



Solar

Green technology in search of renewable energy

FEB 2023

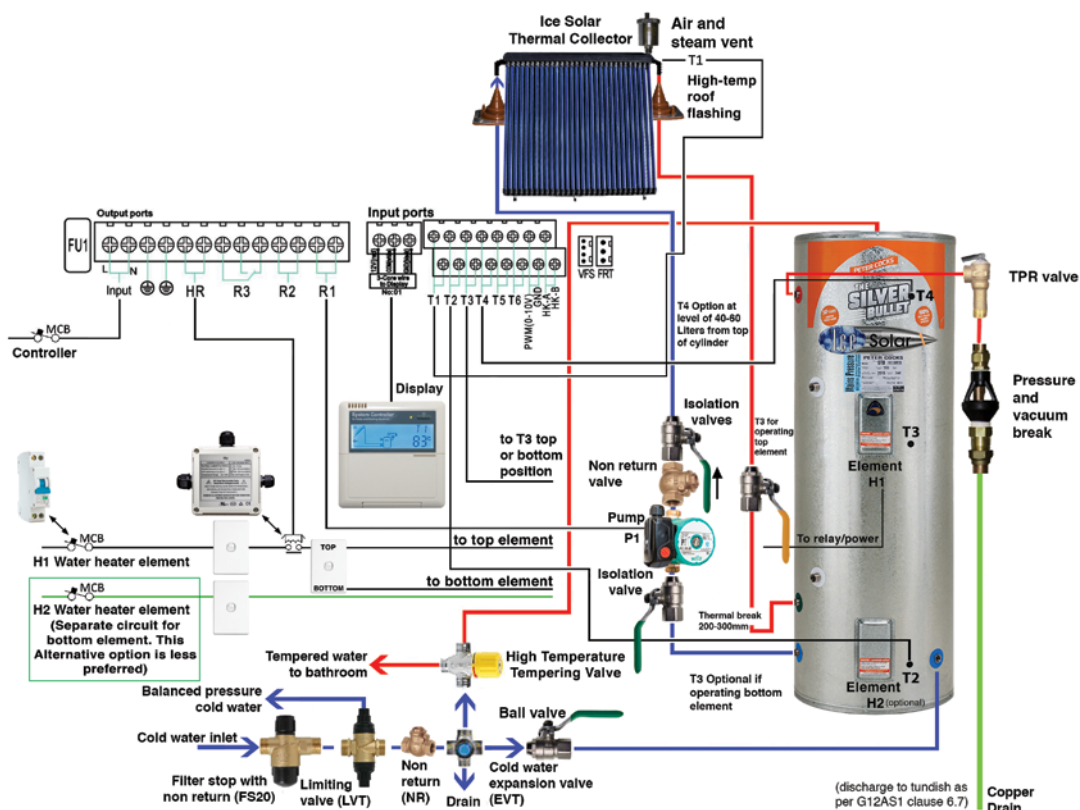
INSTALLATION INSTRUCTION MANUAL

Dear Installer,

We hope you have a great experience installing Ice Solar energy equipment.

If you have any questions please contact us.

Mains Pressure Open Loop Solar System With Electricity



Commissioning with Customer

Please ask customer to be available at the end of the day/estimated completion time for commissioning and to go through user operation.

CORRUGATED ROOF & METAL TILE ROOF



RAISED UP STANDS



TILE ROOF

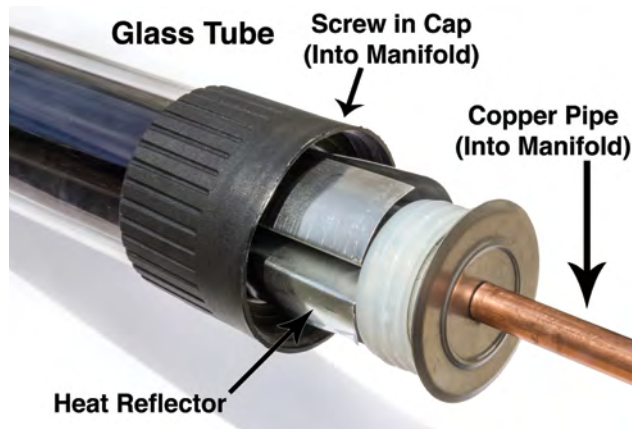


SYSTEM SPECIFICATIONS

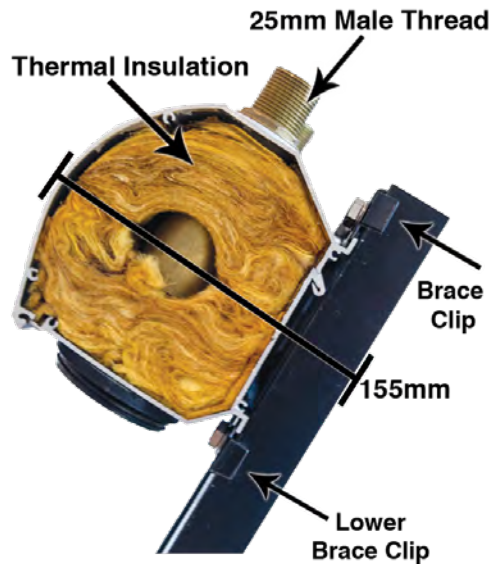
System Area			
STD20	Gross - 2.856m ²	Aperture - 1.881m ²	Absorber - 1.632m ²
STD30	Gross - 4.286m ²	Aperture - 2.822m ²	Absorber - 2.448m ²

