

HOME OWNER HANDBOOK INSTALLATION & COMMISSIONING MANUAL

Energy Smart Water Solar PV Hot Water System ROSC20 Series



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IMPORTANT NOTICE FOR INSTALLERS:

This manual is intended for licensed installers who have prior knowledge, experience, relevant training and comply with relevant Plumber's Code in the installation and maintenance of hot water storage tanks.

Installation of solar array and electrical connection and commissioning to the ROSC20 PCE device is to be carried out by licensed installers.

When commissioning is complete, please leave this document with the owner, drawing their attention to the sections: "Maintenance and Periodic Inspection" and "Troubleshooting".

ROSC20 System model number:

Date of Manufacture:

Serial Number:

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Contact Details

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Website: www.esw.net.au

SAFETY PRECAUTIONS

Please read these precautions carefully

DANGER—SHOCK HAZARD: Do not set up this product or make any electrical or cabling connections, such as the power cord, during a lightning storm.

DANGER—Do not exceed the maximum input voltage of 360 VDC

DANGER—The electronic circuit contains capacitors that may keep voltage even if the unit is not supplied with power. Authorised installer must wait a minimum of 10 minutes after isolating both DC and AC supplies before opening the myPV SC20 enclosure or commencing work on this equipment.

CAUTION—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 of instruction concerning use of the appliance by a person responsible for their safety.

CAUTION— Children should be supervised to ensure that they do not play with the appliance.

CAUTION— If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified person.

CAUTION—To be installed and serviced only by an authorised person.

CAUTION — The storage tank should not be exposed to constant sun/weather conditions.

CAUTION —Only install in vertical position.

CAUTION — Avoid exposure and operation in extreme ambient heat (<0 °C) or (>50 °C) and protect the my-PV SC20 housing from direct sunlight.

CAUTION – Do not touch the power plug on the water heater with wet hands

WARNING —This water heater is to be connected directly to the water mains and not by a hose set.

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

WARNING — This appliance delivers water exceeding 50°C. In accordance with AS/NZS 3500.4 a temperature limiting device is required to be fitted by the installing plumber



WARNING — Check the tank water level every three months and ensure that the water level is within the range of the water level indicator.

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

WARNING — The storage tank plastic wall on the ROTEX tank can melt under the effects of external heat (>85 °C) and, in the extreme case, can catch fire.

WARNING — Do not expose to ammonia, chlorine or other hazardous chemicals.

About This Manual

This manual contains information for installation, commissioning and maintenance of supplied Solar PV Hot Water System ROSC20. It includes information describing the product, its operation and settings.

Installers are to read the manual before assembly, installation, operation and maintenance of this system.

This manual is split into several parts to guide you through the installation process:

- Introduction
- Key points before installation of the ROSC20 system
- Installation guide
- Commissioning Instructions
- Operation Procedures
- Maintenance and Inspection
- Warranty

STANDARDS

The ROSC20 Series complies with the following Standards:

- AS/NZS 60335.2.21:2013+A1
- AS/NZS 60335.1:2011+A1+A2+A3
- IEC 62109-1:2010

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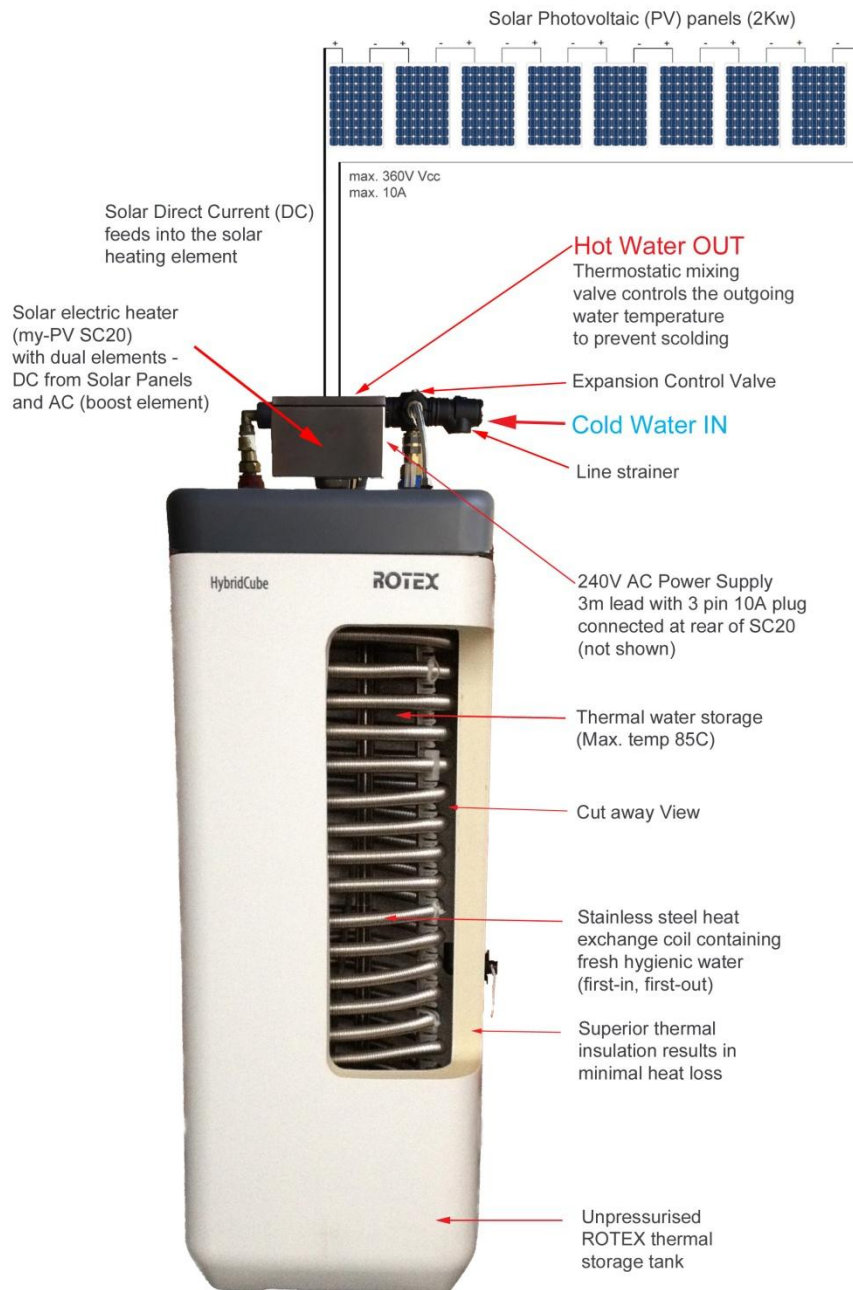
Regulatory Information for Installers

Installation and services must be performed by authorised personnel only. This water heater must be installed in according with:

1. Manufacturers installation instruction
2. AS/NZS 3500.4 "National Plumbing & Drainage Code"
3. AS/NZS 3498 "Authorization Requirements for Plumbing Products"
4. AS/NZS 5601.1 "Gas Installation General Installation"
5. AS/NZS 3000 "Wiring Rules"
6. AS/NZS 5033 Installation of photovoltaic (PV) arrays
7. AS 1768 Lightning Protection
8. AS/NZS 1170.2 Wind Loads
9. AS 4509 Stand-alone power systems
10. Municipal Building Codes
11. Occupational Health, Safety & Welfare Regulations
12. Any other States or Federal Statutory Regulations

Product Introduction

Overview of how the ROSC20 system works



1. The solar photovoltaic (PV) panels absorb the sun's energy and convert it into direct current (DC) power.
2. The DC current from the PV panels is controlled with an MPP-tracker, for maximum power output to the DC heating element located in the tank. NO GRID CONNECTION is required.
3. The solar DC heating element can heat the tank water to a maximum of 85°C at which point it switches off. Once the temperature drops, the solar element will re-activate.
4. On occasions when the solar energy gain is insufficient to heat the water to its minimum temperature of 55°C, an AC boost heating element, either powered by grid and/or battery storage, simultaneously heats the tank water to 65°C. Alternatively a gas backup is available.
(Note: System model numbers ending in E indicate AC electric boost configuration, System model numbers ending in A indicate gas boost configuration)
5. Mains pressure fresh cold potable water runs through the stainless steel heat exchange coil inside the tank separated from the heated thermal storage water. The potable water absorbs energy via the coil from the heated storage water which heats the usable water to its final temperature.
6. To prevent scalding, a high performance thermostatic mixing valve, or tempering valve ensures that water for your personal use is delivered at the required temperature. (To be supplied by installing plumber in accordance with AS/NZS 3500.4)

ROSC20 Specification/Model Numbers

ROTEX tanks are available in 300 & 500 Litre capacities; the tanks are non-pressurised vessels. The tanks have incorporated dual elements, DC solar electric and AC mains electric booster. Alternatively the system can be boosted via an alternate/gas booster. The ROTEX tank is manufactured from a high quality PU rigid foam material. The external and internal casing is a high quality non corrosive material that makes for a longer service life.

