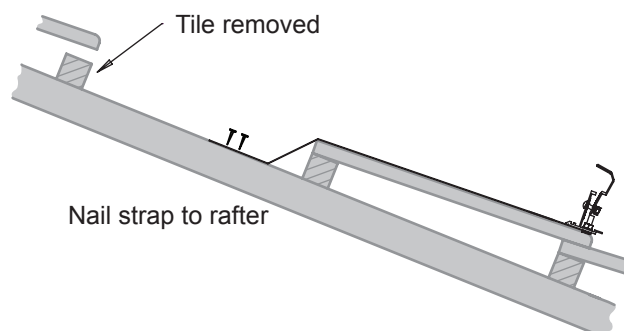
INSTALLATION ON A PITCHED TILE ROOF



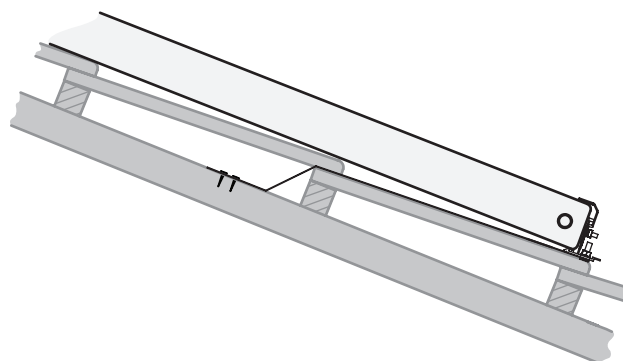
This type of installation is not suitable for use on roofs over 10 m high.

This type of installation is not suitable for use in cyclonic areas.

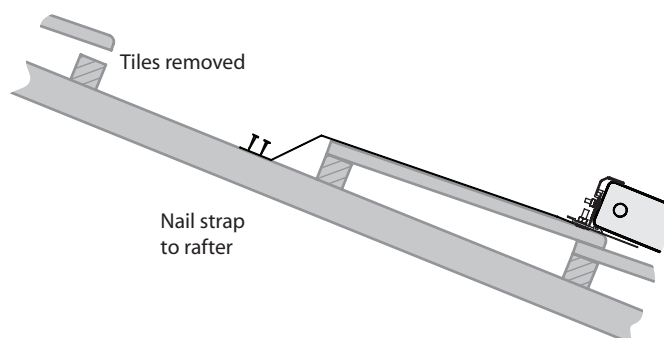
- Attach the collector mounting straps to the rafter or truss under the tiles.



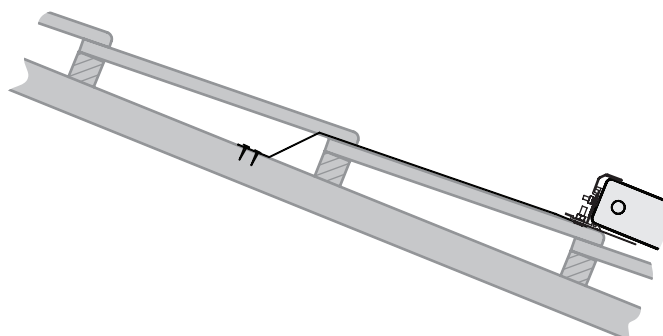
- Place the collector(s) onto the roof above the lower rail. If more than one collector is being installed then join them together using the compression fittings supplied.
- Push down on the collector retainers to clamp the collector and tighten the nuts.



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



- Replace the tiles and ensure the collector is secure.



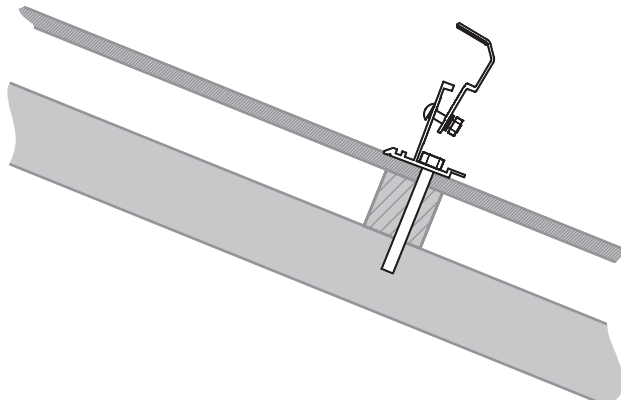
INSTALLATION ON A PITCHED METAL ROOF



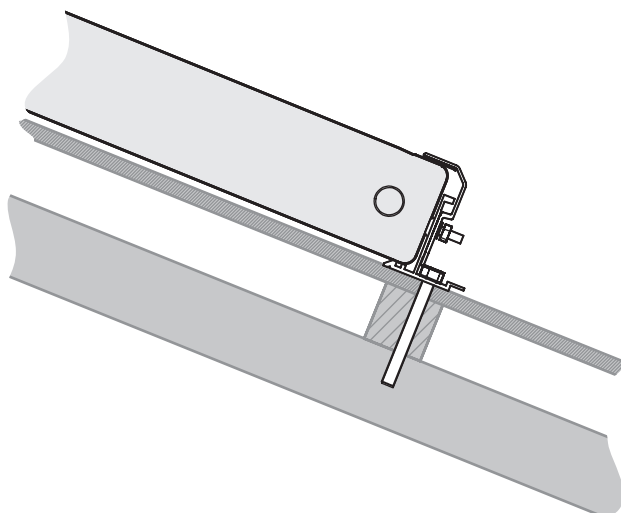
This type of installation is not suitable for use on roofs over 10 m high.

This type of installation is not suitable for use in cyclonic areas.

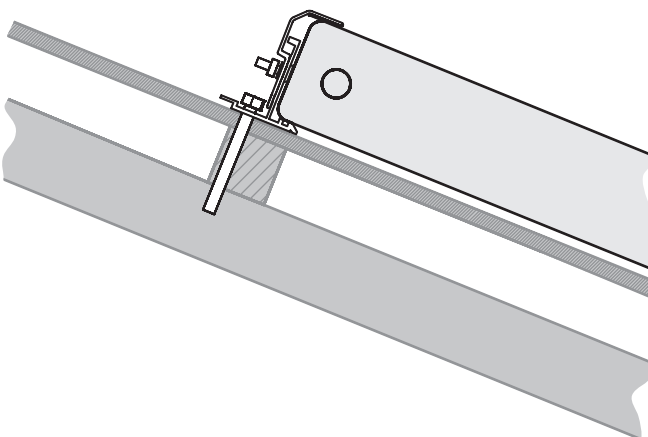
- Position the lower collector mounting rail assembly so that the rail is over the roof purlin.
- Drill through the roof iron and purlin using the holes in the rail as a guide. Apply some silicone sealant down the holes to ensure no water leakage.
- Bolt the rail to the roof purlin using a suitable fastener.



- Position the collector(s) onto the roof above the lower rail. If more than one collector is being installed, join them together using the compression fittings supplied.
- Push down on the clamping brackets to allow the locking teeth to hold the collector in position. Tighten the nut and bolt to securely fasten the clamping bracket in place.