System Weight			
STD20	Stand - 3.5Kgs	Gross - 63Kgs	Net - 61.3Kgs
STD30	Stand - 5Kgs	Gross - 94Kgs	Net - 91.99Kgs

Manifold's Capacity	
STD20	1.1L
STD30	1.7L



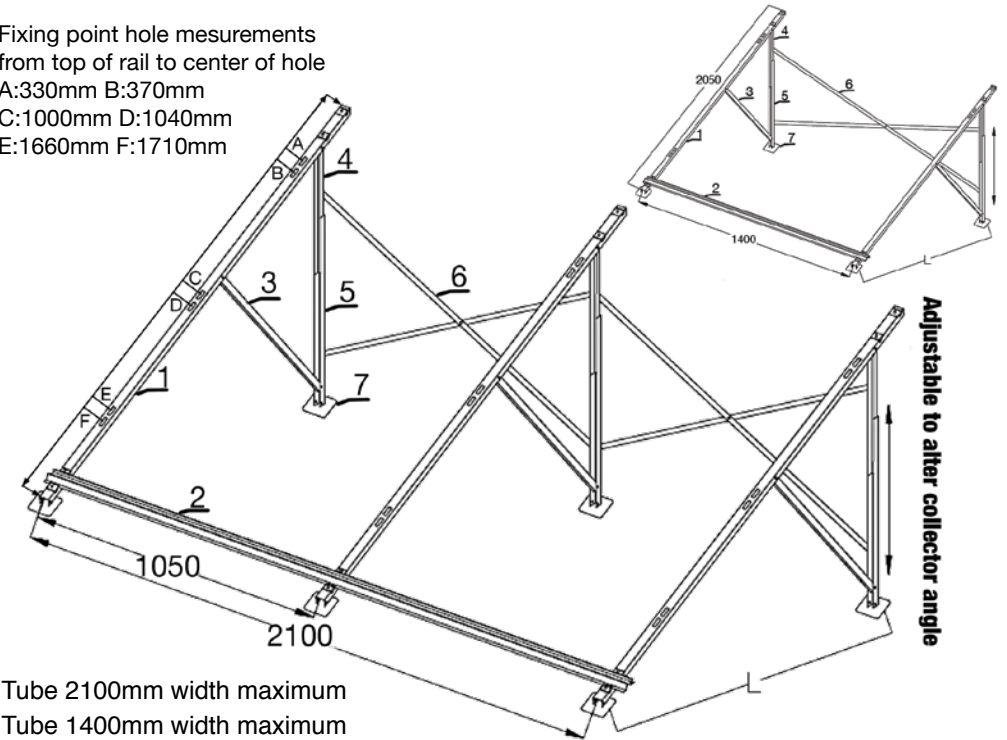
Evacuated Tube Specifications
 Total Weight 2.0 kg
Tube:
 Overall Length 1815mm
 Outer Diameter 58mm
 Inner Tube Inside Diameter 44mm
 Inner Tube Outside diameter 47mm
Copper Heatpipe:
 Diameter 8mm
 Overall length 1792mm
 Transfer section Diameter 14mm
 Transfer section length 60mm



FRAME & STAND ASSEMBLY STD20 - 30

Stand is for flat roof or elevating to different pitch to the roof

Fixing point hole measurements
 from top of rail to center of hole
 A:330mm B:370mm
 C:1000mm D:1040mm
 E:1660mm F:1710mm



30 Tube 2100mm width maximum
 20 Tube 1400mm width maximum

1. Front Track 2. Bottom Track 3. Side Supports 4. Back Stands Upper Bar
 5. Back Stands Lower Bar 6. X Back Supports 7. Feet
 Adjustable Angle Range: 26°(L=1650, 34°(L=1545, 37°(L=1469, 42°(L=1381, 46°(L=1278)

- Adjustable angle range between 26° - 46° Degrees.
 - Sections 4 and 5 should be set to suitable height, adjust these first and bolt together.
 - Sections 3 and 6 should be accurately adjusted and cut to suit the panel's height.
 - Bolt holes may need to be re drilled to be able to assemble at desired height.
- Outrigger: 35mm wide x 30mm height x 3mm powder coated Aluminium 'U' channel.
 - Bottom Rail: 60mm wide x 45mm height x 3mm powder coated Aluminium extrusion.
 - Outrigger Brace: 22mm wide x 12mm height x 3mm powder coated Aluminium 'U' channel.
 - Top section adjustable leg: 35mm wide x 30mm height x 3mm powdercoated Aluminium 'U' channel.
 - Bottom section adjustable leg: 40mm wide x 33mm height x 3mm powder coated Aluminium 'U' channel.
 - Back brace: 23mm wide x 13mm deep x 3mm powder coated Aluminium 'U' channel.
 - Feet: 44mm x 32mm x 3mm powder coated Aluminium.

Frame bolts: all 7mm diameter shaft A4 Stainless Steel, Sizes 15mm, 30mm, 55mm.

SOLAR FRAME MOUNTING

Assemble frame(s), and if a different pitch than roof plane, upstand(s).