Model Numbers: * E for Electric Boost * A for Alternate Boost	ROSC20-328*	ROSC20-343*	ROSC20-34319*	ROSC20-544*	ROSC20-54432*	ROSC20-5443216*	ROSC20-54443*
ROTEX Thermal Store - Energy Storage Tank							
Dimensions (L x W x H) mm	595 x 615 x 1646			790 x 790 x 1658			
Storage tank volume	V = 300 l			V = 500 l			
Empty weight	55 kg	60 kg	67 kg	80 kg	90 kg	95kg	93 kg
Total weight (filled)	355 kg	360 kg	367 kg	580 kg	590 kg	595 kg	593 kg
Corrosion protection	corrosion resistant						
Standby heat expenditure in 24 hours with 60°C	1.3 kWh			1.4kWh			
Max. permitted storage tank temp.	T _{max} =85°C						
Max. Inlet Water Pressure (Coils)	600 kPa						
Cold and hot water	1" external thread						
Heating feed and return flow	1" external thread						
Drinking water - nominal content:	19 l	27.9l	27.9 l	24.8 l	29l	29l	29 l
- Heat exchange coil 1 (m)	28	43	43	44	44	44	44
- Heat exchange coil 2 (m)			19		32	32	43
- Heat exchange coil 3 (m)						16	
- Intermediary medium:	Unpressurised						
myPV Electric photovoltaic powered heating element							
Boost	* Identifies Boost - E for AC Electric or A for Alternate Boost eg Gas						
AC	≈ 220 - 240V/8.7A/2000W max./50/60Hz						
DC	= 100 - 360V/10A max./3600W max.						
Type of Protection	IP54						
Ambient Operating Temp	0 - 50°C						
Connectors	MC4						
Display	3 LED						

About Your System

The ESW ROSC20 Solar PV Water Heating System combines the ROTEX tank with the myPV SC20 Solar Photovoltaic electric water heater with AC boost or alternative boost solution such as an instantaneous water heater. The pressure-less storage water tank serves as a heat storage medium. Domestic (potable water) flows through a spiral corrosion resistant Stainless Steel heat exchanger coil which is completely immersed in the storage tank water. Cold water which flows in through the coil when water is drawn off is heated by the storage tank water.

Electric Boosting

Water stored in the storage tank is heated automatically by an electric booster heating unit (or alternate boost source such as a gas booster). The booster heats the water during very cloudy or rainy weather, during the winter months, or during periods of unusually high demand. The booster heating elements are controlled by an electric thermostat. The thermostat and heating elements are mounted into the storage tank inside the IP54 water resistant enclosure. The boost water temperature is automatically controlled by the thermostat setting when the booster heating unit is energized.

The AC boost thermostat is not adjustable. It has a minimum temperature setting of 55°C and a maximum temperature setting of 65°C. Automatic safety controls are fitted to the water heater to provide safe and efficient operation.

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Gas Boosting

Where gas boosting is used, the AC electric element of the tank is not connected. The water from the tank is pumped 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.

Water Temperature

For domestic use, the system outlet temperature is controlled by a high performance tempering valve or high performance thermostatic mixing valve to be supplied and installed by your installing plumber in accordance with AS/NZS 3400.4 to deliver 50°C. During periods of low solar energy gain, the water temperature is boosted by the thermostatically controlled electric booster heating element or the gas booster for gas boosted systems. An alternative boost heat source can also be used.

The water heater features a non-adjustable thermostat which is located inside the tank (The tank thermostat is factory set to a maximum tank temperature of 85°C for Solar and 65°C for Boost). Tank temperatures above 55°C are required to protect your installation from the potential of Legionella.

Before Installation

Please take note of the following points before installation

Intended Use

The ROSC20 Solar PV Hot Water System is designed to operate using direct PV input, up to 2.5 kW, in ROTEX 300L and 500L heat exchange tanks. This system is designed to have the PV connected directly to the SC20 heating device. It is not intended or approved to be connected to the grid in any way. Any other use is not permitted as it could result in electrical short circuit, fire or electrical shocks. The safety instructions, together with the handling and installation information need to be strictly followed.

Not for pool heating.

Safety Check

WARNING!

- The storage tank plastic wall on the ROTEX tank can melt under the effects of external heat (>85 °C) and, in the extreme case, can catch fire.
- Locate the ROTEX tank at a minimum distance of 1 m from other heat sources (>85 °C) (e.g. electric heater, gas heater, chimney, flue) and flammable materials.
- Locate the ROTEX tank on a firm level base. Where located indoors, ensure adequate drainage is provided.
- Hot water outlet can **exceed 50°C**. Tempering valve or thermostatic mixing valve needs to be installed in accordance to AS 3500.4 by your installing plumber.
- Ensure all sources of electricity are disconnected from the unit before removing any of the electrical covers

Electrical

- Electrical installation must be carried out by a qualified and licensed installer, observing the technical electrical guidelines and regulations according to Australian Standards AS/NZ 3000, AS/NZS 5033, AS 1768, AS/NZS 1170.2, AS 4509 and other regulatory authorities.
- The ROSC20 series of Solar PV Hot Water Systems are registered PCE devices on the CEC register. The 2kW PV array when connected to this device may be eligible for STCs
- Main supply must be switched off and isolated before starting any work on ROTEX tank. Ensure no possibility of unintentional live electricity at work space.
- Compliant electrical devices, leads and power distribution equipment must be used with intact labels and tamper-proof seals.

- 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.

Bore Water

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

Water Quality

- To comply with warranty conditions and ensure long life of the unit, ensure the water condition complies with water quality specified in warranty conditions.
- Domestic hot water flows through stainless steel heat exchange coils only

Installation Location

- Ensure the location is firm, levelled and capable of supporting the overall unit weight once it is filled with water.
 - 1 x ROTEX 500 litre tank = 650 kg filled weight
 - 1 x ROTEX 300 litre tank = 450 kg filled weight
- Ensure suitable means of capturing and managing any overflow is available at the installed location as per AS 3500.4.
- Ensure the size of the door frames are large enough to allow equipment to pass through.
- Ensure reasonable access for installation, servicing and removal of all components of hot water / heating system.
- Tanks and free-standing frames must be installed on solid, level base capable of supporting the weight when filled with water and that membranes remain intact after any fasteners are installed.
- Ensure that installed equipment will not stand in water
- Whether located outdoor or indoor, the water storage tank should be installed close to the most frequently used hot water outlet/s (typically the shower in domestic applications and kitchens in commercial applications) and its position chosen with safety and service in mind.
- As close as possible to the solar panels
- Locate the ROTEX tank at a minimum distance of 1 m from other heat sources (>85 °C) (e.g. electric heater, gas heater, chimney, flue) and flammable materials.
- Locate the ROTEX tank on a firm level base. Where located indoors, ensure adequate drainage is provided.
- Ensure the tank location is not exposed to frost, harsh weather condition and direct sun light and above 85C ambient temperature. Appropriate enclosure needs to be installed to protect the hot water system
- The system is not suitable for installation in areas that experience sub-zero temperatures; Areas of known heavy frost or altitudes higher than 600 m above sea level are not suitable for this system. (System can be installed indoors in these colder climates where the temperature is more moderate) gas booster location based on appliance type and approval
- Do not expose to ammonia, chlorine or other hazardous chemicals.

Clearances

- Allow adequate room to work with tools.
- A minimum of 250mm clearance around the water heater is required.
- 800mm for access cover removal
- 1400mm above for element/control 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 (floor waste located in indoor installations)
- 1 metre away from any heated surfaces

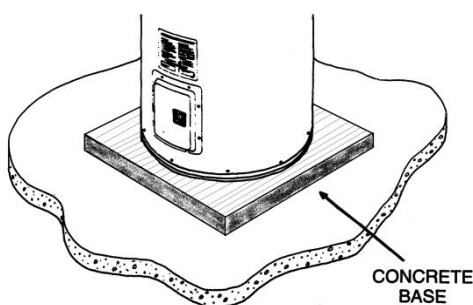
The water heater tank must be connected in such a way that:

- Electrical covers are accessible to a service agent.
- Space is allowed for the removal of the heating elements and control box.
- The booster & pump is accessible for servicing or complete removal of the unit if necessary.

