BOSCH

Invented for life

MODELS

BSS250E-2 / BSS250-21-2 / BSS250-26-2
BSS300E-2 / BSS300-21-2 / BSS300-26-2
BSS400E-2 / BSS400-21-2 / BSS400-26-2

Australia & New Zealand

INSTALLATION AND USER HANDBOOK

- **System Installation**
- **Controller & Pump**
- **Solar Panels**
- **Gas solar booster**
- **Solar Tank**

This solar hot water system must be installed in accordance with the manufacturer's installation instructions, AS5601, AS3500.4. AS3000 wiring regulations (in New Zealand NZBC G12) and all Local Building, Water and Gas fitting regulations.

To be installed and serviced only by an authorised person
This appliance is not suitable for use as a pool heater
Please see important note regarding tank on Page 15

The "authorised installing person" is responsible for:
1. Correct commissioning of this system.
2. Ensure units perform to the specifications stated on the rating label.
3.. Demonstrate operation of the system to the customer before leaving.
4. Hand these instructions to customer.

Failure to install this system in accordance with these installation instructions may void warranty

Note: These instructions are subject to change, due to continuous product improvement.

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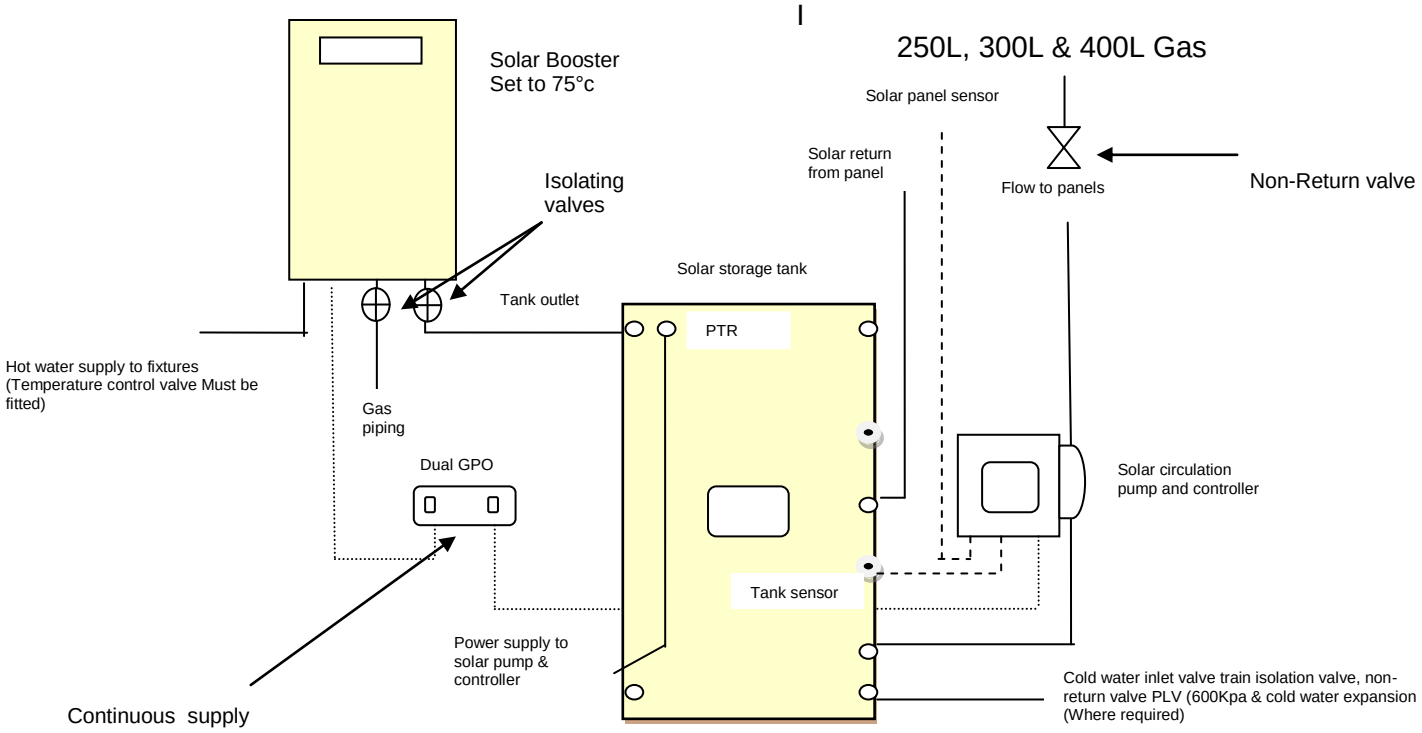
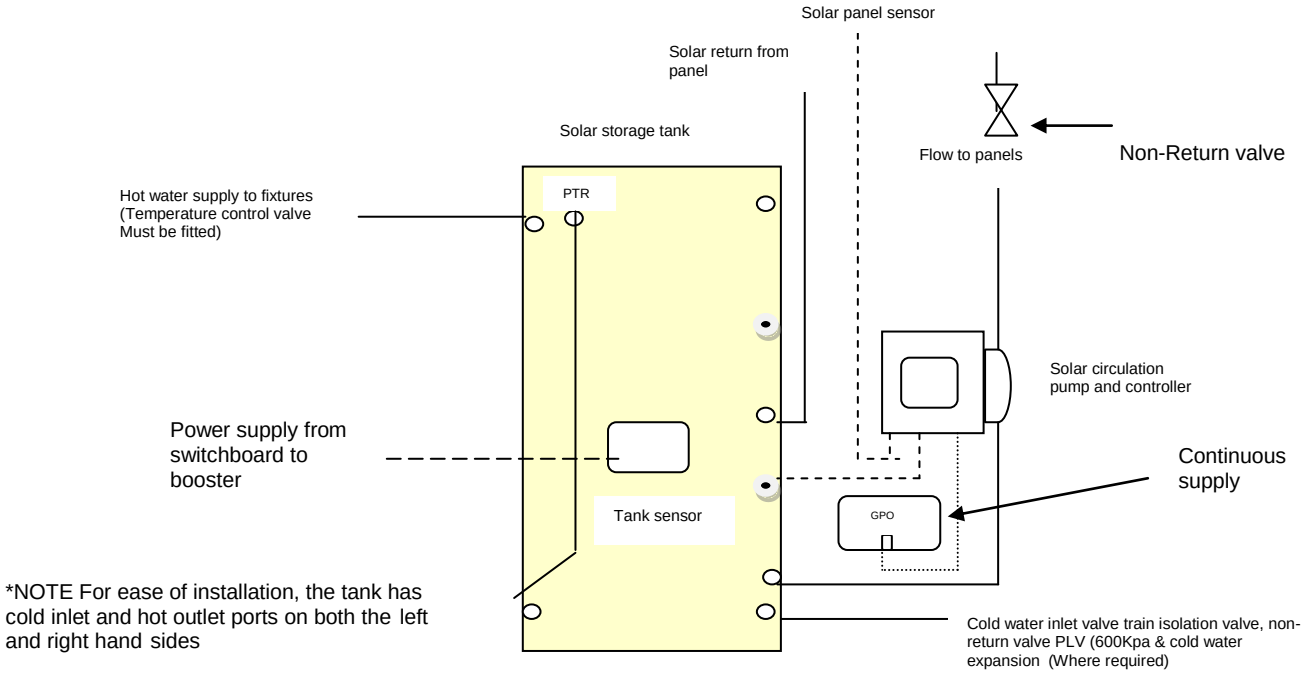
BASIC SOLAR TANK AND COMPONENT LAYOUT

250L, 300L & 400L Gas



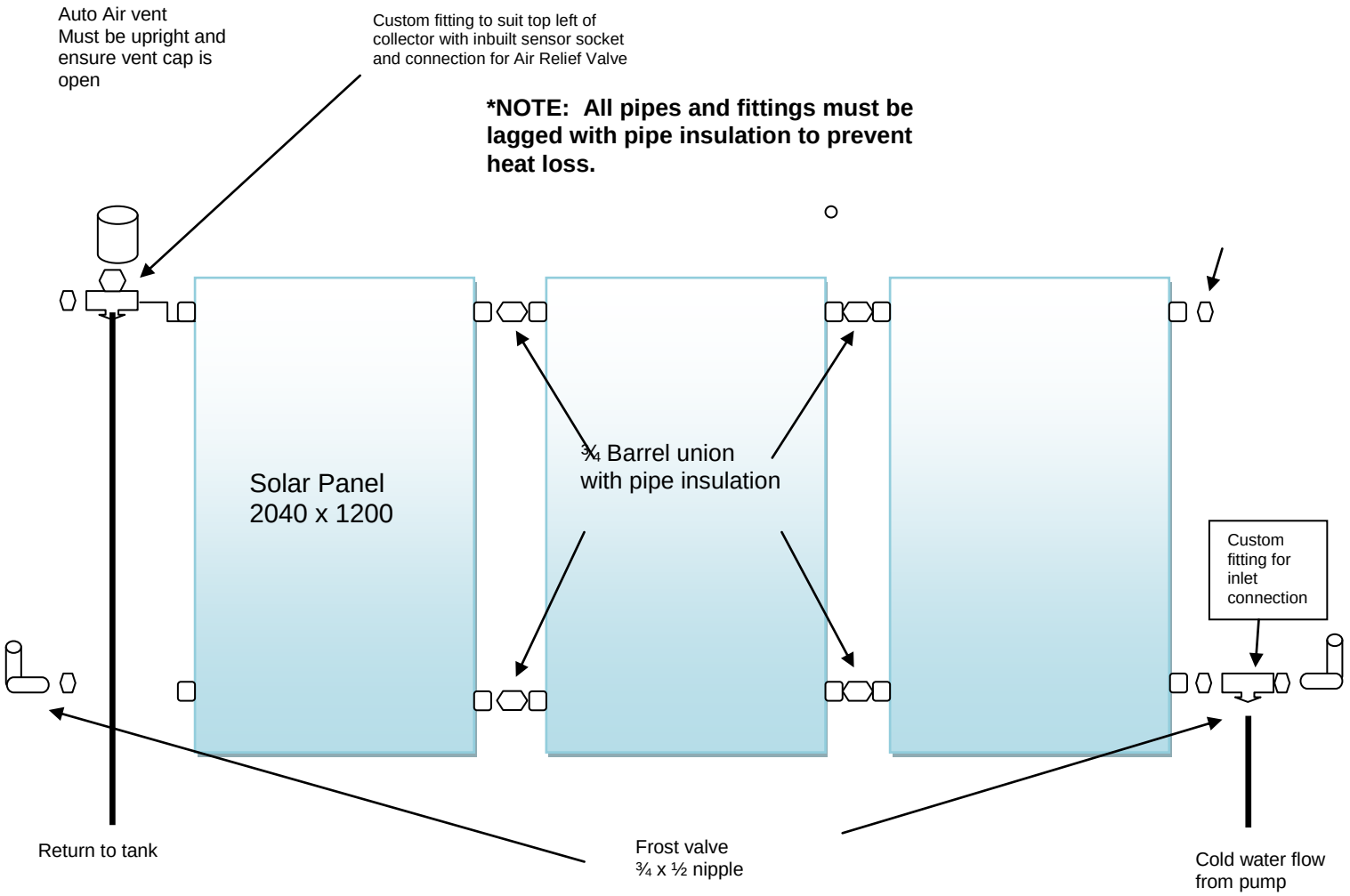
*NOTE For ease of installation, the tank has cold inlet and hot outlet ports on both the left and right hand sides

250L, 300L & 400L Electric boosted solar



*NOTE For ease of installation, the tank has cold inlet and hot outlet ports on both the left and right hand sides

BASIC PANEL LAYOUT 1,2 & 3 PANEL



INTRODUCTION

The following instructions are for the installation of a Split solar hot water system/s, being the panels are mounted on the roof of the dwelling and the solar tank is located either internally or externally at ground level. Where a gas solar booster is to be used, it should be mounted adjacent (In an external location) to the solar tank.

BASIC INSTALLATION STEPS

- Check packaging and product for damage (If the product is damaged, do not install and contact your supplier immediately)
- Check and ensure that you have all components as listed on page 7

Panel installation (See page 7 – 14 for more detail)

- Select Panel location
- Facing north (Not unduly shaded during the day and to the pitch requirements)
- Roof structure can support filled weight of panels (44Kg each)
- Panels can fit on available space on the roof (Panels are 1200mm x 2040 plus pipe and fittings)
- At and before installation, cover panels to prevent excessive heat building up in the panels that may cause damage to the panels and personal injury.
- Fix panels securely with brackets provided (in Cyclonic areas, cyclone kits are required)

Tank location (See page 15- 22 for more detail)

- As close as possible to the most frequently used fixture
- As close as possible to the solar panels (Max 8m)
- Ensure the tank is mounted on a solid base
- Power, water is accessible to be connected to the tank and system
- PTR drain is discharged in a safe manner and conforms to AS 3500.4
- **Note** There are inlets and outlets on both sides of the tank, so ensure the unused points are plugged with brass plugs prior to filling the tank.(Plastic plugs must be discarded)
- Tank is fitted in accordance with the manufacturer's installation instructions, AS3500.4. AS3000 wiring regulations (in New Zealand NZBC G12) and all Local Building, Water regulations.
- The piping between the panels and tank is copper and is well insulated.