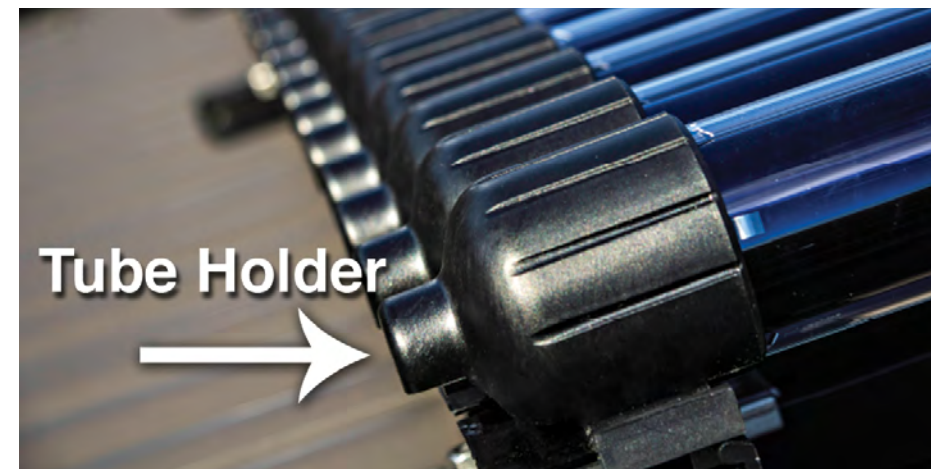
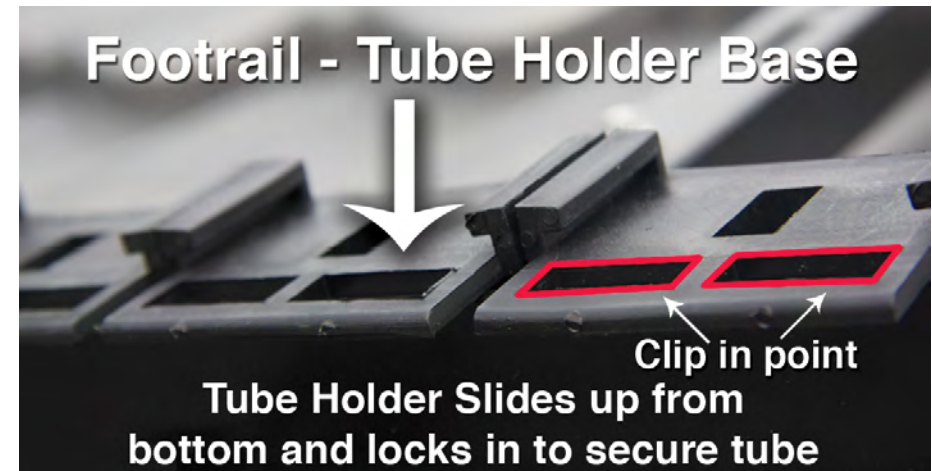
a) Assembly for same plane as roof (ie. collector mounted flat on roof).

1. Locate collector with suitable northerly orientation approximately 300mm below ridge line to allow roof penetrations to be behind the solar collector's manifold giving enough clearance for pipes to clear the ridge support. Ensure that penetrations are clear of other roof structural members, for ease of running pipes.
2. Use HDPE mounting blocks to ensure no part of the solar frame can come in contact with the roof material. This will ensure no corrosion can occur due to the effects of dissimilar metals. Drill clearance hole in the centre of the block.
3. Ensure manifold & foot-rail clips are bolted to 'U' channels before fixing onto roof. The tongues of the clips to face the manifold/foot-rail lip with locking 'U' piece mounted inside of 'U' channel for ease of tightening at end of assembly (see image).
4. Ensure 3 fixings can be achieved into roof purlin per 'U' channel. Top, middle and bottom of U channel see fixing points on previous page under Frame & Stand Assembly.
Note: The foot-rail end of the 'U' channel is determined by the end that has holes in the side that are used for a pivot point for connecting feet for when an adjustable upstand is required for flat roofs.
5. Space rails at no more than 2.1mts apart (overall) for STD30 and 1.4mts apart (overall) for STD20. Note that the fixings to manifold and foot-rail to 'U' channel are horizontally adjustable. Outer 'U' channels are to be installed first and should be located no more than 200mm from edge of solar panel. Fix only to the top of the roofing material profile (see cross section of roof fixing) and select a profile that does not have existing roof screws, so as not to interfere with existing roofing system manufacturer's roof fixing requirements.
6. Drill a clearance hole for the roof mounting screw only slightly larger than the roof screw and small enough that the roofing washer can provide a nice seal against roofing material when tightened. (ie. place roofing washer between roofing material and HDPE block) see roof fixing details.
7. When marking roof fixing points on 'U' channel, select the most suitable purlins for fastening and mark on the rail the fixing positions. If some existing fixing holes don't quite suit, then drill clearance holes in the desired location.
8. For STD30 collectors that have 3 x 'U' channels. Once the two outer rails are fixed, use the foot-rail as a straight edge and rest on the top of these rails and fix the centre 'U' channel in the approximate centre bringing it to line up with the straight edge.
9. Ensure roof mounting screws are firmly tightened to provide a secure and weatherproof seal onto roofing material.