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Foundation

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

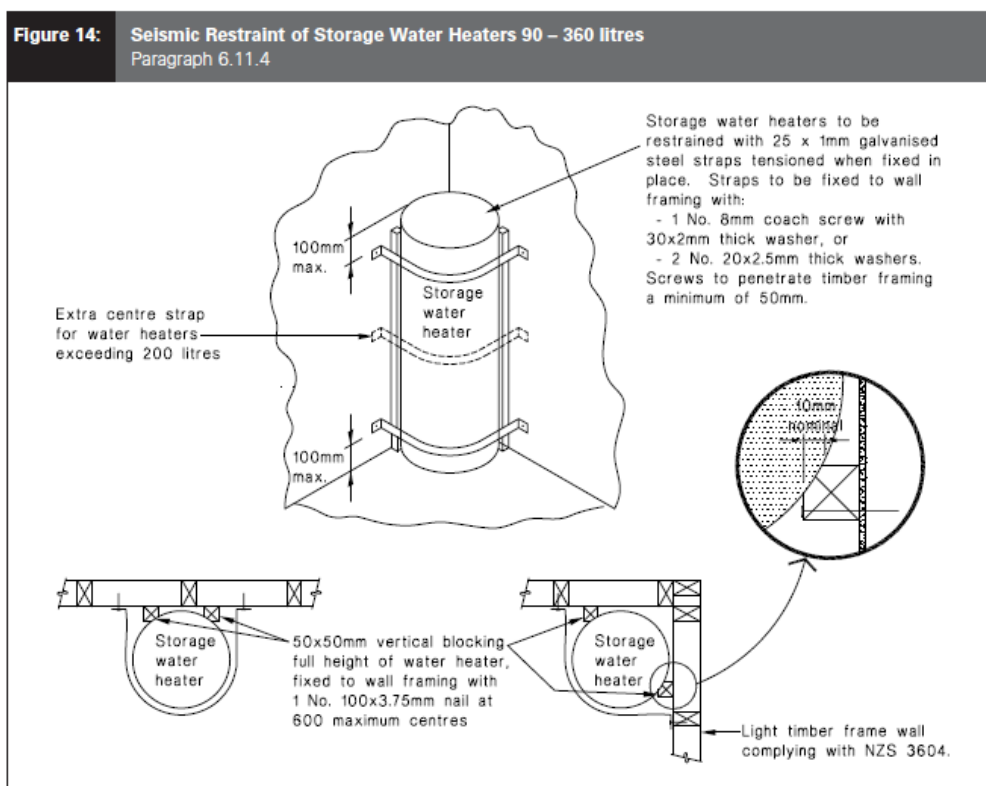


Suitable Water Heater Foundation

- Alternative forms of water heater bases are acceptable providing they allow for adequate support.
- Ensure the base and footings installed can adequately carry the load of the filled tank
 - 1 x ROTEX 500 litre tank = 650 kg filled weight
 - 1 x ROTEX 300 litre tank = 450 kg filled weight

Seismic Restraint

- Where seismic restraint is required in your building code, (i.e. NZBC G12 Building code), please install hot water tanks with seismic straps as shown:



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 (i.e. internal installations).
- Installation of such trays must comply with Clause 4.4 and Sub-Clauses 1 to 5 of the abovementioned Code.
- Safe tray should cover the foot print of the ROTEX hot water system, including all the attached equipment (pump, top up tank) on the tank.

Inspection and Unpacking

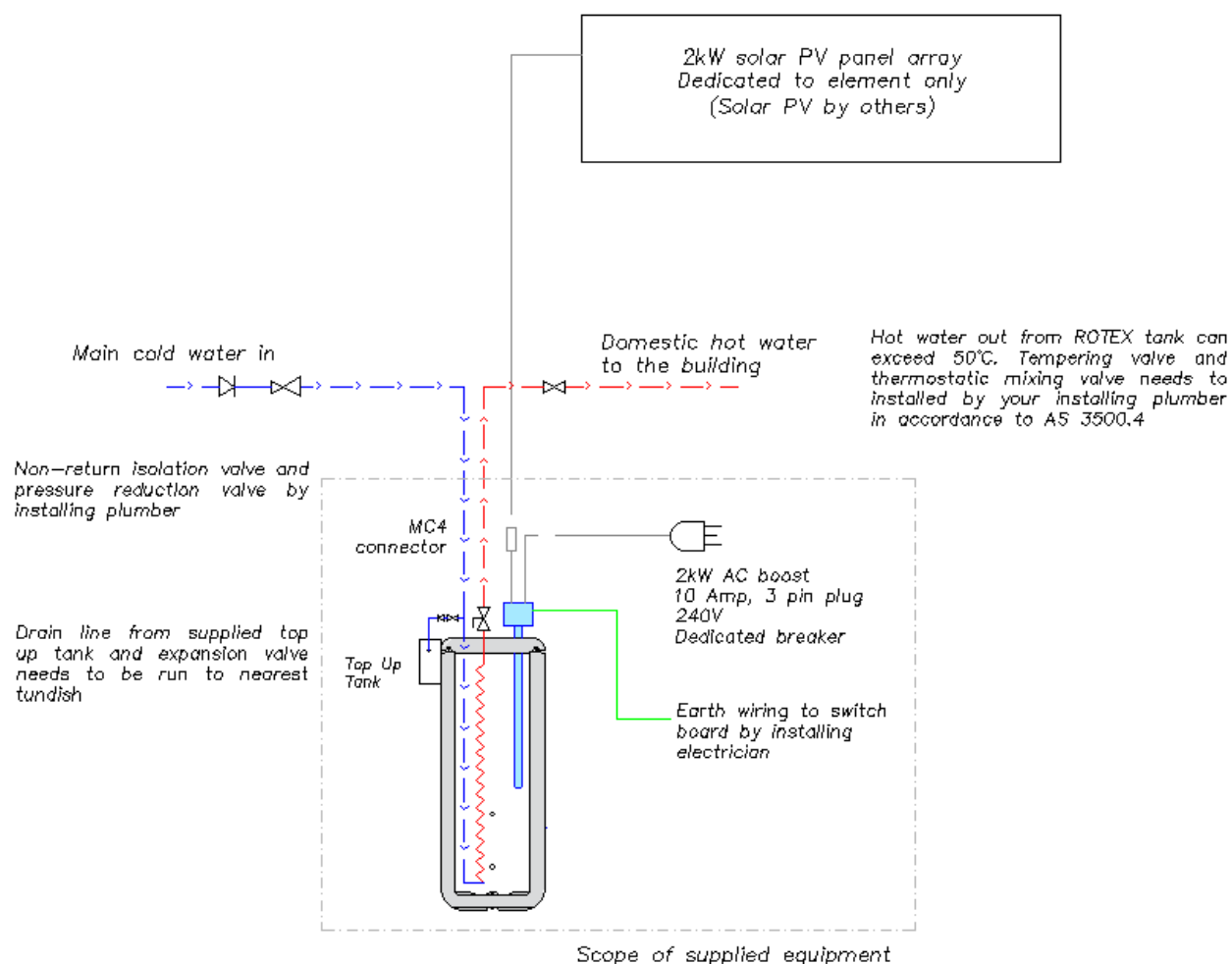
- The ROSC20 Solar PV water heater is to be inspected upon delivery for possible external damage or missing components.
- If damage or short delivery is evident it is to be noted on the freight docket and Energy Smart Water office contacted immediately. A claim should be lodged with the shipping company within three (3) days if shipment is damaged or incomplete.
- If major damage is apparent, do not lift package on to site without prior approval from Energy Smart Water.
- Your hot water system is supplied with the following components:

PARTS LIST		
Item No.	Qty	Description
1	1	ROTEX Thermal Store Energy Storage Tank with my-PV SC20 Electric Photovoltaic Powered Heating element and makeup tank
2	1	Expansion Control Valve
3	1	Pair MC4 plugs and earth cable
4	1	Installation and Owner's Manual
5	0	Gas Booster & Pump (with Alternate boost option only)