- Place the upper collector mounting rail above the collectors. Push down on the clamping brackets to allow the locking teeth to hold the collector in position. Tighten the nut and bolt to securely fasten the clamping bracket in place.
- Drill through the roof iron and purlin using the upper mounting rail as a guide. Apply some silicone sealant down the holes to ensure no water leakage and secure with suitable fasteners.
- Alternatively the rail can be attached to the roof using the collector mounting straps.



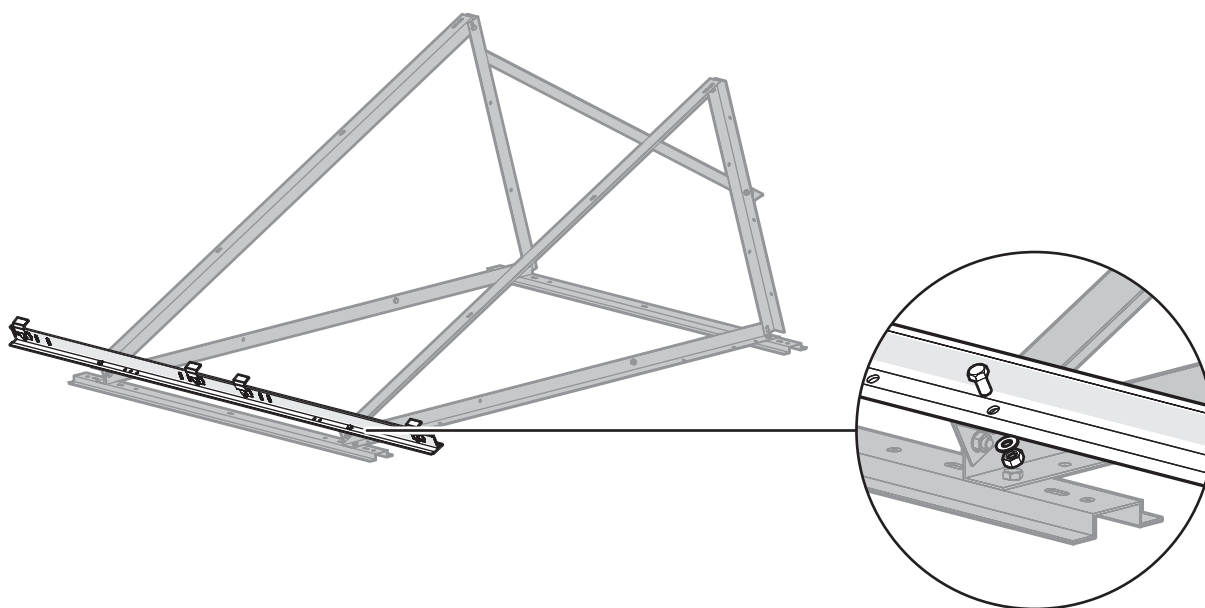
INSTALLATION ON A FLAT ROOF FRAME



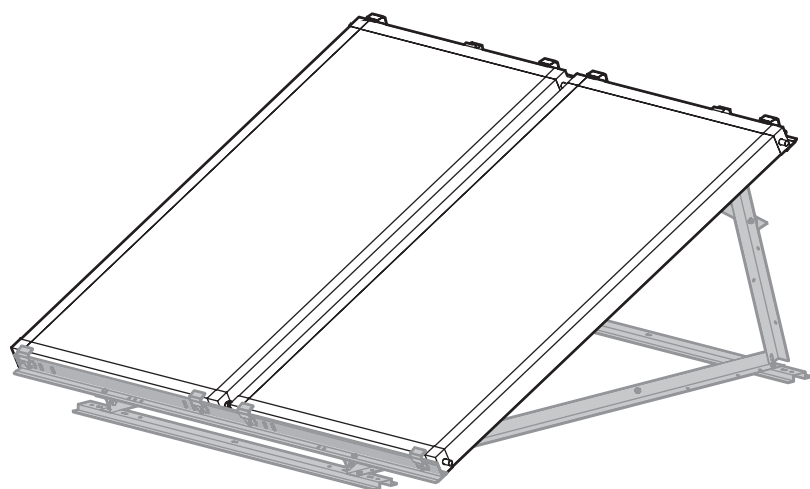
Not suitable for use in cyclone areas

When installing on a roof over 10 metres in height, the frame must be fastened to the roof in conjunction with the “High Rise Roof Mounting Frame Installation Instruction” (15401103) and the longer clamping brackets supplied in DDHRKIT2 and DDHRKIT3 must be used.

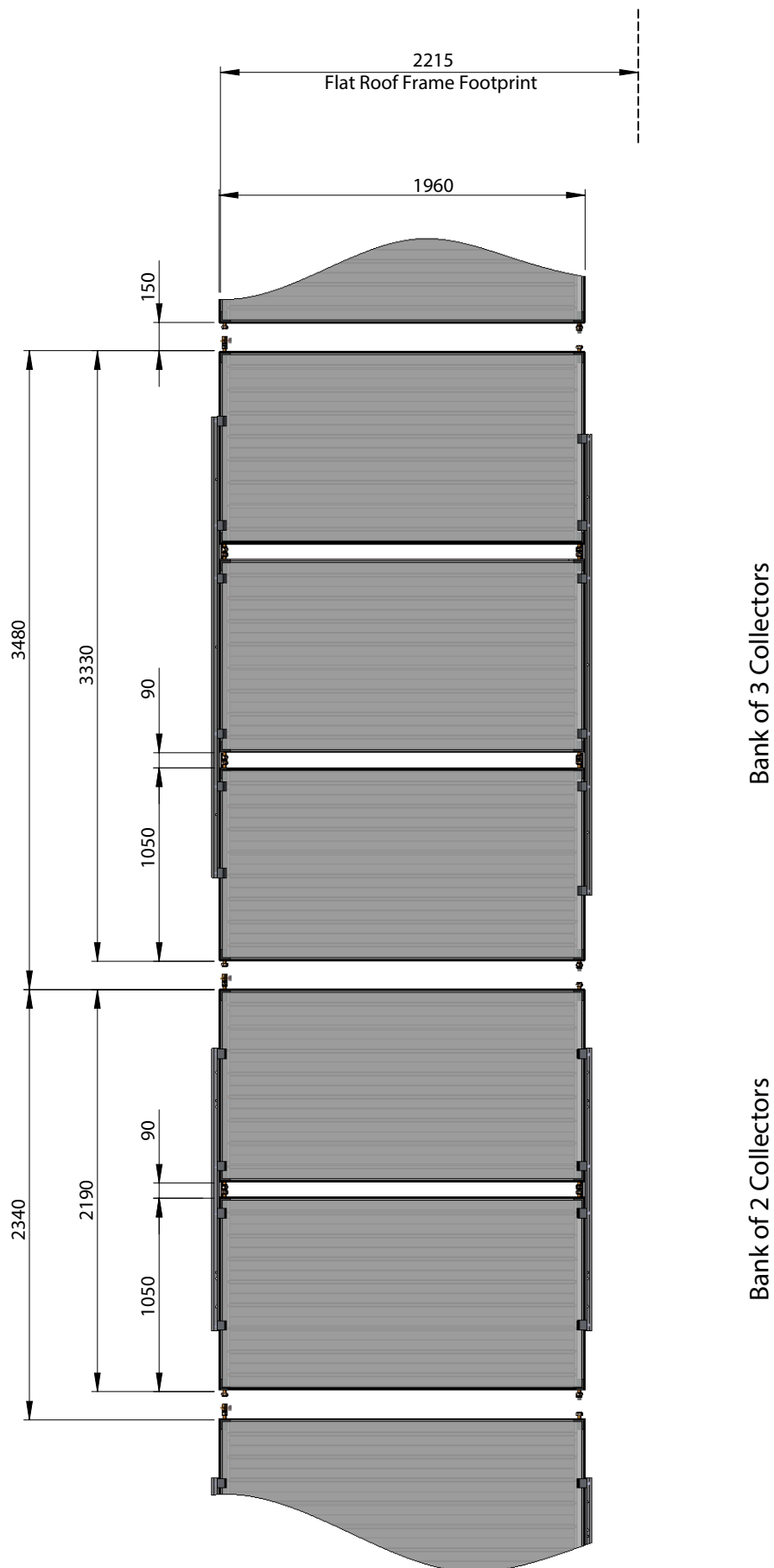
- Assemble the frame as described in “Installation Manual - Roof Frames for Use with Rinnai Solar Hot Water Systems”
- Fasten the mounting rails to the frame using the bolts, washers and lock nuts provided in the frame kit.



