



THE SERVICE AGENT GUIDE

A technical reference to troubleshooting Apricus
systems for service agents

Version 2.0

**“The customer agrees to and accepts all related charges incurred as
a result of a warranty request for service where the fault is outside
the Apricus Warranty Policy” – WARRANTY AGREEMENT**

Disclaimer and Warning

Professional Standards

Works may require licences and qualifications. Apricus Australia advises that if you do not have the appropriate licence or qualification that you engage a suitably licensed and qualified professional to carry out the works.

All works performed must meet the relevant authorities guide lines and standards, including AS/NZS 3500 and any manufacturer's guidelines, and no practice mentioned in this guide supersedes the relevant standards and occupational health and safety guidelines.

Safety

Before performing any works it is advised that a risk assessment and work method statement is complete for the appropriate works.

Please exercise extreme caution and safety when working on solar hot water systems, on a roof, or with electricity. Always wear the appropriate personal protective equipment, and ensure all risk prevention measures are taken.

Water pumping through pipelines can be scalding hot. Heat pipes themselves can become extremely hot and cause serious burns on contact. Particular care should be taken when bleeding air or water, as there is a risk of the manifold, pump or valve expelling scalding hot water.

Disclaimer

The procedures mentioned herein are a guide only. Apricus Australia bears no responsibility for any injuries and/ or damage cause to persons and/ or property while undertaking works mentioned in this guide.

If at any point you are unsure as to a course of action, or if you bear a qualification for any works, or you cannot understand a procedure mentioned in this guide, please contact;

Apricus Australia on 1300 277 428

Or alternatively, your local Relationship Manager, who will direct you to a member of the technical team.

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Customer Service

Customer service is extremely important to Apricus Australia. Our ability to provide successful after sales service is determined by the quality of people in the service agent team. Your role is highly valued and crucial to our success.

Customer Service Checklist – Before Service Work

- ☐ Greet customer with business card
- ☐ Read Warranty disclaimer to customer as follows **“The customer agrees to and accepts all related charges incurred as a result of a warranty request for service where the fault is outside the Apricus Warranty Policy”**
- ☐ Treat Customer with respect and courtesy
- ☐ Talk to customer about problem/ symptoms
- ☐ Check accessibility of site, e.g. locked gate, dogs, etc
- ☐ Assess job & risks

Customer Service Checklist – After Service Work

- ☐ Clean site and leave area tidy
- ☐ Explain to customer the problem, basic operation of the system and what has been done to fix it
- ☐ Leave your details and card
- ☐ Sign and complete warranty form
- ☐ Inform customer of completion and say farewell
- ☐ Label any faulty parts with the WAN number

Diagnosing Faults

Tools Required for Diagnosing & Service Work

- ☐ Probe Thermometer (preferable to have 2)
- ☐ Multimeter
- ☐ Water pressure test gauge
- ☐ Manometer
- ☐ Screwdrivers
- ☐ Shifting Spanners

Materials Required for Diagnosing & Service Work

- ☐ Teflon Tape
- ☐ Thermal Heat Paste
- ☐ Silicone
- ☐ 3m Test Sensor

Identifying areas of common faults

The following points will commonly lead to a fault if **not** present or installed correctly:

- ✓ Check Valve above pump
- ✓ Insulation on all pipework
- ✓ Roof sensor secured and sealed (not touching exposed copper)
- ✓ Pump mounted in correct position
- ✓ Correct flow through collector (and correct sensor location)

Checklist for General Diagnosis

→ And Possible Faults / Test to Run

- ☐ Check temperature from tap and tank with thermometer
 - Tempering Valve (see pg. 32), Solar Contribution (see pg. 10 & 43), Booster (see pg. 28)
- ☐ Check circulation and system operation
 - Pump (see pg. 7), Controller (see pg. 16), Sensors (see pg. 18 & 19), Check Valve, Air lock in Manifold (see pg. 39)
- ☐ Check sensors and sensor location
 - Roof Sensor sealing, Sensor leads touching copper or next to mains power cables (see pg. 18, 19 & 38)
- ☐ Check pipework and circulation flow direction
 - Roof sensor on Collector outlet (see pg. 39), Solar Loop not connected to correct tank ports
- ☐ Check tubes and heat pipe location into collector
 - Broken Tubes, Heat pipes without heat paste, heat pipes not located in the Manifold properly (see pg. 40)

Circulation Pump

Checklist for Pump Diagnosis

→ And Possible Faults / Test to Run

- ☐ Check operation of pump via controller override button
 - Power to pump
 - Bleed air from pump / collector
 - Check valve jammed
- ☐ Check pump Speed Setting
 - Lowest is preferred, too fast will decrease efficiency
- ☐ Check operation of pump via sensors
 - Damaged / incorrectly mounted sensors
 - Bleed air from pump / collector
 - Check valve jammed
- ☐ Check pump location
 - Mounted with barrel horizontal, and electronics casing should be positioned on the side with the cable exiting the bottom

General Checks and Pump Speed Adjustment

- Disconnect power to pump, pull plug from lead first
- Check speed on pump, the lowest speed is generally preferred (*photo P1*)
- Pump position to be fitted with barrel horizontal, and electronics casing positioned on the side with the cable exiting the bottom and preferably on a vertical run of pipe under cover on a wall or secured to the tank, and in the right flow position (check arrow on pump) (*photo P4*)
- Solar rated 'Swing check' or 'Spring check' valve must be fitted above pump and unions
- Make sure power leads from pump are secure and not touching hot copper pipes or fittings
- Make sure pump has support and pipes are clipped to take the weight of the pump fittings etc.
- Check for leaks
- Do not over tighten unions. Over tightening causes damage to union seals
- Bleed pump from stainless steel screw in center of pump face, turn screw anti clock wise to let air out (*photo P2 & P3*)
- Make it clear to the client that the speed on the pump does not change the water at the tap

Photo P1: Pump speed settings, speed 1 is suitable for most installs, a higher speed may be used on multi storey installs, or installs with long solar loops

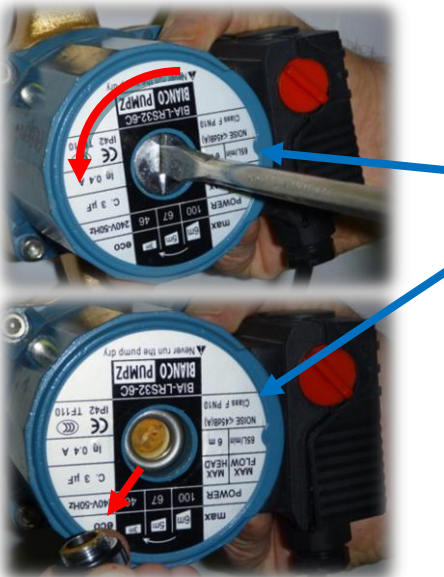


Photo P2 & P3: Carefully loosen pump air bleed screw when commissioning to let out air. Screw can be completely removed to flush small amounts of debris if caught in pump, **WARNING:** may expel scalding hot water

Checking Pump Operation / Circulation

- Set pump speed to '3' as per previous procedure
- Hold down 'pump' button on controller for up to 3 mins and hold probe thermometer on return pipe, watching for a temperature change
- Unplug pump from controller or turn controller off
- Reset pump to speed 1
- Let temperature on roof build up to approx 10 - 20°C above tank temperature
- Plug pump in again, and hold probe thermometer on return pipe, within a short time the return line should start to get hot, indicating that the pump is working correctly
- If no temperature fluctuation can be measured, pump is not cycling, check pump power and put hand on pump to feel vibration of pump turning on, test check valve and bleed air from collector
- When performing this check, if the return line takes more than a minute to get hot, the pump speed is too slow. Then turn the power off, adjust speed up, turn it back on and check again.