Pump & Controller (See page 30 - 39 for more detail)

- Pump and controller is securely mounted on a wall to the side of the tank (within 500mm of the tank.) The power supply lead to the pump and controller is 1500mm in length.
- A continuous supply power point is within 1.5 metres of the controller.
- Run sensor leads to the tank and panels (it is recommend that the sensor leads are protected from the elements and mechanical damage)

Gas Booster (See page 23 - 29 for more detail)

- Booster is mounted on either the left or right hand side of the tank
- The 75c bridge is fitted to the booster. (See page 29 for more detail)
- A continuous supply power point is within 1 metre of the booster.
- Booster is fitted in accordance with the manufacturer's installation instructions, AS3500.4. AS3000 wiring regulations (in New Zealand NZBC G12), AS 5601 & NZS 5261 and all Local Building, Water regulations.

Commissioning the system

- Once the installation is complete the system will need to be filled with water and commissioned.
- First flush all piping of debris.
- Turn the water isolation valve on at the tank.
- Check pipework for leaks.
- Open household taps individually and purge out any air.
- Open vent on auto vent cap (At panels).
- For electric boost turn power supply onto tank.
- Turn power supply onto Controller/Pump station
- For gas boost turn on isolation valves at booster.
- Plug in three pin plug to power supply and turn on
- Commission booster (See page 29 for more detail)
- Check and adjust temperature control valve

- Clean up site
- Hand the customer the operating instructions
- Explain the system operation
- Answer any customer queries.

CONTENTS

Your ‘Solar Wizard’ Solar hot water system is supplied with the following components:

Parts List		
Item No.	**Qty**	**Description**
1	1	storage tank
2	1 or 2	solar collector
3	2	2610mm (L) x 38mm (W) x 25mm (H) x 1.6mm (T) Upper mounting rail – 3 units required for Cyclone areas or Standard bracket kit
4	1	Solar PK1 – Panel Installation Kit (See contents below)
5	1	Pump station & Controller

Solar-PK1	**Panel Installation Kit**	
	20mm Barrel Unions (MI x MI)	2
	Custom Connection for top left of collector include Sensor Pocket	1
	Custom Connection for bottom right of collector	1
	20mm x 15mm Hex Nipple	
	15mm Hex Nipple	1
	15mm MI x C Unions	1
	20mm Brass Plugs	5
NVHT-15F-15C	15mm High Temperature Non-Return Valve	1
AEHT-10	Air Eliminator	1
FPV15	Anti-Frost Valve	2
PTR15/1000	15mm 1000kPa TPR Valve	1
Note	Insulation kits for most valves & Fittings	

*Optional tank installation kit available as an accessory.

Please check to make sure all these components are included with the kit.

SOLAR COLLECTORS

The solar panels absorber material is Black painted copper fins, the outer casing is constructed from corrosion resistant brown anodized aluminum and the glass is low-ironed prismatic glass.

Width (mm)	Length (mm)	Weight empty (Kg)	Weight Full (Kg)
1200	2040	42	44

SOLAR COLLECTOR LOCATION

The solar collectors must be installed in a shade free position.

The solar collectors are to be installed facing toward the equator (i.e. north facing in the southern hemisphere and south facing in the northern hemisphere). Where this orientation is not practical, a system facing up to 45° from the equator will have its efficiency reduced by approximately 4%.

Inclination of the solar collectors should be approximately equal to 90% of the local latitude angle.

Solar collectors may be installed at the roof angle for simplicity of installation and appearance, but must never be flat. If the roof angle varies by 15° from the correct angle, efficiency will be reduced by 10%.

The installer must ensure the structural integrity of the building is not compromised by the solar water heater installation and the roof structure is suitable to carry the full weight of the solar collector(s). If in doubt the roof structure should be suitably strengthened.

Each solar collector and its fittings weighs approximately 44 kg when full of water.

INSTALLATION – SOLAR COLLECTORS

PREFACE:

Approximate roof area required:

2 Collectors are 2.8m wide x 2.4m high. (88kgs total, filled with water)

3 Collectors are 4m wide x 2.4m high. (132kgs total, filled with water)

NOTE: Ensure the mounting surface is strong enough to support the collectors. Most roofs can support the panels, but if unsure consult a structural engineer.

ONLY QUALIFIED TRADESPERSONS SHOULD INSTALL THESE COLLECTORS.

GLAZING CANNOT BE REPLACED ONSITE.

FRAME INSTALLATION Tiled roof (Non Cyclone Area)

Conduct an inspection of the intendant installation position and ensure that the panels can be fitted in this position prior to commencing any work.

1. Position the lower bracket on the roof ensuring there is sufficient room to fit the panels.
2. Remove the row of tiles above the bracket position.
3. Loop bracket support strap through the bracket and fix bracket support to the roof rafters, Ensure the bracket is level.
4. Flatten out return of bracket strap
5. Bend all bracket straps to fit over tiles.
6. Replace tiles above the bracket
7. Unpack panels (where fitted remove protective plastic from the panels)
8. Place panels into position and fit against lower bracket
9. Join the panels together using the brass barrel unions supplied in the panel installation kit.
10. Centre the panels onto the lower bracket and secure the panels onto the bracket 20mm above the bottom of the bracket using the hex screws supplied. **Warning**: Do not drill above 20mm from the bottom of the bracket, as this may cause damage to the internal workings of the panel and this will void the warranty.
11. Remove the row of tiles above the panels to enable the upper bracket to be fitted.
12. Loop bracket support strap through the bracket, Flatten out return of bracket strap
13. Secure bracket to panels 20mm above the bottom of the bracket using hex self-drilling screws. Warning: Do not drill above 20mm from the bottom of the bracket as this may cause damage to the internal workings of the panel and this will void the warranty.
14. Fix bracket support strap to the roof rafters.
15. Bend all bracket straps to fit through and over tiles.

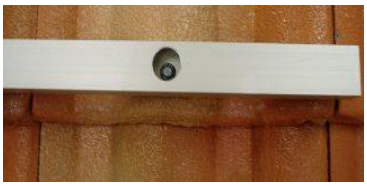
16. Replace tiles
17. Make all water connections, fit all valves and components as per the solar layout diagram contained in these instructions.
18. Note: The panels should be covered fully to prevent the panels heating up to temperatures that have potential to cause damage or injury during system fill or commissioning.

FRAME INSTALLATION metal roof (Non Cyclone Area)

Conduct an inspection of the intendant installation position and ensure that the panels can be fitted in this position prior to commencing any work.

1. Position the lower bracket on the roof ensuring there is sufficient room to fit the panels.
2. Level the panel bracket and fix to the steel roof using roofing screws or rivets, one fastener per rib is recommended.
3. Weather proof screw heads and rivets with silicone sealant.
4. Unpack panels (where fitted remove protective plastic from the panels)
5. Place panels into position and fit against lower bracket
6. Join the panels together using the brass barrel unions supplied in the panel installation kit.
7. Slide the upper panel support bracket under the top of the panels then press it flush against the top of the panels. Mark its position on the roof.

8. Remove the panels, align the upper bracket with the marked line and fix the panel to the steel roof using roofing screws or rivets.
9. Weather proof screw heads and rivets with silicone sealant.
10. Refit the panels between the brackets.
11. Centre the panels onto the brackets and secure the panels onto the brackets 20mm above the bottom of the bracket using the hex screws supplied. Warning: Do not drill above 20mm from the bottom of the bracket, as this may cause damage to the internal workings of the panel and this will void the warranty.
12. Make all water connections, fit all valves and components as per the solar layout diagram contained in these instructions.
13. Note: The panels should be covered fully to prevent the panels heating up to temperatures that have potential to cause damage or injury during system fill or commissioning.



FRAME INSTALLATION (Cyclone areas):

1. Select a suitable place to install the lower mounting rail on the roof, align panel location as high as possible on the roof.
2. Locate lower rail and mark 4 bolt positions on the rail. The bolts are positioned to line up with the peaks of the tin or tile profile. DO NOT drill in the troughs of the roofing material. Ensure the holes are a minimum of 120mm from the end of the rail.
3. Drill the 4 bolt positons on the top of the rail using a 16-20mm metal cutting hole saw, leaving a 5mm pilot hole through the bottom of the rail.
4. Using the drilled rail as a guide mark and drill the roof material with a 5mm pilot hole. This may not be needed for tin roofs, as the screws supplied are self tapping.
5. For tile roofs drill the tiles using a 12-14mm concrete drill bit, paying careful attention for any cracking in the tiles. Replace any cracked tiles with a new tile before continuing.
6. Once the holes have been drilled fill the hole with silicone sealant, and apply a 6mm bead around hole.
7. Apply silicone into the drilled hole then insert the Aluminium spacer tube into the hole. This is not required for a tin roof.

8. Position the mounting rail and insert the screws through the rail and into the roof batten, place a rubber washer as a seal between the roof surface and the mounting rail, then evenly tighten the screws. Do not over tighten and break a tile.

NOTE: ensure a rubber sealing washer is placed between the rail and the roof surface for each screw hole, to provide adequate sealing of the screw hole from water ingress. Use adequate amounts of silicone sealant into the holes before placing the screws in the holes.

9. Also ensure that the fixing screws are of sufficent length to adequately secure the brackets to the roof.

10. Measure and where possible evenly space the three rails to fit under the panels.

11. Fit the middle and top rails as per steps 3 thrhough to 9.

12. After the three mounting rails have been fixed to the roof, fix a set of side brackets on the lefthand edge of each of the rails. Then lift the first panel into place and fix that panel to the rail bracket. Once this has been done you can then lift the 2nd panel into place and using the two barrell unions supplied in the panel fixing kit, join the 2nd panel to the first panel.

13. Then fix the second panel to the rail brackets. The panels are now secure.

14. A total of 3 rails are required for cyclone rated areas.

15. Connect them as shown in the diagram, remembering to use Teflon tape or approved liquid sealant on all plumbing joints.

16. **Always use two spanners to tighten panel fittings, and do not exert any torque on the panels.**

17. **NOTE:** WATER FLOW THROUGH PANELS - the water inlet from the pump must be connected to the lower header pipe of the array. Ensure that the water exits the panels from the top

header pipe, diagonally opposite from the inlet and returns to the "Solar Return" on the tank.

18. Install the air bleed valve onto the outlet of the panels at the top Left hand corner of the panels.

19. **NOTE:** The air bleed valve needs to be commissioned and checked to ensure the valve top is opened and that when the pump operates the valve seals properly. This can be done by listening to the valve to ensure air is not entering the pipe work. Let the pump run for 3-5 minutes if air is still bubbling into the tank at this stage the valve is not sealing.

20. Mount the panel temperature sensor to the Air bleed T piece and the tank sensor into the top (Middle of tank) sensor drywell.
21. Drill a 10mm hole in the roof near the sensor and run the sensor leads through the hole drilled in the roof, once this is done seal the hole with silicone.
22. **NOTE:** Do not use the same hole as the pipe work as movement of the pipes will case the cable to break or short circuit.

23. Install the Solar Hot Pipe and Solar Cold Pipe to run between the storage tank and the collectors. Both pipes should be DN15 (1/2") copper pipe, with 13mm or thicker synthetic rubber insulation (Armaflex, Bradflex). All insulation should be protected from UV degradation by two thick coats of paint, or by covering with ductwork. Pre-lagged pipe (often green PVC or plastic insulation) is not suitable for thermal insulation purposes – only use foamed synthetic rubber insulation.

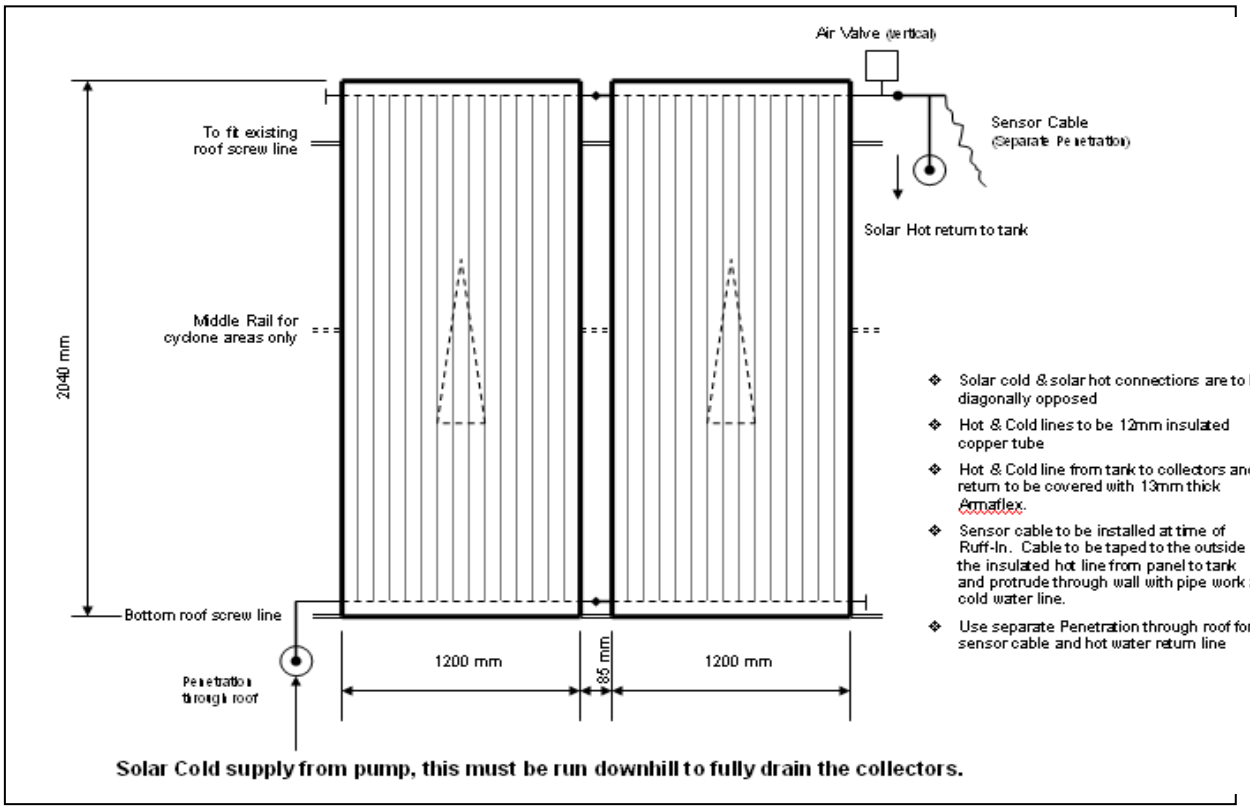
24. Connect the Solar Hot Pipe and Solar Cold Pipe to the heater and to the panels.