- Join the collectors using the compression unions and place the collectors onto the rail. Position second rail above the collector and fasten to frame using bolts, washers and lock nuts.
- Push down on the clamping brackets to allow the locking teeth to hold the collector in position. Tighten the nut and bolt to securely fasten the clamping bracket in place.



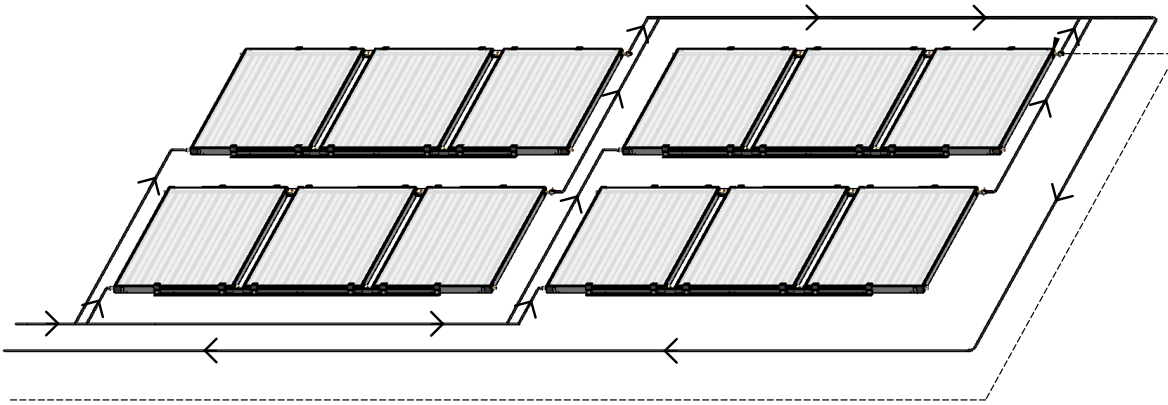
COLLECTOR SPACING REQUIREMENTS



FLOW AND RETURN LINE LAYOUT

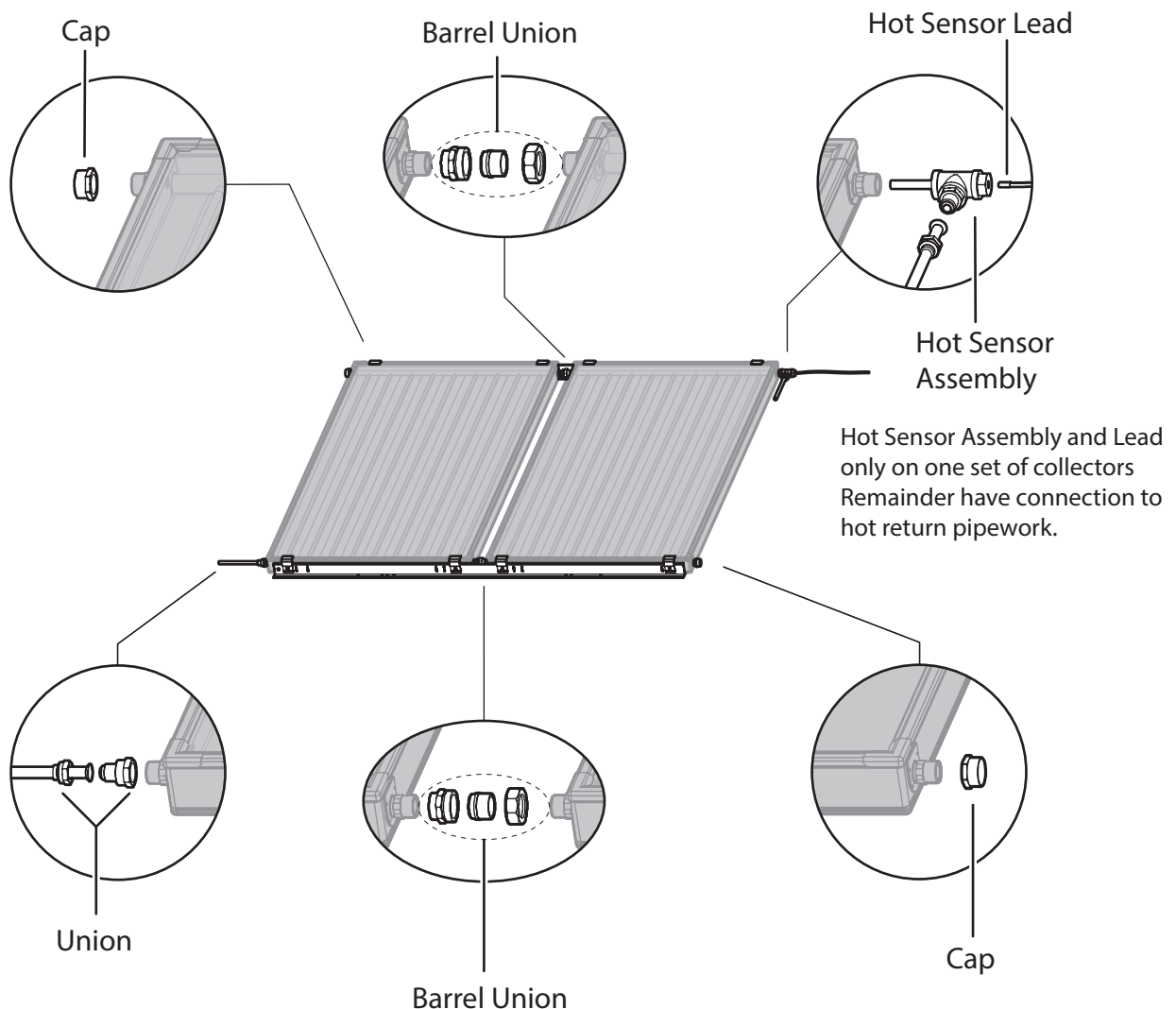
To ensure that the system is operating at optimum efficiency, it is important to ensure that the flow through all the collector arrays is balanced. This can be achieved by using the 'first in last out' approach to ensure equal length flow and return lines for all collector arrays as shown below.

