Apricus Solar Hot Water

Owner's Operating and Maintenance Manual

For Domestic Hot Water Systems

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CHAPTER 1: INTRODUCTION

1.1 TERMINOLOGY

- Bank: Multiple collectors in series (one after the other).
- Boost: The process where a heating component (such as an electric element or gas heater) is used to provide additional heating when solar-heated water is not of an adequate temperature
- Clean Energy Regulator (CER): Government body responsible for overseeing the implementation of the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES).
- Collector: The Apricus solar collector includes the manifold with heat pipes and evacuated tubes inserted.
- Expansion Control Valve (ECV): Installed on the cold mains line to relieve excess pressure.
- Expansion Tank: Fitting an Expansion Tank to the system allows the water to move into the expansion tank and occupy its volume, rather than increasing the system pressure. This reduces the wastage of water through the PTRV and protects the system from high pressures and undue wear.
- Evacuated Tube: functions to harness the solar energy by capturing and retaining the heat due to the presence of the vacuum.
- Flow Line: The plumbing line running from tank solar flow port to the inlet of the collector. This line incorporates the circulation pump.
- Heat Pipe: A copper pipe that sits inside the evacuated tube and is inserted into the collector manifold. A small volume of liquid acts as a heat transfer fluid. It absorbs heat via evaporation, and transfers heat to the system fluid via condensation.
- Header Pipes: The copper “heat exchanger pipes” in the manifold of the Apricus collector through which the water flows.
- Insolation: solar radiation level, expressed in kWh/m2/day.
- Manifold: Refers to the solar collector enclosure that contains the header pipes.
- Pressure Temperature Relief Valve (PTRV): installed on the hot water storage tank to relieve pressure, and excessive temperatures.
- Return Line: The plumbing line running from the solar collector to the solar return port on the tank.
- Stagnation: Stagnation is the maximum temperature a collector will reach, at which point the rate of heat gain and rate of heat loss is balanced.
- Stratification - the passive separation of water into distinct layers of different temperatures; where the temperature at the top of the tank can be significantly higher than the temperature at the bottom.

1.2 SCOPE

This manual has been designed to provide installation instructions for the installer or plumber.

1.3 UNDERSTANDING WATER HEATING

Before explaining the operation of your hot water system is it important for you to understand how water heating works.

When you open a hot water tap, water pressure forces hot water out of the storage tank. When this happens cold water is actually entering the bottom of the hot water storage tank, gradually allowing the hot water in the tank to be pulled up and out.

The water is separated into hot and cold layers, this is primarily due to the fact that heat rises. See Figure 1. This is referred to as stratification and is very important as it allows us to use nearly all of the hot water available in the tank. You can experience this when having a shower when the water suddenly turns cold, this occurs when all of the hot water has been drawn out.

In order to prevent scalding due to excessively hot water, most new houses have a tempering valve installed. If you are in an older house the plumber should advise that you install a tempering valve. This is an important safety device, as it limits the water supplied to the hot water taps to be no more than 50oC. Although this temperature is quite hot, it will not cause burns. Hot water leaves the storage tank and passes through the tempering valve which brings the temperature down to 50oC by mixing with cold water. At the shower most people will then cool it down further by mixing with more cold water.

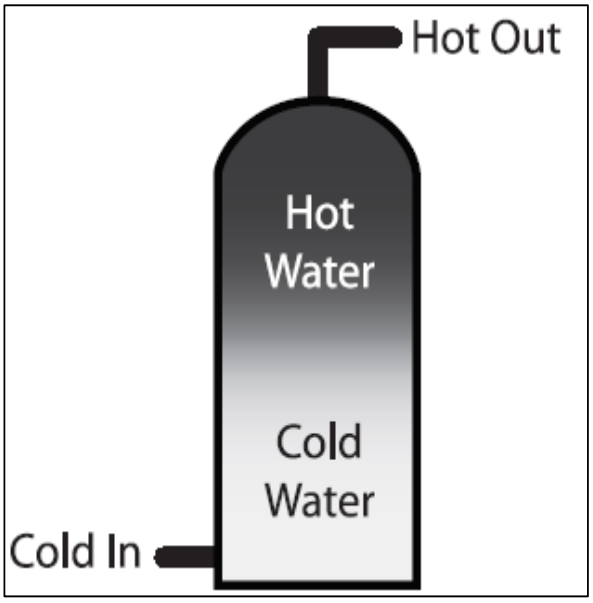

Figure 1 Diagram showing the stratification of hot and cold water within a storage tank.

1.3.1 HOW SOLAR WATER HEATING WORKS

Apricus solar water heating is done by using a solar collector which is a thermal solar heating device. By gaining a basic understanding of your solar hot water system you can develop realistic expectations about the operation of the system, develop habits that maximize energy savings and most importantly, ensure safe and reliable operation.

An Apricus solar hot water system captures solar energy directly and converts it to heat for use in your home.

1. The evacuated tubes ensure maximum absorption of the sun's energy and convert it to usable heat.
2. The heat inside the evacuated tube is carried via copper heat pipes to the insulated manifold (head of collector) that contains a copper heat exchanger.
3. A controller measures the temperature of the water in the manifold and compares it to that in the bottom of the storage tank. If the manifold temperature is higher, the controller switches on a circulation pump that brings the solar heated water back down to the storage tank.

1.3.2 THE EVACUATED TUBE

1. Sunlight strikes the dark absorber coating inside the evacuated tube.
2. The heat pipe transfers the heat up to the copper header pipe location in the insulated manifold box.
3. The vacuum in the tube acts the same as a thermos flask, keeping the heat inside and ensuring it is delivered to the water, not lost to the air. Though the glass may be cool to the touch, inside, the system may be reaching temperatures up to 100°C. Refer to Figure 2.

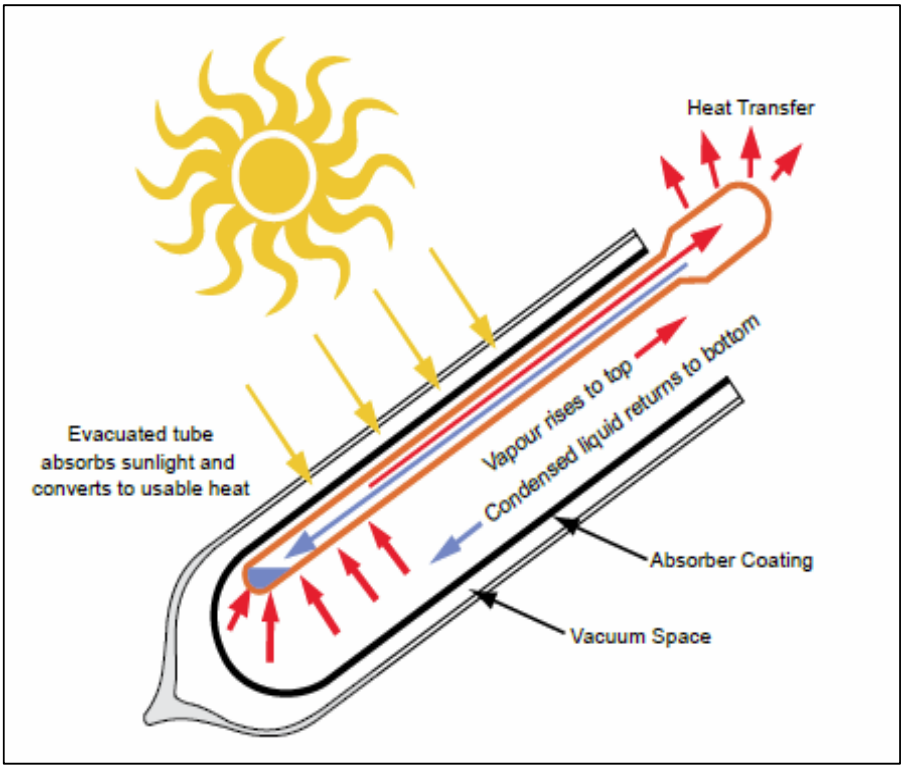

Figure 2 Evacuated Tube Function

1.3.3 SYSTEM PERFORMANCE

The solar hot water system will begin acting immediately after installation to reduce your energy costs. System performance is dependent on the available sunlight that falls directly onto the collector. This means that during the months of winter when the sun is in the sky for fewer hours the solar contribution will fall. Conversely, the performance of the solar hot water system will increase significantly during summer to off-set the greater majority of your hot water usages all year round.