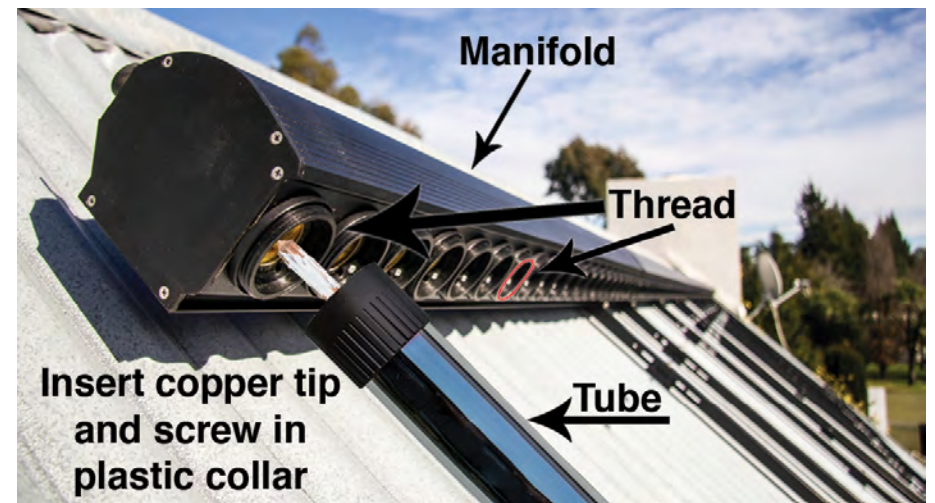
b) Assembly for different pitch as roof (ie. collector on adjustable upstand).

1. Bolt adjustable upstand together using the frame assembly image as a guide, the pieces are numbered and marked on the image for easy assembly.
2. Locate collector with suitable northerly orientation approximately allowing for roof penetrations to be behind the solar collector's manifold giving enough clearance for pipes to clear the roofing support members. Ensure that penetrations are clear of other roof structural members, for ease of running pipes.
3. Use butynol strip or suitable material to separate the powder coated aluminium feet from roofing material to avoid effects of dissimilar metal corrosion.
4. Ensure manifold & foot-rail clips are bolted to 'U' channels before fixing onto roof. The tongues of the clips to face the manifold/foot-rail lip with locking 'U' piece mounted inside of 'U' channel for ease of tightening at end of assembly (see image).

Please note: Insulation is not to run through the roof flashing



SOLAR KIT & PARTS



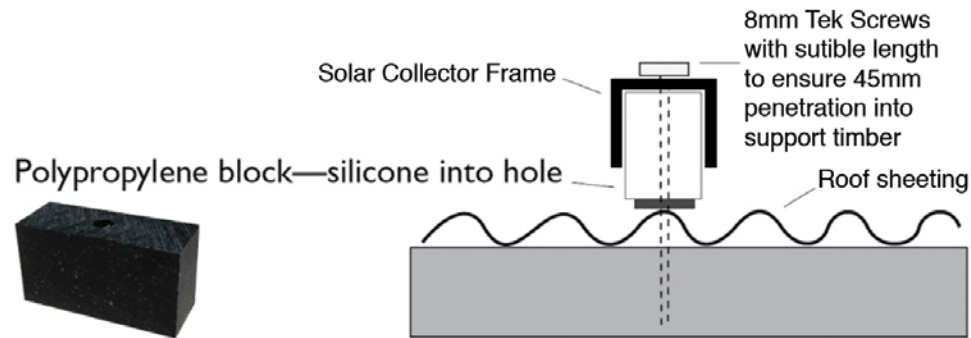
RETROFIT EXAMPLE NOTE:



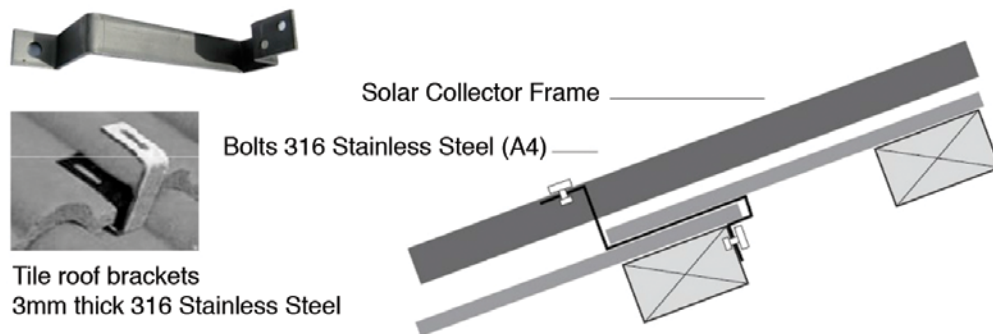
Thermal break in hot water return is sometimes not possible, Here is an installation displaying a thermal break for hot and cold. 4-way valve is inserted into hole drilled through inner baffle in cylinder 4 way valve usually takes the cold feed, however in this example the cold feed is on the bottom left of image as this cylinder has two bottom ports.