NOTE: Ensure that the water inlet from the system pump flow is to the lower right edge of the array, and that the water exits the panels diagonally opposite and through the sensor outlet fitting, and returns to the solar return on the tank.

Upon completion of the water heater installation, check the panels and associated plumbing for leaks while the pump is operating.

COLLECTOR INSTALLATION IN CYCLONE AREAS

The solar panels are ***SUITABLE*** for installation in cyclonic locations when installed with an additional rail mounting and brackets to provide the required additional fixing to the roof frame. This ensures conformance with AS1170.2. Three mounting rails meet the requirement for a C3 rated area.



Note: Drawing for illustration purposes only, connection points may vary from product to product.

SOLAR TANK

Important Note: Please ensure you remove plastic transit plugs from tank and replace with brass plugs supplied with panel fitting kit (These plastic plugs will not withstand solar water temperature and will melt causing leakage from tank).

Solar tanks are available in 250 Litre, 300 & 400 Litres capacities. All three tanks have cold water inlet and hot water outlets on both the left and right hand sides of the tanks for convenience. The connection points not used **must** be sealed off with the brass plugs supplied.

The Solar tanks have incorporated a single element electric solar booster, or the system can be boosted via a gas booster separate to the solar tank.

The inner tank is manufactured from mild steel sheet coated with a special porcelain enamel. The tank is protected from corrosion by two magnesium anode rods, which softens the water and lengthens the service life of inner vessel.

The inner vessel is insulated by a thickened high-density, environment friendly polyurethane thermal insulation layer.

The external casing is a high quality galvanized sheet shell, with outdoor coating technology, anticorrosive and rust-resistant, makes for a longer service life.

	250 Litre	**300 Litre**	**400 Litre**
DIMENSIONS (mm)			
Height	1325	1545	1600
Diameter	620	620	710
Material & thickness of inner vessel	BTC340 R-2.0mm	BTC340 R-2.0mm	BTC340 R-2.0mm
Material and thickness of shell	Galvanised sheet 0.5mm	Galvanised sheet 0.5mm	Galvanised sheet 0.5mm
Insulation thickness	40mm	40mm	40mm
Minimum inlet Water Pressure	200 kPa	200 kPa	200 kPa
Maximum inlet Water Pressure	750 kPa	750 kPa	750 kPa
Connection Cold	20mm	20mm	20mm
Connection Hot	20mm	20mm	20mm
Connection solar	15mm	15mm	15mm
ELECTRICAL (Not applicable for gas boosting)			
Power	240v/50Hz	240v/50Hz	240v/50Hz
amps	15	15	15
Elements	3.6kW	3.6kW	3.6kW
Weight	75Kg	95Kg	112Kg

INSTALLATION – STORAGE TANK

COMPLIANCE WITH STANDARDS

The installation must be performed by an Authorised Persons and comply with the requirements of AS/NZS 3500.4, AS/NZS 3000 in New Zealand NZBC G12 and all local codes and regulatory authority requirements. It is recommended the solar storage tank be installed at ground or floor level. The water heater must stand vertically upright.

SUITABILITY FOR INSTALLATION IN FROST AREAS

The system is suitable for installation in areas that experience sub-zero temperatures; it has an air bleed valve freeze protection system integrated into the system to prevent damage in the event of a light frost. Areas of known heavy frost or altitudes higher than 600 m above sea level are not suitable for this system. The minimum temperature these systems are suitable for in no lower than -5°C.

NOTE: THIS WATER HEATER IS NOT SUITABLE FOR POOL HEATING.

LOCATION

Whether located outdoor or indoor, the solar water storage tank should be installed close to the most frequently used hot water outlet (typically the shower) and its position chosen with safety and service in mind. The panels should be located as close as possible to the storage tank.

CLEARANCES

Allow adequate room to work with tools. A minimum of 250mm clearance around the water heater is required. An additional 300mm is required for relief valve removal, 800mm for access cover removal and 400mm for element removal. You should be able to read the information on the rating plate and all informative labelling.

Adequate provision must be made to dispose of any water escaping from heater or adjacent plumbing that might result in damage to property.

The water heater must be connected in such a way that:

Electrical covers are accessible to a service agent.

Space is allowed for the removal of the heating element.

The pump is accessible for servicing.

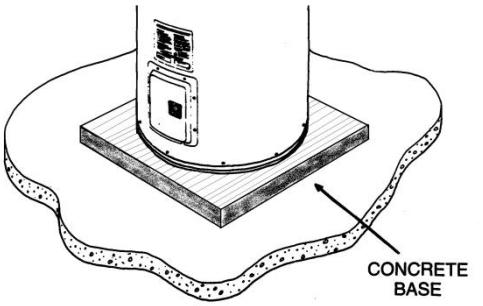
or complete removal of the unit if necessary.

CONFINED SPACES

If the thermostat fails the unit may produce excessive steam.
It is strongly recommended that the heater should be installed in a well-ventilated space to avoid condensation build up.
If installed in confined areas, make provision for Service Access.

FOUNDATION

To ensure adequate tank support, position the unit on an approved support base such as a concrete slab (See figure below).



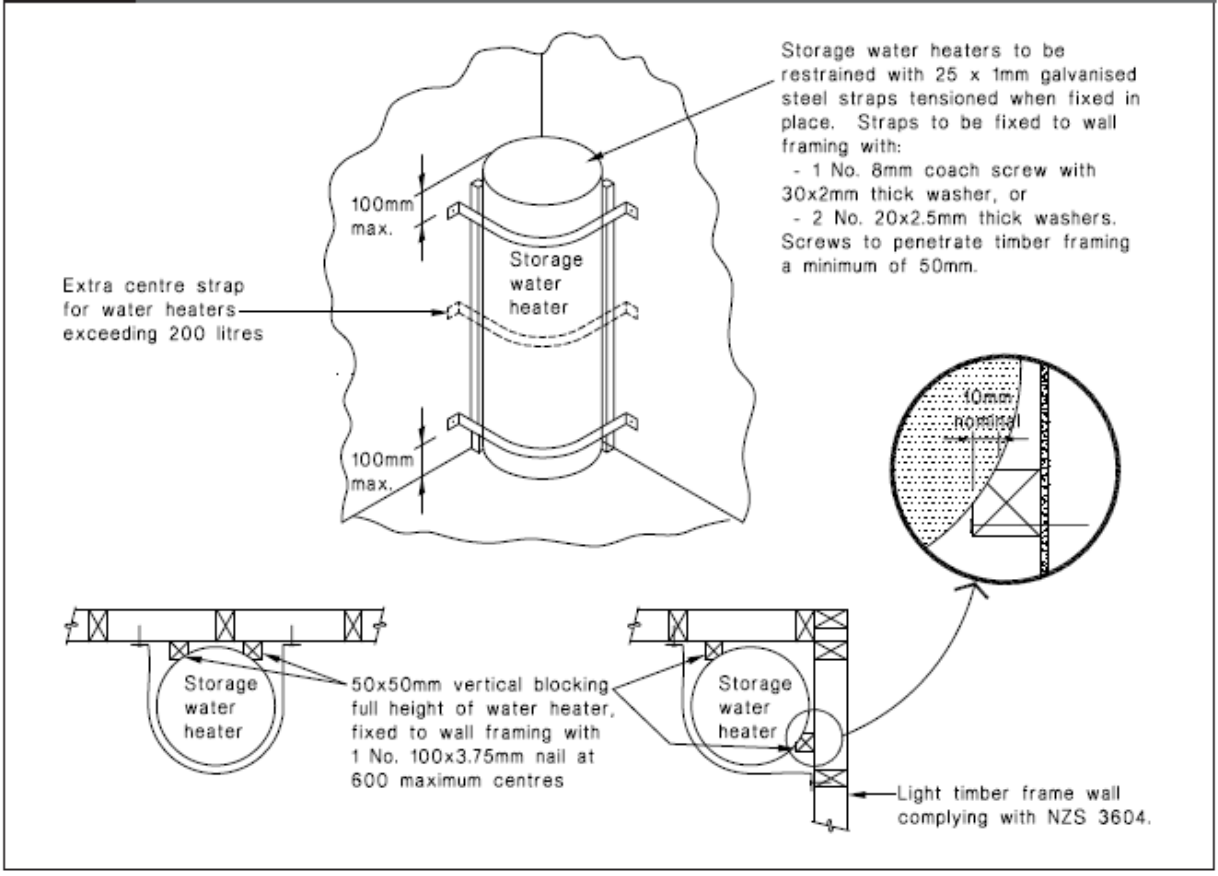
Suitable Water Heater Foundation

Alternative forms of water heater bases are acceptable providing they allow for adequate support.

Attention is drawn to the weight of the water heater tank when full (approx 460kgs) and installer should ensure that the base and footings are substantial enough to avoid subsidence etc.

To comply with NZBC G12 Building code, please install cylinders with seismic straps as shown on Page 18.

Figure 14: **Seismic Restraint of Storage Water Heaters 90 – 360 litres**
Paragraph 6.11.4



SAFE TRAY

It is a requirement of the National Plumbing Code AS/NZS3500.4.2 that new water heaters be installed in a safe tray where in the event of a leak, property may be damaged (ie internal installations). Installation of such trays must comply with Clause 4.4 and Sub-Clauses 1 to 5 of the abovementioned Code.

HOT WATER DELIVERY

This heater supplies water at a temperature exceeding 50^{o}C. A tempering valve must be fitted between the water heater and the outlets in bathrooms and ensuites to comply with the water temperature requirements of AS 3500.4.

WATER PRESSURE

Test incoming water pressure with a gauge. If the pressure exceeds 750kPa, an approved pressure limiting valve is required.

Pressure limiting valves are not supplied with Water Heaters.

PUMP LIMITS

Head limit of 6 meters. A different model pump (available from Bosch) will be required to maintain water flow through the solar collectors for heads greater than 6 metres.

ELECTRIC BOOSTER HEATING UNIT

The booster heating unit provides boosted hot water during periods of low solar gain or high hot water use. The recommended installation is for the electric element to be connected to a continuous electrical tariff. Other configurations of wiring the booster element are not recommended and may affect overall system performance and will not be covered by the warranty.

SADDLING – PIPE WORK

To prevent damage to the cylinder when attaching pipe clips or saddles to the water heater jacket, we recommend the use of self-drilling screws with a maximum length of 12mm. Should pre drilling be required extreme caution must be observed when penetrating the jacket of the water heater.

Note: Damage to the cylinder as a result of saddling to the jacket will void the warranty.

SOLAR PLUMBING CONNECTIONS

To connect the solar cold pipe on the storage tank.

Connect the “Solar Flow” pipe to the non-return valve that has to be fitted on nipple on the outlet side of the pump. This pipe will run to the bottom right of the collector array.

The “Solar Flow” Pipe will carry water from the tank up to the panels for heating. It is very important that this pipe runs continuously upwards or horizontally from the outlet of the pump to the inlet of the panels. If the pipe runs downwards, water will sit in the gooseneck formed by the pipe and cause extra resistance to the pump.

To connect the solar hot pipe to the solar storage tank:

- Connect the “Solar Return” pipe to the tank using a compression elbow. This pipe will run from the top left of the collector array (diagonally opposite the panel inlet fitting) down to the tank. A compression fitting or copper olive fitting is recommended.

- The “Solar Return” Pipe must run continuously downwards or horizontally from the panels to the tank – the reason for this is given in the section above.

Fitting of a non-return valve in the solar line after the pump. We recommend the installation of a ½ inch spring check valve (supplied in panel installation kit) in the solar pump line to prevent the backflow of air from the panels into the pump which can cause cavitation of the pump the next time it starts. Dual spring check valves are **not** to be installed as the pump does not have enough force to flow through the valve. Note that the fitment of the incorrect valve in frost prone areas can cause damage to the panels.

NOTES ON PLUMBING

- *Flush out all piping after installation*
- *DO NOT use thread tape on compression fittings.*
- Copper olives or Compression fittings must be used.
- DO NOT use plastic pipe work between the tank and collectors.