1.3.4 UNDERSTANDING SOLAR CONTRIBUTION

Some home owners make the mistake of thinking that once they install a solar water heater, they can turn their element or gas booster off whenever there is sunlight. This is incorrect for two reasons.

Firstly it is a requirement to heat the water on a regular basis to kill Legionella bacteria, see specific heating requirements in Chapter 3: System Operation. Secondly, solar radiation is only half or one third as strong in the winter months compared to summer, and therefore is not able to provide the same amount of hot water as in the summer.

CHAPTER 2: SYSTEM COMPONENTS

The system components that are a part of the electric and gas solar hot water systems are depicted below.

2.1 TYPICAL ELECTRIC BOOSTED SYSTEM

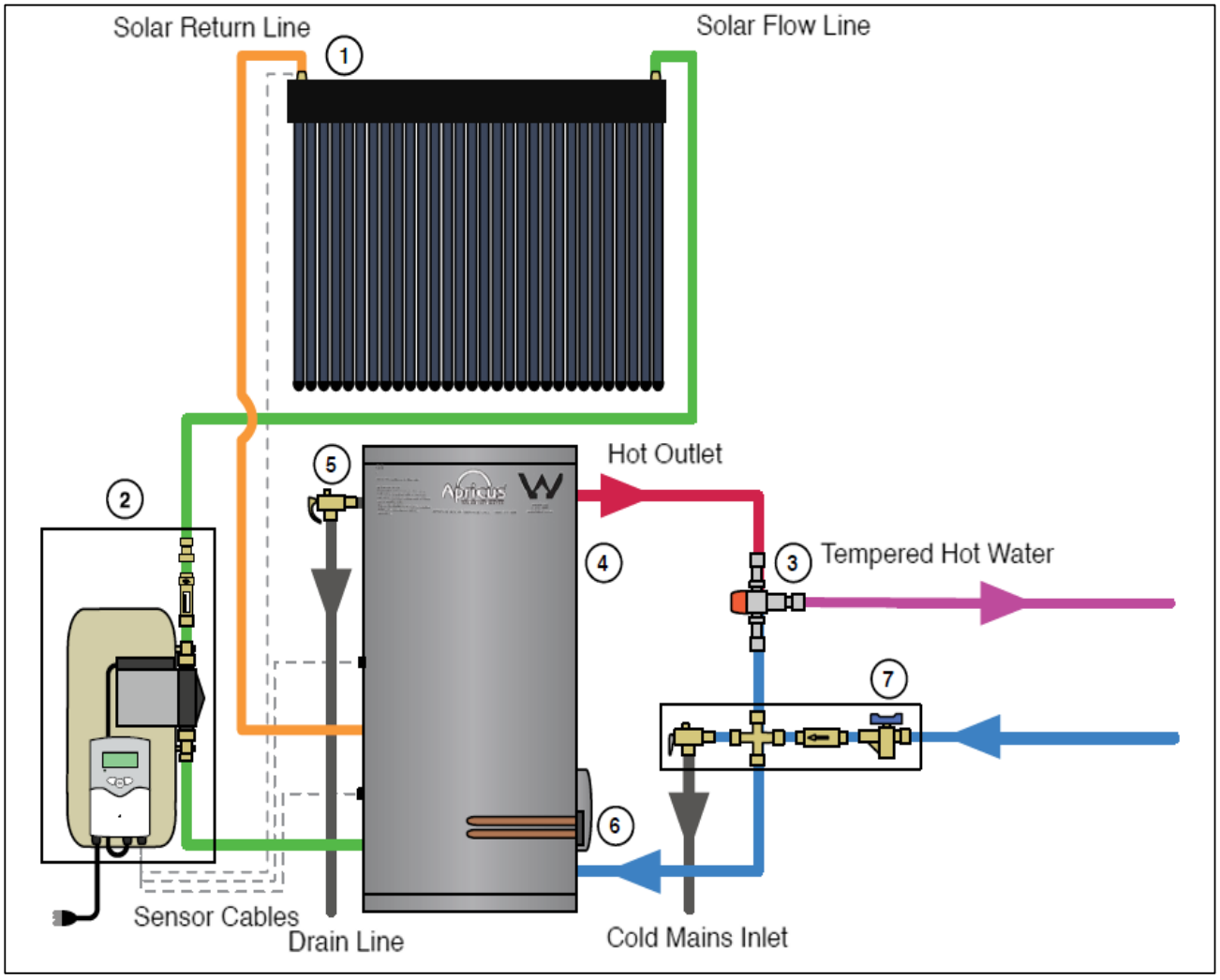

Table 1 Components that make up a typical Electric boosted solar hot water system.

No.	Component	Function
1	Evacuated tube collector	Solar energy collection
2	Circulation Pump	Circulates water from the tank to the manifold
	Controller	Monitors temperatures and controls the system
3	Tempering Valve	Tempers the hot water down to a safe outlet temperature
4	Tank	Stores hot water for when you need it
5	PTRV	Pressure Temperature Relief Valve
6	Electric Element	Provides a backup energy source for cloudy days and legionella protection
7	Mains line valves	Duo valve, cold water expansion control valve, pressure reducing valve, four way cross