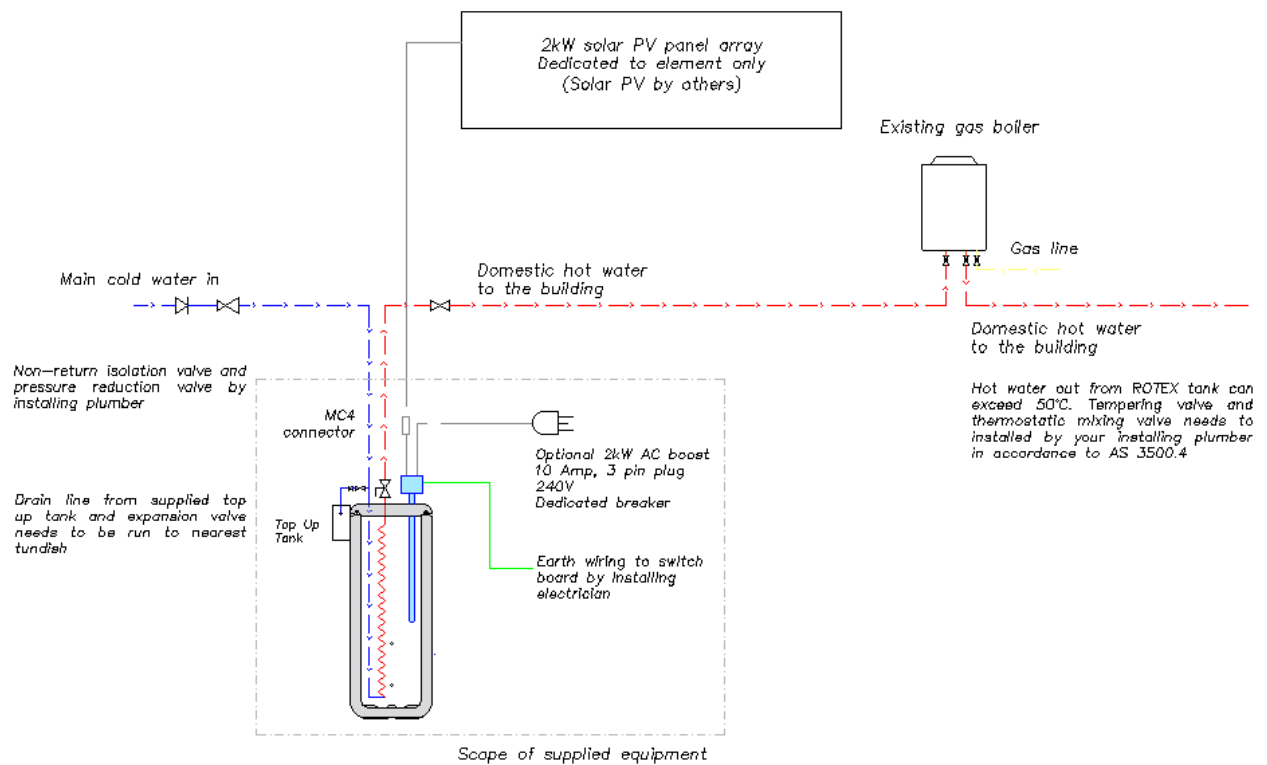
Hot Water System Schematics

Please familiarise with the appropriate hot water variant before installation. Below schematic drawings will provide an overview for your hot water installation.

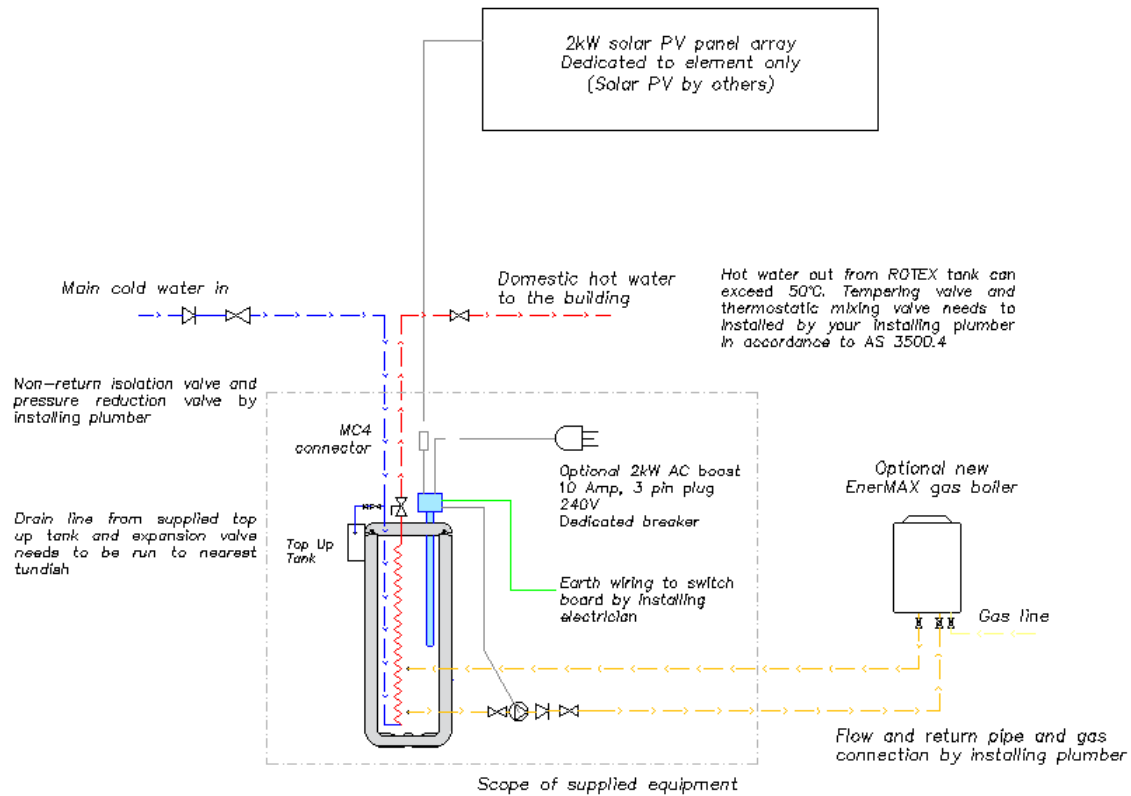
Electric boosted only installation



Post gas boost installation



Gas boost installation

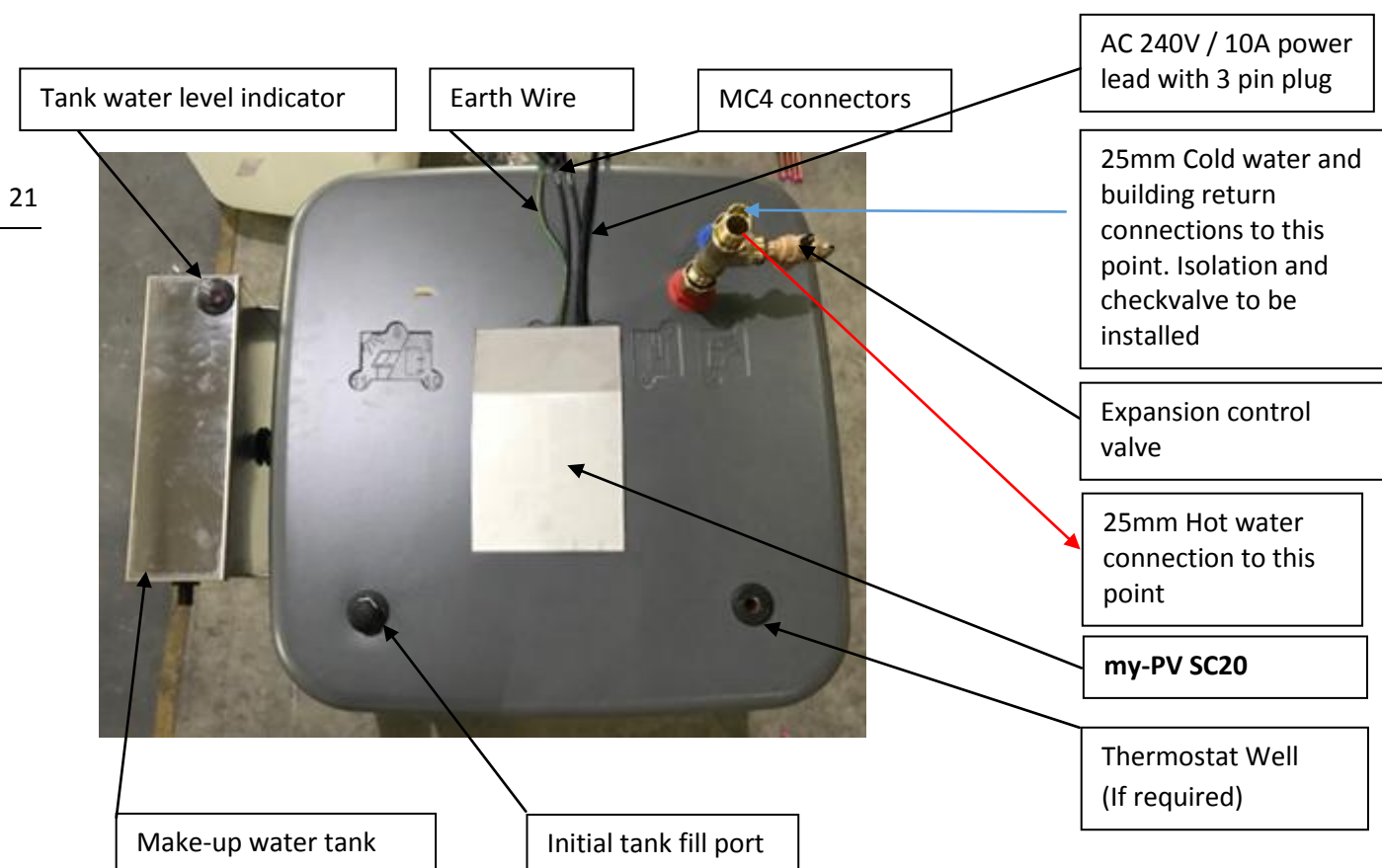


INSTALLATION – PLUMBING

Before Installation of a ROSC20 System, please refer to the schematics and other documentation describing the product. If more details are required, please contact Energy Smart Water before installation.

