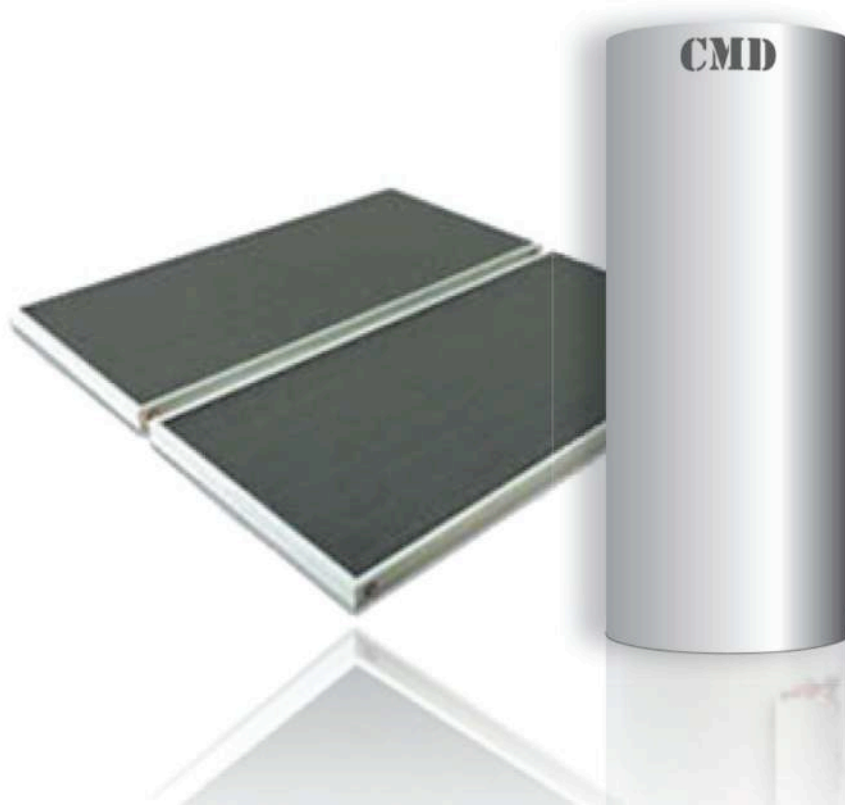


Owner & Installer Manual



CMD ELECTRIC BOOST SOLAR WATER HEATERS

Models

CMD272	CMD273
CMD342	CMD343
CMD452	CMD453



This water heater must be installed and serviced by a qualified trades person.

This guide must be left with homeowner.

CMD ELECTRIC BOOST SOLAR WATER HEATERS

Owner & Installer Manual

Models:

CMD272	CMD273
CMD342	CMD343
CMD452	CMD453

Congratulations for purchasing a high quality CMD Solar Water Heater, designed in Australia for Australian conditions.

This water heater must be installed and serviced by a qualified person.

WARRANTY / SERVICE – Contact CMD Solar, PO Box 14486, Cairns. QLD. 4868 Australia or Telephone 1300 853 392.

Note to Installer: Following Installation, please:

- 1. Complete the installer checklist (page 28) and return to CMD Solar; and**
- 2. Hand this manual to the homeowner for future reference. Note – the Warranty page requires your signature for future reference.**

THIS UNIT IS NOT SUITABLE FOR USE AS A POOL OR SPA HEATER

WARNING: Plumber - Note Carefully: Plastic pipe must not be used on a solar water heater installation due to the effects of high water temperatures and pressures. **USE COPPER PIPE ONLY.** All compression fittings must use brass or copper olives.

Notice to Victorian Customers from the Victorian Plumbing Industry Commission

This water heater must be installed by a licensed person as required by the Victorian Building Act 1993.

Only a licensed person will give you a Compliance Certificate, showing that the work complies with all relevant Standards. Only a licensed person will have insurance protecting their workmanship for six years. Make sure you use a licensed person to install this water heater and ask for your Compliance Certificate.

Installation and service must be performed by an authorised and qualified person. This water heater must be installed in accordance with:

- 1. Manufacturer's Installation Instructions**
- 2. AS/NZS 3500.4 "National Plumbing & Drainage Code"**
- 3. AS/NZS 3000 "Wiring Rules"**
- 4. Relevant Occupational Health & Safety Regulations**
- 5. Municipal Building Codes (including NZ Building Code if installed in New Zealand)**
- 6. Any other relevant Local, State or Federal Statutory Regulations**

WARNING: Plumber – Note Carefully

- **This page of brief instruction is to be read in conjunction with other plumbing and electrical installation requirements contained within this Installation Instruction and Owner’s Manual**
- **All installation work must be carried out by an appropriately qualified Tradesperson/s.**
- The installation must be performed by Qualified and Authorised Persons and comply with the requirements of AS/NZS 3500.4, AS/NZS 3000, 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.
- This Water Heater Is Not Suitable For Pool Heating
- Section 4 “Solar Collector Installation” must be read and understood prior to installation of collectors to roof top.
- Plastic pipe must not be used on a solar water heater installation due to the effects of high water temperatures and pressures. USE COPPER PIPE ONLY. All compression fittings must use brass or copper olives.
- Hot and cold copper pipes to and from the collectors must be completely insulated with a suitably temperature rated insulation that is UV rated and weatherproof with minimum thickness of 19mm.
- Valves and fittings supplied with this water heater are supplied with insulation covers which must be fitted as part of the solar installation. Failure to fully insulate pipework and fittings increases the risk of freeze damage and will void warranty
- The maximum height of solar flow and return pipes must be where these pipes enter and exit the solar collectors to avoid the possibility of air locks in the solar installation.
- The maximum length of the copper tube from the solar pump to the collectors is reliant on mains pressure (minimum 200kPa) and the number of bends and fittings in the run. As a guide, for DN15 copper pipe, the maximum length should not exceed 20 metres for 2 collectors and 15 metres for 3 collectors. Note that maximum pipe lengths are based on minimal bends.
- Valves and fittings supplied with this solar water heater form part of the installation and must be fitted in accordance with this manual.
- The pump and controller assembly is fitted with an AVG Flow Meter FM15-1.4. This flow meter is pre-set to 1.0L/Min for optimal performance and must not be adjusted at time of installation.
- Working on roofs should always be considered a hazardous activity; by law you must observe certain minimum safety precautions. These safety precautions are outlined in the Work Cover Code of practice “Safe work on roofs” Part 1 and 2 and in the Occupation Health and Safety Act 2011.
- A 240V 50 Hz 10 Amp power outlet, connected to continuous tariff, is required for the pump and controller and must be installed by a licensed Electrician. This may be a weatherproof outlet depending on location.
- The responsibility for all OH&S issues relating to the installation of the system resides with the installing tradesperson/s.
- The system should only be connected to water supply of acceptable quality otherwise the warranty provided for the system may become void. Refer to Warranty conditions and section entitled “Water Supply” contained within this manual.
- Frost Protection Kits (CMD -FRK) are available from CMD Solar and should be fitted in areas that experience frost or freezing conditions (below 5°C). See detail herein entitled “Frost Protection Kits”.
- The PTR valves and the Cold Water Expansion valve must be fitted with

a drain to legal discharge points where the water discharge will be clear of any paved areas and will not cause damage or injury. Do not block or seal these drain lines.