2.2 TYPICAL GAS BOOSTED SYSTEM

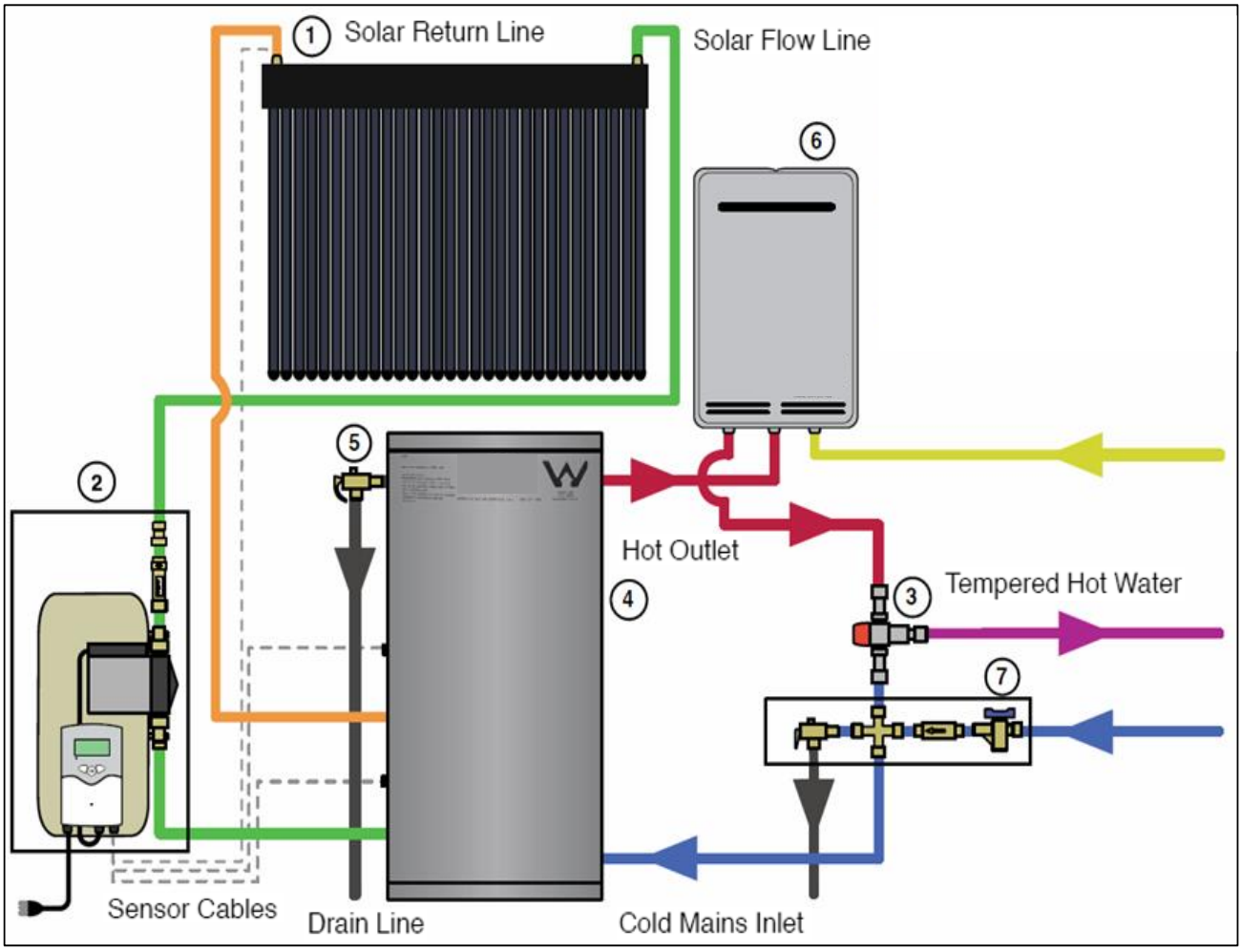

Figure 4 Typical Gas boosted solar hot water system.

Table 2 Components that make up a typical Gas boosted solar hot water system.

No.	Component	Function
1	Evacuated tube collector	Solar energy collection
2	Circulation Pump	Circulates water from the tank to the manifold
	Controller	Monitors temperatures and controls the system
3	Tempering Valve	Tempers the hot water down to a safe outlet temperature
4	Tank	Stores hot water for when you need it
5	PTRV	Pressure Temperature Relief Valve
6	Gas Booster	Provides a backup energy source for cloudy days and legionella protection
7	Mains line valves	Duo valve, cold water expansion control valve, pressure reducing valve, four way cross

CHAPTER 3: SYSTEM OPERATION

3.1 PUMP OPERATION

The Apricus solar hot water system is powered by a small circulation pump, installed beside the tank, which consumes less power than a small light bulb. It turns on and off at varying intervals that are determined by the controller and its temperature sensors. When the temperature difference between the tank and the roof are at just the right temperatures the pump will extract the optimum amount of energy from the collector and transfer it into your hot water tank.

On cold nights the circulation pump may turn on to cycle water from the hot water tank into the collector to prevent the components on your roof from freezing.

3.2 AUXILIARY BOOSTING OPERATION

The auxiliary boost acts as a back up to ensure you always have hot water ready to go, so even when the sun is hiding you and your family are still able to have a hot shower. Secondly, it provides protection against the growth of legionella bacteria that can lead to legionnaire's disease. The temperature requirements and frequencies of heating are in Table 3 below.

Table 3 Minimum heating requirements of different system types.

Type of Apricus system installed	Minimum heating requirements
Glass-lined Bottom element electric boosted system	Once per week to 60°C for 32 minutes
Middle element electric boosted system	Once per day to 60°C
Gas boosted system	Boosting to 70°C if incoming water is less than 55°C each time water is used

3.3 ELECTRIC ELEMENT

Electric element tanks have an element inside them located near either the bottom, or the middle of the tank. This element operates just like a normal electric hot water system; only the amount of work is reduced due to the solar input from your collectors.

Middle element tanks should generally be connected to continuous power to ensure hot water demands are satisfied even when there is low solar insolation. Bottom element tanks may be connected to off-peak power tariffs to reduce energy bills whilst still meeting larger morning hot water loads.

3.4 GAS BOOSTER

Gas boosters are located after the hot water storage tank. For an Apricus gas booster, if the incoming water temperature is less than 55°C, the booster will activate and heat water to 70°C. If the incoming water is greater than 55°C the booster will not start and water will flow directly to the outlets. Under normal operations the gas booster may fire-up on the first instance because there may be cold water in the pipes between the storage tank and itself.

CHAPTER 4: IMPORTANT FEATURES & CHARACTERISTICS

4.1 PTRV

A PTRV is installed on the hot water storage tank to relieve pressure, and excessive temperatures in the system. The PTRV discharges 3-6% of the water heaters capacity during normal heating cycles with a hot water system.

The maximum allowable PTRV water discharge as per AS/NZS 2712 is roughly 10% of tank total volume for an Apricus Australia solar DHW system.

4.2 EXPANSION CONTROL VALVE (ECV)

An ECV is installed on the cold water inlet of some water heaters to relieve pressure within the system. The ECV may discharge a small quantity of cold water rather than the PTRV discharging hot water from the tank. This conserves hot water within the storage tank, as the discharged water from the ECV is much cooler than the PTRV.

4.3 SYSTEM FROST PROTECTION

The controller has a safety mechanism that operates the circulation pump when the temperature in the collector falls below 4°C. Cycling water from the tank increases the temperature of the collectors to prevent the water in the collectors from freezing.

4.4 HOLIDAY MODE

If you are going away for a long period of time your system is capable of protecting itself with the existing safety devices (i.e. ECV, PTRV, Frost Protection mechanism). If your system is electric boosted you may want to switch off your element at the switchboard to save energy, whilst leaving the controller turned on.

4.5 SHUT DOWN MODE

During the months of summer you may experience days of hot weather and your solar hot water system may have the potential to generate more hot water than you would be using. When this is the case, the controller will detect that your storage tank is full of hot water and request the system to shut down. During these times the circulation pump will be inactive until you use a substantial amount of hot water from the storage tank and the solar collectors cool down.

CHAPTER 5: TROUBLESHOOTING

You may encounter abnormal characteristics with your solar hot water system and would like to understand the issue to avoid a service callout from your local plumber/installer.

5.1 PTRV

The PTRV relieves 3-6% of the water heaters capacity during normal heating cycles with a hot water system. If the storage tank is discharging more than a bucket full of water in 24 hours, it may be due to the incoming water pressure being too high. Request for your plumber/installer to fit a pressure limiting valve.

There could be some debris or thread seal tape trapped in the valve mechanism. You can try lifting the valve gently and try to dislodge anything that could be causing that valve not to be re-seating properly. Please refer to Maintenance Procedures provided in Chapter 6: System Maintenance.

5.2 WE DON'T HAVE ENOUGH HOT WATER

Solar collectors work based on weather, when the sun is not shining as bright in the sky your system will require the auxiliary heater to operate to provide the hot water (ensure that this is functioning correctly). Installing a solar hot water system doesn't mean you get more hot water; it harnesses the sun's energy to offset the load from your conventional heat source (electricity/gas) as much as possible.

You may be using more hot water than you realise. Look more closely into how you are using hot water around the home. Adjusting your hot water usage patterns to maximize the energy that your system can generate during the day will benefit your energy bills.