- Rotex tanks are pre-fabricated in the workshop.
- The hot water package is a Plug and Play pre-packaged. Refer to the pictures below.
- Ensure the level surface that can support filled weight of ROTEX hot water system, platform and any attached accessories and pipework.
 - 1 x ROTEX 500 litre tank = 650 kg filled weight
 - 1 x ROTEX 300 litre tank = 450 kg filled weight
- Ensure a water drain is placed near the hot water system.
- Ensure that the lid of the Rotex tank is sitting squarely on top of body of tank.

Domestic Cold and Hot Water connections



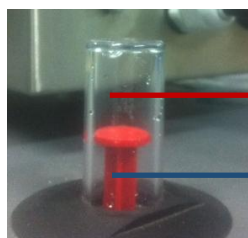
NOTE: To avoid damage to internal coils – Fill coils first prior to filling tank

WARNING —Do not remove any equipment or pipework from the ROTEX tank.

WARNING —Do not attach any external equipment and saddles on the ROTEX tank.

WARNING —Do not use any screws to pierce the skin of ROTEX tank.

- Connect cold water pipework to 25mm 'Cold Water' connection marked on top of tank with blue identifying ring.
 - Your installer must supply and install appropriate isolation, pressure and backflow control as per local regulations. Ring main / building return also connects to this point, entering pipework after backflow control (check valve).
- Connect hot water pipework to 25mm 'Hot Water' connection marked on top of tank with red identifying ring.
 - At hot water outlet, your installer must supply and install appropriate isolation and temperature control valves as per local regulation.
 - Hot water outlet from ROTEX tank can **exceed 50°C**. Tempering valve or thermostatic mixing valve needs to be installed in accordance to AS 3500.4 by your installing plumber.
- To allow for disconnection of the water heater a mechanical union and ball/isolation valves must always be provided at the cold water inlets and hot water outlets to allow for disconnection. 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.
- After all the plumbing fittings are installed as per AS 3500, open the ball/isolation valves to fill the coil with mains pressure water
 - Coil/s must be filled before storage/jacket of ROTEX tank is filled.
 - Mains pressurised water and domestic water flows through the internal heat exchange coil/s.
- Fill the ROTEX tank with water manually
 - Storage/jacket water sits in the tank and unpressurised
 - To speed up the process, a garden hose can be used to fill the tank
 - **Warning:** ROTEX tank needs to be filled to appropriate level before switching on the hot water tank



Maximum water level

Minimum water level

- Above red float indicator needs to be visible and sits between max and min level labelled on the glass.
- Tank water level can be adjusted through ball float arm in the metal automatic top up tank, attached on the ROTEX tank.
- Check pipework for leaks and pressure retention.

Top Up Tank

- Top up tank maintains water level in storage water of Rotex tank and heat source/s
- Mains water to be supplied from via duo valve and pipework



Top Up Tank view from above

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- After mains pressure coil/s are filled and all primary pipework is complete, the jacket of the ROTEX tank can be filled with water.
- This is carried out through the top up tank.
- Ensure all pumps are OFF.
- Make up water will stop flowing when water reaches level of float. To set level, see commissioning instructions later in this document.
- Connect overflow port to suitable tundish.

Drains

- Drain required for the following:
 - Cold expansion valve
 - Make-up tank overflow

Hot Water Delivery

- This water heater can supply water at a temperature **exceeding 50°C**. A tempering valve must remain fitted between the water heater and the outlets in ablution areas to comply with the water temperature requirements of AS 3500.4 by your installing plumber.

Water Pressure

- Test incoming water pressure to the heat exchange coil with a gauge. If the pressure exceeds 600kPa, an approved pressure limiting valve is required.
 - Pressure limiting valves are not supplied with the hot water system.
- ROTEX tank is a non-pressurised vessel and should be manually filled upon initial installation. Refer to 'Installation' steps above.

PTR Valve

- The storage water in the ROTEX tank is unpressurised. Hence, no PTR (Pressure, Temperature Relief) valve is needed for the water heater tank.

Cold Water Expansion Valve

- A cold water expansion valve at 650 kPa is fitted to the pipework and must be extended to a tundish or adequate drain point.

COMMISSIONING – PLUMBING & GAS

Commissioning Sheet - Plumbing	
Task	Complete?
Ensure safe work environment for workers and hot water equipment	
All work must comply to relevant codes	
Install water heater on a flat surface	
Plumbing	
Check for leaks	
Ensure sufficient gas supply and pressure to gas boosters. Purge gas line	
Drains for top up tank, cold expansion valve, gas booster	
Domestic Hot Water	
Connect all domestic hot water pipework	
Ensure cold water pressure does not exceed 600 kpa rating of cold water expansion valve	
Ensure non return valve on cold water supply and ring main return	
Fill domestic hot water circuit / coils before filling ROTEX tank / primary heating circuit	
Ensure delivered hot water pressure complies with AS3500	
Ensure storage water is filled to appropriate level	
Ensure tempering valves or thermostatic mixing valves are installed in accordance to AS3500.4	
Primary / Heating circuit	
Air vent at top if any significant rises of primary pipework	
Fill ROTEX tank with clean water. Fill until water is permanently present in top of tank. Set level.	
Gas Boosters	
Installed to gas code by licensed personnel	
Static and dynamic gas pressure set and regulated to range on appliance data plate	
Measured gas pressure when gas boosters operating	
Set to correct outlet temperature - usually in the range of 75- 83°C, depending on the brand and model of heater	
Water filters clean on start up	
Water filters clean after running for a sufficient period of time	
Flueing	
Flueing is installed to gas code and manufacturers installation instructions	
Ventilate plant room for gas boosters that draw combustion air from location of appliance	

Start up	
Confirm electricity is available	
Check and confirm earthing of all components and assemblies	
Turn on all GPO's and switchboard contactors	
myPV SC20 will start heating the tank	
Bleed primary pumps of air (if applicable)	
Check filter in gas booster for debris after start-up on several later occasions (if applicable)	
When ROTEX tank is at design temperature (thermostat preset at 65°C), gas pump and myPV SC20 will switch off	
Note: ensure delivered hot water temperature complies with AS/NZS 3500.4	
Set top up tank / primary water level	
Set water level in top up tank by bending arm of float valve. The red float indicator at the top of the ROTEX tank should be at the middle of the clear thimble. The water level in the top up tank should be below the overflow connection point.	

Commissioning must be completed by a qualified and licensed personnel in accordance with AS/NZS 3500.4, AS/NZS 3498, AS/NZS 3000; AS/NZS 5601.1, Municipal Building Codes, Occupational Health, Safety & Welfare Regulations, any other States or Federal Statutory Regulations

INSTALLATION – ELECTRICAL

Standards

This unit is to be installed by authorised, licensed installers in accordance with:

1. AS/NZS 3000 Wiring Rules
1. AS/NZS 5033 Installation of photovoltaic (PV) arrays
2. AS 1768 Lightning Protection
3. AS/NZS 1170.2 Wind Loads
4. AS 4509 Stand-alone power systems
5. Municipal Building Codes
6. Occupational Health, Safety & Welfare Regulations
7. Any other States or Federal Statutory Regulations

Photovoltaic (PV) Array

Array Configuration

PV array should not be functionally earthed. Positive and negative lines of the PV array must not be earthed at any time otherwise an earth fault error will occur. Metal frame and support structure of the PV panels shall be earthed according to AS/NZS 5033. A switch-disconnector is required adjacent to myPV SC20 (PCE) and within 3m and line of sight of the PCE. Additionally a switch-disconnector (DC isolator) is required adjacent to the PV array.

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Note: A switch-disconnect must have: marked on/off; be lockable in the off position; be load breaking.