- This water heater is intended to be installed as a fixed appliance and must be installed on a hard, level surface. If installation is to be in a wet area or a concrete floor, ensure the water heater is mounted on a suitable and substantial raised base (eg: wood or concrete)

- The use of a self-draining safe-tray may be required in accordance with the provisions of AS/NZS 3500.4, Clause 5.4.2.
- Please refer any queries relating to the design and/or installation of CMD Solar products or components to the Technical Services Department in writing.
- Rough-In Dimensions for CMD Solar Tanks as follows:

Model	Units	CMD Series Model Number					
		CMD272	CMD273	CMD342	CMD343	CMD452	CMD453
Water Heater Stored Capacity	L	270	270	340	340	450	450
Number of Solar Collectors	#	2	3	2	3	2	3
Tank Height	mm	1408	1408	1711	1711	1733	1733
Overall Diameter	mm	648	648	648	648	730	730
Height to Cold Water Inlet (from ground)	mm	82	82	82	82	83	83
Height to Hot Water Outlet (from ground)	mm	1169	1169	1472	1472	1473	1473
Tempered Water Outlet (midway between hot & cold))	mm	540	540	695	695	695	695
Flow to Solar Collectors (from ground)	mm	650	650	650	650	650	650
Drain to Waste (from ground)	mm	82	82	82	82	82	82
Return from Solar Collectors	mm	569	569	687	687	673	673

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PART A – HOUSEHOLDER GUIDE

IMPORTANT INFORMATION

CMD Solar Water Heater Models have roof mounted solar panels connected to a ground mounted solar storage tank and/or boosting heater. The solar input is harvested with a circulation pump controlled by an electronic temperature differential controller.

1. It is important for the householder to become familiar with the contents of this manual to ensure safety and to optimise the performance and longevity of this water heater.
2. This water heater is designed for use by a single family domestic dwelling to provide hot potable water.
3. Do not operate this water heater until all operating instructions have been read and understood by the homeowner.
4. These water heaters are NOT recommended for connection to Bore Water Supplies and warranty may be void in such installations.
5. A properly drained safe tray must be used where property damage could occur from water spillage (see AS3500.4.2). Ensure this safe tray does not become blocked.
6. If you live in an area that experiences frost in winter months or freezing occurs (below 5°C), please ask your installer to install a CMD Solar Frost Protection Kit (CMD-FRK) to assist with preventing damage to panels. Note that this is a secondary frost protection mechanism as the solar water heater is equipped with an electronic freeze control system that will pump water from the storage tank through the collectors when the temperature of the water in the collectors reduces to 3° Celsius. This process will cease when the water temperature in the collectors rises to 5° Celsius and may repeat while the temperature is low. It is imperative that the power supply to the pump and controller is not interrupted or turned off. Damage to the panels caused by freeze conditions which occur below 5° Celsius when the power is interrupted or turned off is not covered by warranty.
7. Do not activate the power supply to this water heater unless the cylinder is filled with water and a satisfactory Megger reading is obtained by a qualified tradesperson.
8. Do not block or seal the Pressure & Temperature Relief (PTR) safety valve or drain pipe. Never fit a PTR or Expansion Control Valve (ECV) with a pressure rating greater than that indicated on the product-rating label.
9. The water heater warranty can become void if relief valves or other safety devices are tampered with or if the installation is not in accordance with these instructions.
10. Do not place any articles, chemicals or flammable materials on or near the water heater
11. Removal of access covers will expose 240V wiring. Do not remove the terminal box cover or gain access to this water heater unless the power supply has been effectively disconnected by a qualified tradesperson only.
12. Do not operate this water heater with the terminal box cover removed or loose.
13. This water heater is not intended to be operated or adjusted by young children or infirm persons. Young children must be supervised to ensure they do not interfere with the water heater.
- 14. This water heater can deliver water at temperatures which can cause scalding. Check the water temperature before use, such as when entering a shower or filling a bath or basin.**
15. Take care not to touch copper pipes connected to the water heater as high temperatures in the pipework may be present.

16. The water heater pump / controller must be plugged into a 240V 50Hz 10Amp electrical outlet which may be required to be weatherproof depending on location. Take care not to touch the power plug with wet hands.
17. If the power supply cord, plug or electrical conduit to the water heater is damaged, it must be replaced by a qualified tradesperson in order to avoid a hazard. The power supply cord and plug must be replaced with a genuine replacement part available from CMD Solar Pty Ltd.
18. In times of low solar energy contribution, water stored in the solar tank can be heated by an electric booster consisting of an element and an automatic thermostat located on the tank. It is recommended that the electric boost be connected to a continuous electrical supply; however, if connected to an Off Peak Tariff, a night rate tariff is NOT RECOMMENDED. Note that the thermostat must only be adjusted by a qualified tradesperson.
19. **DANGER: FAILURE TO OPERATE THE RELIEF VALVE EASING GEAR AT LEAST ONCE EVERY SIX MONTHS MAY RESULT IN THE WATER HEATER RUPTURING. IT IS IMPORTANT THAT THE EASING GEAR ON THE VALVE BE RAISED AND LOWERED VERY GENTLY. FAILURE TO DO SO MAY RESULT IN THE WATER HEATER CYLINDER FAILING, OR UNDER CERTAIN CIRCUMSTANCES, RUPTURING VIOLENTLY.**
20. **IT IS NORMAL FOR SMALL QUANTITIES OF WATER (UP TO AROUND 15 LITRES IN A 24 HOUR PERIOD) TO BE RELEASED BY THE ECV OR PTR VALVE IN THE HEATING CYCLE. CONTINUOUS LEAKAGE OF WATER FROM THE VALVE MAY INDICATE**
A PROBLEM. IF THE VALVE DOES NOT DISCHARGE WATER WHEN THE EASING GEAR IS OPERATED, OR DOES NOT SEAL AGAIN, A SERVICE CALL SHOULD BE MADE WITHOUT DELAY. THE PTR VALVE IS NOT SERVICABLE.
21. **THE THERMOSTAT IN THE ELECTRIC BOOST IS EQUIPPED WITH AN OVER-TEMPERATURE CUT-OUT. IF THE OVER-TEMPERATURE CUT-OUT ACTIVATES, IT MUST NOT BE RESET AND THE WATER HEATER MUST BE SERVICED BY AN AUTHORISED PERSON.**
22. The amount of water heated by the electric boost is as follows:
 - a. CMD270 – 121 Litres
 - b. CMD340 – 153 Litres
 - c. CMD450 – 202 litres
23. **WARNING: IF THE SOLAR SYSTEM IS NOT USED FOR TWO WEEKS OR MORE, A QUANTITY OF HYDROGEN GAS, WHICH IS HIGHLY FLAMMABLE, MAY ACCUMULATE IN THE SYSTEM. THIS MAY BE OBSERVED AS VIOLENT 'SPLUTTERING' WHEN A HOT TAP IS OPENED INITIALLY. TO DISSIPATE THIS GAS SAFELY, IT IS RECOMMENDED THAT A HOT TAP BE TURNED ON FOR SEVERAL MINUTES AT A SINK, BASIN OR BATH BUT NOT AT 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 HAS FORMED AND IS DISCHARGED THROUGH THE TAP IT WILL PROBABLY MAKE A SOUND SIMILAR TO AIR ESCAPING.**

INSTRUCTIONS AND MAINTENANCE

Warning: This appliance not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge.

Children should be supervised by a person responsible for their safety to ensure that they do not play with the appliance.

Operation

Ensure that your solar hot water system is filled with water at all times. If drained at any time then the solar panels should be covered as prolonged exposure to sun without a supply of coolant water may cause damage.

DO NOT turn off the ELECTRICITY or WATER SUPPLY to the Solar Controller and Pump.

The pump and controller should be connected to a 240V 50 Hz power supply at all times i.e. throughout the entire year. Even in winter it is important that the controller is able to turn the pump ON during cold conditions to prevent panel damage due to freezing.

The controller is a differential thermostat which turns the pump on and off in response to temperature signals received from a hot sensor, located in the solar panels on the roof, and a cold sensor located in a pocket at the base of the solar storage tank. The sensor cables must not be damaged or cut.

Electric Boost

Water stored in the storage tank is heated automatically by an electric booster element which is controlled by an automatic thermostat. The booster element heats the water during very cloudy or rainy weather, during the winter months, or during periods of unusually high demand. Although it is recommended to connect the electric element to continuous power, it can be connected to an off peak tariff but NIGHT RATE OFF PEAK

IS NOT RECOMMENDED as the available power may not be sufficient during inclement weather and you may run short of hot water during these periods.