ROOF FIXING METHODS

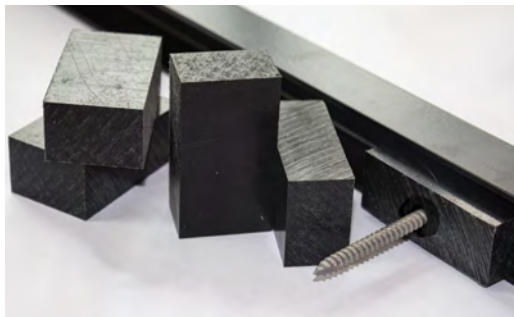
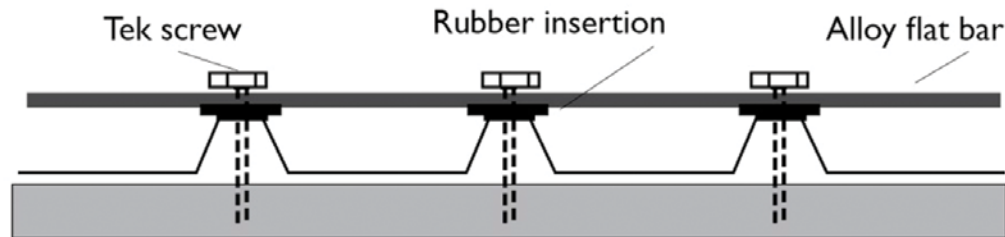
CORRUGATED IRON - POLYPROPYLENE BLOCK



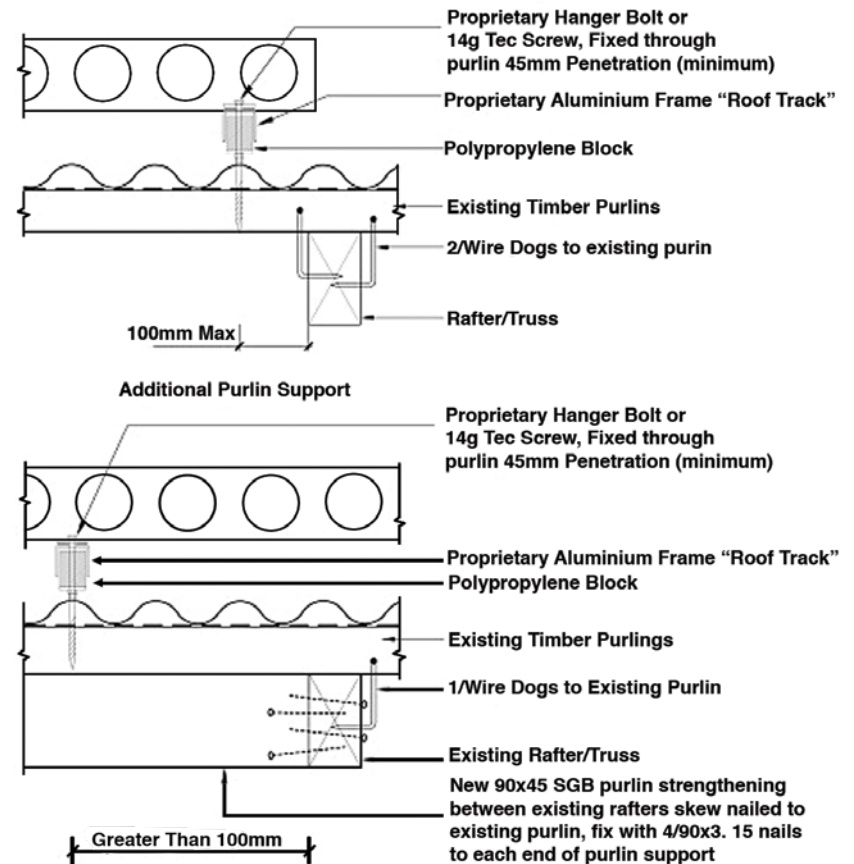
TILE ROOF - BRACKETS



HIGHHAT/TRAPEZOIDAL RAIL



Fixing Detail to Corrugate - Polypropylene Block

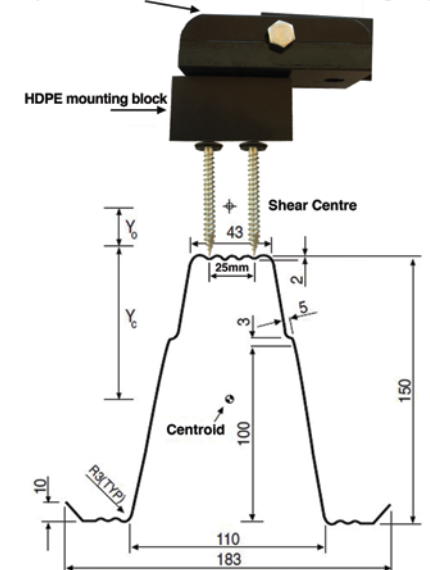


EVENLY SPREAD HEAT PAST AROUND TUBE TIP



TOPHAT PURLIN

Standard proprietary Ice Solar frame and mounting block (with feet for upstands or where required, or direct to frame with mounting block)



PLUMBING

Install to ASNZS3500.4 G12, G12AS2, NZS3501

When installing or repositioning cylinders ensure that parts have access for ease of future maintenance and operation, in particular elements, anodes, valves and pumps. Ensure pumps are positioned with accessible air bleed and speed dial.