Photo P4: Example of pump location with barrel horizontal, electronics casing positioned on the side with the cable exiting the bottom and solar rated check valve above (required) and ball valve below (recommended)

Pump Troubleshooting

Observations /Problem	Cause	Solution
Pump always ON and collector temperature is much higher than tank (>20°C difference)	1. Air lock in manifold	Ensure system is air bled properly. A ball valve and drain should be installed on the return line allowing the drain to be opened, ball valve shut off, thus flushing the collector. Take care as some steam may be released.
	2. Pump failure	Check pump operation / Replace if necessary
	3. Insufficient flow rate	<p>Check flow rate by temporarily installing flow meter.</p> <p>If not sufficient flow rate try:</p> <ol style="list-style-type: none"> 1. Change the pump speed to a higher setting. 2. Eliminate any unnecessary elbows or bends in copper line to reduce pressure drop.

		<p>3. Confirm Correct pump orientation – the flat side of the pump with a big bleed screw is always facing the sides, never facing the up or down.</p> <p>4. Ensure there is 200mm of straight pipe on both sides of the pump to ensure optimal operation.</p>
	4. Pump Cavitations	<p>1. Bleed the pump of air by opening the top bleed screw.</p> <p>2. Ensure there is at least 200mm of straight pipe on both sides of the pump.</p>
	5. Tank inlet sensor is not inserted properly	Re-install the tank sensor by coating with thermal paste and re-check the operation
	6. Incorrect SolaStat settings	Check Programming figures as pre-set factory values outlined in the SolarStat Manual.

Pump not cycling during good weather and the collector is hot	1. Collector roof sensor is not inserted properly	Re-install the roof sensor by coating with thermal paste and sealing with silicone, re-check the operation
	2. Damaged controller, sensors or cables	<p>1. The sensors, cables and controller operation can be checked by procedure mentioned on pg. 9</p> <p>2. If no circulation, check sensors with multimeter (see pg. 17), if broken, replace broken sensor/ cable. Check the operation again.</p> <p>3. If still not working, replace the controller.</p>
Noisy pump during operation	1. Pump Cavitations	<p>1. Bleed the pump of air by opening the top bleed screw.</p> <p>2. Ensure there is at least 200mm of straight pipe on both sides of the pump.</p>
	2. Inappropriate speed settings	Turn the pump off, adjust the pump to a lower speed if

		possible. Then turn pump back on.
	3. System pressure is too low	Increase the system pressure within permissible limits.
Pump simply is not running when switched on	1. The power supply is not available	Check and replace the power fuse in the power supply if need be.
	2. Jammed rotor shaft	Remove central vent plug, check free movement of shaft or free respectively at the slotted shaft end by means of a screwdriver.
Pump running at night. FROST light is ON.	Frost outside and Freeze protection operating	This is normal, but if pump is running more than once/ hour, extra insulation on the collector line should be used.
Pump running at night. FROST light is OFF.	1. System is reverse thermo-siphoning	The non-return valve is not fitted correctly or is faulty. Check the installation and replace the valve if needed.
	2. Tank inlet sensor is not inserted properly	Re-install the tank sensor by coating with thermal paste and re-check the operation

On Sunny day return line not getting hot or takes longer than a minute to get hot when pump is on.	No or low flow	Turn pump off, Run on speed 3 (max speed) for 2-3 minutes to clear out air and increase the flow rate. Return to original parameters.
Pump cycles on and off frequently during hot sunny weather	1. Flow rate too fast	Switch to slower speed. If already on lowest, it is OK. If return line is getting hot, allow it to cool before turning pump back on.
	2. Sensor in flow port on collector instead of return port	Re-install the roof sensor in the return port, re-check operation
Return line much hotter than flow line in cold conditions (>15°C)	Flow rate too slow	Switch to a higher speed setting and check collector and tank sensor positions.
Pump only runs for 20-30seconds each cycle	1. Flow rate too fast	Switch to slower speed. If already lowest, it is OK. If the return line is getting hot then cool down before pump on.
	2. Sensor in flow port on collector instead of return port	Re-install the roof sensor in the return port, re-check operation

SolaStat Hot Water Controllers

Checklist for Controller Diagnosis

→ And Possible Faults / Test to Run

- ☐ Check operation of controller and temperature difference between tank and roof not higher than settings
 - Check sensors
 - Check circulation
 - Bleed air from pump / collector
 - Check valve jammed
- ☐ Controller has 'SSD' on roof sensor
 - Check roof sensor
 - Check circulation
 - Bleed air from pump / collector
 - Check valve jammed
- ☐ Controller has 'SSD' on tank sensor
 - Check tank sensor
 - Check jumper on controller CPU board
 - Check pump direction
 - Check pipework connections
- ☐ Controller has no display
 - Check power to controller and pump
 - Check controller CPU for damage / water

General Checks

- If there is no screen display check the power with a multimeter (*photo C1*)
- Make sure that the controller is fitted on a wall and out of the rain
- Sensor leads are to be tidy and secure not wrapped around copper pipes that are not lagged with UV/ solar rated Armour Flex or similar insulation
- Make sure that the power is 'off' when taking the cover off the controller.
- Look to see if black plastic jumper is off or loose, the jumper fits onto the bottom row of pins second and third from the left (*photos C2 & C3*)
- Make sure all sensors have sufficient heat paste and are fitted correctly with adequate securing
- Roof sensor port hole must only have a smear of silicone on wire to the top of port hole, applied with a finger (not a caulking gun) so as to protect it from weather, but not fill the port with silicone
- **For SolaStat +2 controllers**, make sure tank thermostat is set to highest setting, so that it is greater than the HWC adjustable value of the controller.

Checking Sensors Resistances

- Disconnect all power to the controller and un-plug from wall socket before beginning
- Unscrew sensor from connection port before testing sensor
- A short circuit may be caused by the sensor wires being connected or touching together.
- An open circuit may be caused by the sensor wires being broken or severed.
- Check wires are not cut at any point or that moisture is not getting into the sensor causing corrosion
- If wires/ sensors are broken, cut or damaged, they will need to be repaired or replaced

Sensor Resistances	
Temperature	Resistance in kilo-ohms (kΩ)
0°C	27.25
25°C	10.00
50°C	4.162
75°C	1.925
100°C	0.973
Above 150°C or short circuit. 'SSd' on display, sensor light on	<0.300
Below -40°C or open circuit. 'SSd' on display, sensor light flashing.	>200 or 'OL'

Checking Controller Reading / Roof Sensors

- Check pump operation / circulation (see pg. 10) before checking roof sensors
- For checking sensor resistances with a multimeter, see previous procedure (pg. 19), checking sensor resistances
- To check controller reading / roof sensor it is helpful to have a 3 metre sensor lead in tool kit, you must have power 'off', remove sensor 1 (white and red wires (*photo C4*)) and fit the 3 metre lead. Fit cover back on and turn power on, hold end of sensor probe in your hand (*photo C5*) and if temp goes up, the controller is functioning properly, there may be a roof sensor fault
- If controller is registering 'SSD' on roof sensor and customers aren't getting hot water, follow above steps, if the controller does not register 'SSD' with the test lead, there could be a fault in the roof sensor (or something is preventing flow, e.g. check valve or pump – see pg. 9)