The electric booster heating element is controlled by an automatic electric thermostat. The thermostat and element are mounted on the solar storage tank. The boosted water temperature is automatically controlled to the thermostat setting when the booster heating element switch is in the on position.

The thermostat is tradesperson adjustable. It has a minimum temperature setting of 60°C and a recommended maximum temperature setting of 75°C. It must only be adjusted by an authorised person. Automatic safety controls are fitted to the water heater to provide safe and efficient operation.

The electric booster element will automatically heat the water in the upper section of the tank. An isolating switch can be installed which will allow manual control however be aware that if this switch is turned off, a shortage of hot water can occur during periods of low solar radiation and water temperatures below 60°C can give rise to bacterial breeding including Legionella bacteria. Australian Standards therefore stipulate that this switch be left continuously on and the automatic thermostat be set to a minimum temperature of 60°C.

Safety Valves and Frost Protection Valves

See Solar Layout Drawings to identify these valves.

Never fit a Pressure and Temperature Relief Valve (PTR) or Expansion Control Valve (ECV) with a pressure rating greater than that indicated on the product-rating label.

It is normal for the ECV fitted to the cold mains water supply to dribble as either the solar panels

or water heater heats water within the system. The expansion valve releases water from the system so that the system will be maintained at its design pressure.

The PTR valve fitted to the solar storage tank should not dribble during normal operation as they are fitted as safety valves. If the PTR valve dribbles, operate the easing mechanism on the valve and allow water to discharge through the drain pipe. Remember this water may be HOT and ensure that the discharge does not come in contact with anyone. Release the easing lever SLOWLY and reseal the valve. If the valve is still dribbling 24 hours after reseating contact CMD Solar.

If no water is drawn from the system for several days in hot weather conditions the ECV on the solar storage tank may open and freely discharge water in order to discard the excess solar energy collected. This should happen only infrequently but it is considered normal operation.

If the PTR valve on the storage water heater freely discharges hot water and steam, turn off the electricity supply to the storage unit and contact CMD Solar Service.

IMPORTANT: Relief valves should be checked to be in sound working order in intervals not exceeding 5 years, or more regularly in areas subject to water deposits. Checking should include operation of the relief valve to remove any lime deposits. The PTR valve should be replaced every 5 years.

Frost Protection Valves

Frost protection valve kits (Kit Code CMD-FRK) are available from CMD Solar and should be fitted to collectors where solar water heaters are installed in frost prone areas. Where fitted in frost areas, one frost protection valve is fitted to the bottom of each panel (2 off per kit) and must be pointing downwards towards the guttering. It is normal for these valves to dribble during very cold weather. Failure to install frost protection kits in frost prone areas may void warranty should damage to collectors occur.

Maintenance

Periodic - as needed (minimum six-monthly) by Owner

- Prune or remove trees or shrubs that shade the solar panels. For effective operation the panels should be in full sunlight between at least 9am and 3pm in both summer and winter. Panels which are shaded will not function correctly.
- Shading from newly erected buildings also needs to be considered and panels relocated if necessary.
- Check cleanliness of solar panel glass. Clean if covered in dust, grime, leaves or other build up. The panels may be cleaned with water and detergent only when the panels are cool, for example at the beginning or end of the day or during overcast conditions. If there has been little rain or if the panel is located in a dusty location it may be necessary to clean the panels more frequently. **Note.** CMD Solar does not cover cracked or broken glass in collectors. This may be covered by your household insurance policy.
- Draining and flushing the water heaters and panels must be undertaken by an authorised service agent or plumber and not by the householder due to possible high water temperatures.

WARNING!

Working on roofs should always be considered a hazardous activity; by law you must observe certain minimum safety precautions. These safety precautions are outlined in the Work Cover Code of practice "Safe work on roofs" Part 1 and 2 and in the Occupation Health and Safety Act 2011.

- Flush and reseal the PTR valve and cold water pressure ECV. This is done by raising the release lever, allowing water to flow freely and then lowering the lever slowly and allowing the valve to reseal (this is to remove lime deposits and to

verify that the valve is not blocked). Remember that the water discharging from the valves may be HOT and should not be permitted to come into contact with anyone.

Annual Service – By authorised Serviceman

CMD Solar recommends that the Solar System be serviced annually. The components or parts may not be covered by CMD Solar warranty if damage to the system or parts is caused by the lack of regular maintenance.

- It is important that the PTR valves, the cold water ECV and frost valves be replaced every 5 years.
- The protective anode fitted to the solar storage tank should be checked and replaced if necessary at suitable intervals depending on water quality, but no later than every 5 years. It is recommended that CMD Solar be contacted regarding a suitable replacement anode.
- Changing the anode at regular intervals should extend the working life of the storage tank.

Householder Fault Finding

Prior to contacting CMD Solar for a service call, there are some basic checks that can be made by the householder. Please note that you will be charged by a CMD Solar where the fault is not related to manufacture or failure of a part or out of warranty.

Not Enough or No Hot Water?

If the collectors are shade-free, the weather

is fine and warm and the solar storage tank contents are definitely cold, the circulating pump should operate and the return connection become warm or hot. Please note that the pump is almost silent and vibration-free in operation. Check the following:

1. Is there 240 volts at the power outlet? Is there a blown circuit breaker, RCD or fuse?
2. Is the pump plugged into the controller? The pump and controller are located under the plastic terminal box cover on the storage tank.
3. Are the sensors plugged into the correct sockets in the controller?
4. Are the sensors correctly fitted into the sensor pockets on the tank and collectors?
5. Has all air been purged from the system?
6. Has your hot water usage changed?
7. Is the thermostat setting sufficient to recover from hot water usage?

Pressure and Temperature Relief (PTR) Valve Leaking?

It is usual for a pressure and temperature relief valve to release a small quantity of water during the heating cycle; up to around 15 litres over a 24 hour period is acceptable. If the discharge is noticeably more than this, contact CMD Solar.

Cold Expansion Control Valve (ECV) Leaking?

The ECV may discharge a small amount of cold water to prevent the PTR valve from potentially discharging water that has been heated, thereby saving energy. This is normal.

PART B – INSTALLERS GUIDE

SOLAR TANK INSTALLATION

Installer – Please Note The Following

- 1. This Water Heater Is Not Suitable For Pool Heating**
2. All work associated with the installation of this water heater must be carried out by properly trained and accredited tradespersons and be strictly in accordance with relevant Australian Standards including AS/NZS 3500.4 and AS/NZS 3000, local, State and Federal Regulations including, but not limited to, Occupational Health, Safety and Welfare Regulations (OH&S)
3. If this installation is taking place in an area subject to frost conditions or freezing conditions (below 5° Celsius), the CMD Solar CMD-FRK Frost protection Kit containing two frost protection valves should be installed on the panels.

The solar water heater tank should be installed in close proximity to the most frequently used hot water outlet and its position chosen with safety and service in mind. Other considerations include the position of the solar tank with respect to the solar collectors as heat loss can occur in the pipes, and copper pipe length should not exceed 20 metres (for 2 panel systems). Also consider servicing (the water heater must be accessible without the use of a ladder or scaffold and the anode, PTR valve, thermostat and booster element must be able to be removed) and nameplate data must be able to be read. Other considerations include:

- Electrical supply requirements for the pump and controller
- Weight of the heater filled with water
- Dimensions of the heater and size and location of connection points

- Water supply pressure limitations

Clearance

Allow adequate room to work with tools. A minimum of 25mm clearance around the water heater is required. An additional 30mm is required for relief valve removal, 80mm 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:

- Space is allowed for the removal of the heating element.
- Space is allowed for the removal and replacement of the anode.
- The pump is accessible for servicing.
- Complete removal of the unit can be easily effected 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.