Alternatively balancing valves may be used on each collector array. This may simplify the pipework layout and cost.



COLLECTOR FITTING DETAILS

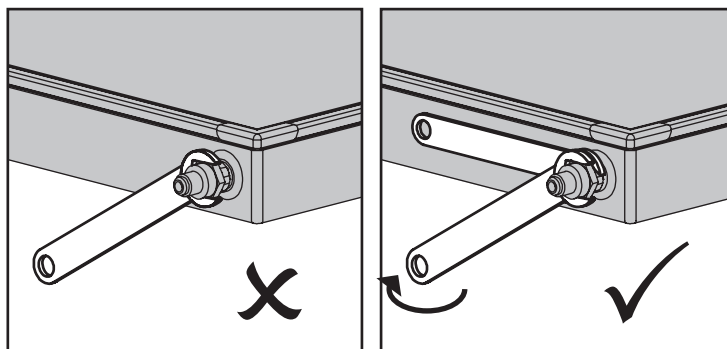
Enduro SP200B



Connecting Fittings to Collector

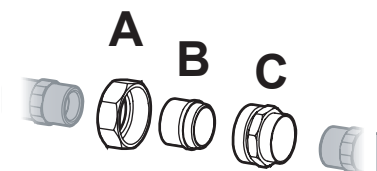


When connecting fittings to collectors ensure that the flats at the end of the collector header are held in place with one spanner, while another spanner is used to tighten fitting. Collector damage or leaks may occur if this isn't done correctly.



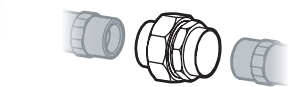
Connecting Barrel Unions

1.



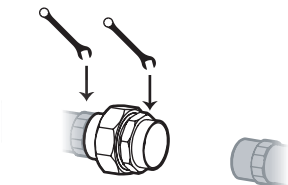
Identify the 3 components of the barrel union as A,B or C

2.



Fasten the barrel union components together.

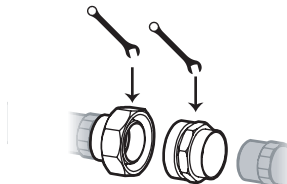
3.



Attach the collector header to the entire barrel union with component B screwing onto the threaded end of the header.

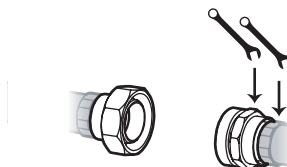
Tighten with two spanners in the places indicated in the diagram above.

4.



Separate component C from components A and B using two spanners in the places indicated in the diagram above.

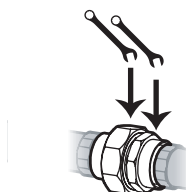
5.



Fasten component C to the header of the 2nd collector.

Tighten with two spanners in the places indicated in the diagram above.

6.



Join the barrel union components together.

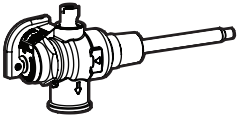
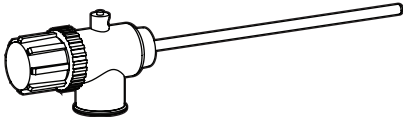






Tighten with two spanners in the places indicated in the diagram above.

STORAGE CYLINDERS

SPECIFICATIONS

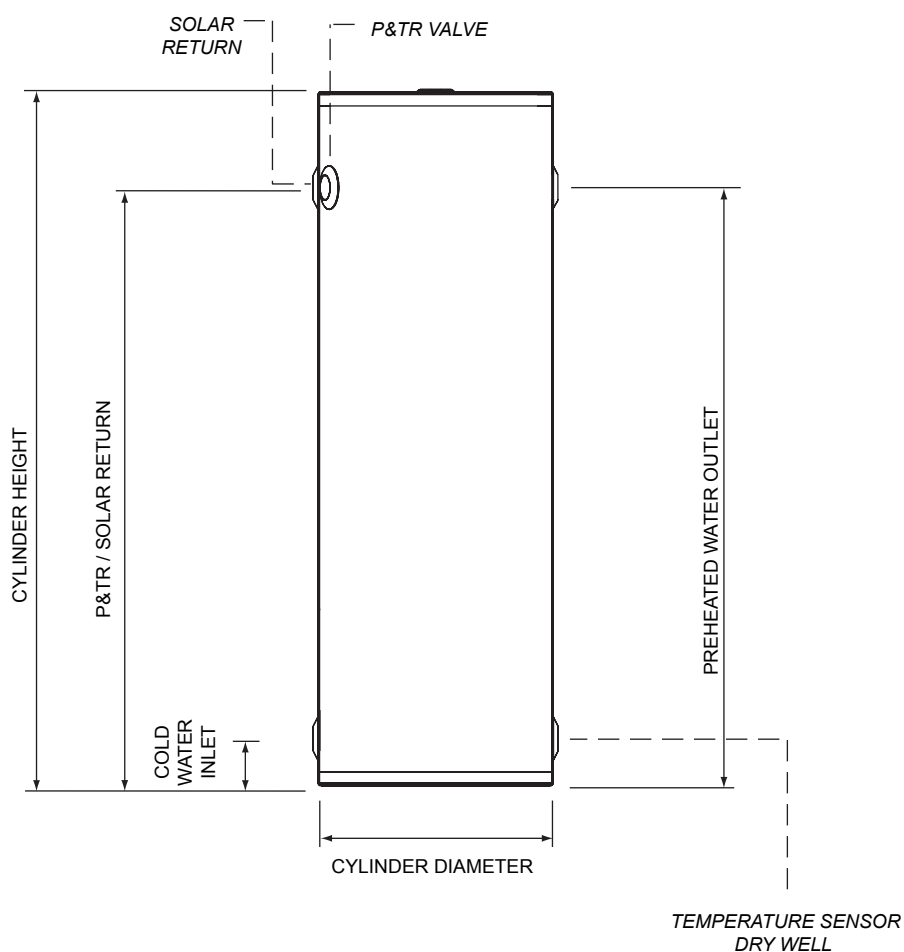
System Type	All Cylinders
PTR valve setting	850 kPa
Rating of PTR Valve supplied	10 kW
Expansion Control Valve (ECV) setting (supplied by installer if required)	700 kPa
Max supply pressure with ECV	550 kPa
Max supply pressure without ECV	700 kPa
Pressure limiting valve rating (supplied by installer if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

COMPONENTS SUPPLIED WITH CYLINDERS

Items Supplied with Vitreous Enamel Cylinders		Items Supplied with Stainless Steel Cylinders	
1	 PTR Valve 92501192	1	 PTR Valve 11004784
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