CONNECTIONS – PLUMBING

CONNECTION SIZES

- Hot water outlet: 20mm Female BSP.
- Cold water inlet: 20mm Female BSP.
- Solar hot (from collectors) connection: 20mm Female BSP
- Solar cold (to collectors) connection: 20mm Female BSP
- PTR 15mm Female
- Pump Inlet and Outlet Fittings: 15mm male BSP (connections already supplied)
- Solar Panel Fittings: 3/4” BSP Barrel Unions (connections already supplied)

INLET/OUTLET CONNECTIONS

To allow for disconnection of the water heater a mechanical union must always be provided at the cold water inlet, solar hot water inlet and hot water outlet on the water heater to allow for disconnection of the water heater. The pipe work must be cleared of foreign matter before connection. All pipe fittings must be assembled using two spanners – do not exert excessive amounts of torque on the pipes or water heater fittings.

PIPE SIZES

The “Solar Flow” and “Solar Return” pipes between the solar storage tank and the solar collectors should be DN15 **Copper Pipe Only**. The cold water pipe to the water heater should be the same size or larger than the hot water line from the water heater. For best results, choose the most suitable pipe size for each individual application. Refer to the relevant plumbing regulations.

DO NOT USE PLASTIC PIPE WORK BETWEEN COLLECTORS AND TANK.

NOTE: The “Solar Flow” and “Solar Return” pipes between the solar storage tank and the solar collectors **must be** of copper and fully insulated with Bradflex / Armaflex insulation or similar (minimum thickness 13 mm). Plastic pipe **must not** be used, as it will not withstand the temperature of the water generated by the solar collectors under certain conditions.

PTR

A drain pipe should be fitted to the PTR valve to discharge clear of the water heater. Connect the drain line to the PTR valve outlet using a compression union or similar – **never** braze/solder to any fittings on the water heater. The pipe work from the PTR valve to the drain should be as short as possible, and fall all the way from the water heater with no restrictions. The outlet of the drain pipe must be in such a position that flow out of the pipe can be easily seen, but arranged so hot water discharge will not cause injury, damage or nuisance.

SAFETY WARNING: As the function of the PTR valve is to discharge high temperature water under certain conditions, it is strongly recommended the pipe work downstream of the relief valve be capable of carrying water exceeding 95ºC. Failure to observe this precaution may result in damage to pipe work and property. Should this pipe become obstructed (eg. squashed, kinked or blocked), then the water heater may be damaged due to internal pressure.

WARNING: If the hot water system is not used for two weeks or more, a quantity of highly flammable hydrogen gas may accumulate in the water heater. To dissipate this gas safely, it is recommended that a hot tap be turned on fpr several minutes or until the discharge of gas ceases. Use a sink, basin or bath outlet, but not a dishwasher, clothes washer or other appliance. During this procedure, there must be no smoking, open flame or any electrical appliance operating nearby. If the hydrogen is discharged through the tap, it will probably make an unusual sound as with escaping air.

CONNECTIONS – ELECTRICAL electric boosting

NOTE: Power must not be turned on until the solar storage tank is filled with water, and electrical circuits are found to be satisfactory. The water heater is designed for a 15 Amp 240 V 50Hz power supply.

Booster Element Power

The solar storage tank with an electric booster element is designed for connection to a 240V AC mains power supply with an isolating switch installed at the switchboard. A 20 mm flexible conduit is required to protect the cable entering the tank. There is a wiring diagram inside the electrical cover, showing how to connect power to the booster element and thermostat components.

BOOSTER ELEMENT WIRING

The system is designed to operate most cost efficiently on the continuous tariff for solar applications.

Other forms of Electrical connections for solar may result in unintended operation of the system.

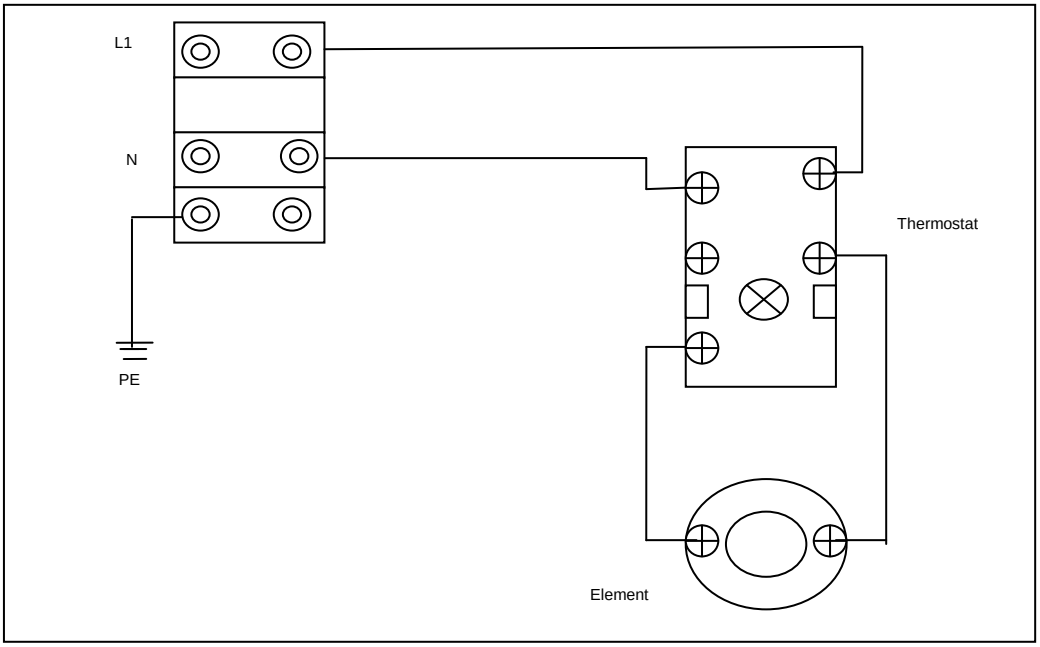
STANDARD WIRING CONFIGURATION

Electrical installation of solar storage tank with circuit breaker only.

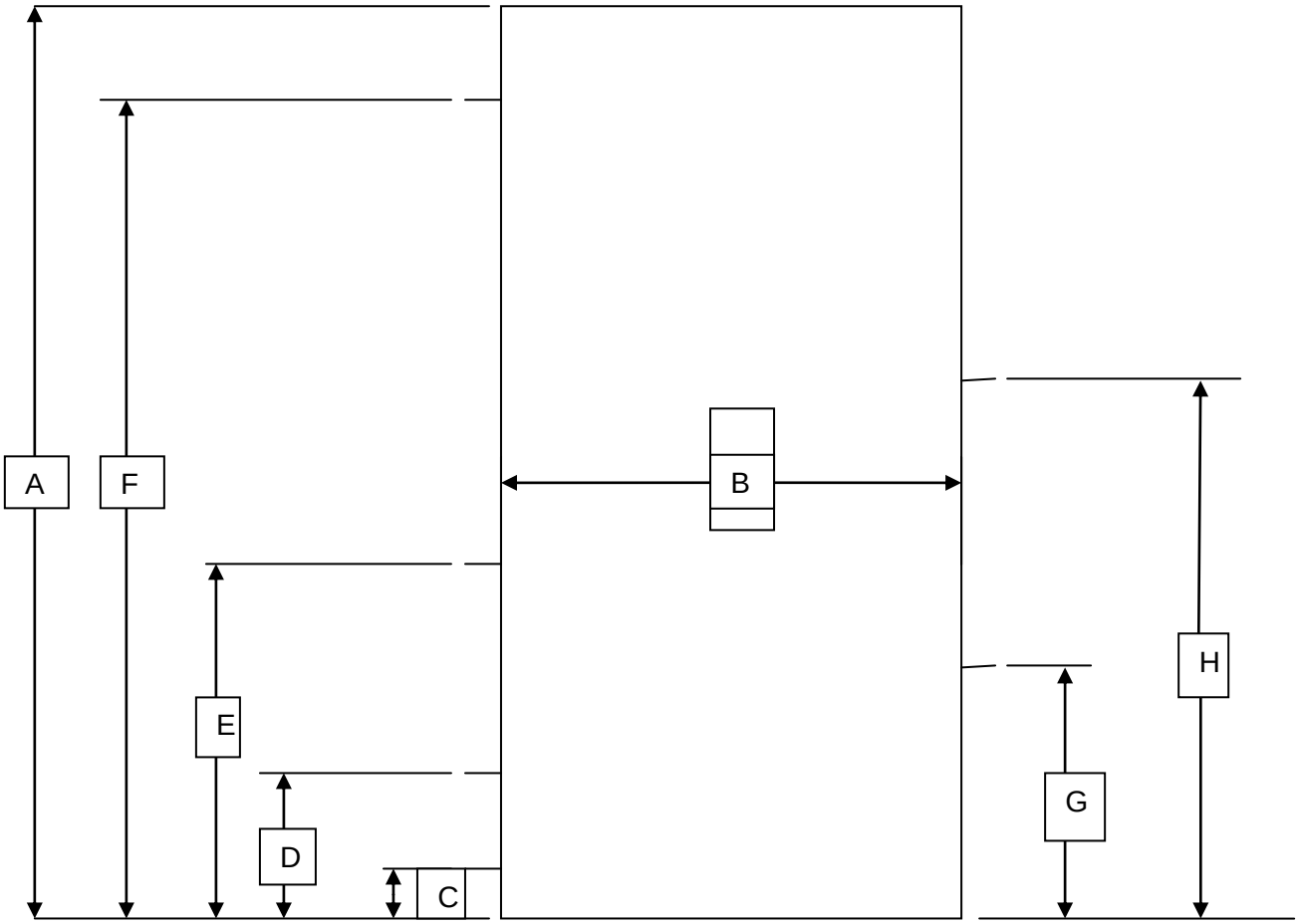
For electric Solar boost applications only L1

For Gas Solar boost applications no electrical connection is made to the Solar tank.

Wiring diagram



SOLAR WIZARD TANK SPECIFICATIONS



		250	300	400
A	OVERALL HEIGHT	1325	1545	1600
B	OVERALL DIAMETER	620	620	710
C	COLD WATER INLET	92	92	92
D	SOLAR OUTLET	192	192	192
E	SOLAR RETURN	532	532	532
F	HOT WATER OUTLET	1100	1322	1375
G	TANK SENSOR (LOWER)	372	372	372
H	TANK SENSOR (UPPER)	782	892	912

Please Note: Connections for Cold water inlet, hot water outlet, solar outlet and solar return are both left and right hand connections.

GAS SOLAR BOOSTER

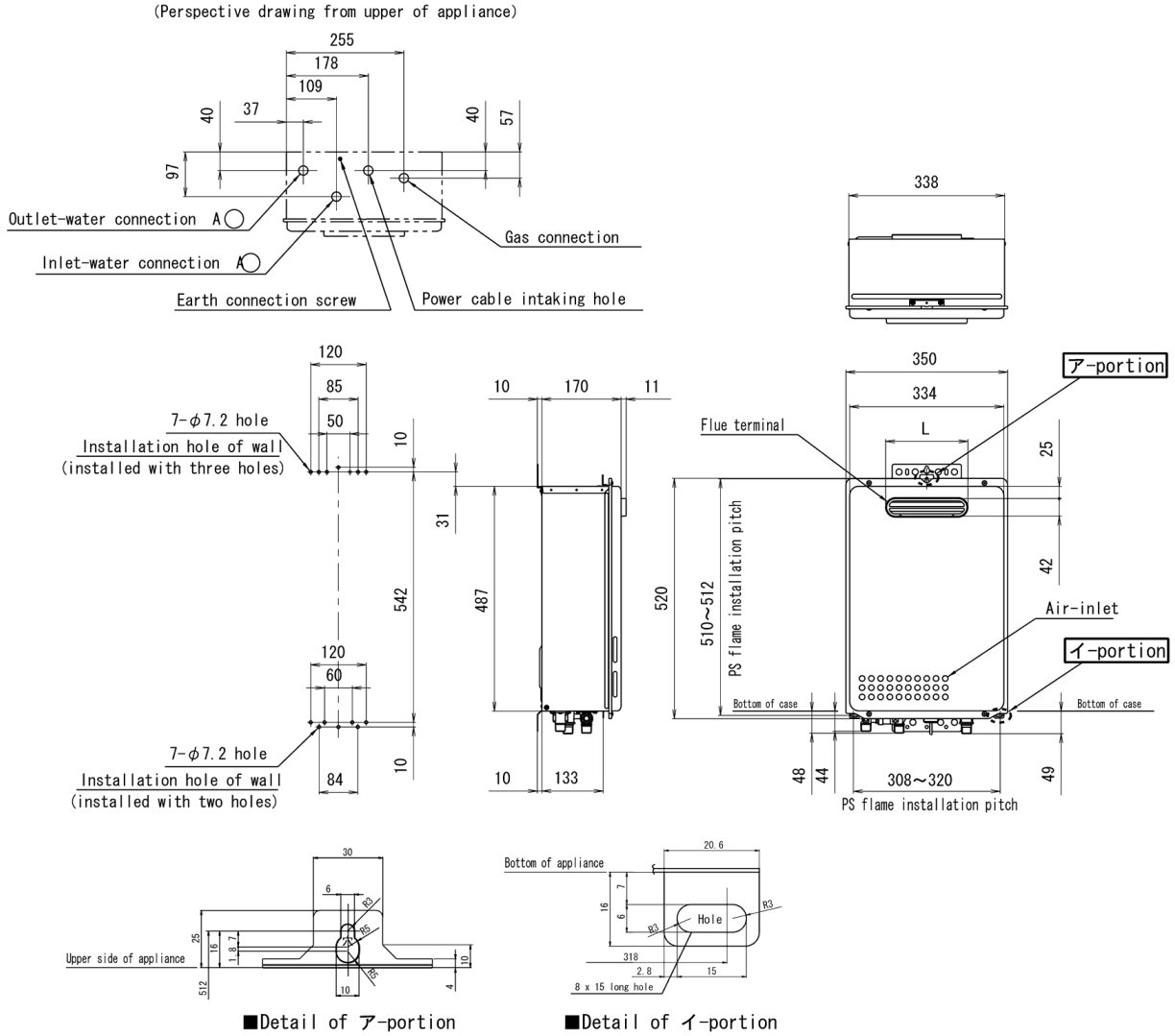
The Bosch solar booster is an external, electronically controlled gas boosted solar water heater.