5.3 CIRCULATION PUMP

Table 4 Circulation pump related issues

Symptom	Potential Cause	Solution
Pump is not operating even during sunny weather.	Storage tank is already full of hot water.	This is normal operation. Controller switches pump off once maximum temperature is reached to prevent over-heating.
	Collector is at a very high temperature.	This is normal operation. Pump will not circulate until the collector temperature is safe.
	Controller/pump power is OFF.	Connect power to controller/pump.
Pump appears to be running but collectors not cooling down.	Air lock in system	Ensure system pressure is 2-6 bar. Drain and refill the system.
	Flow rate is too small. Pump is undersized for given pipe length.	Solar pumps are sized suitably for a total pipe run length of 100m. May require a larger pump to get higher flow rates.
Pump is running overnight.	Frost protection is operating.	This is normal operation. Pump will be activated to circulate tank water to the collector to prevent collectors from freezing.
	System is reverse thermos-siphoning.	Check with the plumber that a U-shaped heat trap on the solar return line piping has been made and if it has not then it is advised to have a non-return valve on the solar return line installed.

5.4 CONTROLLER

The controller provides indicators that can assist you in understanding what the system is doing. Refer to Table 5 below for symbols that may appear on the controller display related to Chapter 5: Troubleshooting.

Do not change any controller default settings.

Table 5 Apricus Controller symbols and descriptions

Controller Symbol	Description	Action required?
☼	Maximum store temperature exceeded: TST Bottom tank temperature will read 75°C. Pump will not be active until hot water is drawn or tank cools down.	This is normal operation.
⚠ (flashing)	Collector emergency shutdown active: COL will read ≥ 110°C. Pump will not be active until collector cools down.	This is normal operation.
❄ (flashing)	Frost protection is operating. Pump will be activated to circulate tank water to the collector to prevent collectors from freezing.	This is normal operation.
🔧⚠ (flashing)	Sensor defect: 888.8 indicates the fault is a broken cable, -88.8 indicates that there is a short circuit.	Contact the Apricus Aftersales Team.
Display off	Controller may be in standby, press main circular button to see if display illuminates. Controller power may be off.	Connect power supply to controller if it is off.

IF YOU HAVE READ ALL THE INFORMATION WITHIN THIS MANUAL AND BELIEVE THAT YOU NEED ASSISTANCE, CALL APRICUS AUSTRALIA'S AFTERSALES TEAM.

CHAPTER 6: SYSTEM MAINTENANCE

Apricus recommends maintenance must be carried out accordingly with but not limited to the maintenance schedule in Table 6. Please refer to the manufacturer's documentation for any non-Apricus components for maintenance guidelines. Maintenance and servicing should only be completed by a certified plumber, with experience in solar hot water systems.

6.1 MAINTENANCE SCHEDULE

Table 6 Suggested Maintenance Schedule

Maintenance Schedule Periods	6 months	12 months	2 years	Per product guide
Solar Collector Maintenance:				
All tube clips are present and secure.		X		
All tube caps are present.		X		
All tubes have vacuum. Check tubes are intact and bottom is silver. Replace if broken. If dirty, clean with glass cleaner (if safe).	X			
Manifold and frame are free of rust.			X	
Inspect manifold.			X	
Descale collector loop or install scale inhibitor.			X	
Check that there is no shading on collector.		X		
Exterior Piping Maintenance:				
All piping is insulated, with no exposed pipe.	X			
All insulation is free from defects.	X			
All insulation is UV and weather protected.		X		
Insulation jacketing is free of degradation.		X		
Check pipe hangers are in good condition.		X		
Piping is labelled clearly.			X	
Inspect brass fittings.		X		
Interior Piping Maintenance:				
All solar piping is insulated.			X	
All hot water piping is insulated.			X	
All piping is labelled clearly.			X	
Check pipe hangers are in good condition.			X	
All valves are clearly labelled.			X	
Inspect brass fittings.		X		
System Maintenance:				
Check that the pump is operational.				X
Check expansion tank (if applicable).				X
Check that the differential control is operational.		X		
Storage Tank Maintenance:				
Drain and flush tank.				X
Inspect anode rod (if glass-lined tank).				X
Inspect tank.		X		
Valves Maintenance:				
Check PTRV operation.		X		
Release PTRV lever to prevent debris build up.	X			
Check tempering valve operation, line strainers are clear and pressure across tempering valve is balanced.		X		
Gas Booster Maintenance:				
Inspect gas unit for insect infestations and plant growth, remove.	X			
Electric Element Maintenance:				
Inspect element for leaks. Check fuse, replace if required.	X			

6.2 MAINTENANCE PROCEDURES

6.2.1 SOLAR COLLECTOR

If a tube is broken it should be replaced as soon as possible to maintain maximum collector performance. However, the system will continue to operate safely with a damaged tube. Any broken glass should be cleared away to prevent injury.

To replace a tube:

1. Remove the tube clip, slide the broken tube out and carefully pick up any glass pieces and dispose of appropriately.
2. Avoid touching the glass wool insulation inside the manifold with bare hands, as it can cause mild skin irritation.
3. If the heat pipe is not damaged, it can be left in place and a new evacuated tube inserted, guiding the heat pipe down the groove between the evacuated tube inner wall and heat transfer film.

Note that the tubes are self-cleaning. However it is possible to clean the tubes in the following ways:

1. Wipe down glass exterior with a wet cloth
2. If particularly dirty, use a glass cleaner and wipe the glass exterior (only if safe to do so).

6.2.2 DRAINING THE SYSTEM

Draining of the collector and/or tank may be required when servicing or performing maintenance on the system. Periodic flushing of the system is not required unless in areas with hard water resulting in scale formation in the bottom of the tank.

WARNING
Allowing the collector to sit pressured with isolation valves closed may lead to dangerously high pressure.

Follow the steps below to drain the collector:

1. Turn off the cold mains water supply to solar storage tank.
2. If the storage tank is being drained,
    a. Disconnect all power supply to water heater.
    b. Release pressure in the tank by carefully operating the PTRV release lever.
    c. Undo the cold inlet and attach a drain hose.
    d. Operate the PTRV release lever allowing air into the heater and water to drain via the hose
3. If the storage tank is not being drained
    a. Isolate piping to and from the solar collector and immediately undo fittings to open drain line
    b. Open up the drain outlet on the solar return line to allow air to enter the system.
    c. Allow the manifold to sit in a vented state for 5-10min to allow itself to boil dry (may need longer in poor weather).
    d. Close the drain when draining is complete.
4. Re-fill the system by following the procedure outlined in the Apricus DHW Installation manual, Chapter 7: Commissioning.

6.2.3 AIR LOCKS

If the pump is running but flow is not being achieved in the solar loop, the system may have an air lock. An air lock can be rectified by following the filling procedure outlined in the Apricus Installation manual in Chapter 7: Commissioning.

6.2.4 OVER PRESSURE PROTECTION MAINTENANCE

The lever on the PTRV should be carefully lifted and placed down once every 6 months, this will help prevent any debris of scale build up in the valve. Ensure the drain pipe from the PTRV is clear.

This should be similarly done for the expansion control valve on the cold mains line (if there is one installed).

6.2.5 MAGNESIUM ANODE REPLACEMENT

Glass lined storage tanks have a magnesium anode inserted into the tank. The anode prevents internal corrosion that will otherwise drastically shorten storage tank life. Apricus recommend the anode be inspected at least every three (3) years, and serviced as required. Inspect the anode on a yearly basis if tank uses hard water.

It is recommended that the manufacturer be consulted regarding suitable replacement anodes.

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

CHAPTER 7: WARRANTY

Apricus Australia Residential Hot Water Warranty policy is outlined in this section. This warranty policy is by Apricus Australia Pty Ltd (ACN 111 285 271) ("Apricus Australia").
Call us on 1300 APRICUS (1300 277 428).

7.1 TERMS AND CONDITIONS OF WARRANTY

7.1.1 TERMS AND CONDITIONS FOR THIS WARRANTY

- Within 12 months from install – Should Apricus Australia determine that the claim is a valid warranty claim, then Apricus Australia shall organize for parts to be inspected/tested and shall advise for replacement.
- Over 12 months from install – Customer/Agent must engage with licensed plumber for repair. Apricus will replace component as per the Apricus Australia domestic warranty policy only.
- Any additional expenses incurred during the 12-month warranty period under this warranty policy will be borne by the product owner.
- Note: Product owners are recommended to always keep receipts, invoices, warranties and any installation record forms where applicable, in a safe place.