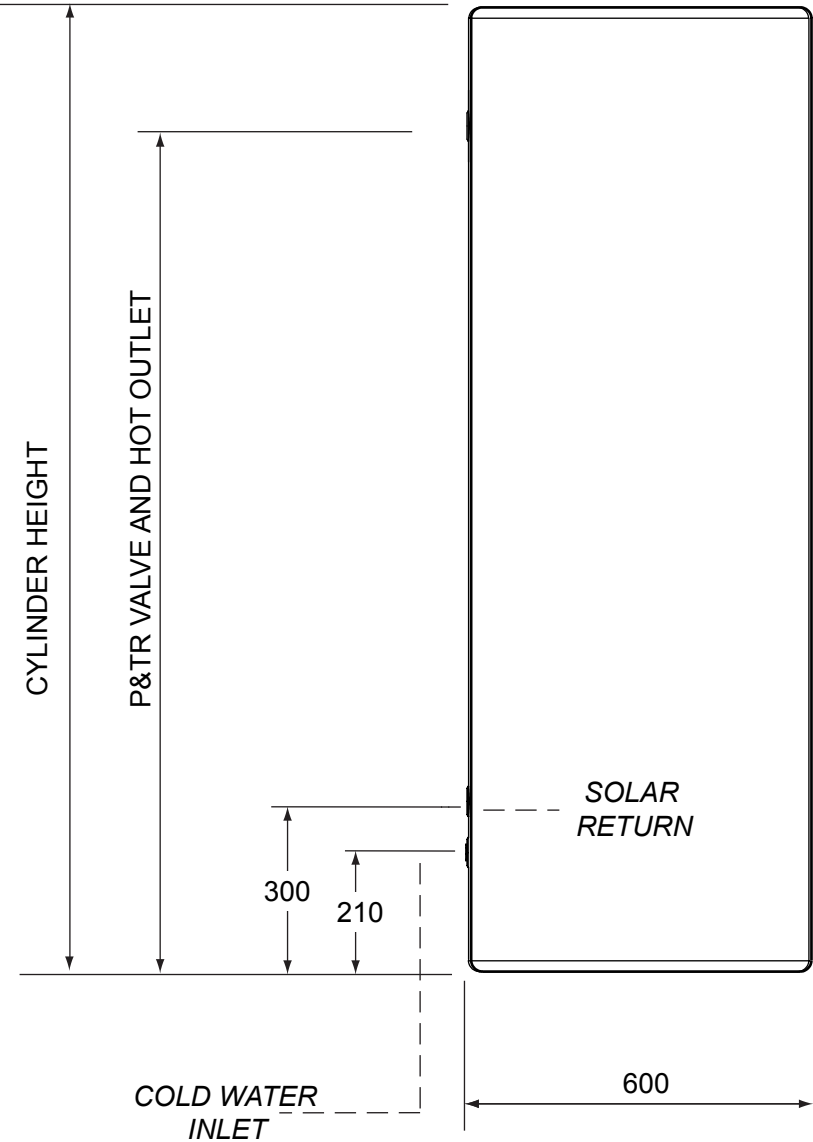
DIMENSIONS**Glass Lined Cylinders**

	SG270SL	SG320SL
Cylinder height	1475	1695
PTR / solar return	1215	1430
Cold water inlet	90	90
Cylinder diameter	625	625
Weight empty	91 kg	107 kg



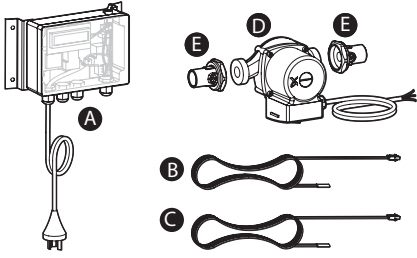
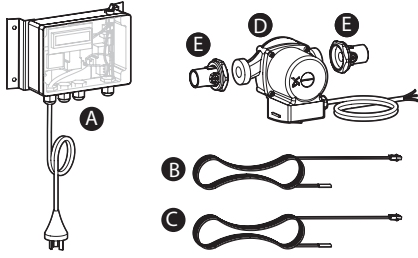
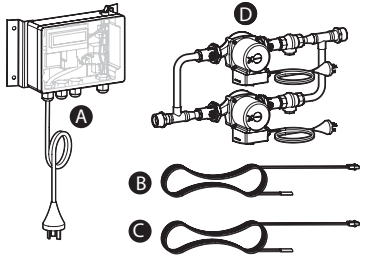
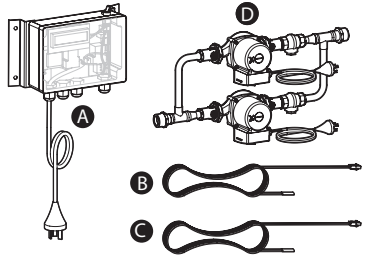
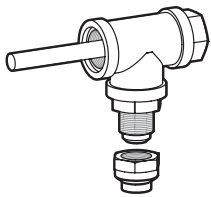
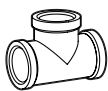




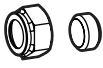
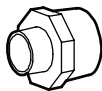


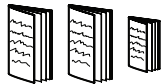
Stainless Steel Cylinders

	DDSS250	DDSS315
Cylinder height	1700	2090
PTR / solar return / hot water outlet	1490	1880
Weight empty (kg)	56	68



PUMP AND CONTROLLER

COMPONENTS SUPPLIED IN SOLAR CONTROLLER KITS

DDSCP20B	DDSCP25B	DDSCP20BDUAL	DDSCP25BDUAL		DDSCP20B	DDSCP25B	DDSCP20BDUAL	DDSCP25BDUAL	
1	-	-	-	 <p>Control Box & Pump Assembly 39001732</p> <p>A Solar Controller * 39001730 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 * 39001730 B Cold Sensor Lead (2m) 31002710 C Hot Sensor Lead (20m) 31002715 D Pump DDUPS2580N E Valve Union Set 16601080</p>
-	-	1	-	 <p>Control Box & Pump Assembly 39001736</p> <p>A Solar Controller * 39001730 B Cold Sensor Lead (2m) 31002710 C Hot Sensor Lead (20m) 31002715 D Dual Pump Assembly DDDP2060N</p>	-	-	-	1	 <p>Control Box & Pump Assembly 39001737</p> <p>A Solar Controller * 39001730 B Cold Sensor Lead (2m) 31002710 C Hot Sensor Lead (20m) 31002715 D Dual Pump Assembly DDDP2580N</p>
1	1	1	1	 <p>Hot Sensor Assembly 10204715</p>	1	1	1	1	 <p>T 1 1/4 Rp 19001021</p>
					1	1	1	1	 <p>T 3/4 Rp 19001011</p>
1	1	1	1	 <p>Adaptor R3/4 x Rp1/2 19801004</p>	1	1	1	1	 <p>Temp Sensor Sheath 140 mm 10204719</p>
1	1	1	1	 <p>1 1/4 nipple 17201046</p>	1	1	1	1	 <p>3/4 Kinco Olive 33001011 3/4 Kinco Nut 16801018</p>
1	1	1	1	 <p>Adaptor 32 to 3/4 17201047</p>	-	2	-	2	 <p>G3/4 (Comp) x R 1 union 33201730</p>
3	1	3	1	 <p>G3/4 (Comp) x R 3/4 union 33201713</p>	1	1	1	1	 <p>Operation / Installation Manual 15401005 High Rise Installation Manual 15401103 Warranty Booklet 15401041</p>

* An alternative controller may be supplied. Refer to instructions provided with it.