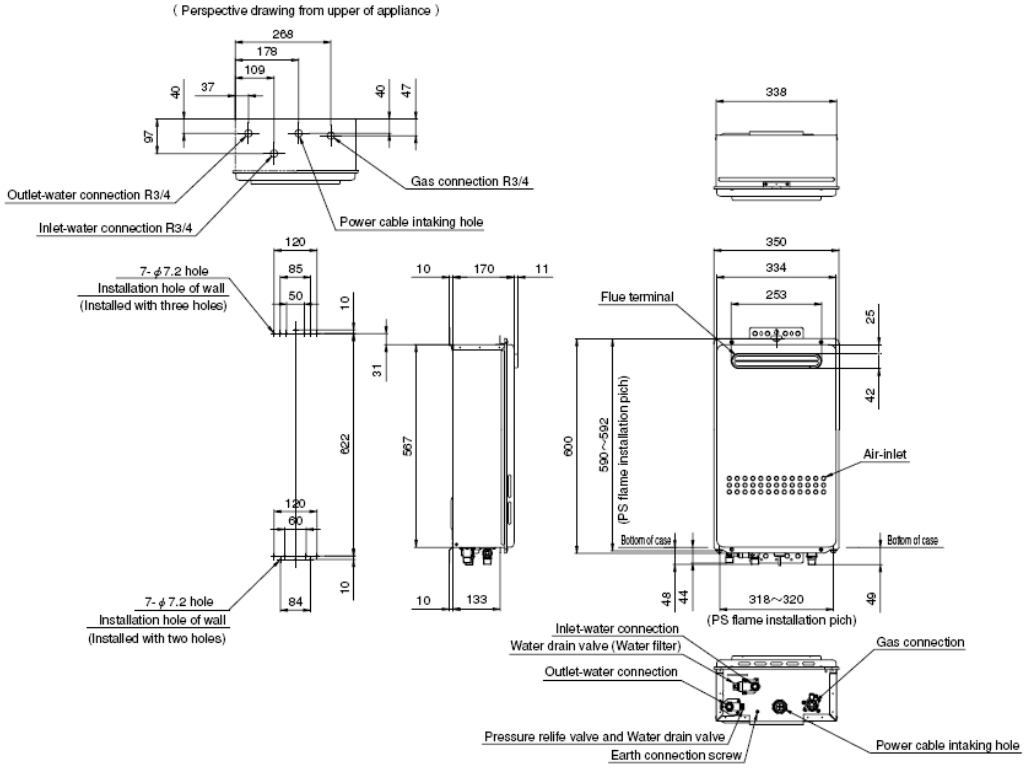
The Bosch **YS2170RAH & YS2670RAH** appliances are supplied set to operate without temperature selector pads and are factory set to deliver a constant 55°C but must be reprogrammed to 75°C as per procedure on page 31.

Before installing this appliance, carefully check that all packing materials have been removed and that the appliance is correct for the gas supply to which it is to be connected

DIMENSIONS

YS2170RAH





TECHNICAL DATA

Nominal hourly gas consumption by proportional gas control:

	Natural Gas	LP Gas
21E	170 Mj/hr	170 Mj/hr
26E	200 Mj/hr	200 Mj/hr

Test Point Pressure (kPa):

Model	Natural Gas Max kPa	Natural Gas Min kPa	LP Gas Max kPa	LP Gas Min kPa
YS2170RAH	.69	.21	.91	.23
YS2670RAH	.72	.19	.80	.22

Water heating capacity		21E	26E
Litres a minute raised 25°C		21	26

Maximum Inlet Water Pressure (Booster)	1000 kPa
Input voltage single phase 50Hz	240 Volt
Maximum output current	1 Amp
Inlet gas connection male thread	18mm
Cold water connection male thread	18mm
Hot water connection male thread	18mm
Relief valve pressure setting	1600 kPa

DATA PLATE
Fitted inside of front cover

GAS TYPE
The gas type is nominated on a temporary label located on the front cover, and on the data plate located inside the front cover. The gas type is the gas on which this appliance is designed to operate.

DO NOT OPERATE WITH ANY OTHER GAS TYPE.

WARNING LABELS
Located on the front of the cabinet- PLEASE READ THESE LABELS CAREFULLY!

POSITION FOR INSTALLATION
The heater must be installed by using a fixing method sufficient to hold the 20Kg weight of unit (see the technical sheet for dimensions of mounting brackets and positions)

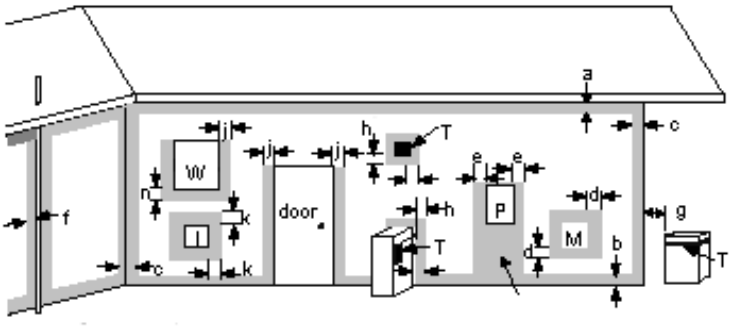
N.B.: On combustible surfaces e.g. weatherboards etc. it is not required to install a fire proof back board.

APPLIANCE LOCATION
(1) This Gas solar water heater is approved for outdoor installation only.
(2) Do not install this water heater with any modification or alteration.
(3) Do not install this water heater indoors or in an enclosed space .

WARNING: FLUE OUTLET MUST BE FREE FROM ANY COMBUSTIBLE MATERIAL.

CLEARANCES FOR FLUE TERMINAL (front of heater)

The location of the flue terminal must comply with the clearances shown on this page. If you are unsure about clearances not indicated here, in general refer to AS5601, or your local authority. In Western Australia refer to the WA Office of Energy Safety rules and regulations.

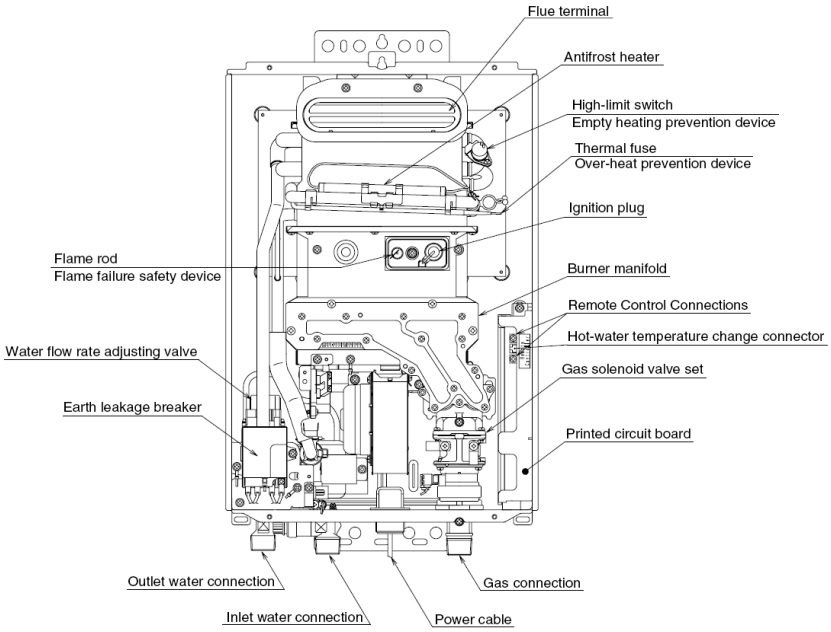


Use as a guide only. Refer to AS5601 or local gas fitting rules for specific locations

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

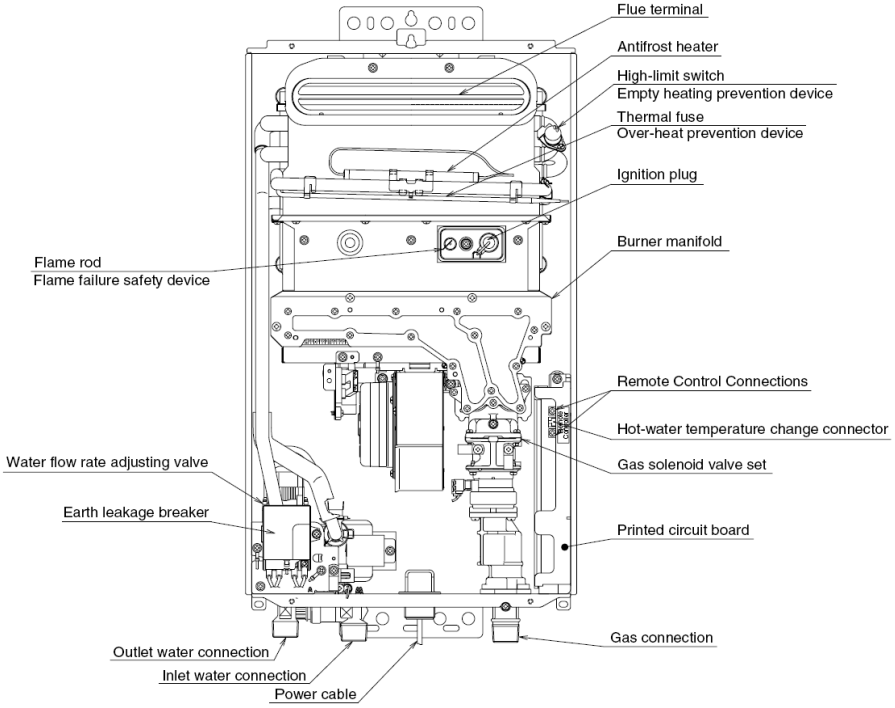
COMPONENT DETAILS

YS2170RAH



YS2670RAH

- YS2670RA



GAS CONNECTION

Fit a union to the Bosch solar booster gas inlet for easy connection and removal. The thread diameter is 18 mm.

THIS DOES NOT INDICATE THE SIZE OF THE GAS SUPPLY.

(2) Fit an AGA approved isolating gas cock in the supply line adjacent to the water heater gas connection.

(3) Ensure that the supply pipe and the gas pressure regulator (LPG or Natural Gas) has sufficient flow capacity for this and other appliances connected to the fitting line.

(4) For LPG appliances ensure that gas cylinders are of sufficient size. The water heater alone will require 2 x 45 Kg capacity cylinders.

(5) Before connecting the appliance to the gas service, purge any debris or air from the gas service.

(6) Check all joints for leaks with an approved leak tester after connection.

Ensure that the gas pipe size is correct. If undersized the appliance will not operate correctly

SERVICE CALLS ARE CHARGEABLE FOR UNITS WITH INCORRECT PIPE SIZES OR BLOCKED GAS OR WATER FILTERS.

CONNECTION FROM SOLAR STORAGE TANK TO BOOSTER

Refer to technical sheet for position of connections. The WATER INLET connection is 18 mm ¾" BSP and requires a union to allow for removal of the water heater. Pipe sizing from the solar storage tank should be sized according to local BY LAWS for water supply.

ISOLATING GATE VALVE

A GATE VALVE OR BALL VALVE must be used on the inlet to the solar booster. THIS REQUIREMENT IS AN AUSTRALIA WIDE REQUIREMENT UNDER THE NATIONAL PLUMBING CODE.

STOP TAPS OR COMBINATION STOP TAPS AND NON-RETURN VALVES ARE NOT TO BE USED.

N.B. NO PRESSURE REDUCTION VALVE IS REQUIRED UNLESS THE WATER PRESSURE EXCEEDS 1000 KPA

HOT WATER CONNECTION TO SOLAR BOOSTER.

Refer to Technical Sheet for position of connection. The outlet connection from the tank is 18 mm (¾" BSP) FEMALE thread, and requires an isolating valve & union at the booster to allow for removal of the unit.

Keep the pipe lengths to a minimum, and make sure that the pipework is well insulated as correct performance of the appliance is dependent on properly insulated pipework.

DO NOT FIT ANY VALVES OR RESTRICTORS TO THE OUTLET OF THE BOOSTER
DO NOT FIT ANY OBSTRUCTION TO THE PRESSURE RELIEF LOCATED ON THE HOT WATER OUTLET CONNECTION.

After purging the air from the system using the hot water supply taps, isolate the water supply, remove the water inlet strainer located on the water supply inlet connection of the booster. Remove any debris from the filter and replace. When replacing the filter, do not over-tighten the “O” ring seal.