Vent safely to open air and carry hot water overflow pipework to drain.

Foundation

To ensure adequate ventilation, position the unit on an approved support base to Attention is drawn to the weight of the water heater tank when full (up to approximately 600kg depending on model) and the installer should ensure the base and footings are substantial enough to avoid subsidence etc.

Water Supply

If the water heater is installed to a tank water supply, a minimum 200kPa water supply pressure must be available or a pressure pump must be installed to allow operation of the system

This water heater has been constructed to meet water quality conditions in most Australian water supply locations. However, harsh water quality does exist in some locations and, if in doubt, contact your local council or water supplier. Only potable water should be used in this water heater. If you are unsure of the water chemistry in your area, you may find additional information by contacting your local water supply authority.

Anode: The anode in your water heater is sacrificial, however it is designed to protect the vitreous enamel lined cylinder in most public reticulated water supplies for five years after which time it should be replaced as part of annual service. However it is important to understand that many water supplies can exhibit chemical qualities that are not suitable for the standard anode supplied with this water heater. Where the Total Dissolved Solids (TDS) is greater than 600mg/L or less than 40mg/L, the installed anode may be unsuitable for use to protect your water heater. In these circumstances, a plumber or authorised service person should be contacted to fit the correct anode.

prevent water ponding around the base of the water heater tank.

Different anodes are available in these situations to protect the vitreous enamel lined tank. Please note that warranty becomes void if the TDS value exceeds 2500 mg/L.

The **Saturation Index** is a measure of the water's corrosiveness. Corrosion may result in early failure of copper parts such as solar collectors and copper sheathed electric components. Water is considered corrosive should the saturation index be below -1.0. Scaling, which is the build-up of calcium carbonate in the tank, can occur where the Saturation Index is above +0.4. In these instances where the Saturation Index exceeds +0.4, ensure the expansion control valve (ECV) is fitted according to instructions contained within this manual. Should the saturation Index exceed +0.8, a low Watts density element must be fitted.

Water heaters installed in locations where incorrect anodes are fitted due to high or low TDS or where the water is corrosive or considered scaling will not be covered by this warranty.

Pipework, Valves and Fittings

Valves and fittings for connecting the solar panels on the roof and the storage tank are supplied.

The temperature of the water at the outlet connection on the panels may reach 150°C or more and therefore only copper pipe can be used between the panels, storage tank and boosting heater.

Class B copper pipe should be used and the runs should be as short as possible to reduce heat losses.

The pipes **MUST** be lagged using thick-walled foam of at least 19mm thickness,

RO.6 and should be weather proofed and UV stabilized.

If insulation is not UV stabilized, it must be protected by a suitable UV resistant paint.

Pre-formed insulation gloves and cable ties are provided to insulate fittings. The areas to be insulated are: inlet pipework fittings to the panel, the outlet pipework

fittings, and on 2 & 3 panel systems the joiners between the panels. These fittings must be insulated to protect them from freezing in cold areas. Warranty may be void if not fitted. Refer to the Solar Panel Layout drawings for location and installation detail. Water may drip from the pipe of the pressure-relief device. This pipe must be left open to the atmosphere

Solar Controller and Pump Operation



The Aestiva Solar Controller and Grundfos Pump supplied with this Solar Water Heater is enclosed within a UV Resistant ABS plastic enclosure which is designed to house these components and protect them from harmful UV radiation. This Pump/Controller assembly is fitted onto the side of the tank directly above the Cold Water Inlet using stainless steel screws provided in the CMD-Ground kit.

The control unit turns the pump on and off in response to temperature signals received from a hot sensor located in the solar panel's hot water outlet fitting on the roof top, and a cold sensor located at the entry to the storage tank. It is crucial that these sensors and leads are not damaged or cut during or subsequent to installation.

Note that after 2 hours of operation of the pump, it will automatically switch off for five minutes before resuming to prevent any possible cavitation of the pump.

The controller incorporates an LCD display that can easily be read to identify the various sensor temperatures and error modes (shown in bold below).

Temperature Probe Turn On (**Pump On Temp**) and Turn Off (**Pump Off Temp**) temperatures are as follows:

"Pump On Temp": 8°C Differential (ΔT) between Panel Sensor temperature and Tank Temperature Sensor (panel sensor hotter than tank sensor).

"Pump Off Temp": 2°C Differential (ΔT) between Panel Sensor temperature and Tank Temperature Sensor.

The Controller will also prevent the pump from circulating water to the panels should the tank temperature, measured at the Tank Temperature Sensor become too high. Temperature setting to protect the tank is as follows:

“Top Out Temp”: 75°C measured at the tank mounted sensor will de-activate the pump to protect the vitreous lining of the steel tank.

Freeze protection is also a standard function of the controller. Where the panel temperature measured at the Panel Temperature Sensor approaches freezing, the pump will activate and circulate heated tank water to the panels until the panel temperature rises and prevents against frost damage. Temperature settings are as follows:

“Protect On Temp”: 3°C measured at the roof top sensor will activate the pump.

“Protect Off Temp”: 5°C measured at the roof top sensor will de-activate the pump

Note that when cold conditions prevail overnight, this frost protect mechanism may switch the pump on and off several times to protect the panels, potentially resulting in reduced hot water being available in the morning.

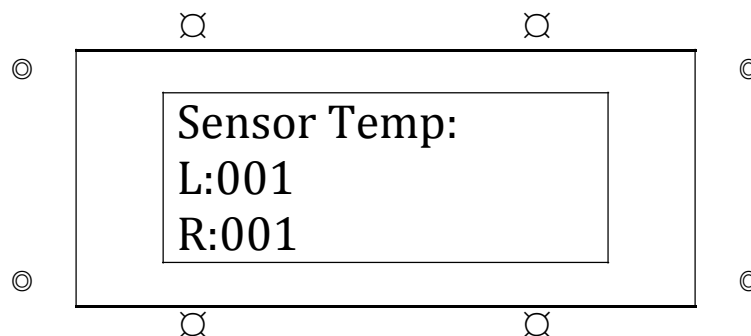
The sensor leads are extra low voltage conduit and secured with conduit saddles to ensure they remain undamaged.

but must to be encased in 20mm PVC The hot sensor (long lead) should be dry and pushed to the bottom of the long hot sensor pocket on the top left hand corner of the solar panel. A clip on the sensor probe port is provided to secure the sensor lead.

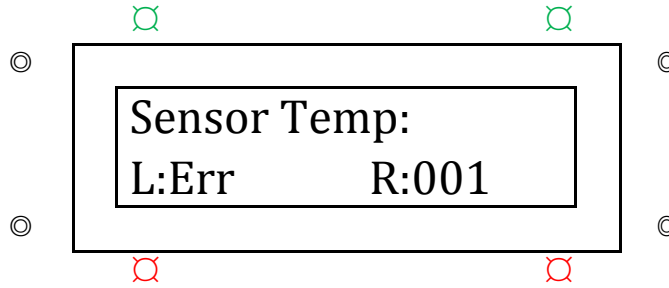
The cold sensor (short lead) is to be fitted dry into the short cold water sensor pocket at the cold water entry to the solar storage tank. Refer to the respective layout diagram supplied with the Solar Storage Tank.