SOLAR CONTROLLER



An alternative solar controller may be supplied. If the controller doesn't match the one shown below, then follow instructions provided with it.

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 pump 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 using the dipswitches. This function can be selected when the installation may be exposed to frost.

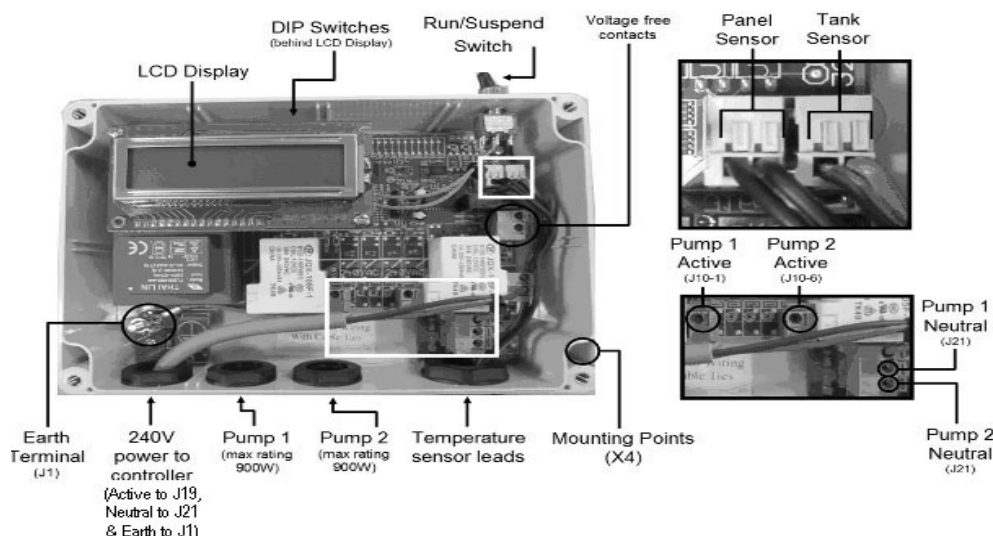
Errors

The DDSC has in-built error detection that is connected to voltage free contacts. The voltage free contacts can either be open or closed on error detection.

		Voltage Free Contacts (Dip Switch settings)	
LCD Display	Error Description	Open On Error	Closed On Error
E1	Fault with pump or panel sensor		
E2	Fault with one or both temperature sensors		
E3	Fault with pump		

It is possible for the LCD to display not only single errors but also multiple errors if present, additionally the LCD will also display the duration of the listed error(s). To clear errors listed, toggle top switch to the suspend state then switch back to the run state.

Solar Controller Components





An alternative solar controller may be supplied. If the controller doesn't match the one shown on page 25, then follow instructions provided with controller.

Pump 1 (Left hand) only:

Pump active wire to controller active (J10-1),
Pump neutral wire to Controller neutral (J21).
Pump earth wire to controller earth (J1)



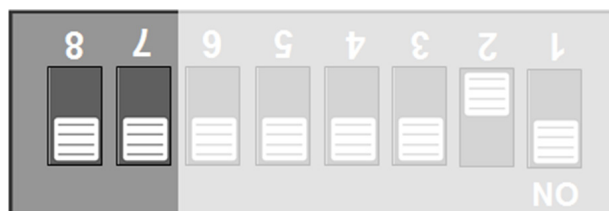
Pump 2 (Right hand) only:

Pump active wire to controller active (J10-6),
Pump neutral wire to Controller neutral (J21).
Pump earth wire to controller earth (J1)



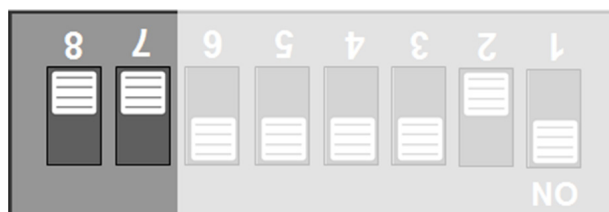
Pumps 1 and 2 simultaneously:

Pump 1 active wire to controller active (J10-1)
Pump 1 neutral wire to controller (J21)
Pump 1 earth wire to controller earth (J1)
Pump 2 active wire to controller active (J10-6)
Pump 2 neutral wire to controller neutral (J21)
Pump 2 earth wire to controller earth (J1)



Pump 1 and 2 Alternating:

Pump 1 active wire to controller active (J10-1)
Pump 1 neutral wire to controller neutral (J21)
Pump 1 earth wire to controller earth (J1)
Pump 2 active wire to controller active (J10-6)
Pump 2 neutral wire to controller neutral (J21)
Pump 2 earth wire to controller earth (J1)



Legend: White indicates position of switch



Dip switches are upside down in controller as shown above.

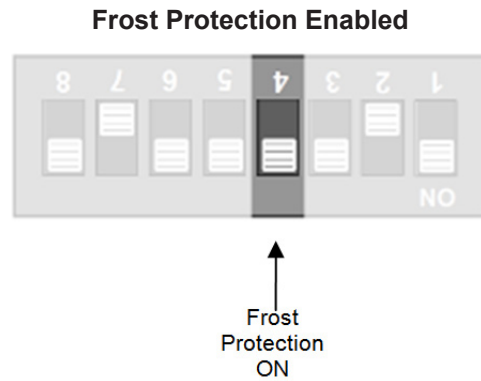
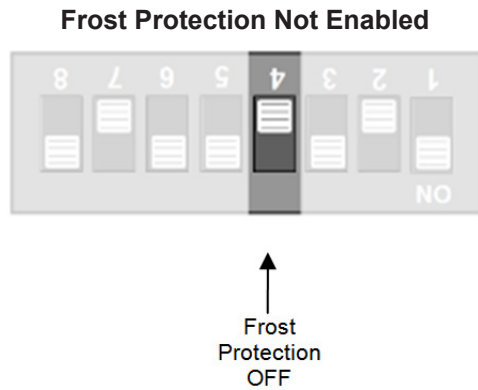
Only switches 7 & 8 are to be adjusted when setting pump configurations.



An alternative solar controller may be supplied. If the controller doesn't match the one shown on page 25, then follow instructions provided with controller.

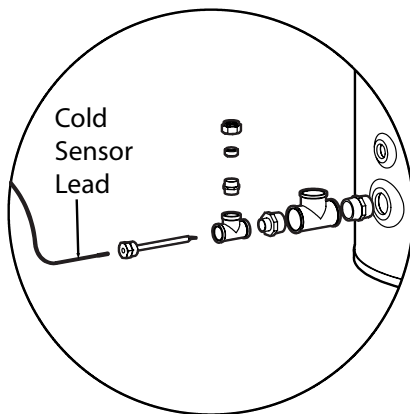
Dipswitch Settings For Frost Protection

Only switch 4 is to be adjusted when setting frost protection. In frost areas it is advised to fit a non return valve on the outlet of the solar transfer pump or fit a heat trap on the solar return pipe.