PV array design rules

<p>Upper voltage limit calculation: example: Voc STC (25°C cell temp)= 37.3VDC Voc temp. coeff= -0.33%/°C @ -15°C => delta T= -40°C -40°C * -0.33%/°C = +13.2% Voc max =Voc STC + 13.2% = 44.22VDC 42.22V * 8 in series = 337VDC <360VDC DC voltage in range</p> <p>Notice: Panel characteristics at lowest possible temperature are decisive. If voltage exceeds 360VDC potential damage of unit!</p> <p>Upper current limit calculation: Overcurrent will be limited to 10A.</p> <p>Notice: Over current will not damage unit!</p>	<p>Low voltage limit calculation: Design value is minimum heating rod resistance = 15 Ohm example: Impp STC (25°C cell temp)= 8.26ADC Isc temp. coeff= +0.033%/°C @ 65°C => delta T= 40°C 40°C * 0.033%/°C = 1.3% Impp max = Impp STC + 1.3% = 8.37ADC Vmpp min = Vmpp STC -13.2% = 32.4VDC</p> <p>minimum voltage= 8.37*15 = 125VDC min number of panels: 125/32.4 = 4</p> <p>Notice: Panel characteristics at highest possible temperature are decisive. MPP tracking range is 100 to 360V. The higher the current, the more voltage is required to utilize the current. If voltage V<100: unit will not work if voltage/15 < current: unit will not run at MPP</p>
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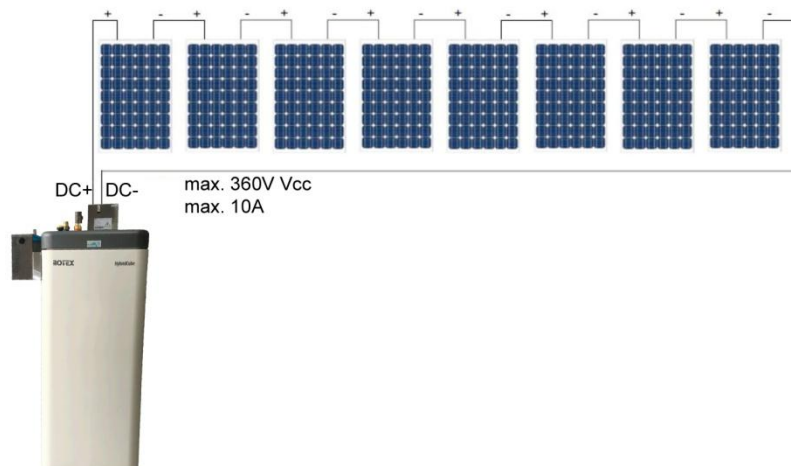


Figure 1: wiring schematic of PV Panels

STCs

The ROSC20 series of Solar PV Hot Water Systems are registered PCE devices on the CEC register. The 2kW PV array when connected to this device may be eligible for STCs if installed by a CEC grid-connect accredited installer.

Safety Instructions

- ❖ This unit has dual electrical supply 240V 8.7A AC and 360V 10A DC
- ❖ When the photovoltaic array is exposed to light, it supplies a DC voltage to the SC20.
- ❖ In addition the SC20 may be powered from AC supply for electric or alternate boost
- ❖ The electronic circuit contains capacitors that may keep voltage even if the unit is not supplied with power. Wait a minimum of 10 minutes after isolating both DC and AC supplies before opening the myPV SC20 enclosure or commencing work on this equipment.
- ❖ Before opening the enclosure isolate both DC and AC supplies
- ❖ For the AC supply an in line circuit breaker with a rating of 10A must be installed.
- ❖ Installation and connection procedures must comply with local regulations.
- ❖ Damages resulting from non compliance with the installation/operating manual result in loss of warranty.
- ❖ Permanent earthing of the SC20 device must be provided. Even if not powered from AC. The unit is connected with an additional Earth lead to be hard wired to the Earth.
- ❖ Never switch on the system without a full tank of water, covering the element.
- ❖ Check the tank water level periodically and ensure that the water level is within the range of the water level indicator.
- ❖ Only install device in a vertical position.
- ❖ Avoid exposure and operation in extreme heat ($>50^{\circ}\text{C}$), or cold ($<0^{\circ}\text{C}$) or direct sunlight.
- ❖ Do not exceed the maximum input voltage of 360 V DC
- ❖ In commercial installations, the applicable accident prevention laws regarding use of electricity, must be adhered to.
- ❖ The my-PV SC20 PV heating device does not contain components which can be repaired/replaced. In case of failure please contact Energy Smart Water

Electric Boosting

Caution - Power must not be turned on until the storage tank is filled with water

The AC electric boost heating element provides boosted hot water during periods of low solar gain or high hot water use. The recommended installation is for the AC 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 warranty. Refer to electrical installation instructions below.

Booster Element Power

The storage tank with an electric booster element is designed for connection to a 240V AC, 10A mains power supply with an isolating switch designed to operate on a standard tariff.

Alternate Boost

Gas Booster

This system supports Gas Boost by instantaneous units in lieu of the electrical boost. The system can be ordered this way and setup for operation as a system ready for installation on site. Consult with Energy Smart Water for a customized solution.

Pump

The pump is connected to the ROSC20 control unit via a standard 3 pin plug connected directly to the ROSC20 controller, when the thermostat calls for booster heat the pump is powered to pump water from the tank through the gas booster and back into the tank again thus energising the tank from 55 degrees to maximum 65 degrees.

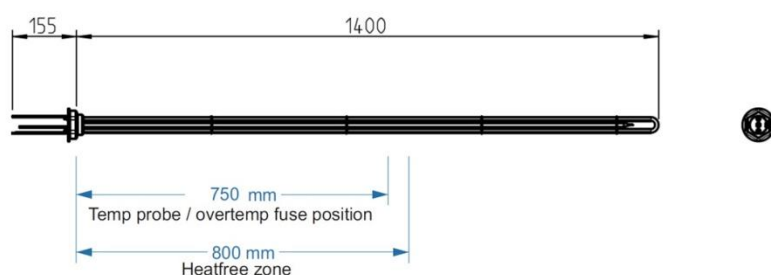
MYPV SC20 Photovoltaic Water Heater

Assembly and Installation

Installation only to be conducted by authorized personnel.

The tank has to be filled with water as per tank installation manual.

SC20 has to be installed vertically in the tank by screwing the 40mm thread into the lid of the ROTEX tank. The cold zone reaches down 800mm from the sealing.



Do not use any force when screwing the element into the lid until it touches the seal. Use a 60mm spanner and apply up 80 Nm.

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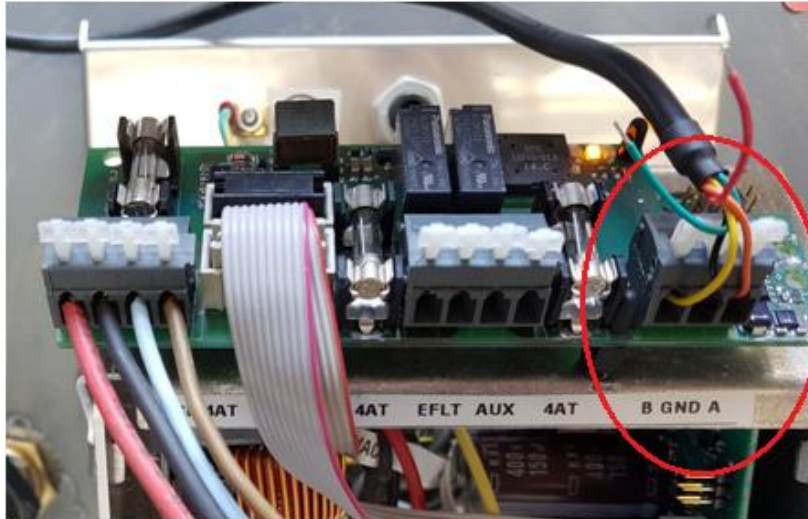
Electrical connection myPV SC20

- ❖ This unit is to be installed in accordance with AS/NZS 3000 .
- ❖ SC20 housing must be earthed.
- ❖ The unit must be connected to a 10A RCD protected circuit.
- ❖ Make sure that the main switch of the PV plant is disconnected.
- ❖ DC cables to be connected with correct polarity, to the two MC4 connections. The system will not work in the case of reverse polarity, but no damage is caused.
- ❖ Connect the AC cable for AC, gas or alternate boost support heat.