Controller Error Codes

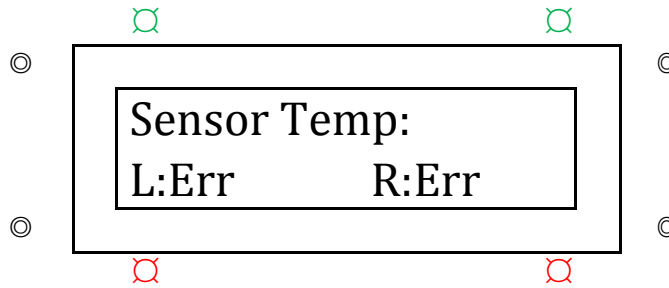
The LCD display will normally display the Lower “L” tank sensor temperature and the Roof-top “R” sensor temperature as follows:



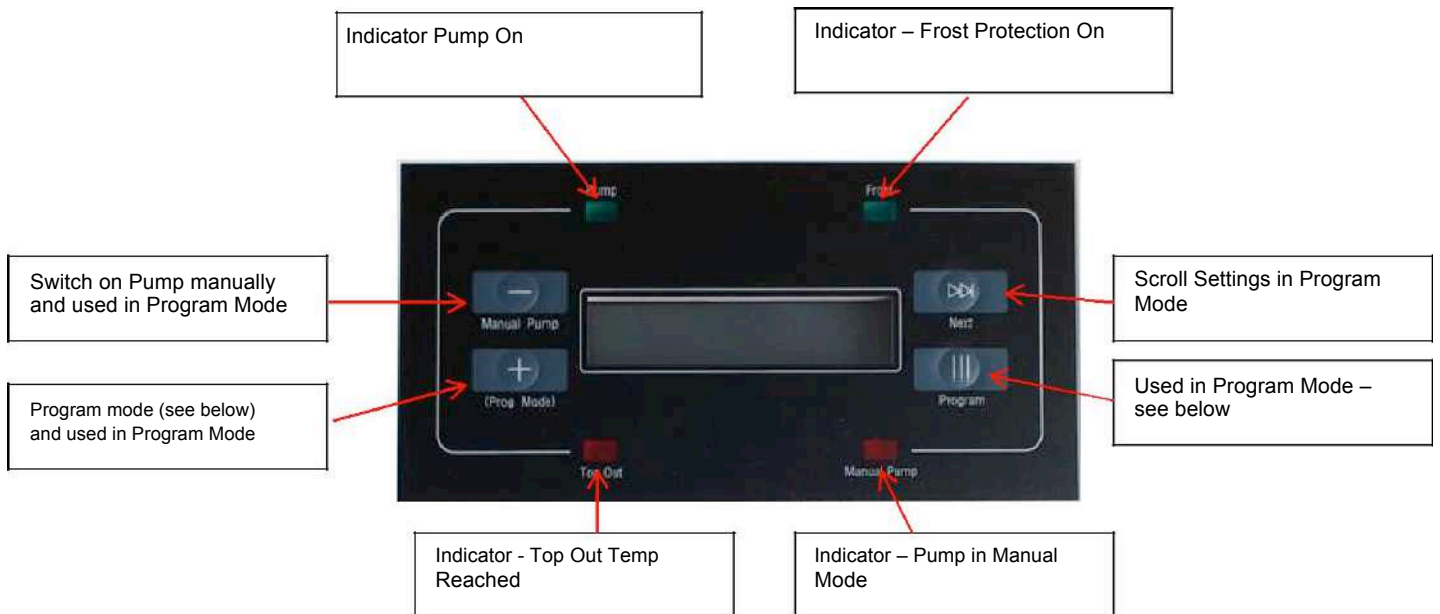
In event of a tank sensor failure, an error code will be shown on the display and 4 LED lights (2 green and 2 red) will become visible as follows:



Similarly, when errors occur on roof top or both sensors, the display will indicate as follows:



Basic Controller Functions



Programming the Controller

Note: the controller is pre-set at the factory to operate at optimal settings for most situations. Any access to the program mode and change to factory settings must be done by a qualified and authorised person. The range of settings available are as follows:

SETTING	Factory Setting (°C)	Minimum Setting (°C)	Maximum Setting (°C)
Pump On Temp	8	0	90
Pump Off Temp	2	0	90
Top Out Temp	75	0	90
Protect On Temp	3	0	90
Protect Off Temp	5	0	90

Access to the Program Mode is as follows:

1. Press and hold down “**Next**” and “**Program**” keys
2. Then, press and hold down “(**Prog Mode**)” key whilst holding down the “**Next**” and “**Program**” keys for approximately 3 seconds. Red and Green LED’s will flash.
 - a. “**Pump On Temp**” appears – Value = 008 (factory pre-set). Remove fingers from keys.
 - b. “**Pump On Temp**” can be increased or decreased using the “+” and “-” buttons
 - c. Following any changes, the program may either be exited by pressing and holding down the “**Program**” key for around 3 seconds or access next Setting “**Pump Off Temp**” by pressing the “**Next**” key. The same method applies to accessing all five settings available.
 - d. When all settings are set to desired level, press and hold the “**Program**” key for around 3 seconds. All settings will be retained and “**Set Finish Rebooting**” will briefly appear before returning to sensor temperatures.

MANUAL PUMP Key

When pressed (not in Program Mode), this key activates the pump manually, over-riding the pre-set settings of the controller. “Pump” and “Manual Pump” LED’s will glow. If left on, the pump will run for 2 hours and then switch back to PUMP AUTO.

DO NOT turn off the ELECTRICITY or WATER SUPPLY to the Solar Controller and Pump.

Note: Panel warranty does not cover damage caused by frost or freezing where:

- the solar controller and or pump are not operating;
- frost protection valves have not been fitted;
- the mains water supply to the system has been turned off; or
- the mains cold water supply to the system freezes because it is not insulated.

Mounting Kits

Note: The copper pipework and specified insulation is to be supplied and fitted by the installer. The solar water heater is equipped with two Plumbing Mounting Kits as follows:

1. **CMD Ground Kit** – Ground Mounting Kit supplied as part of the Solar Water Heater Tank installation package.
2. **CMD Roof Kit** – Roof Mounting Kit supplied as part of the Solar Collector installation package.












Both kits are designed to provide the installing plumber with all parts required for a normal installation. Additional components required for installation are to be supplied by the installing plumber.









The following items are contained within the CMD Ground Kit. Refer to section below entitled “Solar Collector Installation” regarding componentry for CMD Roof Kit.

The CMD Ground Kit Contains:

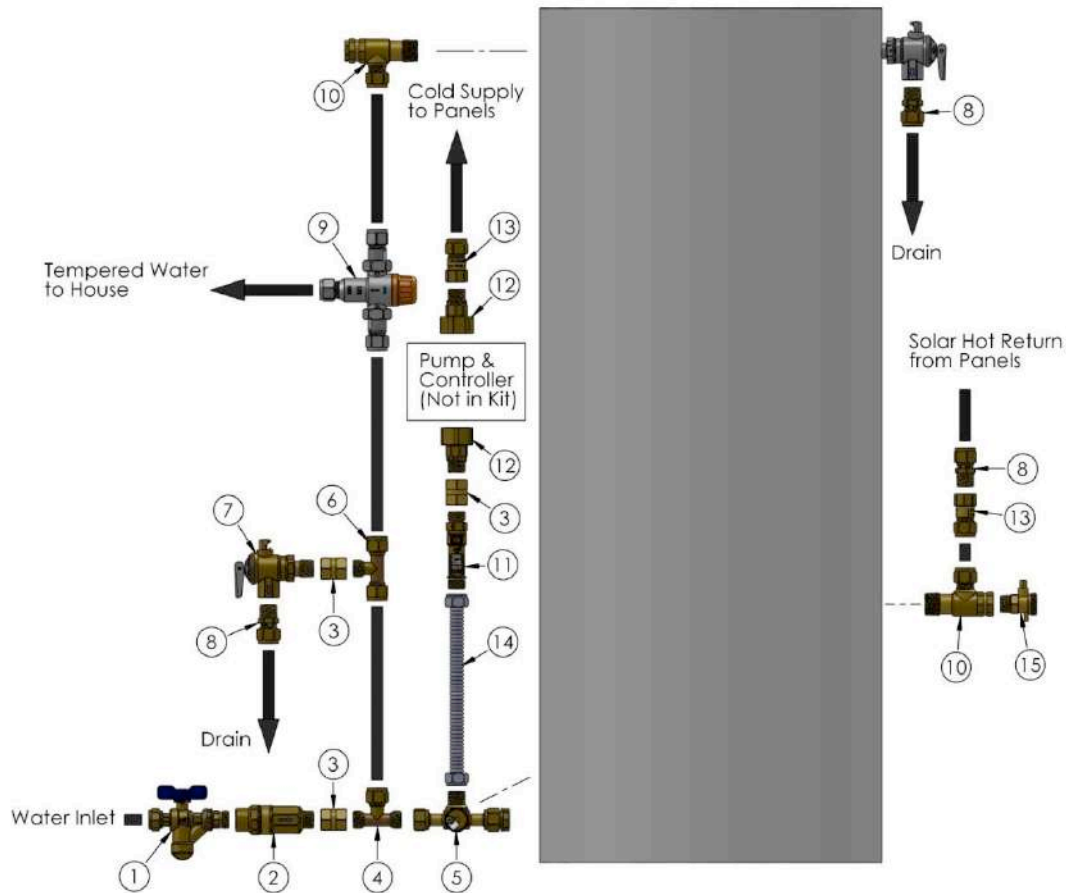
- Brassware and Valves (Excluding PTR Valve which is contained in the water heater tank packaging)
- Installation Manual including commissioning check list to be completed and retained as a record by CMD Solar.
- Pump and Controller.
- Stainless steel screws for mounting pump and controller.