Photo C1: Controller with no display, check power

Photo C2: Black jumper on controller CPU board

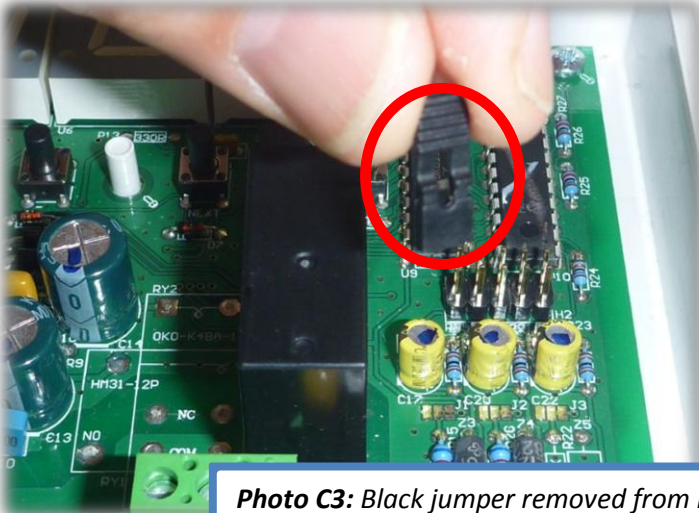
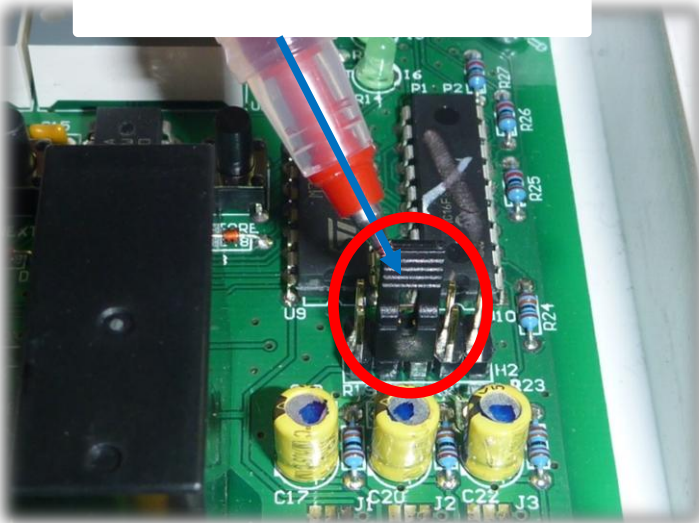


Photo C3: Black jumper removed from board

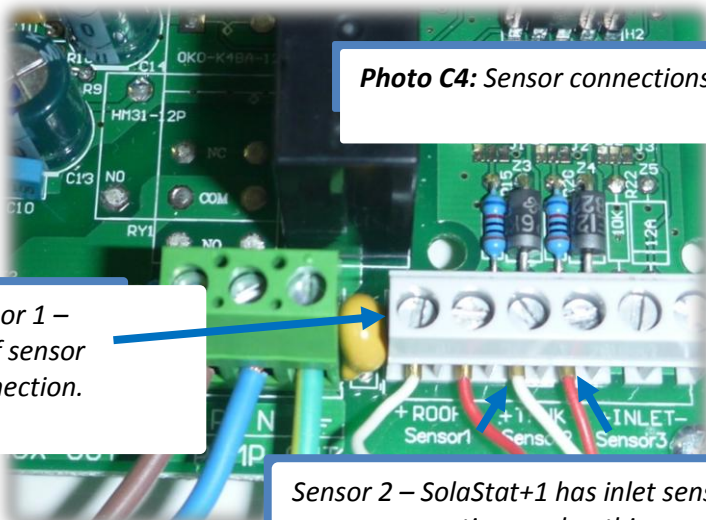


Photo C4: Sensor connections to board

Sensor 1 –
Roof sensor
connection.

Sensor 2 – SolaStat+1 has inlet sensor wired to tank
sensor connection, and nothing connected to Sensor
3 connection

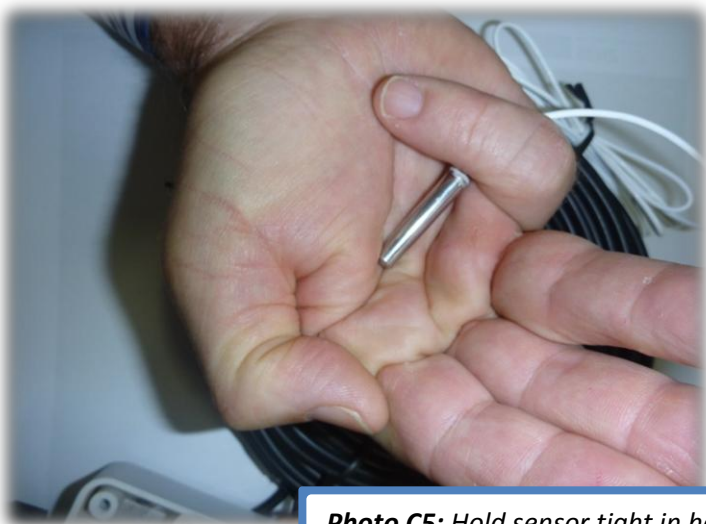
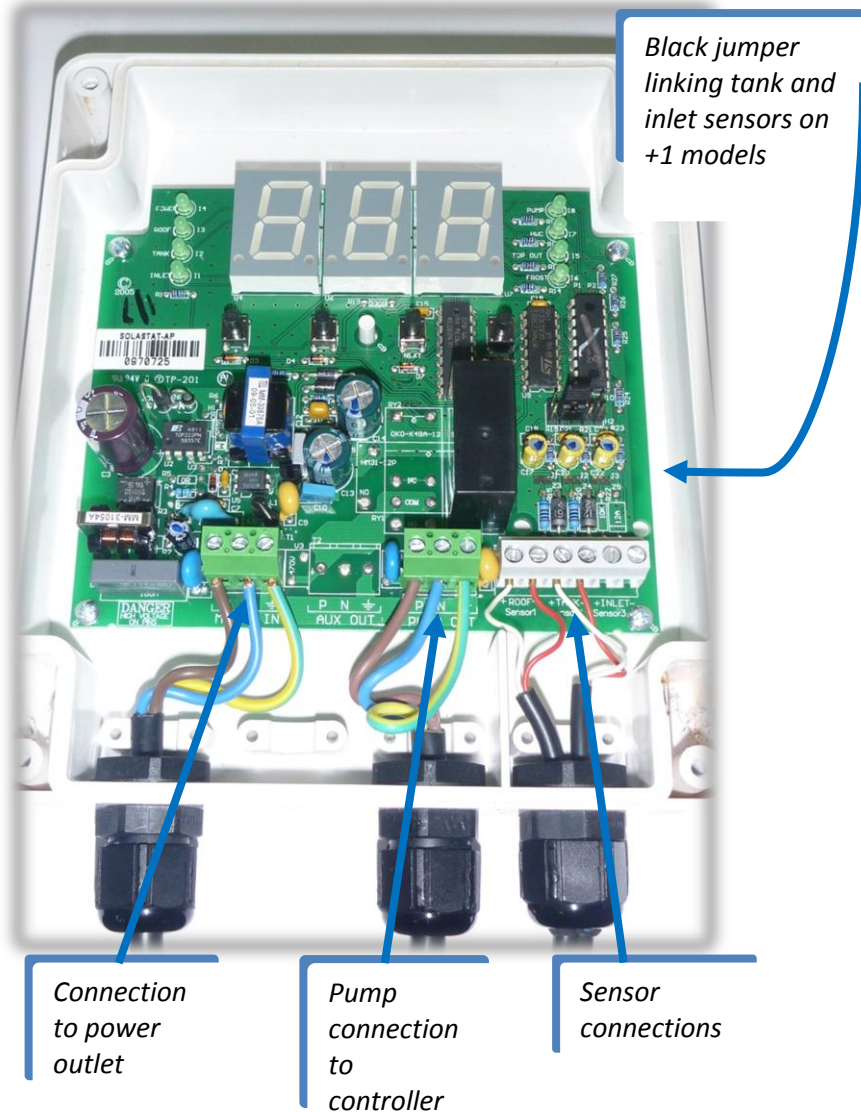


Photo C5: Hold sensor tight in hand to raise
temperature and check operation

Photo C6: SolaStat +1 controller internals



SolaStat Controller Troubleshooting

Observations /Problem	Cause	Solution
No operation, no display and no lights	No power	1. Check mains outlet 2. Check fuses
Power light ON but no display or corrupted display	1. Power brown out.	Remove power while brownout condition is present
	2. Unit faulty	Remove power for 10 minutes, repower and see if unit is operating. If not unit needs repair.
Display on; pump not running and yet sunny outside. Pump light is ON	1. Pump damaged or disconnected	See if pump has become unplugged.
	2. Pump Timer has turned pump off.	Wait one minute for pump to restart.
Display on, pump not running and yet is sunny outside. PUMP light is OFF. TOPOUT light is OFF.	1. Roof Sensor reads “Hi” on display.	Normal Operation, pump disabled.
	2. Sensor not mounted properly.	Check Sensor is thermally bonded to Solar Panel outlet.
	3. Water not hot enough yet.	Check temp of Roof and Inlet, they need to be greater than the difference programmed for Pump ON. Wait.