WARNING: Systems must be installed so that there is a minimum of 2 meters head of pressure that is continuously maintained above the location of the manifold (top of solar collector). Failing to provide sufficient pressure can result in shortened life expectancy of the pump and will void the warranty.

WARNING: Only use high temperature rated valves. Pipework for cylinder cold feeds should be done in copper from the valve kit to the cylinder, as a backwater expansion can be, at times, of high temperature that plastic plumbing systems are not suitable for.

CAUTION: Once the heat pipes are installed DO NOT close both hot and cold ball valves to solar collector without draining the manifold, as heat expansion may create leaks. One of these valves should always remain open during maintenance to allow water to expand back into the cylinder.

1. Installations will run most efficiently with 3/8" pipe runs with the Ice Solar standard system configurations. Ensure the whole 20m length of 3/8" (9mm) copper coil is used. NOTE: flare connectors require flaring tool that has a 3/8" (9mm) setting. Only use 1/2" pipe if running more than 3 collectors in series. Or for commercial installations size is according to system specific configuration.
2. Run the hot return line first. Select the shortest pipe run for highest collection efficiency. ie closest side of solar collector's manifold to the cylinder. Use the balance of the coil for the return line. This helps with the self cooling (CMAX) setting for when cylinder reaches temperature.
3. Use only high temperature joining methods. In stagnation the solar collector can reach temperatures of up to 200 degrees C. ie. braze welding for roof fittings is failsafe (not on air vent), Gasoil/Teflon or Haldite/Teflon are both acceptable for these products are rated to over 200 degrees C. Hemp and graphite is not recommended. Use high temperature washers for fixing swivel unions onto the manifold.
4. Connect air vent AAV (vertical position) and probe assembly onto the hot water return side of the manifold. The air vent captures air before it returns to the cylinder and the probe reads temperature as it leaves the manifold. The probe socket is IP68 rated for secure weather and bird resistant socket for the PT1000 (T1) sensor.
5. Choose the penetration entry points for copper pipe through roof. Take into consideration exposure from ground view (ie. hide behind manifold to reduce visibility for a tidy job). Ensure no roof support members will interfere with penetration points, and there is enough room to achieve nice connection onto manifold fixing points. Then drill a 25mm-32mm hole through highest point of roof profile for the 3/8" (9mm) pipe through roof flashing. Drill a second 10mm-12mm hole through highest part of roof profile for the PT1000 (T1) cable that will line up with the cable penetration lug in the flashing, there are two to choose from, so choose whichever is easiest for cable run.

IMPORTANT ensure PT1000 (T1) cable can not come in contact with the high temperature return pipe and that it can not get damaged by sharp edges of roof material. Carefully cut high temperature flashing at the level above the first rib, this is the 3/8" mark. Choose one of the separate cable nibs of the flashing and cut top of this nib to run the PT1000 (T1) cable. Run the insulation up to the flashing DO NOT run insulation through flashing.

6. Complete plumbing as shown on schematic of front cover of this manual. Turn water on and check system for leaks.
 - Connect and close ball valves, non-return and pump on cold side to draw cold water up to solar panel. Install ball valve before pump and after non-return valve so that these items can be easily serviced in the future without draining the water from the manifold.
 - It is good practice to create thermal breaks if possible by bringing the hot water return pipe below the level that it enters into the cylinder by approximately 200mm, then back up into the cylinder. This prevents heat loss by heat drifting up the line. This is particularly important for solar/wetback installations and low pressure installations.
 - The circulation pump must be installed to draw the cooler water from the lower section of the cylinder and circulate this water through the collector before returning back to the cylinder at a point higher than the draw-off (150mm-200mm) using dedicated solar ports or a 4-Way valve.
 - Circulation pump MUST be mounted so that the cylindrical shape of the pump is in a horizontal position to avoid accumulation of air that will burn the pump out.
 - Check all connections are complete then fill cylinder.
 - Open ball valves and check whole system for leaks.
 - Ensure automatic air vent on roof is open to allow air to escape.
 - Bleed (purge) pump of air, using the bleed screw on pump.
 - Setting Pump Speed – set pump speed according to the hot water systems pressure
Mains Pressure = Pump Speed 1: Medium Pressure = Speed 2 : Low Pressure = Speed 3
 - Cover air vent with jacket.
 - Insulate copper pipe above roof line. It is not necessary to cover brass fittings unless system is in a corrosive environment. Covering fittings can create difficulties in future maintenance of system.
7. Smear heat past around the top copper head of each heat-pipe. The heat-paste is required for high efficiency heat transfer; it also acts as a lubricant on installation to allow the Heatpipe to slide into the copper socket inside the manifold. Hold thumb over tube-collar to keep these components together against top of borosilicate glass tube, then slide the inner copper heat-pipe out by approximately 6-8 inches (150mm-200mm). Gently resting bottom end of glass tube on foot rail, and holding onto inner copper pipe, look up into manifold, and slide tip of Heatpipe all the way up into copper manifold socket. Giving the copper pipe a little wriggle as it goes in will ensure you feel it slide all the way up into this socket. Then move the glass up with the tube-collar to the manifold, and screw on the tube-collar. Still holding the glass so it can not slide down, slide on the tube cup base and ensure it locks securely into place

PLUMBING RETROFITTING

When fitting to existing **non-solar** cylinders.