7.1.2 NECESSARY ELIGIBILITY REQUIREMENTS TO MAKE CLAIMS UNDER THIS WARRANTY:

- The person(s) making the claim must be the product owner or have consent to act on behalf of the owner.
- The person(s) making the claim must contact Apricus Australia as soon as they notice any defect(s) without excessive delay, and the product must be within its warranty period.
- The product must have its original serial numbers and/or rating labels where applicable.
- The product must be installed in Australia.
  The warranty period begins from the date of installation of the component(s), in the event that proof of installation cannot be provided, the period begins from date of purchase, and in the event that this is also not available, the warranty will begin from date of manufacture of the product plus 3 months.

7.1.3 LODGING A CLAIM UNDER THIS WARRANTY:

1. For all warranty issues please call Apricus Australia on 1300 277 428 or email warranty@apricus.com.au.
2. Provide full product owner's contact details: name of owner, address of installation site, contact number(s), proof of original installation date or if not available, the date of manufacturing and serial number from the rating label, where applicable for water heaters and tanks.

7.1.4 SUMMARY OF WARRANTY PERIODS

Summary of Warranty Periods can be found in Table 1.

Table 1 – Warranty Periods for Residential Components

Component	Description	Warranty Period (Parts Only)	Warranty Period (Parts & Labour)	Reference Clause (but not limited to)
Thermostat and Element	Tank Thermostat, Element	1 year	1 year	7.8.1-7.8.3, 7.8.6
Valve	Flow Meter	1 year	1 year	7.8.1-7.8.3, 7.8.6
	PTR Valve	2 years	1 year	7.8.1-7.8.3, 7.8.6
	Valves for Solar Pump Kit	2 years	1 year	7.8.1-7.8.3, 7.8.6
Pump	Grundfos Pumps (UPS, ALPHA)	2 years	1 year	7.8.1-7.8.3, 7.8.6
Controller	Apricus Controller and sensor leads (Resol)	1 year	1 year	7.8.1-7.8.3, 7.8.6
	Apricus Controller and sensor leads (SolaStat)	1 year	1 year	
Storage Tank	Apricus Glass-Lined Storage Tanks *Tank models: SX160000DWA, SX250000DWA, SX315000DWA, SX400000DWA*	10 years on cylinder	1 year	7.5.1, 7.8.1-7.8.3, 7.8.6
	Apricus Glass-Lined Storage Tanks *Tank models: AP250GLG, AP315GLG, AP400GLG*	10 years on cylinder* See reference clauses.	1 year	7.5.1, 7.5.3, 7.8.1-7.8.3, 7.8.6
	Apricus Stainless Steel Storage Tanks *Tank models: AP250WSG, AP315WSG*	10 years on cylinder* See reference clauses.	5 years	7.5.1-7.5.2, 7.8.1-7.8.3, 7.8.6
Electric Storage Tank	Apricus Glass-Lined Electric Storage Tanks (excludes element and thermostat) *Tank models: DS160136DJA, DS250136DJA, DS315136DJA, DS400136DJA, DS160136DJB, DS250136DJB, DS315136DJB, DS400136DJB, DS160136DJA-AR, DS250136DJA-AR, DS315136DJA-AR, DS400136DJA-AR, DS160136DJB-AR, DS250136DJB-AR, DS315136DJB-AR, DS400136DJB-AR*	10 years on cylinder	1 year	7.5.1, 7.8.1-7.8.3, 7.8.6
	Apricus Glass-Lined Storage Tanks (excludes element and thermostat) *Tank models: AP250GLE, AP315GLE, AP400GLE, AP250GLEM, AP315GLEM, AP400GLEM*	10 years on cylinder* See reference clauses.	1 year	7.5.1, 7.5.3, 7.8.1-7.8.3, 7.8.6
	Apricus Stainless Steel Electric Storage Tanks (excludes element and thermostat) *Tank models: AP250WSE, AP315WSE, AP250WSEM, AP315WSEM*	10 years on cylinder* See reference clauses.	5 years	7.5.1-7.5.2, 7.8.1-7.8.3, 7.8.6
Gas Water Heater	Bosch Gas Water Heater (26L/min and 32L/min) *Gas Booster Models: YS2670RAH, KM3211WH, KM3211WHQ*	3 years 10 years on Heat Exchanger	1 year	7.4.1-7.4.4, 7.8.1-7.8.3, 7.8.6
	Apricus Gas Water Heater *Gas Booster Models: GK-2020K, GK-2620K, GK-2030K, GK-2630K*	10 years on Heat Exchanger	1 year	7.4.1-7.4.4, 7.8.1-7.8.3, 7.8.6
	Rinnai Gas Booster	3 years	3 years	7.4.1-7.4.4,

	REU-V2426WS-AK/S26N *REU-V2426WS-AK/S26L*	10 years on Heat Exchanger		7.8.1-7.8.3, 7.8.6
Manifold Casing	Aluminium manifold leaking	15 years	2 years	7.6.1-7.6.4, 7.8.1-7.8.6
	Large area paint pitting or peeling	15 years	3 years	
	Rubber tube seal cracking	15 years	2 years	
	Rubber end cover cracking	15 years	2 years	
Solar Collector Copper Header	Copper header leaking	15 years	2 years	
Solar Collector Brass Fittings (Flared Nuts)	Brass fittings leaking or splitting of metal	15 years	2 years	
Evacuated Tube	Evacuated tube having a complete loss of vacuum. See section 4.1	15 years	2 years	
Heat Pipe	Heat pipe not transferring heat	15 years	2 years	
Frame	Frame structural failure, dimensional inconsistencies that affect installation	15 years	2 years	
Tube Clip	Tube clip structural failure	15 years	2 years	
Tube Rubber Cap	Tube rubber cap Cracking	15 years	2 years	

7.2 GENERAL CONDITIONS

7.2.1 This Warranty is for Apricus Australia domestic use of the solar hot water heating system only.

7.2.2 To the extent that a claim falls under the 'Parts Only' Warranty Period, the Warranty covers the repair and/or replacement of such failed component in domestic use free of charge. However, the transport, installation and labour costs of repairing the component or delivering the replacement component and removing and replacing the existing component will be the responsibility of the Customer of the existing component.

7.2.3 To the extent that a claim falls under the 'Parts and Labour' Warranty Period, the Warranty covers the repair and/or replacement of such failed component in domestic use and any associated labour costs free of charge.

7.2.4 The decision to repair or replace the component that is the subject of the Warranty will be entirely at the discretion of Apricus Australia.

7.2.5 Where an Apricus component, as per Table 1, in domestic use, is repaired or replaced by Apricus Australia, the balance of any original Warranty Period will remain effective. The repaired or replaced part does not carry any additional warranty period.

7.2.6 Apricus Australia reserves the right to alter the design, components or construction to its Apricus Australia Domestic hot water system or custom design. Such alterations shall not constitute a defect in design or construction under this Warranty.

7.2.7 Any claim under this Warranty must include full details of the defect and/or damage to the Apricus Australia Domestic hot water system or component(s) in domestic use. All claims must be made within one (1) month of the detection of the defect.

7.2.8 Dated proof of purchase is required prior to commencement of any work under this Warranty.

7.2.9 Apricus Australia does not warrant any work conducted by the installer of the Apricus Australia Domestic hot water system or component(s) in domestic use.

7.2.10 This Warranty only applies to the Apricus Australia domestic hot water system and its components, or component(s) in domestic use and does not cover any plumbing or electrical associated parts, including but not limited to any parts supplied by any person installing the Apricus Australia Domestic hot water system or component(s) in domestic use.