Display on, pump will not operate and yet is sunny outside. PUMP light is OFF. TOPOUT light is ON.	Top out temperature exceeded	If tank temperature greater than top out programmed value then it's working normally.
Hot water drops significantly overnight yet little or no draw off of hot water by the user.	1. System is reverse thermo siphoning.	The non-return valve is not fitted correctly or is faulty.
	2. System is in a high frost area.	Discuss non frost sensitive options with provider
	3. Hot water pipes leaking	Check for leaks on the hot water service (pipes & taps)
	4. Hot and cold water cross feeds.	Find and remove cross connection
HWC Light never comes on. <u>*(Only applies to SolaStat +2 relay controller)</u>	1. Tank thermostat temperature is set below HWC Adjustable Values.	Turn Tank Thermostat Temperature to highest setting so tank thermostat temp is greater than HWC Adjustable Values.
	2. Collectors are heating tank to greater than adjustable values.	Normal Operation.

HWC light flashing. (1Hz) <u>*(Only applies to SolaStat +2 relay controller)</u>	HWC Reheat Upper adjustable value has not been reached	Wait for the tank to heat up to Reheat Upper or Tank thermostat is set below Reheat Upper or Sensors incorrectly installed.
HWC light flashing FAST. (3Hz) <u>*(Only applies to SolaStat +2 relay controller)</u>	HWC Biosafe adjustable value has not been reached	Wait for the tank to heat up to Biosafe or Tank thermostat is set below Biosafe or Sensors incorrectly installed.
“Lo” on Display <u>*(Only applies to SolaStat +2 relay controller)</u>	Sensor below - 20°C	Check Outside Temperature
“Hi” on Display	Sensor above 158°C	Check collector has water in it.
“SSd” on display. ROOF light Flashing	1. Wire to Roof sensor shorted.	Repair wire
	2. Roof sensor damaged	Replace Roof Sensor
	3. Roof sensor below -40°C	Check outside temperature
“SSd” on display. ROOF	1. Roof Sensor above 160°C	1. Smart Shut down, normal operation,

light ON.		check temp display returns when collector cooler.
		2. Check collector has water in it.
	2. Wire to Roof Sensor shorted	Repair Wire
	3. Roof sensor damaged	Replace Roof Sensor
“SSd” on display. TANK light flashing	1. Wire to Tank sensor broken	Repair wire
	2. Tank sensor damaged	Replace TANK Sensor
“SSd” on display. TANK light ON.	1. Wire to TANK sensor shorted	Repair Wire
	2. Tank Sensor damaged	Replace TANK sensor.
“SSd” on Display. INLET light Flashing	1. Wire to Inlet sensor broken	Repair wire
	2. INLET sensor damaged	Replace INLET sensor
“SSd” on Display. INLET light ON	1. Wire to INLET Sensor shorted	Repair wire
	2. INLET Sensor Damaged	Replace INLET Sensor

Tank & Ancillaries

Checklist for Tank & Ancillaries Diagnosis

→ And Possible Faults / Test to Run

- ☐ Booster not operating correctly
 - Check thermostat / element
 - Check electrical set-up (off peak 1, 2 or continuous, timer installed, manual switch, solastat +1 or +2)
 - Check gas booster operation
- ☐ Inspect TPR valve
 - Check mains pressure
 - Check PLV
 - Check sensors
 - Check thermostat and element
- ☐ Check pipework connections
 - Solar loop connected to correct ports
 - No nylon olives used
 - Tempering valve connected to cold in, not solar loop
- ☐ Check all adjacent pipework
 - Leaks on pipework can effect system performance
 - Poorly designed pipework can cause thermo siphoning

General Checks

- Check tank is plumb, level and installed on a ripple slab, baytek, or similar hot water tank support as per local standards
- Check all connections to tank, make sure they are free from leaks, and connected with “unions or similar” in accordance with AS.3500, and that **nylon olives have not been used**, as they can not tolerate the temperatures produced
- All connections should be made to the specified port (hot outlet not connected to the right hand side on aquamax)
- All pipework should be insulated with UV rated insulation (including cold pipes in frost prone areas, in accordance with AS.3500)

Electric Booster System & Element

- Turn power off at power board take out fuse if needed
- Check power off with multimeter
- Remove the screws from the thermostat cover
- Check power off with multimeter (*photo T1*)
- Remove red plastic PVC guard to access element and inspect for leaks around element and bolts
- If not leaking, check element with a multimeter (set to ohms Ω 0 – 200) a reading of 15 – 18 ohms is normal, if reading is showing open circuit (often displayed as OL or 1) then element is damaged and will require replacement (*photo T2*)
- Ohms test across element to check element only, ohms test across thermostat to check element and thermostat.
- If element leaking or not working, element will require replacement

Electrical Wiring Diagram

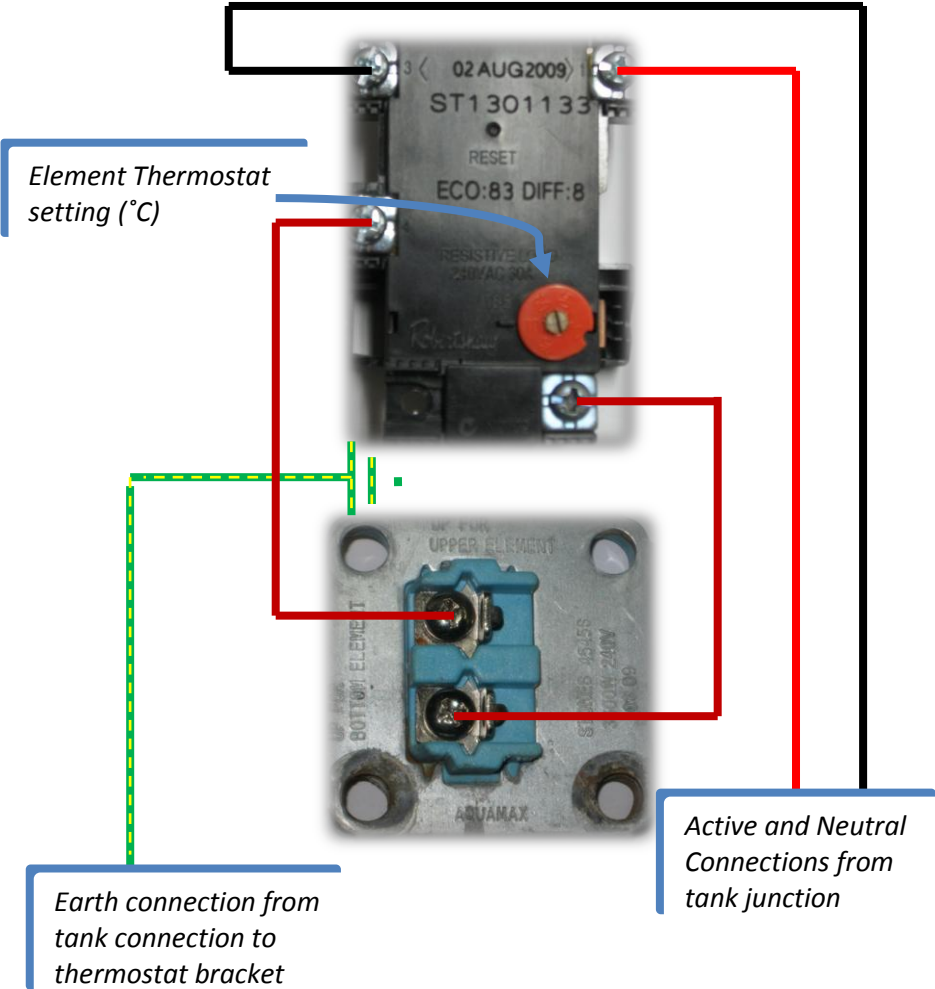




Photo T1: Test power with multimeter or similar before removing thermostat cover



Photo T2: Check element resistance (with power off) using a multimeter set to ohms (Ω) 0 - 200