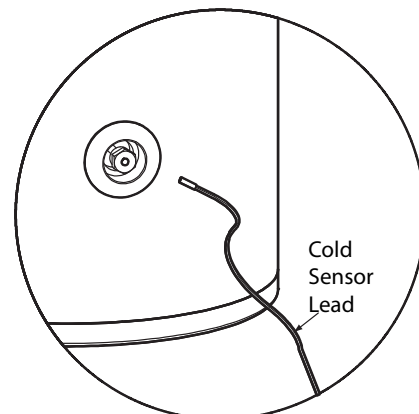


Location of Cold Temperature Sensor

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.

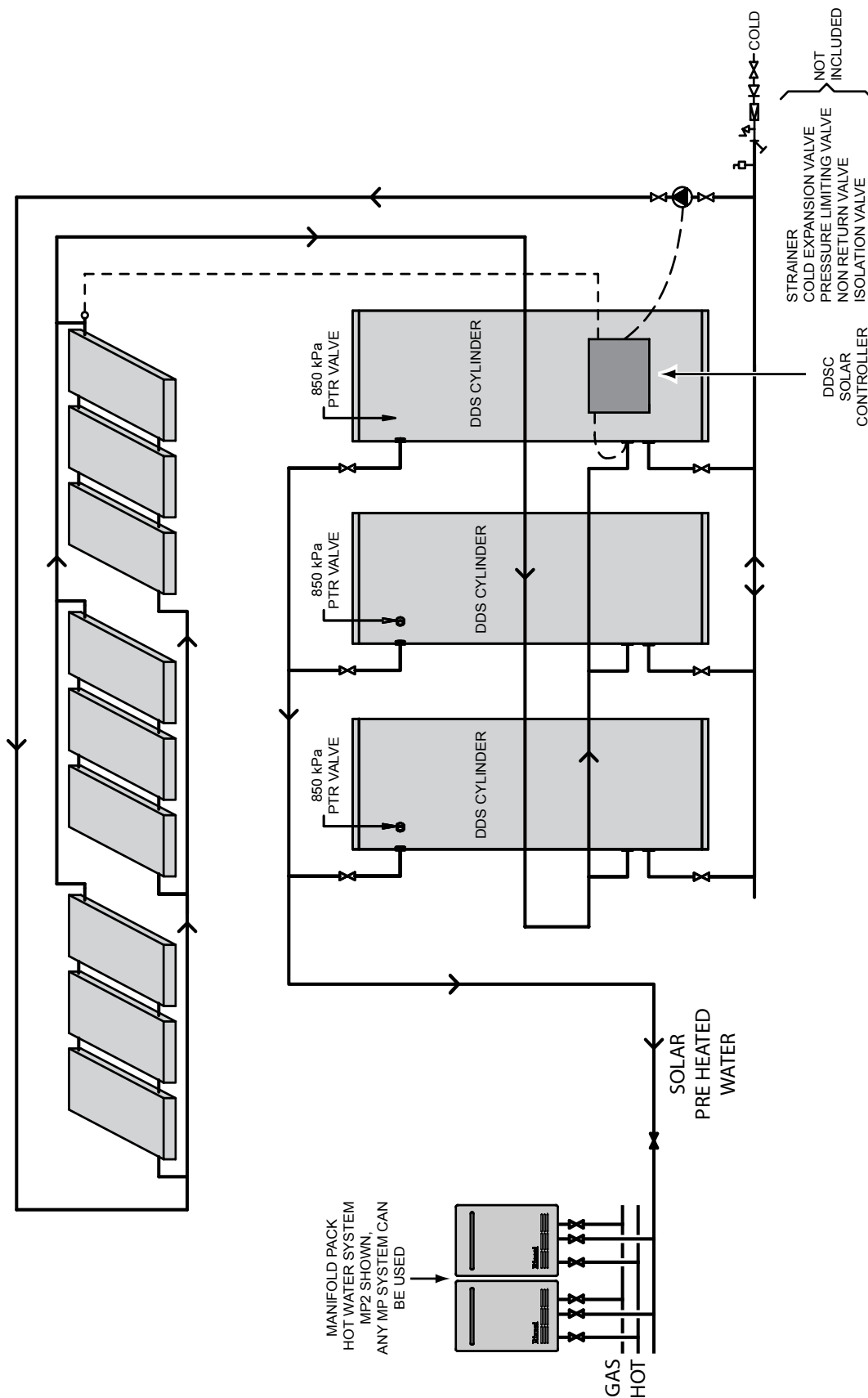
Temperature (°C)	Resistance (Ohms)	Temperature (°C)	Resistance (Ohms)
0	32000	60	2000
10	19000	70	1100
20	12000	80	1000
30	8000	90	900
40	5000	100	700
50	3000		