CMD Ground Kit – Ground Mounting Kit Components

Codes: (AVG)	Image	Quantity	Instructions
HWP 875 (ARBV15) Diagram item 15		1	Use Tool Located on Cap on chain to open valve and bleed air from system. Then close valve. Cap may be left screwed onto fitting and Hose Connection stored for later use.
HWP 652 (BFEQuickie15) Diagram item 10		2	Used for Hot Water Outlet and Solar Return connection
HWP 681 (BFP15MI)		1	Used for connection to unused port on 4-Way Tee
HWP 665 (BFS15) Diagram Item 3		4	4 required <ol style="list-style-type: none"> 1. Connection of Item 7 – ECV Valve 2. Connection of Item 11 – Flow Valve 3. Connection of Item 2 PLV 4. Connection of Item 10 – Solar Return
HWP 656 (BFT15C15C15C w 1 Nut & Olive) Diagram item 4		1	Connection of 500kPa PLV to 4-Way Tee
HWP 656 (BFT15C15C15C w 2 Nuts and Olives) Diagram items 4/6		1	Tee off for ECV Valve Refer to installation diagram for positions
HWP 661 (601074 – 15MI Thermowell)		1	15mm Thermowell Sensor Port on 4-Way Tee (Item 5)
HWP 655 (BFTQuickie15) Diagram item 5		1	4-Way Tee for connection to Cold Water Inlet (Flow)
HWP 670 (BFU15MI15C) Diagram item 8		3	Drain Line unions for ECV Valve, PTR Valve and Solar Return Pipe from Collectors
HWP 675 (BFU25Q15C) Diagram item 12		1	Pair of Pump Connection Unions
HWP 870 (ECV15-700) Diagram item 7		1	750kPa Expansion Control Valve (ECV)

<p>HWP690 (FC15FL – 175mm) Diagram Item 14</p>		<p>1</p>	<p>175mm Stainless Steel Flexible Coupling</p>
<p>HWP 685 (FM15-1.4) Diagram item 11</p>		<p>1</p>	<p>Flow Meter 1.4L/Min (Installer - Set to 1.0L/Min on installation)</p>
<p>HWP 866 (NRIBVS – 15C) Diagram item 1</p>		<p>1</p>	<p>Non-Return Isolating Valve with Strainer and Insulation</p>
<p>HWP 867 (NVHT-15F-15C w Nut and Olive) Diagram item 13</p>		<p>1</p>	<p>15mm High Temperature Non-Return Check Valve. Install on load side of Pump & Controller. (Note direction of Flow)</p>
<p>HWP 868 (NVHT-15F-15C without Nut and Olive) Diagram item 13</p>		<p>1</p>	<p>15mm High Temperature Non-Return Check Valve. Install on Solar Return line. (Note direction of Flow)</p>
<p>HWP 855 (PLV15-500FM) Diagram item 2</p>		<p>1</p>	<p>500kPa Pressure Limiting Valve installed after Trio-Valve (Item 1)</p>
<p>HWP 860 (TVA15CHP) Diagram item 9</p>		<p>1</p>	<p>High Performance Tempering Valve 15mm with Insulation</p>
<p>HWP 275 (MSKM15MM)</p>		<p>1</p>	<p>4 off M4 and 4 off M6 304 Grade S/Steel Screws and washers for mounting of Base Plate and Cover of Pump and Controller Assembly to Tank Outer Casing. (Note Nut-serts provided on Tank Case for ease of mounting).</p>

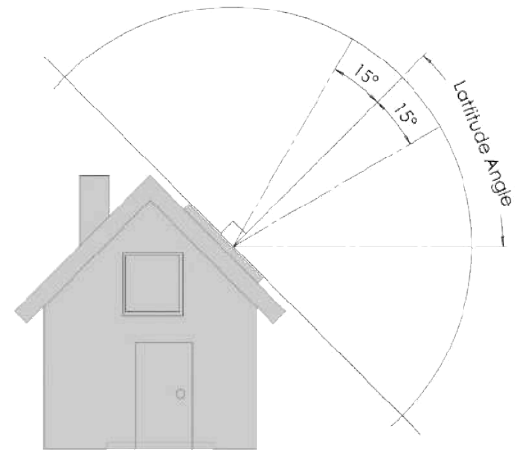
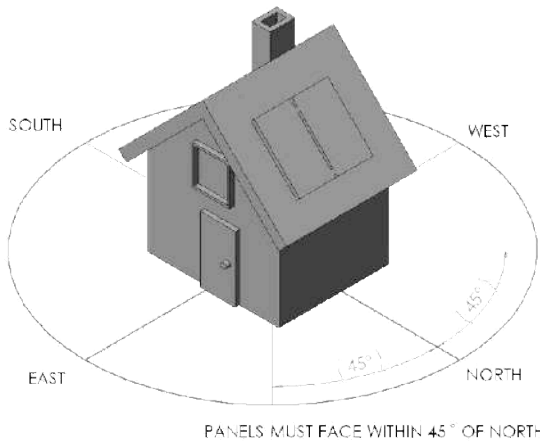
CMD-Ground Kit – Installation Diagram



SOLAR COLLECTOR INSTALLATION

To achieve maximum solar performance, the solar collectors should be installed facing as close to North as possible. The following are guidelines for the installation of solar collectors:

- Solar collectors should be positioned to face the equator which is North facing in Australia. The further away from North, the greater the loss in solar efficiency.
- The inclination of the solar collectors should be within 10% either side of the local latitude angle. For example, the latitude of Brisbane is 27° South so the inclination of the solar collectors should be approximately 24 to 30 degrees.
- Solar collectors should be free from shading by trees (should be checked regularly) or nearby buildings or other structures.








Note: If the above guidelines cannot be achieved, consideration should be given to increasing the solar collection area by adding an extra solar panel, particularly if the direction is further than 45° either side of North. In any case, no direction should be chosen that has any inclination towards South.