ELECTRICAL CONNECTION

The booster is equipped with a three pinned earthed plug to be connected to a 240V, 50Hz continuous electrical supply. The electrical rating of the appliance is 0.4 Amps
The appliance requires a 240V, 50Hz weatherproof plug installed in a protected position adjacent to the appliance.
IMPORTANT: The appliance should always be disconnected from the power supply before any maintenance is carried out. If the power cord is damaged and requires replacement, use only an original spare part available from the manufacturer.

PRE-SET TEMPERATURE

The Bosch water heaters are factory pre-set to deliver hot water at 55°C, however when used as a booster unit in conjunction with a solar hot water system, the booster will need to be adjusted to 75°c.

Supplied with the booster unit are two temperature bridges, a 60°c bridge (Blue wire marked ‘B’) and a 75°c bridge black wire (marked ‘A’)

To alter the delivery temperature:

1. Turn the power supply to the unit off and remove three pin power plug from supply.
2. Remove front cover of booster by removing the four securing screws (Disconnect the earth wire).
3. Contained inside a plastic bag and taped to the inside of the front cover are the two bridges.
4. Remove the 75°c bridge from the plastic bag.
5. Located on the right hand side of the booster is the Printed Circuit Board (PCB).
6. At the top of the PCB (Between the temperature controller connection points is provision for the insertion of a polarised plug).
7. Carefully insert the bridge into the PCB.
8. Refit the front cover of the unit (Refit the earth wire)
9. Fit three pin power plug to the power supply.
10. Turn the power supply on.

The booster will now automatically boost the water temperature to 75°c.

Note The Solar booster cannot be fitted with temperature control pads.

COMMISSIONING AND TESTING

After completing the installation of the system, connect manometer to gas inlet test point, turn on the water, power and gas supplies to the unit. Confirm the booster delivers the temperature the consumer requires. With the hot water running, confirm correct gas inlet pressure and remove manometer. Retighten test point and soap test. Test operation of the appliance, explain operation to consumer & hand over these installation instructions. Please leave your contact details with the consumer. This initial commissioning procedure can only be performed whilst the solar storage tank is cold and the solar booster is operating at maximum.

BURNER PRESSURE ADJUSTMENT

No adjustment should be necessary providing the gas inlet pressure is correct.
Burner pressure adjustment is necessary when converting to a different gas type or replacing the PCB. Refer to service manual for details.

N.B. The combustion fan can continue to operate for up to approximately 7 minutes after the unit is turned off. This is normal, not a fault.

USER SAFETY INSTRUCTIONS

PLEASE CAREFULLY READ THIS USER INSTRUCTION BEFORE USE.

You have selected the Bosch Electronic computer controlled solar booster unit. The following instructions will assist you to obtain the best performance from your Bosch solar booster.

SAFETY

Always check water temperature by hand before entering the shower or bath.

The temperature may have been changed.

Do not touch cover or flue outlet when the Bosch solar booster is in operation.

Keep flammable materials, trees, shrubs etc. away from the Bosch solar booster.

Water flow needs to be more than 2.5L/min. to operate these Bosch solar booster.
Hot water temperature may vary at low water flows, or the Water Heater may go out without warning.

Warning - If the appliance does not operate, burns with yellow flame, leaks water or a gas smell is evident, turn off and contact the local gas authority, the manufacturer or an authorized service person.

IN CASE OF DIFFICULTIES

If the Bosch solar booster ceases to operate, please check that the electricity supply is available.

Also check that the gas supply is turned on.

If a fault develops there are no user adjustments or serviceable components contained in this appliance. Please contact an authorized service person.

CONTROLLER & PUMP

SolaStat-Eco is Easy to Use with the advanced generation of smart, microprocessor based Differential Solar Hot Water Controllers.

The solar controller is mounted on the front of the solar pump box. The solar controller has been wired to the pump.

The solar pump/controller is equipped with a three pinned earthed plug to be connected to a 240V, 50Hz continuous electrical supply. The appliance requires a 240V, 50Hz weatherproof plug installed in a protected position adjacent to the appliance.

SolaStat-Eco has Advanced Functions and takes the basics of differential control, frost protection, top out and add to these sensor diagnostics, smart shutdown, comprehensive status lights with the option of a Pump Timer for Pump Cavitation Recovery.

Your SolaStat-Eco is pre-programmed in the factory as per below:

Pump ON	Pump OFF	Top Out	Frost
12 °c	6°c	75°c	4°c

Your SolaStat-Eco has a microcomputer at its core that intelligently and automatically controls your solar hot water system at greater efficiency. The SolaStat-Eco measures water temperatures at 2 different places in the system and turns on a water pump at the optimum time.

The pump moves hot water from the solar collector into the hot water tank.
The SolaStat-Eco has advanced features that; protect the system from damage, run self diagnostics, self correction of some problems and will keep you informed as to what the SolaStat-Eco is measuring and what decisions it is making.

Principle of operation:

The solar hot water panel sensor is called 'ROOF'
The lower hot water tank sensor is called 'INLET'
The SolaStat-Eco is a differential solar hot water controller. The controller measures the temperature at the 'Roof' sensor and compares this to the 'Tank' sensor. If the difference between the roof and the tank is greater than the programmed upper limit (typically 12C) then the pump turns on and transfers heated water from the solar collector to the tank and replaces this with cooler water from the bottom of the tank. When this happens the tank heats up and the collector tends to cool down.
The heat difference is reduced to a point where the lower limit (typically 6C) is reached and the pump turns off. This cycle repeats as long as the sun shines and there is a difference in temperature, the tank heats up progressively this way.

There is a huge amount of energy in sunshine, as high as 1000 watts per square metre. This can lead to water temperatures present in the hot water tank beyond what it is designed to handle (close to boiling). This is especially true of 'ceramic' lined tanks. Also pressure can build which can cause other plumbing problems. To protect the hot water tank and stop pressure problems a maximum temperature can be set called 'Topout'. This will prevent the pump from moving any more water from the collector until the tank has cooled to a safe level.

To protect the solar collector from freezing in mild frost areas the 'Frost' function can be enabled.

This will turn the pump on to move a small amount of water through the collector. Heavy frost areas may need other solutions such as glycol based systems or drain down.

The SolaStat-Eco has other special features to those mentioned above.

· **Pump Timer:** This is an optional factory setting to assist in pump cavitation recovery. After the pump has run continuously for approximately ten minutes, it will turn off for one minute. This cycle is repeated as long as the pump is required to run and will not affect normal operation in a standard hot water collector and cylinder installation. The one minute turn off period helps any accumulated air to escape from the pump and has been effective as a backup in exceptional conditions. This feature can help prevent the pump running for hours in a 'locked up' state, increasing the installation reliability. Also refer 'Plumbing Issues, Cavitation'

· **20°C lockout:** If the collector is less than 20°C it will not contribute any useful heat, even to cold water. Therefore the controller will not turn the pump on under differential conditions ('frost' protection still works).

· **Sensor diagnostics:** The SolaStat-Eco constantly checks the sensors. If the roof sensor is above 140°C, the pump is disabled. If a sensor is outside the specified temperature range of -40°C to 150°C then the display flashes the 'Topout' light for the Roof sensor and flashes the 'Frost' light for the Inlet sensor and the controller enters Smart Shutdown mode. The sensor has either a slowly flashing light for a temperature above 150°C (possibly shorted sensor or wire) or a fast flashing light for a temperature below -40°C (possibly open sensor or broken wire). For example if the 'Roof' sensor wire is cut during some building work then the SolaStat-Eco 'Topout' light flashes fast and the controller enters Smart Shutdown mode until the wire is repaired.

· **Smart Shutdown (SSd):** In Smart Shutdown mode, the 'Topout' and or 'Frost' light is flashing and the pump is disabled except for 'Frost' protection when the Roof sensor is working.

· The 'PWR' light on indicates that power is being applied to the unit.

· The 'PUMP' light will be on when the pump is on. The exception to this is, if the Pump Timer is on a one minute recovery cycle, the light will be on but the pump will not be running during that minute. (see 'Pump Timer' explanation on previous page).

· 'TOPOUT' light on indicates the value stored as the maximum allowable hot water tank temperature has been reached. If lit the pump will be disabled until the temperature drops at least 2°C lower.

· The 'FROST' light comes on when the value stored for the onset of a frost condition has been detected on the solar collector. To stop the collector freezing and bursting, the pump will come on just enough to raise the temperature of the collector by 2°C. Only a small amount of warm water is needed to protect the collector.

The 'PUMP' button will turn the pump on as long as the button is held down, unless of course the pump is already on in normal operation.

The 'TEST' button will check the system during which all the lights should flash on.
Pressing Button 'F2' flashes the Topout light and pressing Button 'F3' flashes the Frost light but these buttons have no effect on unit operation.

Pump override: For added flexibility you can make the pump operate manually. The pump will turn on as long as the 'Pump' button is held down unless of course the pump is already on in normal operation.

Test: Briefly pressing this button will cause all the lights to flash for 3 seconds.
Display panel description.

SolaStat-Eco Safety Instructions.

Read safety instructions and limit of liability before proceeding with the installation.
General Safety Instructions.
1. This installation guide is for the installation of SolaStat-Eco solar hot water controllers only and is not an installation guide for any other part.

2. The complete installation should be checked at least annually for damage or malfunction.

3. All servicing to be carried out by an authorised service agent only.

4. All aspects of the installation must comply with local electrical and plumbing regulations (and any special solar hot water regulations).

Installation Precautions.
1. Power leads must be facing directly down, not sideways or upwards.

2. Must be in a safe environment for users to inspect.

3. Failure to mount sensors correctly can lead to a poorly controlled solar hot water system with safety issues like overheating and over pressure damage to the plumbing and hot water tank and freezing damage to the solar hot water collector.

Electrical Precautions.
1. All mains voltage electrical work to be carried out by a qualified electrician.

2. Always use within specified voltage and load ranges. Never use with damaged leads, plugs or sockets.

3. Do not allow the sensor cables to come within 10mm of the high voltage connectors or components inside the enclosure.

Note on Hot Water Cylinders with Over Temperature Cut-out.
Some standard electric element hot water tanks have an over-temperature cut-out fitted to remove power in the event of a thermostat failure. The temperature this is set to can typically range from 75°C to 95°C which is adequate for electric element heating safety. However in solar hot water systems this temperature can be exceeded and the over-temperature cut-out may activate turning the electric element off. The cut-out needs to be manually reset by a qualified electrician. In these installations it may be necessary to modify the electrics in a manner approved by the hot water tank manufacturer or set the topout adjustable value to a temperature lower than the
over-temperature cut-out.

CAUTION: Dangerous Voltages may be present. The SolaStat has no user serviceable parts.

Protective enclosure only to be opened by qualified personnel.
Remove ALL power sources before removing protective cover.

Warning:
SolaStat-Eco Mounting.

Where to mount the SolaStat-Eco.

1. Against a flat vertical surface with sufficient strength to hold the enclosure and any additional weight from the plugs, sockets and cables.

2. Power leads must be facing directly down, not sideways or up.

3. Safe for users to inspect.

4. The buttons can be easily read and accessed.

5. Allow for cable runs, location of power outlets and lengths of wires.

Mounting the Sensors.

This is Critical to the Success of the Installation.

The sensors are the only way the SolaStat-Eco can efficiently control and protect the system.

1. **The 10m ROOF Sensor**.
The 'ROOF' sensor is best fitted into a metal immersion 'pocket' just inside the solar collector in the hot water outlet pipe. Liberally apply heat transfer compound between the sensor and the lining of the 'pocket'. Sensor should be sealed with neutral cure sealant and externally lagged, also the cable should be insulated from the bare pipe. Heat transfer compound is available from your distributor.

2. **The 2m INLET Sensor**.
If Topout is required; The 'INLET' sensor is best fitted into a metal immersion 'pocket' near the middle of the hot water tank. Caution should be exercised to allow for stratification of hot water in the tank. For Topout Adjustable Value we recommend a conservative value somewhat lower than the hot water tank manufacturer's maximum temperature. If Topout is not required then the 'INLET' sensor is best fitted into a metal immersion 'pocket' near the bottom of the hot water tank. Liberally apply heat transfer compound between the sensor and the lining of the pocket'. If a 'pocket' is not available then bond the sensor against the metal wall of the tank (not the outside cladding or insulation) using thermal transfer compound between the tank and sensor.

Warning

1. Sensors must not be immersed in water.

2. It is recommended that sensor leads be kept 300mm away from mains and comms cables.

3. Ensure the correct sensors are mounted in the correct place.

4. Failure to properly mount the 'Inlet' sensor as prescribed in the method above can result in;
    a. The system may not operate at greatest efficiency.
    b. There may be inaccurate 'Topout' sensing.HWC or other components may get damaged.

5. Failure to correctly mount the 'Roof' sensor as prescribed in the method above can result in;
    a. The system may not operate at greatest efficiency.
    b. Failure to detect Frost conditions. Panel can burst.

SolaStat-Eco Operation.

Pump station.

The pump station is wired direct to the SolaStat-Eco. If replacing the pump it should be the correct type of pump for domestic solar hot water circulation and not exceed the horse power (hp) rating as specified on the label on the side of the enclosure.

Power Up.