Temperature & Pressure Relief valve

- Gently lift the TPR valve lever to release hot water through the drain pipe, gently return the lever back to the closed position
- Lever should be operated smoothly as a sudden inflow of water may cause the valve to failsafe open.
- Valve may take a moment for discharging to stop
- Please note; customers may notice valve discharging intermittently during the day, this is normal. Customers are likely to notice this more than traditional off peak systems, as they discharge during their heating cycle during the day, rather than only heating and discharging at night
- Valve may discharge 2 -10 Litres a day under normal operation. Amount of discharge will vary dependant on size of tank, pressure in system, demand on system, etc.
- If valve running excessively, using a pressure gauge, check mains pressure and hot water pressure, inspect PLV/ PRV (if none installed may be required prior to replacing TPR valve, excessive pressure without protection voids warranty)
- Also, using a probe thermometer, check temperature of hot water in tank, temperatures above 99°C can be caused by sensors or thermostat incorrectly mounted, incorrect controller settings, or a solar loop not connected correctly.
- See tank manufacturer's guidelines and relevant standards before replacing a TPR valve

Tempering Valve

- Tempering valves are to be installed in accordance with the relevant standards, (AS.3500.4 clause 1.9.2 states that in *most* residential buildings all sanitary fixtures used primarily for personal hygiene purposes are to have the temperature limited to 50°C, please refer to standards for further details)
- Check valve is installed in the correct position (hot & cold connected to 'H' and 'C' on valve)
- Check the tempering valve is connected **directly to the cold inlet** to the tank, not the solar loop cold feed
- Take cover off valve, use a black marker to draw a line across the valve so as to locate position that installer originally had the valve set on, adjust valve with key, clock wise at first, so as not to jam valve. (*photo T6*)
- Rotate valve anti clock wise fully and then take it back 1/8th of a turn, so valve is loose. Using a thermometer, check temperature at a tap, adjust the valve if necessary
- If tap water is not hot enough from tempering valve turn water off and clean filters. CAUTION: water discharging may be hot
- Check filters are clean and free of teflon tape, lock seal or other sealants and debris
- Make sure nylon olives have not been used and there are no leaks.
- Make sure that no power leads are wrapped around the valves, fittings or pipes.

Check filters of tempering valve if flow or temperature from taps is poor

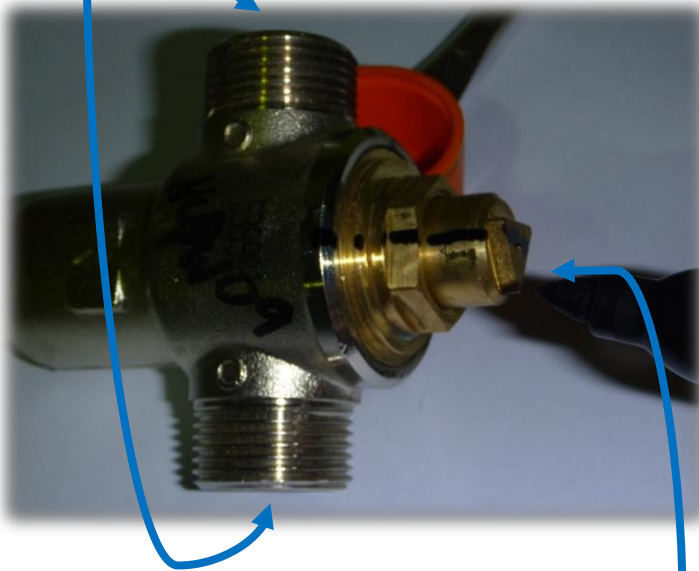


Photo T6: Using black marker, mark the position the valve is set at

Tempering Valve Troubleshooting

Observations /Problem	Cause	Solution
The valve is noisy	The water velocity is too high (above the requirements of AS3500.1)	Install a pressure limiting valve to reduce water velocity
There is no water flow from tempering valve outlet	1. Hot and cold water supply failure.	1. Restore the water inlet supplies and check outlet temperature.
	2. Tempering valve line strainers may be blocked.	2. Remove the strainers from the valve and flush thoroughly, ensuring all debris is removed.
	3. The hot and cold water supplies may be connected in reverse.	3. Remove current supply connections and connect correctly
	4. Either hot or cold water supply may be terminated.	4. Remove tempering valve and check both hot and cold supply is delivering water to valve.

Water temperature fluctuating	1. The tempering valve line strainers may be blocked	1. Remove the strainers from the valve and flush thoroughly, ensuring all debris is removed.
	2. Varying inlet water supply pressure	2. Install a pressure limiting valve.
Receiving only hot or cold water from the outlet of the tempering valve	1. The tempering valve setting is not properly set.	1. Adjust the outlet temperature of the tempering valve to correct temperature setting.
	2. Hot and cold water supply may be connected in reverse.	2. Remove current supply connection and connect correctly.
Low or fluctuating water flow rate	1. The tempering valve line strainers may be blocked.	1. Remove the strainers from the valve and flush thoroughly, ensuring all debris is removed (additional line strainers should be installed)
	2. Varying inlet water supply pressure.	2. Install a pressure limiting valve to both inlet water supplies of tempering valve.

Outlet temperature of valve not adjustable.	1. Hot and cold supplies are reversed.	1. Remove the current supply connection and connect correctly.
	2. Faulty Tempering Valve.	2. Replace tempering valve and re-check operation.
Hot and cold water cross feeds.	Non-return valves are lodged open.	Flush and clean non return valves and line strainers of all debris.
Unable to set the desired mixed water temperature	1. The tempering valve may be blocked.	1. Remove strainers from the tempering valve and flush thoroughly ensuring all debris is removed.
	2. Hot and cold water supply may be connected in reverse.	2. Remove the current supply connection and connect correctly

Replacing a Sacrificial Anode

- It is recommended that anodes are replaced every 3 – 8 years
- Brown or 'dirty' looking water coming through a hot tap when first turned on is an indicator that the anode has corroded
- Isolate the water supply to the tank and relieve the pressure from the tank through a hot water tap
- Remove the housing cap on the top of the tank
- Using a large socket set or similar remove the anode top nut
- Remove the anode from the top of the tank
- Insert new anode and tighten top nut
- Reinststate the water supply, bleed air and flush system through a hot tap (not a mixer tap)
- Check for leaks and replace the housing cap

Manifolds, Collector & Roof Works

Checklist for Manifolds & Roof Works Diagnosis

→ And Possible Faults / Test to Run

- ☐ Check tubes
 - Broken Tubes / Tubes turned white
- ☐ Check Heat pipes location into collector
 - Heat pipes without heat paste
 - Heat pipes not located in the Manifold properly
- ☐ Check flow and return pipes into collector
 - Sensor sealed and in correct position
 - Uninsulated connections
 - Roof flashings / deck-tites used
 - Return supposed to be higher port of collector

General Checks for Roof Works

- Check manifold for leaks around the connections and case
- Make sure roof sensor has sufficient heat paste and is fitted correctly in the hot return outlet
- Roof sensor port hole must have only a smear of silicone on wire to the top of port hole so as to seal it from weather (applied with finger not caulking gun).
- Check that the correct deck-tite flashings have been used to seal the pipes passing through the roof
- Sensor leads are to be tidy and secure, not wrapped around copper pipes that are not lagged with UV/ solar rated insulation
- All parts of the solar loop are to have UV/ solar rated insulation, without gaps, particularly all parts of the roof connections (*photo R1 & R2*)



Photo R1 & R2: Roof Connections, all exposed copper is to be insulated without gaps, roof sensor is to be secured to the outside of the insulation (foil tape can be wrapped around pipe and sensor to protect sensor wire) and roof penetration is to be sealed with an approved roof flashing