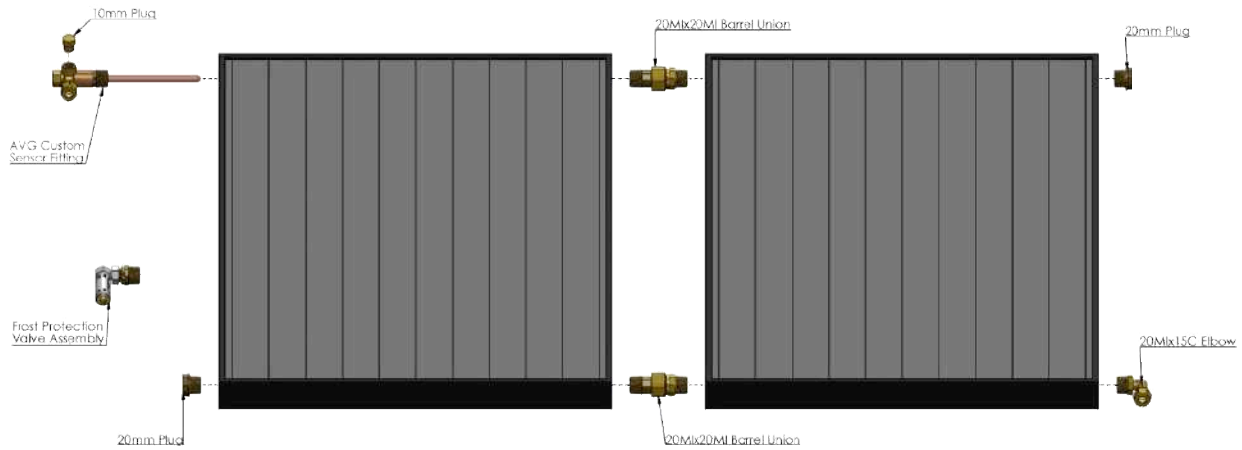
CMD2-Roof Kit – Collector Plumbing Roof Mount Kit

The CMD2-Roof Plumbing Roof Mounting Kit is supplied with the solar collectors for installation when the collectors are installed. The kit does not include Frost Protection Valves as standard. The Frost Protection Kit (CMD-FRK) is available as an accessory for use in frost prone areas.

Components contained within the CMD2-Roof Kit include:

Codes: (AVG)	Image	Quantity	Instructions
HWP 662 (BFAVT20R)		1	AVG Custom Sensor Fitting. Insert Roof Top Sensor to end of pipe when installed. Comes with Insulation Glove. Fit hot water return to tank.
HWP 680 (BFP10MI)		1	10mm Plug. Fit to unused port of HWP 662 in place of Air Eliminator.
HWP 651 (BFE20MI15CQIK)		1	20Mlx 15C Elbow. Cold Water Inlet to bottom RHS of Collector with Insulation Glove
HWP 682 (BFP20MI)		2	20mm Male Brass Plugs for top-right and bottom-left FM ports on Hot Water Collectors
HWP 672 (BFU20R25Q20R)		2	20MI x 20MI Brass Barrel Union with Insulation Glove for connection of the solar collectors

NOTE: Details of CMD Roof Kit components shown above are for two-panel configurations. Three panel kits (CMD3-Roof) are also available on request.



CMD2-Roof Installation Diagram



FROST PROTECTION KITS (CMD-FRK)

Additional accessories available from CMD Solar include the Frost Valve Kit. These valves are required to be installed in frost prone areas or areas subject to freezing (below 5°C) and must be installed facing downwards (one per panel). The valve must not contact the roof. During frosty conditions these valves open and allow a slow flow of water through the panels. They will automatically close when the water temperature rises. They provide backup for the freeze protection facility on the controller in the event of power failure. Do not use thread sealants to connect the frost valves; they must be fitted using the sealing washer supplied with the valve. Note: Thread sealants may cause problems with the operation of the valve.

The following items are contained within these kits for installation.

Frost Protection Kit Model No.	CMD - FRK
---------------------------------------	------------------

Product Code	Description	Qty.
BFT20FI	3/4" Brass Tee Female	1
BFN20MI15MI	20MI x 15MI Reducing Hex Nipple	3
BFN20MI20MI	20MI Brass Hex Nipple	1
FPV	Frost Protection Valve	2
TEF-ROL	Roll of Teflon	1

Filling and Commissioning the System

Do not turn on electric power until the whole system has been filled with water and a satisfactory Megger reading is obtained by a qualified person.

Solar Storage Tank and Water Heater

Follow instructions supplied with the heater. Note that it is necessary to provide a properly drained safe-tray under heaters located where leakage may cause damage.

When locating the water heater, ensure the installation does not compromise the structural integrity of the building.

Note: A Tempering Valve must be fitted in accordance with Australian Standards and other State and Council regulations.

Turn on a hot water outlet tap, preferably the one furthest from the heater. DO NOT purge through the PTR valves. Open the mains cold water supply valve so that air is displaced from the water heater and replaced with water. The hot water outlet tap should be left on until the water flowing from it flows steadily without spurts. Turn off the hot water tap and allow the system to pressurize. Check the system for leaks. Repair if required.

Solar Panels

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.

Turn on the mains water supply and ensure the water heater is full of water and all of the hot taps are turned off. Turn on the circulating pump either by the manual override or by plugging it directly into a power point. Open the air bleed valve (HWP 875) at the tank and allow all air to purge from the system. When water flows freely from the air bleed valve without air spurting, close off the valve. Allow the system to pressurise. Check for leaks and rectify if required.

Note. It is important that all air be removed from the solar panel circuit to ensure the circulating pump will function effectively. Air in the system will prevent circulation. If difficulty is experienced in purging all air from the system, it may need bleeding from the highest point of the panels by loosening a fitting and allowing air to be bled at that point.

Remove covers from solar panels.

WARNING – on a sunny day, if the solar panels are not covered during this operation, the water flowing from the air bleed valve can be extremely hot causing steam and possible scalding. Ensure sufficient precautions are taken to prevent injury to nearby persons.

Solar Pump and Controller

Ensure that the hot and cold sensors are plugged into the correct sockets at the tank inlet connection and the top hot outlet of the solar collectors..

Ensure that the pump is correctly plugged into the Solar Controller power outlet.

Plug the Solar Controller into the weatherproof (where required) mains power outlet and switch on.

If the weather is fair, the return pipe from the panels will become warm. Please note that the pump is very quiet and vibration free in operation.

If the weather is cool and cloudy, it may be necessary to cool the cold sensor probe to make the pump run. Alternatively, temporary connection of the pump to mains power will enable a test run. Be sure to reconnect it to the Solar Controller after testing.

Note: If the pump is not capable of purging air from the system, all air must be purged manually from the highest point at the panels.

How to Turn Off the Water Heater

Should it be necessary to turn off the water heater following commissioning, then:

- Switch off or isolate the electrical supplies to the water heater AND the pump / controller
- Close the cold water valve at the water heater inlet

Note: If the water heater is located in a frost area and freeze protection valves are not fitted, damage to the panels may result if the water heater is switched off. Damage to the panels where no power is available at the pump / controller and where no freeze protection valves have been fitted is not covered by warranty

Draining the Solar Collectors

- Ensure power is switched off at both the water heater and controller
- Open a hot water tap and allow the hot water to run for a full 5 minutes immediately prior to draining the solar collectors. This will assist in draining high temperature water from the collectors back to the storage tank. After 5 minutes, the hot water tap may be closed.

NOTE: Extreme care must be exercised as water discharged from the solar collectors may be at a very high temperature

- Turn off the water heater (see above)
- Loosen fitting on top of solar panel return pipe
- Disconnect the solar cold pipe and water will drain from the solar collectors
- When water stops flowing from the solar hot and cold pipes, reconnect the solar cold pipe and retighten fitting on top of solar panel return pipe.

Draining the Water Heater

- Ensure power is switched off at both the water heater and controller
- Open a hot water tap and allow the hot water to run for a full 5 minutes immediately prior to draining the solar water heater tank. This will assist in draining high temperature water from the collectors back to the storage tank. After 5 minutes, the hot water tap may be closed.

NOTE: Extreme care must be exercised as water discharged from the solar collectors may be at a very high temperature

- Turn off the water heater (see above)
- Operate the relief valve release lever carefully to release the pressure in the water heater – do not allow the lever to snap back or damage may result to the valve seat
- Undo the union at the cold water inlet and attach a hose to allow the water to drain from the tank
- Operate the relief valve again to allow air into the water heater which will allow the water in the water heater to drain away

PART C – PRODUCT WARRANTY

This warranty is offered by CMD Solar and full contact details are shown at the end of this document.