7.2.11 To the extent permitted by law, Apricus Australia shall not be liable under this Warranty for any consequential loss or damage or any incidental expenses resulting from any breach of this warranty, including but not limited to, claims for damage to buildings, roofs, ceilings, walls, foundations, gardens, personal belonging or household effects, fixtures and fittings, or any other consequential loss, damage or inconvenience, either directly or indirectly due to leakage from the Apricus Australia domestic hot water system or component(s) in domestic use or any other matter related to the system or its operation.

7.2.12 The benefits conferred by this Warranty are in addition to all other rights and remedies in respect of the Apricus Australia Domestic hot water system or component(s) in domestic use, which the purchaser has under the Competition and Consumer Act 2010 and consumer protection legislation of the States and Territories. Nothing in this Warranty has the effect of excluding, restricting or modifying those rights.

7.2.13 Goods presented for repair may be replaced by refurbished goods of same type rather than being repaired. Refurbished parts may be used to repair/replace the goods.

7.2.14 This Warranty is effective for all Apricus Australia Domestic hot water system or component(s) in domestic use installed after 1st April 2016.

7.2.15 If the Customer has not paid in full for the Apricus Australia Domestic hot water system or component(s) in domestic use then this Warranty does not apply.

7.2.16 The Apricus Australia domestic hot water system and its components or component(s) in domestic use are covered by a warranty against defective factory parts or workmanship from the date the Apricus Australia domestic hot water system or component(s) in domestic use is installed for the relevant period for such component as outlined in Table 1 – Warranty Periods. If the date of installation is unknown, the Warranty commences three (3) months after the date of manufacture.

7.2.17 Apricus Australia's 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.

7.2.18 AS/NZS2712 - The Australian Standard for solar collectors. Testing to meet this includes resistance to glass breakage and impact resistance under certain conditions including hail, stagnation conditions, protection against water ingress and structural strength.

7.3 INSTALLATION

7.3.1 Upon installation of the Apricus component(s) in domestic use, the licensed plumber who installed the component(s) as a part of a domestic hot water system must complete a customer installation record form; containing the customer's contact details, product installation date, product serial numbers, licensed plumber contact details, summary of system format and contact phone number(s) of the merchant and/or group. A copy of the completed form should be left with the customer, a copy kept on permanent file by the installing plumber and a copy sent to Apricus Australia.

7.3.2 The Apricus component(s) must be installed in accordance with Apricus Australia's installation instructions, and all relevant local, state and national statutory requirements, including but not limited to, AS3500.4 & 5, AS5601, AS3000 and AS2712.

7.3.3 Installation must be completed by registered plumbers, gas fitters and electricians that are licensed in the State or Territory in which the installation is completed.

7.4 WATER HEATERS

7.4.1 For solar hot water systems, it is a legal requirement that water be heated on a regular basis to kill Legionella bacteria that can lead to Legionnaires disease. The frequency this temperature must be reached varies, and is explained below:

i. Bottom element electric boosted system - Once per week to 60°C, that is, tanks with 90% volume above the element.

ii. Mid element electric boosted system - Once per day to 60°C;

iii. Gas boosted systems boost water to 70°C each time water drawn from the storage tank is less than 55°C.

7.4.2 The electrical system components must be installed and connected to a 240V power supply by a qualified electrician in accordance with AS3000.

7.4.3 Gas water heaters with a thermostat setting of less than 75oC have the specified warranty period for parts only as per Table 1, however if set to greater than 75oC have one year for parts only.

7.4.4 The Gas water heater must be installed as per the specifications of the manufacturer, i.e. if the unit is internal, then it cannot be installed externally unless specified otherwise by manufacturer.

7.5 STORAGE TANKS

7.5.1 Apricus Storage tanks/ water heaters

i. Alterations or repair of the Unit other than by an accredited and licensed service agent or technician are not covered. Attachment of accessories or use of non-genuine replacement parts other than those manufactured or approved by the tank manufacturer are not covered by this Warranty.

ii. This Warranty applies only to the Unit and does not cover any ancillary plumbing or electrical parts supplied by the installer such as pressure limiting valve, tempering valve, line strainer, stop cocks, non-return valve, electrical switches, pumps or fuses, or faulty installation.

iii. The Unit must be installed by a licensed tradesperson in accordance with information set out in the manual supplied with the Unit and/or any relevant statutory requirements. If the Unit is located in a position that does not comply with the installation instructions or relevant statutory requirements, then this Warranty does not cover major dismantling or removal of cupboards, doors, walls or special equipment and/ or excessive labour, at the determination of the tank manufacturer, to make the Unit accessible for repair or replacement.

iv. As required by legislation, including under the ACL, any claims for damage to furniture, carpets, walls, foundations or any other consequential loss either directly or indirectly due to defects of any kind in a Unit will only be met by tank manufacturer where the damage could be considered reasonably foreseeable and installed complying with the installation instructions and all relevant statutory requirements.

v. 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.

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

i. Replacement of the Unit;

ii. Repair of the Unit;

iii. Refunding the cost of the Unit;

iv. Payment of reasonable costs of having the Unit repaired;

v. Payment in respect of the reduced value of the Unit.

7.5.2 Apricus Stainless Steel Tanks

i. Apricus Australia warrants Stainless Steel MPE/MPS water heater/storage vessels against faulty workmanship and materials. This warranty shall not apply to such Unit or part thereof, which has been the subject of fixed temperature settings in excess of 80ºC, or if any repairs have been made by any person not approved by Apricus Australia.

ii. For this tank, Apricus Australia Will;

   i. For the period up to and including the 5th year after the date of installation: repair or replace defective components or, at the discretion of Apricus Australia, provide a replacement unit or parts, including the cost of labour to repair the unit.

   ii. For the 6th year after the date of installation, the same warranty will apply except that the owner will be charged 30% of such repair work and or cost of replacement parts.

   iii. For the 7th year after the date of installation, the same warranty will apply except that the owner will be charged 40% of such repair work and or cost of replacement parts.

   iv. For the 8th year after the date of installation, the same warranty will apply except that the owner will be charged 60% of such repair work and or cost of replacement parts.

   v. For the 9th year after the date of installation, the same warranty will apply except that the owner will be charged 80% of such repair work and or cost of replacement parts.

   vi. For the 10th year after the date of installation, the same warranty will apply except that the owner will be charged 90% of such repair work and or cost of replacement parts.

   Note that the % represents the proportion the customer will pay based on the current Apricus price list for material and labour (where applicable).

iii. The above conditions, with regard to labour, apply within State Capital City metropolitan areas, as determined by Apricus Australia Outside these areas, the unit or parts are to be returned, unless otherwise arranged, to Apricus Australia or a service agent nominated by Apricus Australia. All freight and insurance charges (both ways) are the responsibility of the owner. When making a warranty claim, it is the responsibility of the owner to provide proof of original purchase and the date of installation. The unit must be installed by appropriately qualified trades-people in accordance with relevant standards and local statutory authorities' regulations. Responsibility for repairs to the unit cannot be accepted unless authorization to carry out repairs has been previously given by Apricus Australia where a warranty claim has been made and it is found that the fault is not within the unit, all costs will be charged to the owner. The warranty does not extend to any consequential loss or damage, which may be a result of the operation or non-operation of this unit, subject to any statutory warranty to the contrary.

iv. Any unit or part replaced under warranty is not covered by a further full warranty but is covered for the remaining period of the existing warranty.

v. Note that the water quality parameters must not be exceeded as per section 7.6, except Chloride which must be less than 200mg/L.