Checking Flow Direction through Collector

- It is of utmost importance that the roof sensor is installed on the hot outlet of the collector, and the outlet is the higher point of the collector (generally the eastern side of the collector, when facing north)
- Turn water to hot water system and controller off
- Relieve excess pressure from system through hot tap
- Disconnect hot return outlet from collector
- Have someone on the ground turn the controller back on and hold down the pump button
- If water expels from collector flow is in correct direction, if water expels from pipe, flow is in reverse direction and will need to be rectified by reversing the flow and return pipes
- Reconnect all pipes, turn water back on, bleed air from system and commission

Checking Evacuated Glass Tubes

- Be aware, Heat pipes can be extremely hot, use with extreme care and take safety precautions when checking tubes
- Visually inspect tubes for cracks, broken tubes or discolouration of light absorbing coating of tube, meaning evacuated tube or heat pipe may need replacing
- Run hand, carefully, across tubes, if vacuum is intact tubes should be cool to the touch in comparison to temperature of heat pipes and collector, if tubes feel as hot on the outside, as they are internally, vacuum in tube or heat pipe has been damaged and will require replacement
- Carefully remove an evacuated tube, check that heat pipes have sufficient heat paste and have been located all the way into the manifold
- When reinstalling the tube, remember to pull heat pipe out of tube approx 200mm, and locate the heat pipe all the way into the manifold, before inserting the tube (*photo R3*)



Photo R3: Locate the heat pipe completely, before inserting the glass tube

General Plumbing and Solar Collector Troubleshooting

Observations /Problem	Cause	Solution
Not enough hot water	Electric or gas booster is not configured correctly	<p>Ensure gas booster is operational; check gas supply and pressure with a manometer.</p> <p>For electric systems, fit an automatic timer for the element power supply set to run from 3pm to 6pm, providing a boost each day. End user can override to turn the element ON for a few hours if they need additional hot water.</p> <p>Alternatively, make sure system is not on off-peak 1</p>
Hot water dumping from tank PTRV.	1. Excessive pressure in the system	Check pressure in mains and hot water, install a PLV or PRV if necessary

	2. High temperature setting in controller not functioning to turn off pump.	Check to ensure TOP-OUT function is set to 70°C. Check TANK sensor contact.
	3. Sensor/s not mounted properly.	Check Sensors are thermally bonded into sensor ports or directly contacted to inner wall of the tank
Excessively hot water delivered to house taps	No tempering valve installed	Install tempering valve, providing 50°C water supply to house.
Banging noise in pipes when hot water tap is opened	1. Steam formation in collector when hot water tap is opened after a period of collector stagnation. Often occurs when inlet cold pressure is low (<400kPa)	1. Install check valve (duo-valve or swing check) on cold line before tank
		2. System in top-out, use more hot water or reduce collector size
	2. Check valve on cold line not sealing	Replace with new check valve. Cold expansion valve or PTRV should be dumping water each day.

Poor solar contribution	1. Insufficient flow rate	See pump troubleshooting guide page 11
	2. Is working fine, but customer has turned booster off.	Explain to customer that in the winter or poor weather the tank will not heat up to full temperature. Boosting is needed all year round to ensure enough hot water.
	3. Damaged tubes	Check to ensure tubes are all intact. Replace any damaged tubes.
	4. Incorrect installation of heat pipes.	Heat pipes are not inserted into the ports correctly, or do not have coating of heat transfer past.
	5. Low installation angle reducing winter output (if angle is less than the latitude)	Increase the installation angle to at least latitude angle, and preferably 10-15° greater than latitude.

	6 Insufficient insulation resulting in excessive heat loss	Ensure all exposed copper pipe is insulated and protected against UV degradation.
	7. Thermo siphoning at night.	Install downward U shaped copper pipe on collector return pipe just before tank inlet to form a heat trap or install a solar rated check valve
	8. Increased hot water demand	If the customer is using a lot more hot water than in the past then the percentage of solar contribution will be reduced even though solar output may be the same.
Water dumping from roof	Leakage in the manifold	Inspect the manifold. If water is present in the evacuated tubes, then the manifold has to be replaced.

Example Installs













Warranty Procedures

- ✓ Receive the Warranty Service Request Form from Apricus by email or fax
 - Apricus will complete the following details on this form
 - Date claim was received
 - System Model
 - Installation Date
 - Retailer details (sold by)
 - Installer details (installer)
 - Description of fault and possible causes

PLEASE NOTE YOU MUST RECEIVE THE REQUEST FORM WITH
A WARRANTY AUTHORISATION NUMBER BEFORE
PERFORMING ANY WARRANTY WORK.

- ✓ Contact the consumer to organize a service date and time
 - If the customer has no hot water (electric/ gas booster, tank or tempering valve fault) please organize a service call within 48 hours
 - If the customer has access to hot water (pump, controller or collector fault) please organize a service call within 5 days
- ✓ Travel to site, greet the consumer, take pictures, make observations, troubleshoot and service the system
- ✓ Explain your service work to the consumer

- ✓ Complete the service agent portion of the Warranty Service Request Form as shown below:
 - Note time travelled one way to site
 - Note distance travelled one way to site
 - Note “Full Warranty” if the fault is covered by the Apricus Australia Warranty Policy
 - Note “Non Warranty” if the fault is not covered by the Apricus Australia Warranty Policy
 - Note the work and observations from site in “Description of Fault/Warranty job”

To be completed by Apricus Service Agent				
Call Date: / /	Time Travelled(min):	Distance Travelled (km):	Full Warranty <input type="checkbox"/>	Non Warranty <input type="checkbox"/>
Description of Fault / warranty job:				
Customer Signature: _____ Serviceman Signature: _____				

- ✓ Label the faulty products with tape and the WAN number and place back into the original part box with a copy of the Warranty Service Request Form
- ✓ Create an invoice for your service work
- ✓ Submit your warranty claim including photos, Warranty Service Request Form and Invoice to warranty@apricus.com.au or fax 02 9475 0092
- ✓ An Apricus Representative will schedule a monthly visit during which they will exchange your faulty parts for new ones

How to Complete an Apricus Warranty Service Request Form.

It is of utmost importance that the service agent completes points 8 – 10 and points 16 -21. Generally Apricus Australia will complete the other points, prior to sending the form to a service agent

WARRANTY SERVICE REQUEST

Warranty Authorisation Number:

Ph: 1300 277 428

Fax: (02) 9475 0092

Email: warranty@apricus.com.au

Validation of Warranty Claims:

Dated proof of purchase must be produced before a warranty claim can be accepted.

Repair Warranty Policy:

Apricus warrants repairs carried out by its authorised staff or agents only. For the warranty coverage duration and details please see the warranty coverage form.



Credit Policy:

Apricus does not extend credit to retail customers. All work is strictly COD on job completion, payable by cash or cheque to the serviceman.

Postal Address:

Apricus Australia Pty Ltd

P.O. Box 1288, Rozelle, NSW 2039

Date: / 1. /	Failure Date: / 2. /	Taken By: 3.	System Model: 4.	Install Date: / 5. /
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- 1. Date** – The date you took the call.
- 2. Failure date** – The date the customer first started having trouble.
- 3. Taken by** – Your initials.
- 4. System Model** – The Apricus system model number (for example AE-315-OGLM-30).
- 5. Install Date** - The date the unit was installed. Not always the purchase date.