Connection of RS485

Extension board

The extension board has the following connection terminals:



Description from the left to the right:

Gas Boost: 240V out, 4.0A fuse

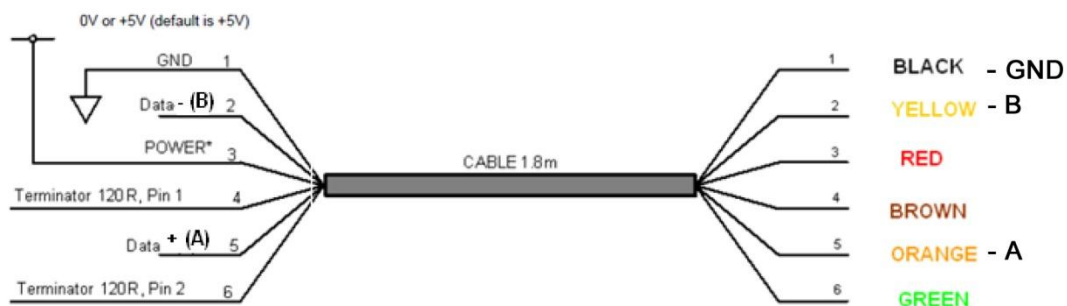
EFLT - Earth fault alarm: potential free relay contact, 4.0A fuse Buzzer: sends audio signal simultaneous with red blinking LED of the SC20

AUX: potential free relay contact, 4.0A fuse (also used for gas-boost switching)

B GND A - RS485: data communication

3 LED: left = red, middle = yellow, right = green

The following **Figure 5.1** shows the cable signals and the wire colours for the signals on the USB-RS485-WE cable.



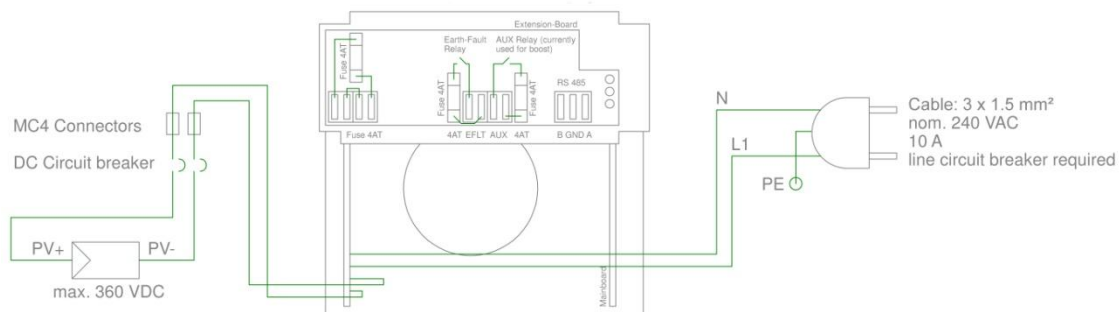
[ROSC20 Software Download](#)

Operating Status Indicator

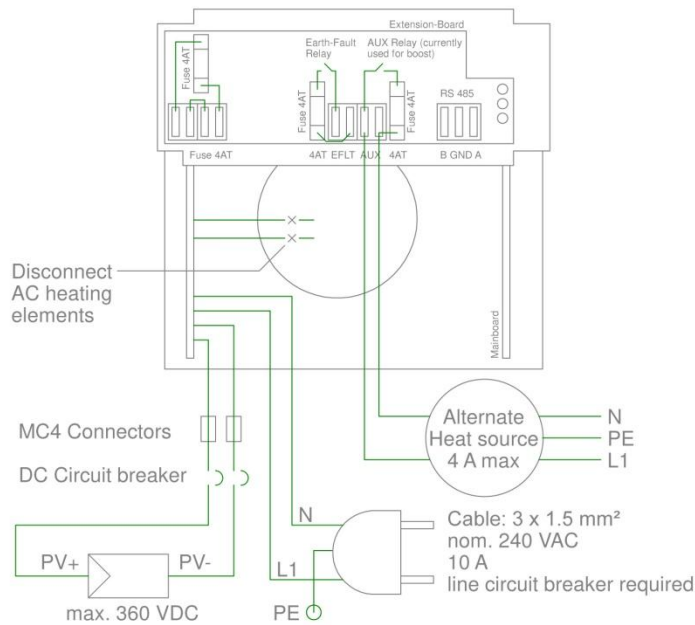
Red, yellow, green	Startup (app. 7 sec)
Green flashing	Standby
Yellow	Solar heating
Yellow flashing	Heating AC , gas or alternate boost support heat
Green	Heating complete, Set temperature reached
All flashing	Setup Mode
Red, red flashing	Fault

Wiring Diagrams

Wiring Diagram SC20 Electric Boost

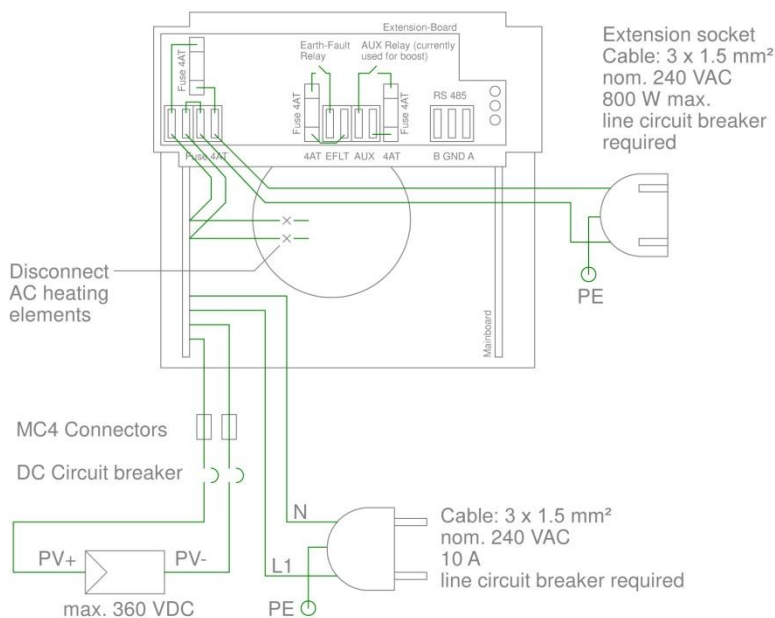


Wiring Diagram SC20 Alternate Boost - External Supply



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Wiring Diagram SC20 Alternate Boost Internal Supply



COMMISSIONING - ELECTRICAL

Check that plumbing commissioning is complete and tank is full of water before proceeding.

Normal PV operation without AC

(AC plug not connected)

1. After connecting SC20 device to the PV plant the DC separator needs to be switched on and it will take approximately 10 minutes for the system to operate. During this time the green LED will blink (standby).
2. The set temperature of 85°C is fixed.
3. Normal operation ► Yellow LED on
4. After set temperature is reached ► System turns off, yellow LED off, green LED on

Normal operation with AC, Gas or alternate reheating

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The additional reheating using AC, Gas or Alternate support heat, ensures that the reheat temperature is reached, independent from the PV input.

The reheat temperature is factory set at 55°C cut-in and 65 °C cut-out.

Operating Status Indicator

Red, yellow, green	Startup (app. 7 sec)
Green flashing	Standby
Yellow	Solar heating
Yellow flashing	Heating AC , gas or alternate boost support heat
Green	Heating complete, Set temperature reached
All flashing	Setup Mode
Red, red flashing	Fault

Fault report

Red LED flashing modes:

1x flash ► Over temperature cut off (98°C) . System has to be checked by an authorized service technician.

2x flash ► Water temperature above 90°C. System switches off and back on once temperature decreases.

Remark: This temperature is close to the over temperature cut off (98°C). Ensure to set the temperature of the external source below 85°C.

3x flash ► Electronic overheating. System switches off and back on after cooling off.

4x flash ► Faulty electronic or heating element. System needs to be checked by an authorized service technician.

5x flash ► DC-insulation fault (PV collectors or electric heating element). System has to be checked by an authorized service technician.

6x flash ► Faulty temperature sensor. System needs to be checked by an authorized service technician.

Troubleshooting

The system does not contain components which can be repaired/replaced. In case of failure please contact:

Energy Smart Water Pty. Ltd. | **E** esw@esw.net.au | **T** +61 3 9939 6722 | **W** esw.net.au

Technical data

DC	
DC-Voltage	100 - 360 V (max.)
MPP-Voltage	100 - 360 V
Number of MPP Trackers	1
Max. input current	10 A, limited power
Power rating	2.000 W at 25°C surround temperature, Derating when overheating
DC connection	Original MC4, 1 string
Recommended module configuration	4 - 8 pieces polycrystalline module with 60 cells
MPP- matching efficiency	99,8 %
General data	
Maximum pressure	max. 10 bar (1MPa)
Total efficiency	>99% power rating
IP rating	IP54
Ambient Operating temperature	0 °C to 50 °C
Operating status display	3 LED's
Interface	serial IR Interface
Dimensions (WxHxD)	175 x 265 x 1550 mm incl. element
Length of element	140 cm
Heating rod thread connection	40mm
Weight	4.5 kg incl. cable, without package
Environmental rating	
Environmental category	outdoor
Pollution degree	2
Relative humidity rating	0-99% (not condensing)
Cooling	convection
Maximum altitude	1000 meters above sea level
Overvoltage category for each input	Category 2

AC	
Heating capacity	2.000 W
Connection	Single phase, 3wire cable, 240 V, 50-60 Hz
Fuse	16 A
Cable	3 m
Standby-power	0 W in DC operation, <2 W in AC operation

- ❖ The safety temperature limiter in myPV SC20 cuts out permanently at 98°C +/- 3°C.
- ❖ The myPV SC20 PV heating device does not contain components which can be repaired/replaced. In case of failure please contact Energy Smart Water.