Please also observe the instructions above for plumbing with these added notes

- A. Turn off power from Main Circuit Breaker (MCB), turn off isolation switch.
- B. Drain the cylinder and remove cold feed.
- C. Drill through baffle with clearance hole to take riser pipe. NOTE: Baffles behind cold feed side-entry ports pull the cold water from lower down in the cylinder, therefore allowing a higher return position when 4-Way riser pipe is inserted horizontally through the clearance hole.
- D. Connect riser to 4-Way valve and insert valve into cylinder.
- E. Reconnect cold feed to one side of 4 way valve.
- F. Connect Solar Out to other side of 4-Way valve ball valve.
- G. Connect Solar return to riser pipe end of 4-Way valve.
- H. Connect a tempering valve (anti-scalding device) if non-present. Use high temperature rated valves only - suitable for wetback and evacuated tube solar systems that can produce extra high temperatures.

WIRING RETROFITTING

when fitting to existing non-solar cylinders

Please also observe the instructions above for wiring with these added notes

Probes need to read accurately so that the controller operates correctly within its set parameters. For the best reading on a non solar cylinder, the probes need to be resting vertically against the inner barrel of cylinder. I.e. so that the full length of probe has metal to metal contact. When the probes are tucked under the insulation, the insulation maintains pressure to keep the probe in place and against the barrel. Barrels are rounded, so the reading will not be so accurate if the probe is installed horizontally.

- T2 is to be located at approximately the level where the cold is drawn from the base of the cylinder, i.e. the 'solar out' at the bottom of the cylinder.
- T3 is to be located, above the point of hot water return from the solar panel and also above the element. For a single element cylinder, this is best achieved by opening the element cover and scraping away the insulation for a path for the probe with a long flat screwdriver against the inner barrel as high as possible above the element.
- T4 is to be located in the upper portion of the cylinder approximately 1 shower worth (40-50Litres) from the top. Take into consideration the insulation at top of the cylinder, this would generally be 350-450mm from the top of the tank. Using a gauge to ensure the inner barrel can not be damaged, drill through the outer casing with a 9mm drill. Using some 2mm wire (coat hanger wire) create a path through insulation so that the probe will end up flat against the barrel. I.e. the probe will end up above or below the hole you drill and end up at the level of approximately 40 Litres.

WIRING

Controller is pre-programmed and pre-wired for ease of installation

- Mount controller terminal box, display and relay.
- Controller terminal box is best located in close proximity to the cylinder, as most of the probes are fitted to the cylinder and have a 3mt cable length. The terminal box is best positioned at chest to eye height (1.4mt-1.7mt) from floor level for ease of future maintenance/access.
- The controller terminal box requires a standard 3 pin power socket (10amp) to plug into, and is best located within 1 metre below the proposed location of terminal box. The power cable for the terminal box is 1 metre long.
- The display for the controller is best positioned at the end user's eye level in a well-lit area, usually a hallway outside the cylinder cupboard where there is sufficient light. Check that there is a light that will cast direct light onto the display so the buttons can be clearly read at night if required. The display cable is 5metres. Remove plastic protective coating over glass display screen once building work/painters have finished.
- Solar cylinders should have probe sockets, though some brands of solar cylinders do not have sensor sockets that line up for full functionality of this system and therefore will require some retrofitting of probes (see retrofitting below). All Ice Solar cylinders have probes in the correct position.
- Insert probes into cylinder as per schematic. I.e. T2 to reads bottom of tank, T3 mid and T4 top. (probe locations may differ for advanced installs).
- Probes need to be well secured so that they are taking accurate temperature readings. Best Method for standard probe sockets is as follows: drill a clearance hole through the plastic cap of cylinder to take the probe cable. Feed the probe through the cap, then insert the probe all the way into the horizontal thermocouple sleeve inside the cylinder. Apply neutral cure silicone just inside the outer casing of the cylinder under the cap, then insert the cap. Use tape to hold cable in place for minimum 24 hours to allow silicone to cure.
- Once probes are secure clip cables using cable ties back to terminal box and trim excess cable to make a tidy job. IMPORTANT: secure probe wires away from hi voltage electrical cables such as the element cable, pump and controller electrical cable. Hi voltage can interfere with sensitive probe wires.
- Ensure all electrical and sensor wires are protected from moisture.
- Pump simply plug into 3 pin female socket that is attached to controller.
Note: It is not recommended to hardwire the pump for ease of future maintenance. Remove excess cable for a tidy job and reconnect to terminal box.
- When plumbing complete, then plug in controller and turn on power.
- Set time clock by pressing Clock "+" "-" to adjust hours, then press clock "+" "-" to adjust minutes, then press clock again to lock-in.
- All setpoints are already preprogrammed as per the owner's manual. For advanced installations then please seek advice for specific settings changes.