Before you connect the power;

1. Read safety instructions, warnings and limit of liability before proceeding.

2. Complete all the installation and that the Sola-Stat–Eco is securely mounted.

3. The system is full of water.

4. Power outlet socket to be installed by a qualified electrician.

5. There is no water, metal shavings or other electrical hazards to contaminate the plug, socket and surrounding environment.

Only then;

Plug it in and turn it on.

What You Should See.

The first thing you should see after power up is;
1. On the top left the 'PWR' light should be on.

2. Other lights will be on depending on how the solar hot water system is operating.
The pump operation can be tested by pressing the 'PUMP' button. This will turn the pump on as long as the button is held down, unless of course the pump is already on in normal operation.

The SolaStat-Eco is now installed and should be working. It would be best to observe some solar hot water pump cycles but this will rely on the sun shining. Check all functions are working correctly before leaving the installation.

Note 1. See User Guide for explanation of display and status lights.
Note 2. See "Trouble shooting" section if system not working correctly.

SolaStat-Eco Sensor Maintenance.
Lengthening SolaStat-Eco Sensor Wire.

The sensor wire can be lengthened within certain guidelines. Poor connections or induced interference can cause false temperature readings.

1. The sensor is not polarized- it can be connected either way around.

2. The wire normally used for sensor lengthening is twin 0.5mm^2 stranded speaker wire.

3. Firmly attach wires to each other by either soldering (heatshrink over each joint) or by quality screw terminals. Joins must be kept dry.

4. It is recommended that sensor leads be kept 300mm away from mains and comms cables.

5. Over 20 metres; extra care must be taken to avoid electrical interference being picked up.

6. In 'noisier' electrical environments screened cable may be required.

7. The absolute maximum cable length is 100 metres.

Replacing a SolaStat-Eco Sensor.
If a damaged sensor needs to be replaced then the cover of the enclosure will need to be opened unless the choice is made to join the wires externally (see "Sensor Wire Lengthening" section).

1. Remove the mains power supply, preferably remove the plug from the wall socket. Make sure no other power source is feeding back through other connections.

2. Remove the 4 screw covers on each corner of the lid of the enclosure. This will require a fine tipped tool such as a screw driver. Be careful not to damage the lid. Always press the tool away from you to avoid injury if you slip.

3. Remove the 4 screws that hold the lid on.

4. Unscrew the damaged sensor from the terminal block.

5. Loosen the cable clamp for the sensor leads.

6. Carefully pull the wire back through the opening in the bottom case.

7. Thread the new sensor wire back through where the old one came from.

8. Place the wires of the new sensor into the terminal block where the old sensor came from and retighten the screws.

9. Do not allow the sensor cables to come within 10mm of the high voltage connectors or components inside the enclosure. Tighten the screws on the cable clamp.

10. Replace the lid, replace the 4 screws and tighten.

11. Push in 4 new screw covers available from your distributor. Note: there are locating lugs to ensure correct orientation.

12. Reconnect the SolaStat-Eco and turn on the power.

Trouble Shooting

Symptom	**Cause**	**Solution**
No operation, No lights.	a. No power. b. Power brown out. c. Unit Damaged.	a. Check mains outlet or Check fuses. b. Remove power while brownout condition is present. c. Remove power for 10 minutes, repower and see if unit is operating. If not unit needs repair.
PWR light ON, pump not running and yet is sunny outside. PUMP light is ON.	a. Pump faulty or disconnected. b. Pump Timer has turned pump off.	a. See if pump has become unplugged. b. Wait one minute for pump to restart.

PWR light ON, pump not running and yet is sunny outside. PUMP light is OFF. TOPOUT light is OFF.	a. Sensor not mounted properly. b. Water not hot enough yet. c. Roof sensor over 140C.	a. Check sensor is thermally bonded to Solar Panel outlet. b. Check temperatures of Roof and Inlet, they need to be greater than the difference programmed for pump ON. Wait. c. Normal Operation, Pump disabled.
Pump will not operate and yet is sunny outside. PUMP light is OFF. TOPOUT light is ON.	a. Topout temperature exceeded.	a. If Tank temperature greater than Topout programmed value then is working normally.
Pump running continuously.	a. Pump is cavitating. b. Special installation. c. Settings incorrect. d. Airlock.	a. If pump is making noise like stones passing through it then it is cavitating. See SolaStat Plumbing Issues. b. Special installation where long pump on times are normal. c. Check programming. d. Air relief valves not installed/functioning.
Pump runs at night. FROST light is ON	a. Frost outside Pump runs at night.	a. Normal operation.
FROST light is OFF	a. System is reverse thermosiphoning	a. The non-return valve is not fitted correctly or is faulty.
Hot Water drops significantly overnight yet little or no draw off of hot water by the user.	a. System is reverse thermosiphoning. b. System is in an excessive frost area. c. Tank losing heat.	a. The non-return valve is not fitted correctly or is faulty. b. Discuss non frost sensitive options with provider. c. Install better insulation on hot water tank.
TOPOUT Light Flashing Fast	a. Wire to Roof sensor broken. b. Roof Sensor Damaged. c. Roof Sensor below -40C.	a. Repair wire. b. Replace Roof Sensor. c. Check Outside Temperature.
TOPOUT Light Flashing Slowly	a. Wire to Roof Sensor shorted. b. Roof Sensor Damaged. c. Roof Sensor above 150C.	a. Repair Wire. b. Replace Roof Sensor. c. Check Collector has water in it.
FROST Light Flashing Fast	a. Wire to Inlet sensor broken. b. Inlet Sensor Damaged.	a. Repair wire. b. Replace Inlet Sensor.
FROST Light Flashing Slowly	a. Wire to Inlet Sensor shorted. b. Inlet Sensor Damaged.	a. Repair Wire. b. Replace Inlet Sensor.

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SolaStat-Eco Trouble-shooting Guide.
This is intended as an initial guide to minimise service calls.

Introduction.
Any solar hot water system involves professional level plumbing and water much hotter than would normally be seen in standard domestic hot water systems, any installation must be carried out by a registered and qualified plumber. All parts including the pump must be rated for the elevated temperatures found in solar hot water systems.

Solar Hot Water Specifics.

1. Tempering valve.

There is a huge amount of energy radiated by the sun. It is not uncommon for the water from the solar collector to exceed 100 C (under pressure).
Therefore it is vital a tempering or 'mixing' valve is fitted so the domestic supply from the tank does not burn the end users. The tempering valve must be installed to best plumbing practices. The tempering valve must be rated to handle these elevated temperatures.

2. Non return valve.

Hot water rises and cold water falls. If the solar collector is colder than the tank, such as during the night, the hot water from the tank can self thermosiphon up to the collector. The collector now radiates the heat to the cool night air and the water descends back down to the tank. To stop this loss of hot water at night or during cloudy skies there has to be a one way or 'non return' valve fitted.
The failure of this non return valve is a common problem with solar hot water systems. The orientation of the valve as per manufacturer's instructions is critical. Also the valve sometimes will not close when swarf or other debris gets caught in the valve seat.

3. Pressure relief valves.

Solar hot water systems can run much hotter than standard domestic hot water systems. Hotter water expands more and needs high quality pressure relief valves to avoid possible catastrophic rupturing somewhere in the system, probably the tank.
Qualified plumbers using best industry practice must decide on adequate pressure relief valves, the number and placement of them.

4. Air Relief Valves.

It is important that air relief valves are fitted (especially in a low pressure system) to the highest point of both the feed to and the return from the solar water collectors. Otherwise air locks can occur within the piping etc., and not just the pump. (An air lock in the system will increase the head that the pump is working against and for some installations this is too much and the water ceases to circulate. For systems where air locks occur, the pump may need to be set to a higher speed or a higher head pump installed).

SolaStat-Eco Plumbing Issues, Cont.

5. Cavitation.

A pump is used to circulate the water between the tank and the collector.
If the pressure at the inlet or impellor of the pump falls below the vapour pressure of the liquid being pumped, cavitation will occur. Cavitation in a pump is more likely to occur as the temperature of the water rises and/or the pressure of the water decreases.

Bubbles form when the water is sucked into the pumps impellor and collapse again as small implosions when the water is ejected out of the impellor which can be so rapid that a rumbling/cracking noise is produced (it sounds like stones passing through the pump) and there can be damage to the impellor and other sensitive components as well as a drop in water volume moved.

Mains pressure solar hot water systems are less susceptible to cavitation than low pressure systems as the extra pressure will make it less likely that vapour bubbles will form.

The SolaStat-Eco controllers have an optional factory setting called 'Pump Timer' to assist in pump cavitation recovery. After the pump has run continuously for approximately ten minutes, it will turn off for one minute. This cycle is repeated as long as the pump is required to run and will not affect normal operation in a standard hot water collector and cylinder installation.

The one minute turn off period helps any accumulated air to escape from the pump and has been effective as a backup in exceptional conditions. This should not be considered a substitute for the afore mentioned best plumbing practices. This feature can help prevent the pump running for hours in a 'locked up' state, increasing the installation reliability.

GRUNFOS PUMP

The pump supplied is a Grunfos UP 15-14 and suitable for most domestic single and double storey applications. The pump is mounted in a waterproof mounting box with the solar controller fixed to the front of the box. Typically the 'Solar pump Station' is mounted on a wall adjacent to the tank.

The water-conduction part of the pump is hermetically separated from the stator with a stainless steel spherical separator. The motor can be separated from the pump housing, enabling easy maintenance and replacement.

MOTOR

240v/50Hz, enclosure class IP42, Insulation class F.

AMBIENT AND LIQUID TEMPERATURES

+2°c to +95°c
It is recommend to keep the operating temperature as low as possible (e.g 65°c) to avoid lime precipitation.

MAXIMUM SYSTEM PRESSURE

1.0Mpa (1000 kPa)

To avoid cavitation noise and damage to the pump bearing at high temperatures, the following minimum pressure is required at the pump suction port:

Liquid temperature	65°c
Minimum inlet water pressure	2.8m head
	0.27 bar

CONNECTIONS

15mm female BSP.

COMMISSIONING

TO FILL AND TURN ON THE WATER SUPPLY TO THE SYSTEM

The power supply to the solar storage tank and solar control unit **MUST NOT** be switched on until the water heater is filled with water.

Turn on the water supply to the system.

Open all of the hot water taps in the house in turn, allowing any air in the lines out. It is important that this is done before the heater has had time to warm up, as the air bubbles can cause spurting from the taps. Also check the Solar piping for leaks, leaks will significantly decrease the performance of the heater.

The solar panels must only be filled when they are cold, so it is important to ensure that the panels are fully covered for a suitable time beforehand. Filling hot panels may cause injury by scalding. Loosen the fitting on top of the solar panel return pipe to the solar storage tank and then turn on the mains cold water supply. Cover the loosened fitting with a cloth to prevent water spraying from the fitting. Allow water to flow from the loosened fitting until a steady flow free of spurting is achieved and all air is displaced. Re-tighten the fitting. Allow the system to pressurise. Check for any leaks.

Refer to each individual component for commissioning instructions.

TO TURN OFF THE WATER HEATER

If it is necessary to turn off the water heater on completion of the installation, such as on a building site or where the premise is vacant, then:

Close the cold water isolation valve at the inlet to the water heater.
switch off the electrical supply at the circuit breaker to the storage tank.

HOME OWNER USER GUIDELINES

IF THE HOT WATER SYSTEM IS NOT USED FOR TWO WEEKS OR MORE, A QUANTITY OF HIGHLY FLAMMABLE HYDROGEN GAS MAY ACCUMULATE IN THE WATER HEATER.

TO DISSIPATE THIS GAS SAFELY, IT IS RECOMMENDED THAT A HOT TAP BE TURNED ON FOR SEVERAL MINUTES OR UNTIL DISCHARGE OF GAS CEASES. USE A SINK, BASIN, OR BATH OUTLET, BUT NOT A DISHWASHER, CLOTHES WASHER, 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 AN UNUSUAL SOUND AS WITH AIR ESCAPING.

ABOUT YOUR HEATER

The **'Bosch'** solar water heater storage tank installed at ground or floor level, remotely from the solar collectors. As the sun heats the water in the solar collectors the increase in temperature activates the water circulator (Pump). The water pump switches on whenever the water in the solar collectors is hotter than the water in the tank. Cooler water from the solar storage tank is circulated to the solar collectors to be heated by the sun's energy. This process continues while solar energy is available and will stop if the water in the panels gets cooler than the water in the tank or if the storage tank reaches its maximum set point.

The solar storage tank is suitable for either outdoor or indoor installation. This system is not suitable for installation in areas that experience prolonged sub-zero temperatures without power supply, but does offer a basic freeze protection for the panels in 'power out' situations. If you need assistance determining whether your area is suitable for this solar system, please contact Bosch 1300 30 70 37

MAINS PRESSURE LIMITS

The water heater is designed to operate at mains pressure by connecting directly to the mains water supply. If the mains supply pressure exceeds 750kPa, a pressure-limiting valve must be fitted before the inlet of the heater, rated at 600kPa.

HOW HOT SHOULD THE WATER BE?

When operated in a domestic situation the system's outlet temperature should be between 50^{o}C and 80^{o}C. During periods of low solar energy gain, the water temperature can be boosted by the thermostatically controlled gas booster for gas boosted systems or electric booster heating element for electric boosted systems.

The water heater features a tradesperson adjustable thermostat. This requires a licensed tradesperson to make any temperature adjustments. The thermostat is located inside the electrical cover(The tank thermostat is factory set at 66°c for electric boost and the gas booster must be set to 75°c at the time of installation). These temperatures are required to protect your family from the potential of leigonella.