7.5.3 Apricus Glass-lined Tanks

i. Apricus Australia warrants glass-lined water heater/storage vessels against faulty workmanship and materials. This warranty shall not apply to such Unit or part thereof, which has been the subject of fixed temperature settings in excess of 80ºC, or if any repairs have been made by any person not approved by Apricus Australia.

ii. For this tank, Apricus Australia Will;

   i. For the period up to and including the 7th year after the date of installation: repair or replace defective components or, at the discretion of Apricus Australia provide a replacement unit or parts. Note that the cost of labour to repair the unit will be the responsibility of the customer after the first year.

ii. For the 8th year after the date of installation, the same warranty will apply except that the owner will be charged 60% of cost of replacement parts. Repair work costs will be the responsibility of the water heater/storage vessel owner.

iii. For the 9th year after the date of installation, the same warranty will apply except that the owner will be charged 80% of cost of replacement parts. Repair work costs will be the responsibility of the water heater/storage vessel owner.

iv. For the 10th year after the date of installation, the same warranty will apply except that the owner will be charged 90% of cost of replacement parts. Repair work costs will be the responsibility of the water heater/storage vessel owner.

Note that the % represents the proportion the customer will pay based on the current Apricus price list for material and labour (where applicable).

iii. The above conditions, with regard to labour, apply within State Capital City metropolitan areas, as determined by Apricus Australia Outside these areas, the unit or parts are to be returned, unless otherwise arranged, to Apricus Australia or a service agent nominated by Apricus Australia. All freight and insurance charges (both ways) are the responsibility of the owner. When making a warranty claim, it is the responsibility of the owner to provide proof of original purchase and the date of installation. The unit must be installed by appropriately qualified trades-people in accordance with relevant standards and local statutory authorities' regulations. Responsibility for repairs to the unit cannot be accepted unless authorization to carry out repairs has been previously given by Apricus Australia Where a warranty claim has been made and it is found that the fault is not within the unit, all costs will be charged to the owner. The warranty does not extend to any consequential loss or damage, which may be a result of the operation or non-operation of this unit, subject to any statutory warranty to the contrary.

iv. Any unit or part replaced under warranty is not covered by a further full warranty but is covered for the remaining period of the existing warranty.

v. Note that the water quality parameters must not be exceeded as per section 7.6.

7.6 SOLAR COMPONENTS

7.6.1 For solar components the warranty periods are conditional upon the type of component and perceived issue of that component.

ii. Rapid colour fading of manifold warranty period is 2 years for parts only and 2 years for parts and labour.

iii. Evacuated tube loss of vacuum

i. For the 10 tube collector, a minimum of one evacuated tube must have a complete loss of vacuum.

ii. For the 20 tube collector, a minimum of two evacuated tubes must have complete loss of vacuum.

iii. For the 22 tube collector, a minimum of two evacuated tubes must have complete loss of vacuum.

iv. For the 30 tube collector, a minimum of three evacuated tubes must have complete loss of vacuum.

7.6.2 Distributor/dealer/installer must quote the serial number when making a warranty claim and provide a copy of the Distributor Installation Record Form

7.6.3 Distributor/dealer/installer must provide to Apricus a dated photograph of the faulty products providing reasonable visual evidence of the defect; and

7.6.4 The faulty products must be kept in storage by the dealer for no less than ninety (90) days and made available for inspection by Apricus or its designee upon the request of Apricus unless otherwise agreed to in writing by Apricus.

7.7 DOMESTIC SYSTEMS

7.7.1 For domestic SHW systems, the warranty policy applies to the individual Apricus components as per Table 1.

7.8 PRODUCT WARRANTY EXCLUSIONS

This Warranty does not apply to any defects or damage that are not due to faulty factory parts or workmanship including, but not limited to, defects or damage caused by or resulting from:

7.8.1 Transport and Installation

i. Transport, rough handling;
ii. Improper storage;
iii. Normal wear and tear and reasonable abrasion;
iv. Incorrect or improper installation and maintenance of the Apricus Australia domestic hot water system or component(s) in domestic use, including but not limited to, installation and maintenance otherwise than in accordance with the instructions specific to the component(s) in domestic use and/or contained in the owner's manual supplied by Apricus Australia and/or standard industry practises;
v. Faulty valve, connection to incorrect water supply. Pressure limited valves and pressure relief valves must be fitted to inlet as per installation manual.
vi. Incorrect system selection;
vii. The Apricus Australia Domestic hot water system or component(s) in domestic use being relocated from its original point of installation.

7.8.2 Repair or Modification

i. Unauthorised alteration or repair of the Apricus Australia Domestic hot water system or component(s) in domestic use, other than by a licensed plumber or by an approved Apricus Australia agent;
ii. Unauthorised modification or attachment of any parts or accessories that are incompatible or non-industry standard components other than those manufactured or approved by Apricus Australia;
iii. Serial tags/stickers on any of the components being removed or defaced.

7.8.3 Environmental and External Factors

i. Accidental or intentional damage, acts of God, storm damage, vandalism, failure due to misuse or abuse of the product for purposes other than the intended application, or neglect of any kind;
ii. Damage to power cable or wires, lightning strikes, dirty power supply or power surges and the power supply to the Apricus Australia Domestic hot water system or component(s) in domestic use being cut;
iii. Attacks by any creatures/animals including but not limited to birds, rodents and/or insects;
iv. Ingress of dirt or dust;
v. The solar collector being left dry (no liquid circulation) and exposed to daily sunlight (i.e. Not covered) for a period exceeding 6 months;
vi. Freezing in regions with minimum temperatures below -15oc (in accordance with AS/NZS 2712:2007 freeze level 1);

vii. Corrosive environmental conditions beyond normal outdoor limits that exceed the reasonable performance of the specified materials of the component(s) in domestic use;
viii. Corrosion, erosion, scaling or product affected by oxides or chemicals;
ix. Failure due to tank corrosion where the magnesium anode has been degraded, and not replaced within the recommended maintenance periods advised by Apricus within manual.
x. Abnormal stress or strain

7.8.4 Solar Components

iv. Manifold
    i. Damage to the manifold casing during or after installation;
    ii. Failure to seal insulation up to manifold casing for rear port manifolds;
    iii. Piping connected to the inlet/outlet is "hung" off the collector, not properly supported causing rubber seal to be pulled out of shape;
    iv. Gradual colour fade or colour inconsistency;
    v. Large area paint pitting or peeling as a result of environmental conditions beyond normal outdoor limits (see section 6.3). Note that the paint pitting or peeling must be enough to be visible from ground level to be covered;
    vi. Rubber tube seal cracking due to attacks by insects or animals (see section 6.3);
    vii. Rubber end cover cracking due to attacks by insects or animals (see section 6.3);
v. Solar collector copper header
    viii. Leakage from any connection to header inlet or outlet;
    ix. Defects resulting from exposure of the manifold header pipe to pressure exceeding 0.8Mpa/8bar/116psi;
    x. Defects resulting from exposure to flow rates exceeding 15 L/min or 4gpm;
    xi. Defects resulting from the freezing of the liquid contained in the manifold header pipe;
    xii. Leakage of the manifold header pipe as a clear result of metallic corrosion and not structural braze failure;
    xiii. Poor heat transfer, excessive pressure drop, or blockage of header as a result of scale formation;
    xiv. Installation of more than five end port manifolds in series without flexible connections to allow unrestricted longitudinal expansion and contraction of the header pipe(s);
    xv. Piping connection on the inlet/outlet of the collector that restricts longitudinal expansion and contraction of the header pipe(s);
vi. Brass fittings (Flared nuts)
    i. Brass fitting has been over torqued, indicated by deformation marks on corners of the HEX of the nut, crossed thread or other clear evidence of incorrect use;
    ii. Spanner/wrench with teeth (rather than flats) has been used to tighten the fitting;
    iii. Non Apricus supplied nipple has been used with the flared nut;
    iv. Piping connected to the inlet/outlet is "hung" off the collector, not properly supported;
    v. Copper flare has been deformed from original manufactured shape;
vii. Evacuated Tube
    i. Heat pipes are not installed correctly full depth into header ports, indicated by deformation of the tube top plate;

ii. Heat pipes are not running straight up and down the top side of the evacuated tube due to excessive rotation of the evacuated tube during installation;
iii. Collector mounting frame is installed in twisted (not squared or even) position putting stress on evacuated tubes;
iv. Loss of vacuum due to installation related causes;

viii. Heat pipe
i. Heat pipes are installed outside of the required 20-80deg installation angle;
ii. Heat pipes have been bent or damaged causing rupture to the copper pipe;

ix. Frame
i. Failure due to any modification to the mounting frame components;
ii. Failure when not installed in accordance with Apricus installation guidelines;
iii. Failure of non-Apricus fastening components or the structure to which mounting frame is attached;
iv. Failure due to wind loading when the mounting frame installation has not been installed in line with special installation guidelines and local structural codes for high wind regions;
v. Failure due to excessive snow loading;
vi. Corrosion of the metal due to exposure to environmental conditions that exceed the limits of the frame materials.