Date: / /	Failure Date: / /	Taken By:	System Model:	Install Date: / /
Sold by: Co.:	6.		Ph:	
Installer Co.:	7.		Ph:	

6. Sold by – The company from which the customer purchased the Apricus System

7. Installer – The company/plumber that installed the Apricus System.

Installer	Co.:	Ph:
Faulty Part	Fault Code	Primary Warranty Claim Checklist:
<input type="checkbox"/> APKR-KIT (10,20 22,30) <input type="checkbox"/> AB10/10ET/HP <input type="checkbox"/> AF(10,20,22,30)(L,M,H)(T,F)	<input type="checkbox"/> AP - Physical Fault <input type="checkbox"/> AF - Functional Fault <input type="checkbox"/> AO - Other Fault/Faults	<input type="checkbox"/> Installed by licensed plumbers according to installation manual <input type="checkbox"/> The part is within its warranty coverage time frame <input type="checkbox"/> The collector has not been moved from original installation location <input type="checkbox"/> Serial Number: _____
<input type="checkbox"/> Bianco-LRS32-6C (BI3) <input type="checkbox"/> Salmson-SB04-15K (SA1) <input type="checkbox"/> Salmson-SB25-20B (SA3) <input type="checkbox"/> Grunfos-UP-15-14B <input type="checkbox"/> Grunfos-UPS-20-60B <input type="checkbox"/> WILO (WI3) <input type="checkbox"/> Other:	<input type="checkbox"/> PP - Physical Fault <input type="checkbox"/> PL - Leakage Fault <input type="checkbox"/> PE - Electric Fault <input type="checkbox"/> PS - Switch Failure <input type="checkbox"/> PW - Internal Water <input type="checkbox"/> PO - Other Fault/Faults:	<input type="checkbox"/> Installed by licensed plumbers and electricians according to manual <input type="checkbox"/> The part is within its warranty coverage time frame <input type="checkbox"/> Non-return valve fitted on line above pump <input type="checkbox"/> Air properly bled and no extensive cavitations exists <input type="checkbox"/> Serial Number: _____
<input type="checkbox"/> SolaStat-Plus (S) <input type="checkbox"/> SolaStat-Plus (S2) <input type="checkbox"/> Delta SolaStat (Delta SolaX) <input type="checkbox"/> Other:	<input type="checkbox"/> CE - Electric Fault <input type="checkbox"/> CR - Control Sensor Fault <input type="checkbox"/> CD - Display only SSD <input type="checkbox"/> CT - Temperature Fault <input type="checkbox"/> CP - Physical Fault <input type="checkbox"/> CO - Other	<input type="checkbox"/> Installed by licensed plumbers and electricians according to manual <input type="checkbox"/> The part is within its warranty coverage time frame. <input type="checkbox"/> No alterations to the factory programmed features & settings <input type="checkbox"/> Have Sensors been exposed to Y / N & kPa _____ <input type="checkbox"/> Probe Temperature at time of fault (roof and tank) _____ <input type="checkbox"/> Serial Number: _____
<input type="checkbox"/> Reflex-RETEMPVALVE <input type="checkbox"/> RMC – Heatguard Ultra (RL TEMP VALVE) <input type="checkbox"/> Other:	<input type="checkbox"/> TM – Water Mixing Fault <input type="checkbox"/> TP – Physical Faults (such as cracked outer casing) <input type="checkbox"/> TO – Other Fault/Faults:	<input type="checkbox"/> Installed by licensed plumbers and licensed electricians according to manual <input type="checkbox"/> The part is within its warranty coverage time frame. <input type="checkbox"/> Installed with at least 1m pipe run between the valve and outlet <input type="checkbox"/> Equal water pressure on both sides of the valve <input type="checkbox"/> No foreign matter or debris is found in the valve <input type="checkbox"/> Pressure Limiting Valve? Y / N & kPa _____ <input type="checkbox"/> Expansion Control Valve? Y / N & kPa _____ (only for S.A.8 W.A) <input type="checkbox"/> Serial Number: _____
<input type="checkbox"/> Apricus Tank (OT250,315,400) (GLE,GLEM,GLG)	<input type="checkbox"/> HA - Anode Fault <input type="checkbox"/> HT - Thread Fault <input type="checkbox"/> HE - Element Fault <input type="checkbox"/> HM - Thermostat Fault <input type="checkbox"/> HL - Leak from Tank	<input type="checkbox"/> Installed by licensed plumbers and licensed electricians according to manual <input type="checkbox"/> The part is within its warranty coverage time frame <input type="checkbox"/> The water quality is deemed acceptable as outlined in the Warranty Policy <input type="checkbox"/> Anode has been replaced as required or every 2 years <input type="checkbox"/> Serial Number: _____
Supplier Warranty <input type="checkbox"/> Warranty for: Everlast Aquamax Bosch Rinnai Eternity RMC		

8. Faulty Part – Make a mark to indicate which part has failed or needs to be investigated (one part per claim).

9. Fault Code – Make a mark to indicate which category of fault applies to the faulty part (select one).

10. Primary Warranty Claim Checklist – Make a mark in each line if the statement is true. For example: mark x in the instance where the part has been “installed by licensed plumber and electrician according to manual”. All necessary lines are required to be marked for the warranty to be valid.

PLEASE NOTE – where possible complete the serial number of the faulty part located at the bottom of checklist.

In the case of controllers please indicate if the sensors have been extended.

In the case of tempering valves please indicate if there is a pressure limiting valve present, an expansion control valve present and if so what the pressure in kPa of the system is.

Supplier Warranty <input type="checkbox"/> Warranty for: Everlast Aquamax Bosch Rinnai Eternity RMC		11.
I/we agree to and accept all related charges incurred as a result of this request for service where the fault is outside the Apricus Warranty Policy 12.		
Description of Fault: <div>13.</div>		
Customer Details	Name	14. Ph:
Address:		
Service Agent	Co.	15. Ph:
Address:		Fax:

11. **Supplier Warranty** - Make a mark in this section and circle the manufacturer/supplier of the faulty part in question. For example if it is an Everlast tank circle Everlast.

12. Please read the **disclaimer** to the customer to ensure they are aware and understand that should the service work fall outside warranty and it is not an installer error they may receive an invoice for the work completed.

13. **Description of Fault** – Describe the symptoms and behaviors of the Apricus System. Please include all details that may be helpful in diagnosing the fault such as times of day, water usage and off peak/regular tariff details.

14. **Customer Details** – Capture the customer information – **Name, Phone and Address.**

15. **Service Agent** – Details of the person/company who will perform the service work – **Name, Phone and Address** (Apricus requires this information for reporting purposes).

The lower section is to be completed by the Service Agent while at the job.

To be completed by Apricus Service Agent				
Call Date: /16./	Time Travelled(min): 17.	Distance Travelled (km): 18.	Full Warranty <input type="checkbox"/> 19.	Non Warranty <input type="checkbox"/>
Description of Fault / warranty job:				
20.				
Customer Signature:		21. Serviceman Signature:		
FOR INTERNAL USE ONLY: Faulty part returned to Apricus <input type="checkbox"/> Faulty part sent to Manuft. / spl. <input type="checkbox"/> Date: / /				
Replacement parts received from Manuft. / spl. <input type="checkbox"/> Service Agent paid <input type="checkbox"/> Date: / /				

16. **Call Date** – The date you went to the job/completed the job.

17. **Time Travelled** - The total time in mins travelled (one way).

18. **Distance Travelled** – The distance in kms travelled one way to the job.

19. Make a mark to indicate **Full Warranty** if the part has failed due to manufacturing error within the warranty period. Make a mark to indicate **Non Warranty** if the part has failed due, but not limited to, installer error (warranty claim checklist is not satisfied), act of god (for example hit by tree) or vermin (for example mice eating through sensor lead).

20. **Description of Fault / Warranty Job** – Serviceman’s description of what has been found and what works have been completed

21. **Customer Signature** – Obtain the customers signature after completing job.

Serviceman Signature – Please sign to acknowledge the completion of the job.

22. **FOR INTERNAL USE ONLY** – Please DO NOT complete this section as it is solely for Apricus internal employees.

Labelling and Returning Faulty Parts Procedure

1. Apply a piece of gaff or sticky tape to the faulty product
2. Write the Warranty Authorization Number located on the top of the Warranty Service Request form on the tape attached to the faulty part. Please find below examples for each component

a) Controller



b) Pump



c) Tempering Valve



d) Element



A photograph of a brass valve assembly, likely a solenoid valve, lying on a white surface. A red-handled marker is positioned vertically next to the valve, with a small white label attached to its handle. The label has the text "WAN" and a hash symbol "#". The valve has a cylindrical body with various ports and a handle on the right side.