In addition to the guarantees under the Australian Consumer Law (ACL), CMD Solar provides consumers (i.e. retail customers, not trade customers) a warranty that all products in its product range (products) will be free from defects in materials and workmanship under normal use for the period of time applicable to particular components of each product as set out in the table below.

If a product fails to conform to this warranty during the applicable warranty period, CMD Solar will either replace any failed component of the product or replace the product free of charge (which CMD Solar will determine at its absolute discretion).

Table of Applicable Warranty Periods

Hot Water Storage Cylinder and Solar Collectors	7 years
All electrical parts, e.g. element, thermostat	2 years
Associated valves supplied by CMD Solar including Frost Valves	2 years
Labour to replace or repair defect	1 year

- The original storage tank must have undergone a 5 year maintenance service no earlier than 2 years before the expiration of the original 5 year warranty period and no later than one month after the expiration of the original warranty period in accordance with the maintenance instructions published in the owner’s manual.
- The failure of the original storage tank or solar collector panel must be certified by CMD Solar.

Exclusions

1. This warranty only applies to defects which have arisen solely from faulty materials or workmanship in the product and does not apply to other defects which may have arisen as a result of, without limitation, the following:
 - Installation by a non-authorized person or installation that is not strictly in accordance with the manufacturer’s installation instructions as described in the Installation and Owner’s Manual;
 - Accidental damage, abuse, misuse, maltreatment, abnormal stress or strain of the products;
 - Tarnishing and damage to or deterioration of finishes as a result of harsh or adverse conditions (including corrosive environments such as coastal locations, and inadequate ventilation and drainage of installation locations);
 - Fair wear and tear;
 - Excessive water pressure, blocked pipework, faulty plumbing, restricted flow or excessive temperature;
 - Scale formation or the effects of corrosive water where the product has been connected to a water supply that is outside the parameters outlined in the Installation and Owner’s Manual;
2. Alterations or repair of the product other than approved by CMD Solar are not covered (for the avoidance of doubt, the attachment of accessories or use of non-genuine replacement parts other than those manufactured or approved by CMD Solar are not covered).

3. Where the water heater is installed in a position that does not allow easy and safe access, the cost of accessing the water heater safely, including the cost of additional materials, handling and/or safety equipment, is not covered.
4. Personal injury, property damage or economic loss, howsoever caused, will not be covered.
5. The warranty is restricted to residential installations only. A separate warranty applies to commercial installations.
6. Freight and travelling costs associated with the repair or replacement of the product in accordance with this warranty is not covered except where the product is installed inside a 25 kilometre radius of the business premises of CMD Solar.
7. Where a failed component or system is replaced under warranty, the balance of the original warranty period shall remain effective. The replaced part or system does not carry a new warranty.
8. Solar collector glass damage or breakage is not covered under this warranty. Your household insurance policy should be extended to include damage or breakage of the solar collector glass.
9. Freezing and frost damage is not covered under this warranty except where adequate precautions are taken in accordance with the instructions contained in this "Installation Instructions and Owner's Manual" and then only in accordance with the separate warranty coverage provided for any frost protection devices fitted.

Australian Consumer Law (ACL)

In addition to this warranty, certain legislation (including the ACL) may give you rights which cannot be excluded, restricted or modified. This warranty must be read subject to such legislation and nothing in this warranty has the effect of excluding, restricting or modifying those rights.

If CMD Solar fails to meet a guarantee under the ACL, your remedy for such failure may be limited to any one or more of the following:

- replacement of the product;
- repair of the product;
- refunding the cost of the product;
- payment of reasonable costs of having the product repaired;
- payment in respect of the reduced value of the product.

As required by legislation, including the ACL, any claims for damage, or any consequential loss either directly or indirectly due to defects of any kind in a product will only be met by CMD Solar where the damage or loss was reasonably foreseeable by CMD Solar.

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 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.

HOW TO MAKE A WARRANTY CLAIM

At the time of purchasing your water heater, you should ensure you receive an owner's manual and that details of your purchase, including the date of purchase and the serial number of the storage tank, are recorded therein. You should keep those documents in a safe place in case of a warranty claim as documentary proof of purchase or other tangible evidence will be required to make your claim. Claims can be made at the point of sale or by

posting, faxing, or emailing a written claim to CMD Solar (contact details listed below) within 3 months of the appearance of a defect. Claims must include the following details:

- Date of purchase;
- Location of purchase;
- Proof of purchase; and
- Contact details including name, address, telephone numbers, and email address.

Please note: When making a service call, it is imperative that the 6-digit water heater serial number, located on the technical label, is quoted.

CMD Solar contact details are as follows:

**Contact: Liam Dunne
CMD Solar
PO Box 14486
Cairns QLD 4868
P: (07) 4038 1450 E: service@cmdsolar.com.au**

Note: Whilst every care has been taken to ensure the accuracy in preparation of this document, no liability can be accepted for errors or omissions and any subsequent consequences that may arise. Specifications and materials may change without notice.

WARRANTY FORM

Model – CMD Solar Water Heater

Manufactured and distributed by:

CMD Solar
PO Box 14486
Cairns QLD 4868

PLEASE FILL IN THE DETAILS HEREUNDER AND RETAIN THIS WARRANTY TOGETHER WITH YOUR PURCHASE INVOICE, WHICH MUST BE PRESENTED WHEN MAKING A WARRANTY CLAIM.

Homeowner Name: _____ Installation Address: _____

_____ City: _____

State: _____ Post Code: _____ Date of installation: _____

CMD System Model Number: _____ Number of Collectors: _____

Serial Number of Tank: _____ Plumber Name: _____

License no: _____ Plumber Signature: _____

This warranty does not exclude, limit or modify any warranty, condition or liability which is or may be implied or imposed on the Company by virtue of the Trade Practices Act, 1974, or any other statute, law, rule or regulation except for the extent to which the Company is lawfully entitled. Note that CMD Solar is not liable for any expenses associated with making a warranty claim.

CMD SERIES SOLAR WATER HEATER – INSTALLER CHECKLIST

Attention: Installer - upon Commissioning; This Form must be completed and returned to CMD Solar. Failure to do so can void homeowner warranty.

The Installer is responsible for Commissioning & Testing - [✓] For “Yes”, x for “No”.

- Has the installation been installed in accordance with Workplace Health & Safety regulations? Is the Contractor Solar accredited?
- Has this system been installed to Australian standards AS3500.4 –1994, AS/NZS 2712 including water tightness test and Wiring Rules AS/NZS 3000?
- Has the contractor located solar collectors where site drawing / order nominates. (Collectors should be facing North for optimum efficiency). If not, indicate direction _____
- Has the system been installed as per this Owner & Installer Manual
- Have the tempering valve, cold water expansion valve, pressure reducing valve and two high temperature non-return valves been installed?
- Has both Solar Collector sensor & Tank sensor leads been installed and TESTED to ensure are functioning correctly
- Has both the Flow & Return COPPER pipes been correctly insulated; Armorflex 13mm (or similar) Does the pump light switch on when operating
- Are Solar Flow & Return lines installed using Copper pipe (Plastic Pipe or similar not acceptable)
- In areas where frost or freezing (below 5°C) is prevalent are CMD-FRK Frost protection kit fitted?
- Has the air been purged from system from the air-bleed fitting adjacent the solar return Has the circulation pump been tested and ensure water is circulating to collectors

I certify that the CMD Series solar hot water system is installed at the address shown below and has been installed to the manufacturer's requirements and in accordance with this installation manual.

Homeowner Name: _____ Installation Address: _____

City: _____

State: _____ Post Code: _____ Date of installation: _____

CMD System Model Number: _____ Number of Collectors: _____

Serial Number of Tank: _____ Plumber Name: _____

License no: _____ Plumber Signature: _____