Subject to change

Disposal

Retain packaging materials or dispose properly. At end of service life, dispose according to local disposal laws.

EU declaration of Conformity

SC20 complies with the following standards
EN60355-2-21, EN60730-2-3, EN61000-6-2

Maintenance

Every Six Years – Major Service

(by authorized personnel only)

Only genuine replacement parts are to be used on this water heater. Major service and replacement parts are not included in the warranty. A charge will be applicable.

The major service includes the following:

- Replace the temperature pressure relief valve.
- Check the electric heating unit for excessive calcium build-up or corrosion and replace if necessary
- Visually check the unit for any potential problems
- Inspect all connections
- If a safe tray is installed, check the drain line is clear of blockages

Every Three Months – Minor maintenance check

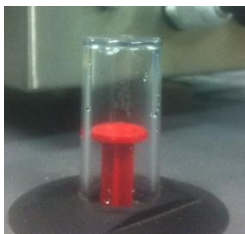
(by home owner)

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CAUTION – Do not touch the power plug on the water heater with wet hands

The minor check includes the following:

- Visual check of water level float



- Visual check for water discharge from expansion control valve
- Visual check for exposed electrical wire
- Visual check for earth wire disconnection
- Visual check for any leaks from tank, pipework or pump
- Visual check that the SC20 housing is not in direct sunlight to extend life of unit
- Remove any flammable materials nearby
- Remove any chemicals nearby
- Check that tank foundation has not sunk or moved

Troubleshooting

For Authorised Personnel Only

Cause	Remedy
ROTEX tank overflowing	
Leaking mains pressure coil	Isolate each tank to determine which tank is leaking. Check coil for leakage. Replace as necessary.
Top up tank incorrectly set	Bend float arm in top up tank to lower water level

Top Up Tank Overflowing	
Float incorrectly set	Bend float arm in top up tank to lower water level
Leaking mains pressure coil	Isolate each tank to determine which tank is leaking. Check coil for leakage. Replace as necessary.

Mains pressure expansion valve leaking	
Water pressure too high	Check and reset / reduce inlet main pressure
Water temperature too high	Check and reset thermostat / solar controller

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No Hot water	
No electricity	Check electricity supply
	Check that all plugs and sockets are connected
Faulty thermostat	Check electricity supply
	If stop working, replace the thermostat with the same model number
	Can plug primary pump directly into GPO for short term hot water supply. This is only applicable when using gas continuous flow water heaters as heat source. GCF heaters will run to their present outlet temperature and automatically switch off and on. Do not use this method for more than one week.
myPV SC20 failed – red flashing light	Request an authorised & certified electrician to investigate

Noisy heat transfer pump For back up gas boiler only	
Air trapped inside pump	Bleed pump according to manufacturer's instructions
Poor mounting	Mount pump on isolation pads / springs

Heat transfer pumps are not operating For back up gas boiler only	
Unplugged	Check plug and power supply
Motor failed	Contact Energy Smart Water to determine correct pump replacement
Capacitor failure	Contact Energy Smart Water for replacement parts
Pump is not primed	Purge air lock from pipe. Run pump till the line is full.

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



Warranty

This warranty is given by Energy Smart Water Pty. Ltd. 2/11 Dalkeith Drive, Dromana Vic 3936.
ABN 65 161 756 690

Terms of Warranty

This Warranty covers any defects in materials when the product is installed and operated according to Energy Smart Water written installation instructions, subject to the terms within this Limited Warranty document. Improper installation may void this Warranty. This Warranty extends to the original purchaser and subsequent owners, but only while the product remains at the site of the original installation. This Warranty only extends through the first installation of the product and terminates if the product is moved or reinstalled at a new station.

Replacement of the product may be authorized by Energy Smart Water only. Energy Smart Water does not authorize any person or company to assume for it any obligation or liability in connection with the replacement of the product. If a component or product returned to Energy Smart Water is found to be free of defects in material or workmanship, or damaged by improper installation or damaged during return shipping, the warranty claim for product, parts and labour may be denied.

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Proof of purchase is required to obtain warranty service. You may show proof of purchase with a dated sales receipt, credit card statement or other proof of purchase. In the first instance, you should contact Energy Smart Water by email or telephone and point out the defect.

All Energy Smart Water water heating units are carefully checked, tested and subject to stringent quality controls.

Energy Smart Water will repair or replace the covered product or any part or component that is defective in materials or workmanship as set forth as follows:

Product (equipment only - used in domestic applications)	Warranty Period
• ROTEX Sanicube storage polypropylene container	10 years
• ROTEX Sanicube fittings	1 year
• Stainless steel heat exchanger coils for potable water	3 years
• myPV SC20 Solar Electric Device	2 years
• Other parts	1 year

Labour	Warranty Period
• Replace defective parts	1 year

Labour limited to 50 km radius from GPO in Australian capital cities

Purchaser's Statutory Rights

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 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.

Conditions of Warranty

- Supplied product must only be installed, commissioned or serviced by qualified personnel.
- The connection, attachment, integration or general association of other equipment or parts that are not specified by Energy Smart Water which either directly or indirectly affect the performance or operation of this equipment could void warranty.

Water Quality

It is important that the ROSC20 system is installed in water conditions that are suitable for its efficient long-term use. Product warranty is limited to the following conditions:

Description	Max allowable
pH	6.5 to 8.0
TDS (total dissolved solids)	600mg/L
Total Hardness	200mg/L
Chlorides	150mg/L
Magnesium	10mg/L
Calcium	20mg/L
Sodium	150mg/L
Iron	1mg/L

If there is no option but to use a poorer water quality that is outside the max allowable warranty conditions, coil/s can be replaced at owner's expense. Please contact Energy Smart Water Pty Ltd. Water supply must be sourced from municipal water supply.

Please contact the local authority for more information regarding the quality of water in your area.
Water quality outside of the above recommendations will void warranty.

Note that heat sources are separated from mains water supply, however maximum allowable limits are applicable for both applications.

Warranty Exclusions

- Where the product has not been installed, operated, maintained or serviced in accordance with the instructions supplied by Energy Smart Water Pty Ltd.
- Where the product is not used according to the project specification
- Water quality outside of the limits specified in this manual.
- Where the product is misused, damaged, neglected, abused, operated outside of instructions in this manual.
- Where damage is caused by an act of God, fire, lightning, flood, earthquake, landslide, storm, hail, frost, wind or other severe adverse weather conditions.
- Where cold water pressure level exceeds the maximum pressure specified in this manual.
- Where water hammer or water pressure spikes occur.
- Where any attempt has been made to repair the product other than by Energy Smart Water Pty Ltd Accredited Service Agent.
- Where any attempt to replace parts on product other than by parts approved by Energy Smart Water Pty Ltd.
- Where attempts to replace parts / maintain / repair without approval of Energy Smart Water Pty Ltd.
- Where the water heater is located in a position that does not comply with the installation instructions or relevant statutory requirements
- Where the water heater is moved or reinstalled at a new location
- Where access to water heater requires dismantling or removal of cupboards, doors or walls, or use of special equipment to gain access or relocate water heater ground level or to a serviceable position.
- SUBJECT TO ANY STATUTORY PROVISIONS TO THE CONTRARY, THIS WARRANTY EXCLUDES ANY AND ALL CLAIMS FOR DAMAGE TO BUILDING, STRUCTURE, FIXTURES AND FITTINGS, FURNITURE, CARPETS, WALLS, FOUNDATIONS OR ANY OTHER CONSEQUENTIAL LOSS EITHER DIRECTLY OR INDIRECTLY DUE TO LEAKAGE FROM THE WATER HEATER, OR DUE TO LEAKAGE FROM FITTINGS AND / OR PIPE WORK OF METAL, PLASTIC OR OTHER MATERIALS CAUSED BY WATER TEMPERATURE, WORKMANSHIP OR OTHER MODES OF FAILURE.
- A call out fee is chargeable where it is found there is no fault with the water heater, where the complaint is related to excessive discharge from the temperature and / or pressure relief valve due to high water pressure, where there is no flow of hot water due to faulty plumbing or cross connection, where water leaks are related to plumbing and not the water heater or water heater components, where there is a failure of gas, electricity or water supplies, where the supply of gas, electricity or water does not comply with relevant codes or acts or other issue not due to performance of water heater.