- [illegible]



b) Tempering Valve



4. Include a copy of your invoice and the completed warranty service form in the box with the faulty part
5. An Apricus representative arranges a monthly meeting where the faulty parts will be exchanged for new parts.

***Please Note, Apricus will not accept and pay for service work on warranties that are returned without the proper labelling and paperwork completed.**

Trouble Shooting Table Index

Pump Related Problems and Solutions. (see page 11)

1. Pump always ON and collector temperature is much higher than tank (>20°C difference)
2. Pump not cycling during good weather and the collector is hot
3. Noisy pump during operation
4. Pump simply is not running when switched on
5. Pump running at night. FROST light is ON.
6. Return line not getting hot or takes more than a minute to get hot when pump is on
7. Pump cycles on and off frequently during hot sunny weather
8. Return line much hotter than flow line in winter weather (>15°C)
9. Pump only runs for 20-30seconds each cycle

SolaStat Controller Related Problems and Solutions (see page 23)

1. No operation, no display and no lights / corrupted display
2. Display on; pump not running and yet sunny outside. Pump light is ON
3. Display on, pump not running and yet is sunny outside. PUMP light is OFF. TOPOUT light is ON/ OFF.
4. Hot water drops significantly overnight yet little or no draw off of hot water by the user
5. HWC Light never comes on / flashing. ***(Only applies to SolaStat +2 relay controller)**
6. "Hi" or "Lo" on Display ***(Only applies to SolaStat +2 relay controller)**
7. "SSd" on display.

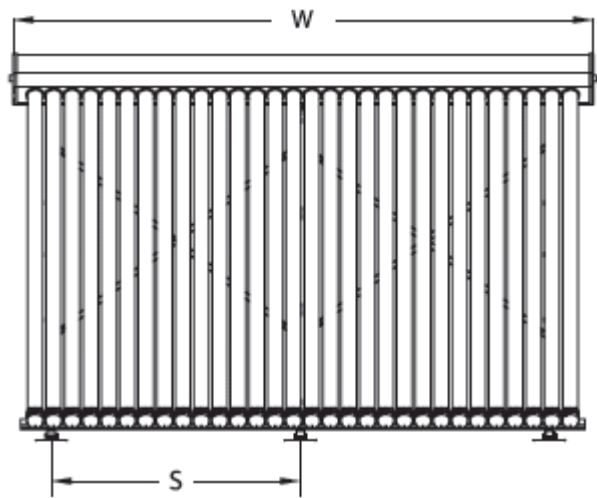
Tempering Valve Related Problems and Solutions (see page 34)

1. The valve is noisy
2. There is no water flow from tempering valve outlet
3. Water temperature fluctuating
4. Receiving only hot or cold water from the outlet of the tempering valve
5. Low or fluctuating water flow rate
6. Outlet temperature of valve not adjustable.
7. Hot and cold water cross feeds.
8. Unable to set the desire mixed water temperature

All other Plumbing and Solar Collector Related Problems and Solutions (see page 41)

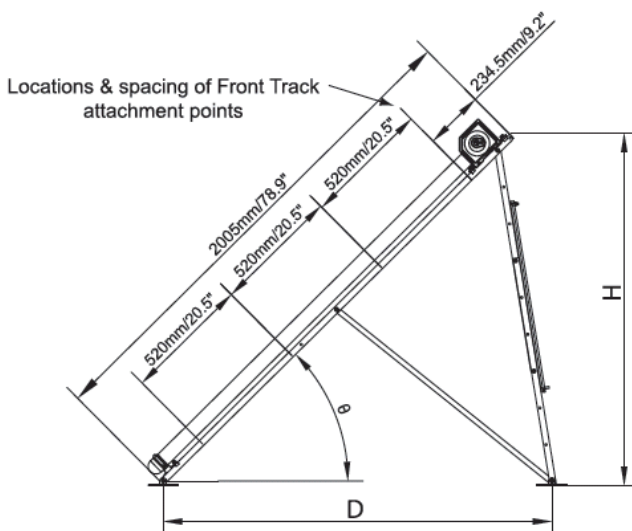
1. Not enough hot water
2. Hot water dumping from tank PTRV.
3. Excessively hot water delivered to house taps
4. Banging noise in pipes when hot water tap is opened
5. Poor solar contribution
6. Water dumping from roof

Manifold Dimensions



Size	S	W	Weight
10 Tubes	490mm/19.3"	796mm/31.3"	34.8kg
20 Tubes	1190mm/46.9"	1496mm/58.8"	63.5kg
22Tubes	665mm/26.2"	1636mm/64.4"	71.3kg
30 Tubes	945mm/37.2"	2196mm/86.4"	94.8kg

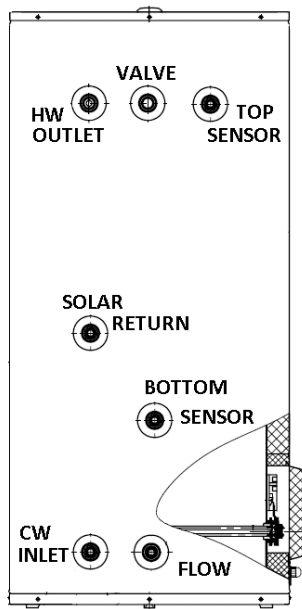
*10 & 20 tube collectors only have 2 sets of legs



Angle	Type	D	H
57°	High Angle (Round Feet)	1278mm/50.3"	1674mm/65.9"
51°		1427mm/56.2"	1551mm/61.1"
44°		1581mm/62.2"	1393mm/54.8"
38°		1709mm/67.3"	1236mm/48.7"
33°		1814mm/71.4"	1078mm/42.4"
51°	High Angle (Roof Rack)	1900mm/74.8"	1562mm/61.5"
46°		1900mm/74.8"	1448mm/57.0"
41°		1900mm/74.8"	1326mm/52.2"
37°		1900mm/74.8"	1196mm/47.1"
32°		1900mm/74.8"	1059mm/41.7"
27°	Mid Angle (round Feet)	Variable	~ 918mm/36.1"
27°	Mid Angle (round Track)	1900mm/74.8"	918mm/36.1"
13°	Low Angle (round Feet)	Variable	~ 450mm/17.7"
13°	Low Angle (roof Track)	1900mm/74.8"	450mm/17.7"

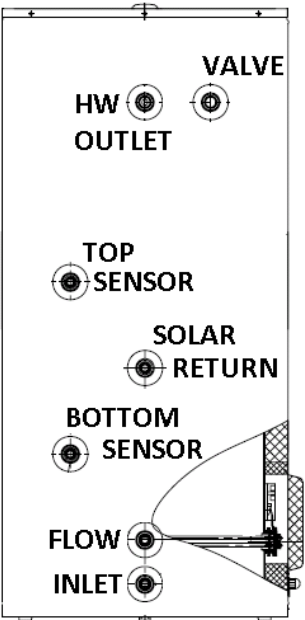
Tank Dimensions

Everlast Tank



Measurements (mm)	160lt	250lt	315lt
Tank height	1140	1620	1990
Tank diameter	580	580	580
Top Sensor Port	666	1191	1191
PTR port	666	1191	1191
HW outlet	666	1191	1191
Solar Return port	370	370	425
Bottom Sensor	295	295	320
Cold Water Inlet	168	168	168
Solar Flow	269	269	269

Apricus Tank



Measurements (mm)	250lt Bott	250lt Mid	315lt Bott	315lt Mid	400lt Bott	400lt Mid
Tank height	1388	1388	1682	1682	1731	1731
Tank diameter	648	648	648	648	731	731
Top Sensor Port	759	759	841	841	841	841
PTR port	1167	1167	1470	1470	1474	1478
HW outlet	1167	1167	1470	1470	1474	1474
Solar Return port	564	432	564	509	564	564
Bottom Sensor	369	303	369	342	369	369
Solar Flow	174	174	174	174	174	174
Cold Water Inlet	74	74	74	74	74	74

[illegible]

[illegible]