GAS BOOSTING

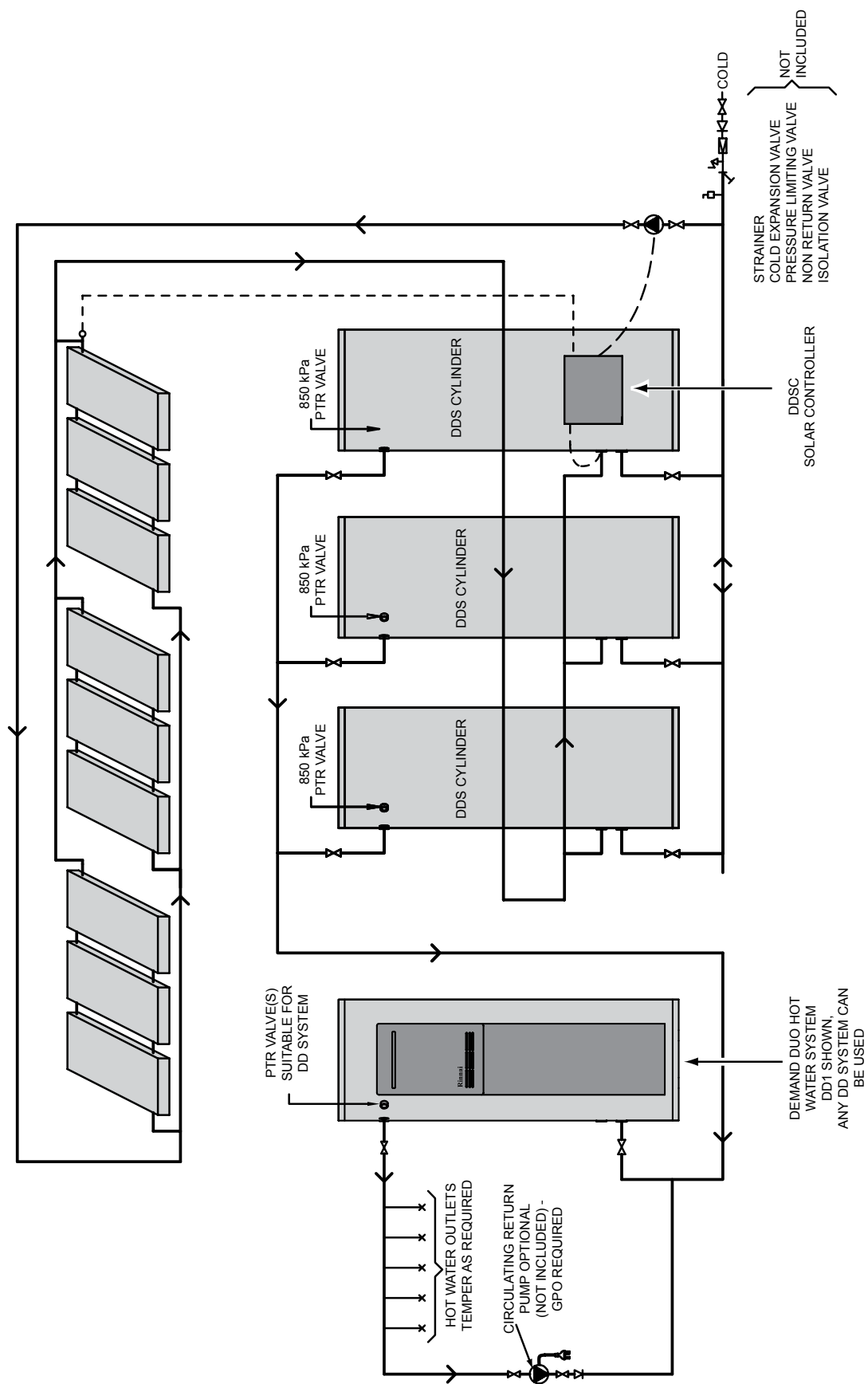
The installation of the Manifold Pack or Demand Duo must be carried out in accordance with instructions supplied with the system. Piping connections to the Solar Preheat must be carried out as shown on the following pages.

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

SOLAR PREHEAT WITH MANIFOLD PACK

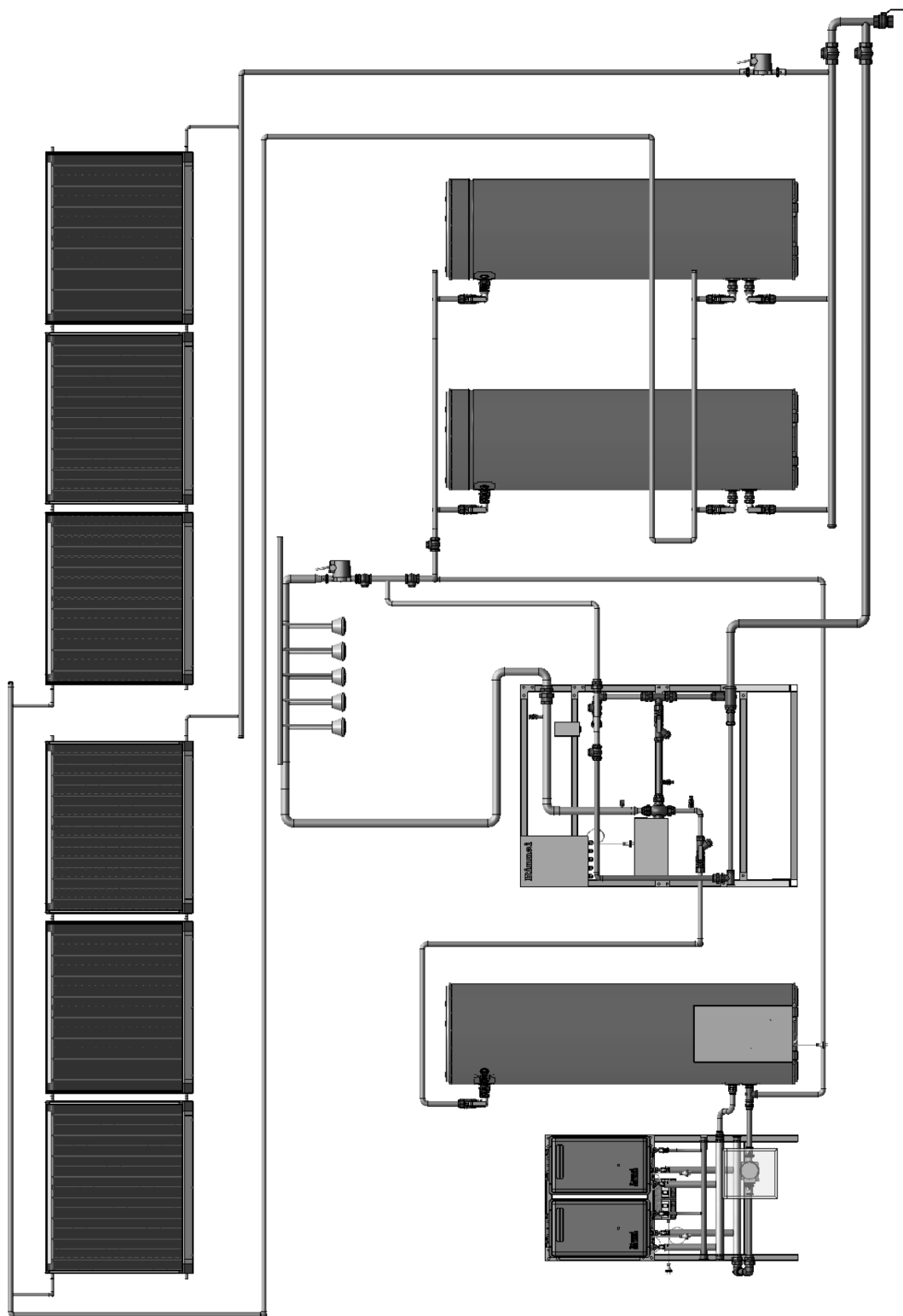


SOLAR PREHEAT WITH DEMAND DUO



DEMAND DUO HOT WATER SYSTEM DD1 SHOWN. ANY DD SYSTEM CAN BE USED

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	
Booster heating not operating OR Insufficient gas supply for gas boosted heating system	<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>
Excessive hot water consumption	<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>
Gas Booster Setting	<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>
Temperature and pressure relief valve / expansion control valve discharging water continuously	<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 'Safety Devices' on page 5. 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	
Restriction in the hot tap or failure of the cold water supply to the heater	<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	
Insufficient Sunlight / Collectors Shaded	<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 12.</p>
Solar control unit switched off	<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'</p> <p>Check the power outlet for the solar control unit is switched on</p>
WATER FLOW FLUCTUATIONS	
High hot water usage	<p>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.</p>
WATER HAMMER	
Hot and cold water plumbing in the premises	<p>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</p>

Rinnai

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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.

Internet: www.rinnai.com.au E-mail: enquiry@rinnai.com.au

National Help Line

Tel: 1300 555 545* Fax: 1300 555 655*

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

Hot Water Service Line

Tel: 1800 000 340