SAFETY WARNING: Ensure all sources of electricity are disconnected from the unit before removing any of the electrical covers.

HOTTER WATER INCREASES THE RISK OF SCALD INJURY

We recommend, and it may also be required by regulations, that an approved temperature limiting device be fitted into the hot water piping to all bathrooms and ensuites. This will keep the hot water temperature below 50ºC at those outlets. The risk of scald injury will be reduced and still allow hotter water to the kitchen and laundry.

SAFTEY WARNING

This water heater is not intended to be operated, adjusted or tampered with by young children or infirm persons. Young children should be supervised to ensure they do not play with the water heater.

DOES THE WATER QUALITY AFFECT THE WATER HEATER?

The water heater is not recommended for connection to a bore water supply. Many such sources contain contaminants harmful to the components of the solar system If the system is connected to bore supply against our recommendation, warranty does not apply. See details on warranty page.

IS ANODE PROTECTION REQUIRED?

Vitreous Enamel lined displacement storage tank water heaters use an anode to provide protection from corrosion on the steel walls of the tank.

Notes :

Pipe work between the solar collectors and solar storage tank MUST be insulated with the specified material, or better.

FAULTS & SERVICE

Check the items below before making a service call. You will be charged for attending to any condition or fault that is not related to manufacture deflect or failure of a part.

Booster heating unit not operating

Inspect the isolating switch marked “HOT WATER” in the meter box and ensure it is turned “ON”. Check the electrical tariff to which the unit is connected. If the unit is connected to an Off Peak tariff, remember heating hours are restricted

Collectors shaded

Ensure the glass on your solar collectors is free of dust, salt spray or any other matter, which may reduce the effectiveness of the solar collectors. Hose or wash the collector glass with water and a soft brush when the solar collectors are cool. Trim any trees which may shade the solar collectors.

If trees or other objects shade the solar collectors or if the glass is dirty, the effectiveness of the solar collectors will be greatly reduced. Clean the collector glass (Clean the panels with water and a soft brush), trim trees or relocate the solar collectors if the obstruction is permanent.

Are you using more hot water than you think?

Is one outlet (especially the shower) using more hot water than you think? Carefully review the family's hot water usage. It is a good idea to restrict the amount of hot water used by simply fitting an inexpensive water saver shower rose. Conventional shower roses can require up to 20L/min of flow to spray properly, but a large amount of this water is wasted. We recommend showers roses that pass 8-9L/min of shower flow.

Thermostat setting

Ensure the thermostat setting is appropriate. You may choose to have your electrician adjust the thermostat upwards to gain additional hot water capacity when boosting.

Tempering Valve Malfunctions

Have your plumber check to make sure your tempering valve is calibrated and is functioning correctly – this can cause the water from your taps to be cool, even though there is plenty of heat available in the water heater.

WATER FLOWING FROM THE OVERFLOW OUTLET

Normal Operation

It is normal that the PTR pipe will leak water when the unit is in operation. This is caused by the expansion of the tank water, and should stop after the heater has reached maximum

operating temperature. The tank may also leak small amounts of water in summer, when the hot weather will cause the tank to reach higher temperatures.

Continuous dribble

Try gently raising the easing lever on the relief valve for a few seconds this may dislodge any trapped particles of foreign matter and clear the fault. **Release the lever gently**.

Steady flows for long period (often at night)

This may indicate the mains water pressure sometimes rises above the designed pressure of the water heater. Ask your installing plumber to fit a pressure limiting valve.

HIGH ELECTRICITY BILLS

With the installation of your new solar hot water system, maximum electrical energy savings can be achieved with careful planning of hot water usage. Should you at any time, feel your electricity account is too high, we suggest you check the following points:

- Is the relief valve running excessively?
- Are you using more hot water than you think?
- Is there a leaking hot water pipe, dripping hot water tap etc? Even a small leak will waste a surprising quantity of hot water and energy. Replace faulty tap washers, and have your plumber rectify any leaking pipe work.
- Are you using the booster heating unit properly?
- Consider recent changes to your hot water usage pattern and check if there has been any increase in tariffs since your previous account.
- Does the system have the correct foam insulation installed on the pipe work? Incorrect insulation can waste solar energy and lead to excess electrical use at times of high water use.

NOTE: ***IF YOU HAVE CHECKED ALL THE FOREGOING AND STILL BELIEVE YOU NEED ASSISTANCE, CALL 1300 30 70 37***

COLLECTOR GLASS

Solar Wizard WARRANTY DOES NOT cover breakage of solar collector glass. Check your household insurance policy to ensure that the policy covers collector glass breakage. In the event of the Collectors glass being broken a new collector will need to be installed. Onsite replacement of the glass is not possible.

MAINTENANCE REQUIREMENTS

SAFETY WARNING

This water heater is supplied with a thermostat pressure relief and non-return valve. These devices must not be tampered with or removed. The water heater must not be operated unless both of these devices are fitted and are in working order.

The **WARRANTY** can become void if relief valve or thermostat is tampered with or if the installation is not in accordance with these instructions.

The relief valve should be checked for correct operation at least once every six months. Gently raise and lower the lever until a constant flow of water is released.

Bosch recommend that the anode and relief valve are replaced at interval of five years. Please contact Bosch on 1300307037 for advice on the correct components.

SOLAR COLLECTOR GLASS

Ensure the glass on your solar collectors is free of dust, salt spray or any other matter, which may reduce the effectiveness of the solar collectors. Hose or wash the collector glass with water and a soft brush when the solar collectors are cool. Outdoor window cleaning products work well on the collector glass, and may be used to clean the collectors from the ground. Regularly trim any trees that may shade the solar collectors.

DRAINING THE WATER HEATER

SAFETY WARNING: Before draining the system ensure you will not be scalded by the hot water in the system. (Water temperatures are likely to be well above 50 deg C.)

- Switch off the electrical supply at the isolating switch to the solar storage tank and at the power outlet for the solar control unit.
- Unscrew the water heater drain fitting, sliding the temperature probe out until water flows freely.
- If it is necessary to run the water away from the heater (eg. if the tank is indoors), the wires to the temperature probe can be unscrewed from the controller circuit, and reconnected later, allowed the probe to be removed from the drain fitting.
- Ensure the heater is refilled with water before reconnecting electrical power.

WATER SUPPLIES ANALYSIS

Your 'Bosch' solar water heater is manufactured to suit the water conditions of most Australian metropolitan supplies. However, there are some known water supplies which can have detrimental effects on the water heater and its operation and/or life expectancy. If you are unsure of your water quality, you can obtain information from your local water supply authority.

WARRANTY of this product is VOID where the product is installed in areas where corrosive water is present or has been present in the product in the time span of the warranty. This product should only be connected to a potable water supply.

Water that is corrosive to copper is typically associated with some bore water supplies of water not treated by water authorities to ensure against copper corrosion. Corrosive water for copper can result in premature failure of the product through hot water copper pitting corrosion where small holes develop in the inner tank or copper panels and the product eventually leaks.

The following criteria shall be met under the terms of the Warranty to ensure that water is not corrosive or scaling to copper.

1. pH is greater than 7.0 (pH > 7.0)
2. Bicarbonate to sulphate ratio is greater than 2:1 (>2:1)
3. Langelier Saturation Index (LSI) is greater than negative 1 and less than plus 0.8 (-1 < LSI<0.8)

NOTE: WATER HEATERS NOT INSTALLED IN ACCORDANCE WITH THE ABOVE ADVICE WILL NOT BE COVERED BY WARRANTY.

ELECTRIC BOOSTING

Water stored in the storage tank is heated automatically by an electric booster heating unit. The booster element heats the water during very cloudy or rainy weather, during the winter months, or during periods of unusually high demand, such as when friends or relatives visit. The booster heating unit is controlled by an electric thermostat. The thermostat and heating element are mounted on the solar storage tank inside the two covers. The boost water temperature is automatically controlled to the thermostat setting when the booster heating unit is energised.

The thermostat is tradesperson adjustable. It has a minimum temperature setting of 60ºC and a recommended maximum temperature setting of 75ºC. It can only be adjusted by an authorised person. Automatic safety controls are fitted to the water heater to provide safe and efficient operation. Bosch recommends that the thermostat be set at 75 ºC for the best efficiency.

GAS BOOSTING

Where gas boosting in used the electric element and thermostat of the tank are not connected to power. The gas booster is installed and connected inline between your solar tank and the hot water outlets of your home. The water from the outlet of the tank passes through the booster, if the sensor inside the gas booster detects the water temperature is lower than the preset temperature of the booster, the booster will turn on and heat the water.

Robert Bosch (Australia) Pty Ltd (Bosch)
Manufacturer's Warranty
(Applicable for purchases from 1 January 2012)

All Bosch hot water units are carefully checked, tested and subject to stringent quality controls.

1. Warranty
Bosch offers, at its option, to repair or exchange this Bosch hot water unit or the relevant part listed in clause 2 below at no charge, if it becomes faulty or defective in manufacture or materials during the warranty period also stated in clause 2. This warranty is offered in addition to any other rights or remedies held by a consumer at law.

2. Warranty periods & coverage
(a) Domestic hot water units: 3 years (parts and labour)
(b) Solar Storage Cylinder: 5 years Part and 3 years labour
(c) Solar Collectors: 7 years Part and 1 years labour
(d) Solar Circulating Pump: 2 years (parts and labour)
(e) Heat exchangers used in domestic hot water units: 10 years (parts only)
(f) All other components: 12 months (parts and labour)

Note: For installations in Victoria only – to comply with State legislation, the solar circulating pump, solar controller and components within the solar booster are covered by a Five (5) year parts and labour warranty.

All warranty periods commence on the date of purchase of the hot water unit by the end-user. However, where the date of purchase by the end-user is more than 24 months after the date of manufacture, all warranty periods will automatically commence 24 months after the date of manufacture.

3. Warranty exclusions
This warranty is VOID if any damage to or failure of the hot water unit is caused wholly or partly by:
(a) faulty installation
(b) neglect, misuse, accidental or non-accidental damage, failure to follow instructions
(c) use of the unit for purposes other than which it was designed or approved
(d) unauthorised repairs or alterations to the unit without Bosch's consent
(e) use of unauthorised parts and accessories without Bosch's consent
(f) use of non-potable water or bore water in the hot water unit (see product instructions for further details)
(g) continued use after a fault becomes known or apparent.

This warranty DOES NOT include:
(a) costs of consumables or accessories
(b) wear and tear, normal or scheduled maintenance
(c) to the extent permitted by law, any damage to property, personal injury, direct or indirect loss, consequential losses or other expenses

(d) changes in the condition or operational qualities of the hot water unit due to incorrect storage or mounting or due to climatic, environmental or other influences.

NOTE: Any service call costs incurred by the owner or user of the hot water unit for any matter not covered by the terms of this warranty will not be reimbursed by Bosch, even if those costs are incurred during the warranty period. If the hot water unit is located outside the usual operating area of a Bosch service agent, the agent's travel, freight or similar costs are not covered by this warranty and must be paid by the owner or user of the hot water unit.

4. Warranty conditions

(a) Proof of purchase may be required.
(b) The hot water unit must be installed by an authorised and licensed installer.
(c) Proof may be required of the date of installation and correct commissioning of the hot water unit has been carried out to Bosch's satisfaction (such as a certificate of compliance).
(d) Repair or replacement of the hot water unit or any parts under this warranty does not lengthen or renew the warranty period.
(e) This warranty is not transferable and is only offered to the original purchaser of the hot water unit.
(f) No employee or agent of Bosch is authorised to amend the terms of this warranty.
(g) This warranty only applies to Bosch hot water units purchased from an authorised reseller and installed in Australia or New Zealand.
(g) To the extent that any condition or warranty implied by law is excludable, such condition or warranty is excluded.

5. How to lodge a warranty claim and warranty procedure

(a) Warranty claims must be made with the Bosch Customer Contact Centre (Australia: ph 1300 307 037; New Zealand: ph 0800 543 352). Please be ready to provide the model and serial numbers, date of installation, purchase details and a full description of the problem. Warranty claims must be made before the end of the warranty period.
(b) All warranty service calls must conducted by an authorised Bosch service agent.
(c) Invoices for attendance and repair of a hot water unit by third parties not authorised by Bosch will not be accepted for payment by Bosch.

6. Privacy Act 1988 (Cth)

A customer's personal information collected during warranty claims may be used for the provision of customer support, for the provision of information about products and services and for other marketing activities undertaken by Bosch and its Bosch Service Agents who are authorised to carry out warranty repairs on behalf of Bosch (**Purpose**). Bosch is committed to protecting the privacy of its customers' personal information. It will act in compliance with the National Privacy Principles and *Privacy Act 1988* (Cth). Bosch will not forward customers' personal information to third parties other than for the Purpose. A customer can object at any time to the use of their personal information for the Purpose. Bosch will cease to use a customer's personal information accordingly if an objection is made.

7. Bosch contact details

If you have any questions about this warranty or to lodge a warranty claim, please contact:

Robert Bosch (Australia) Pty Ltd
1555 Centre Road, Clayton, Victoria 3168
Tel: Australia: 1300 307 037
Tel: New Zealand: 0800 543 352

IMPORTANT NOTE FOR AUSTRALIAN CONSUMERS

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.