x. Tube clip
i. Corrosion of the metal due to exposure to environmental conditions that exceed the limits of the frame materials.

xi. Tube Rubber Cap
i. Cracking due to attacks by insects or animals (see section 6.3).

7.8.5 Evacuated Tube Collector and Frame Exclusions

i. Breaches of warranty resulting from either:
i. Any use of a Product for any purpose other than its ordinary purpose, as well as any neglect, accident, or ordinary wear and tear;
ii. Damage from transport, shipping, handling, or any act of God or other Force Majeure;

ii. Breaches of warranty result from installation that is not in accordance with either:
iii. Apricus' installation and operation manual in effect on the date when the Product is sold to the Distributor;
iv. Instructions and/or all relevant standards, codes of practice, electrical wiring and safety regulations and any regional authority regulations;
v. A solar collector is damaged because of the failure of mounting brackets, fasteners, nails, straps or other components for solar collector mounting that are either not supplied by Apricus or not fastened according to the instructions supplied by Apricus.
vi. A solar collector is damaged because of the failure to fasten it to structurally sound material, resulting in significant movement or vibration of the Product.
vii. Any component of the Solar Collector is damaged as a result of exposure to wind or snow loading.
viii. The Product is exposed to environmental conditions or mechanical forces that exceed the levels that component materials can be reasonably expected to withstand.
ix. The defective part, accessory, or component of the Product was not manufactured by Apricus, or Apricus' OEM suppliers.

x. The Product is opened, serial tag removed or defaced, or its structure is altered in any way.
xi. If any maintenance or repair on the Product is completed by un-authorized persons.
xii. The Product is relocated from its original point of installation.
xiii. Not installed by a suitably qualified and licensed contractor.
xiv. Reduction in collector output due to gradual loss of tube vacuum over the life of the collector.

7.8.6 Water Pressure and Quality Thresholds

i. Excessive water pressure above 800kpa when no ECV installed or 680kpa when ECV is installed and ECV setting is no more than 725kpa, negative pressure (partial vacuum), excessive temperature, water hammer;
ii. Sludge, sediment and/or foreign particles accumulating as a result of connection to a water supply from filtered or treated sources such as; deionized water, spring water, untreated bore water or any water source non-suitable for human consumption;
iii. Contamination and corrosion from particles in the water supply, with the water stored in the cylinder exceeding at any time the following levels:

Total hardness	</= 200 mg/litre or ppm
Total dissolved solids	</= 600 mg/litre or ppm
Electrical conductivity	</= 850 µS/cm
Chloride	</= 250 mg/litre or ppm
Magnesium	</= 10 mg/litre or ppm
Sodium	</= 150 mg/litre or ppm
pH	Min 6.5 to Max 8.5

7.9 GLOSSARY OF TERMS USED IN THIS WARRANTY

Term	Definition
ACL	Australian Consumer Law is the national law for fair trading and consumer protection.
Brass fittings	Fittings used to connect manifold to manifold (connectors), or fittings related to connecting the manifold to copper pipe (elbows or straight fittings). These are made out of brass material.
Claim	Any claim, action, proceeding, loss, damage, cost, expense or liability whatsoever incurred or suffered by or brought or made or recovered against any person and however arising (whether or not presently ascertained, immediate, future or contingent)
Collector	Manifold, tubes and flush mount frame.
Controller	Device used in the SHW system to set the temperature requirements of the system to control relays such as pumps.
Copper header	The copper header pipe is within the manifold, and acts to transfer heat into water.
Corrosion	Process that involves deteriorating material due to oxidation.
Customer	Person(s) or body/bodies corporate to whom these terms and conditions are directed.
Cylinder	Refers to the tank cylinder.
Dry collector	Refers to a collector without any liquid circulating through it, being exposed to daily sunlight without being covered.
ECV	Expansion control valve
Electric water heater	A hot water storage tank that contains electric heating elements to heat water.
Electrical conductivity	Amount of dissolved material in water, which relates to its ability to conduct electrical current through it.
Element	An electric element is generally found mounted on electric hot water storage tanks

	and it works to heat water.
Element (bottom)	Bottom element refers to the location of the element being mounted towards the bottom of the hot water storage tank. This element heats volume of water above the bottom of the tank generally at off peak times.
Element (Middle)	Middle element refers to the location of the element being mounted towards the middle of the hot water storage tank. This element heats volume of water above the middle of the tank continuously.
Evacuated tube	The evacuated tube functions to capture heat from the sun.
Flared nuts	Fittings provided loosely connected on manifold outlets to allow connections to copper pipe or another collector through other brass fittings. Flared method of connecting can be used with these nuts to make secure connections.
Flow meter	Measures the flow rate of water.
Frame	A flush mount frame allows mounting of the collector flush onto the roof, the roof must be pitched at 20degrees or more. A tilt mount frame allows mounting of the collector on to the roof at an angle of either 30degrees or 45degrees onto a roof at an angle of less than 20degrees. The recommended pitch of the collector is the location's latitude +/- 10degrees.
Gas water heater	An auxiliary energy source, also known as a gas booster that functions to heat water.
Hardness	Water that is high in dissolved minerals.
Heat pipe	A heat pipe sits inside each evacuated tube and works to collect heat to transfer into the copper header pipe within the manifold.
Insulation	Materials used for heat retention.
Manifold	The manifold contains the copper header pipe that transfers heat into water.
pH level	Measure of how acidic/basic water is.
PTR Valve	Pressure, temperature relief valve.
Pump	Device using suction or pressure to move water
SHW	Solar hot water
Storage tank	Container holding volume of water.
Terms	These terms and conditions of sale.
Thermostat	Device that works with the electric heating element to regulate the temperature by activating or deactivating the element as required to a certain temperature.
Tube clip	Used to secure the bottom end of the evacuated tube (over the tube rubber cap) into the bottom track (part of the flush mount frame).
Tube rubber cap	Used to protect the bulb at the end of the evacuated tube.
Vacuum	A state of very low pressure. Vacuum is used in the evacuated tube to insulate heat in the tube once it is captured. Vacuum used within the heat pipe is used to create very low pressure to alter the behaviour of liquid inside (allowing liquid to boil at a lower temperature).
Water hammer	Also known as 'fluid hammer', refers to the pressure wave caused when a fluid in motion is forced to suddenly stop or change direction.
Wind loading	Force on a structure arising from the impact of wind on it.

CHAPTER 8: GENERAL INFORMATION

8.1 SYSTEM REGISTRY

Registering your Apricus solar hot water system will ensure that your details are placed on our computer system streamlining any future after-sales/service requirements. You can register your Apricus Australia solar hot water system online at: www.apricus.com.au

8.2 STAY IN THE LOOP

To stay up to date with the latest Apricus news, product updates, announcements, and specials. Sign up to our Apricus e-newsletter and connect with us on social media by visiting our website: www.apricus.com.au