SETTING UP THE CONTROLLER

ICE81Q (pg12 of manual is most helpful)

- Set time using the time and date button.
- To move around the functions shown on the menu structure of page 12, you start by pressing 'SET' several times to skip past the password setting until you get to the first function DTO. You open a menu by pressing 'SET' and you close a menu by pressing 'ESC'. To move to the next menu item you press '+', to move to the previous menu item you press '-'. To open a drop down menu (TEMP & FUN) you press 'SET', to close a drop down menu you press 'ESC'. A menu is open when the menu items reading is flashing. A menu is closed when the menu items reading is solid. If you don't touch any key, the menu setting will be saved where it was left, and then the controller will automatically go back to the standby mode after 6 seconds.
- ALL TEMPERATURE SETTINGS ARE ACCURATE IN THERMOCOUPLE SOCKETS, IF RETROFITTED WITH PROBES INSERTED INTO CYLINDER CASING HOLES (DRILL 9MM HOLE) AND SET FLAT AGAINST INSIDE CYLINDER BARREL BETWEEN CYLINDER AND INSULATION, THEN ALLOW 3-5DEGREES LOWER THAN ACTUAL READINGS WHEN SETTING CONTROLLER FOR COPPER AND STAINLESS CYLINDERS AND 5-10 DEGREES FOR GLASS OR ENAMEL LINED CYLINDERS).
- Ideal settings For DTO & DTF for use with nMIN set to 30% (recommended) for adjustable power to pump to create variable speed:
Copper Solar cylinder = DTO 8 DTF 6 (with prob socket)
Copper Retrofit = DTO 10 DTF 8
Stainless Solar = DTO 8 DTF 6 (with prob socket)
Stainless Retrofit = DTO 10 DTF 8
For Glass & Enamel Lined cylinders (ie. Rheem) – DTO 14 DTF 12 heating using the controller through a single pole relay (via h1 of controller terminal box).
- THET = timing function for heating - there are 3 time heating settings to choose from. Typical settings are:
 - TH1 "ON" at 03:00 45°C and "OFF" at 05:00 48°C.
 - TH2 "ON" and "OFF" at 10:00 – Therefore this setting will remain OFF.
 - TH3 "ON" at 17:00 50°C, OFF at 22:00 to 55°C (or if customer only uses half the cylinder on a daily average basis, leave off by setting ON & OFF at same time) or adjust to suit customer requirements & allow for probe discrepancies (Contact Ice Solar Ltd if help required).



CHECKING CONTROLLER SETTINGS

Set Points are as per Owner Manual

If there has been a power surge it is a good idea to check the controller to ensure settings have not reverted back to the factory setting. ie. if the frost symbol has disappeared or T4 is not showing on the screen when scrolling through parameters (press "+" or "-" to scroll), then this is an indication that the system has reverted to factory default settings.

WARNING: DO NOT make changes to the setpoints without a full understanding of the controller function. If unsure seek advice from Ice Solar.

- Press any button to wake up the controller.
- Press Set THET appears - this is for Auto Time Heating (Time clock) Factory times are as per owners manual - REFER to Owner's Manual for adjustment.
- Press Set THET appears, Press "+" CIRC appears, then press "+" PWD appears, then keep on pressing "+" to skip through password until first item on main menu comes up ie. LOAD. Press plus to move through the items, see Owner's manual for the detailed list, however, the main menu items in order are LOAD, COL, PUMP, COOL, AUX, MAN, BLPR, OTDI, OPAR, OHQM, FS, UNIT, RST, PASS.
- Press "SET" to open an item. If it is flashing it is asking if you want to change, if you don't wish to change, press "esc", if you do wish to change, then press "+" or "-" to make change then press "esc".
- DTO and DTF and SMX are set to most common installations as per the owners manual taking into consideration nMin30% for incremental pump speed. GLASS/ENAMEL lined cylinders do not provide good readings through so to compensate increase DTO to 12 and DTF to 10. SMX should also be set at 60, as the maximum operation of the cylinder for enamel lined cylinders is 70 degrees and this allows for the discrepancy of probe reading less than actual by up to 10 degrees.
- For low-pressure systems that have possible air-locking issues ie. less than minimum of 2 meters head of pressure maintained above the level of the collector, then nMin can be changed to nMin100% to assist with flow. However, it is always best practice for the longevity of the pump to have good constant pressure in the system.

Note: If only morning users of hot water set night heating back up as priority (ie.TH1).
If only evening users of hot water set late afternoon heating back up as priority TH3).

Note: Advanced systems that require set points different from owners manual should be recorded and dated on the owner's manual for ease of future technical reference

ELECTRICAL

- Provide standard 3 pin power socket for the controller to plug into below the location of controller terminal box near the hot water cylinder.
- For single element cylinders, connect phase from MCB/isolation switch via contactor side of the relay to element.
- For two-element cylinders provide a 20 amp rocker switch between relay and elements, so that the customer can choose top element or bottom element. Mark the switch accordingly. Alternatively, a 20amp rotary switch can be used. Most rotary switches are marked with 1 and 2 so mark the corresponding elements on the cylinder 1 and 2 so it is clear to the end user what element that the system is operating.
- CAUTION: It is not recommended to have separate switching for elements independent of the controller, otherwise an element can be accidentally left on reducing the performance of the controller. Please ensure the end-user understands how the system is connected.
- CAUTION: Ripple or intermittent power can restrict the use of intelligent time heating, backup time heating and manual heating functions of the controller. For full user control, DO NOT install with devices that can disrupt power. If the user is happy to use intermittent power, then ensure that the user adjusts time heating settings and legionella control to suit, and that they are aware that manual boost will only work during power supply.
- WARNING: Do not connect the controller to a ripple controlled or unstable power source.

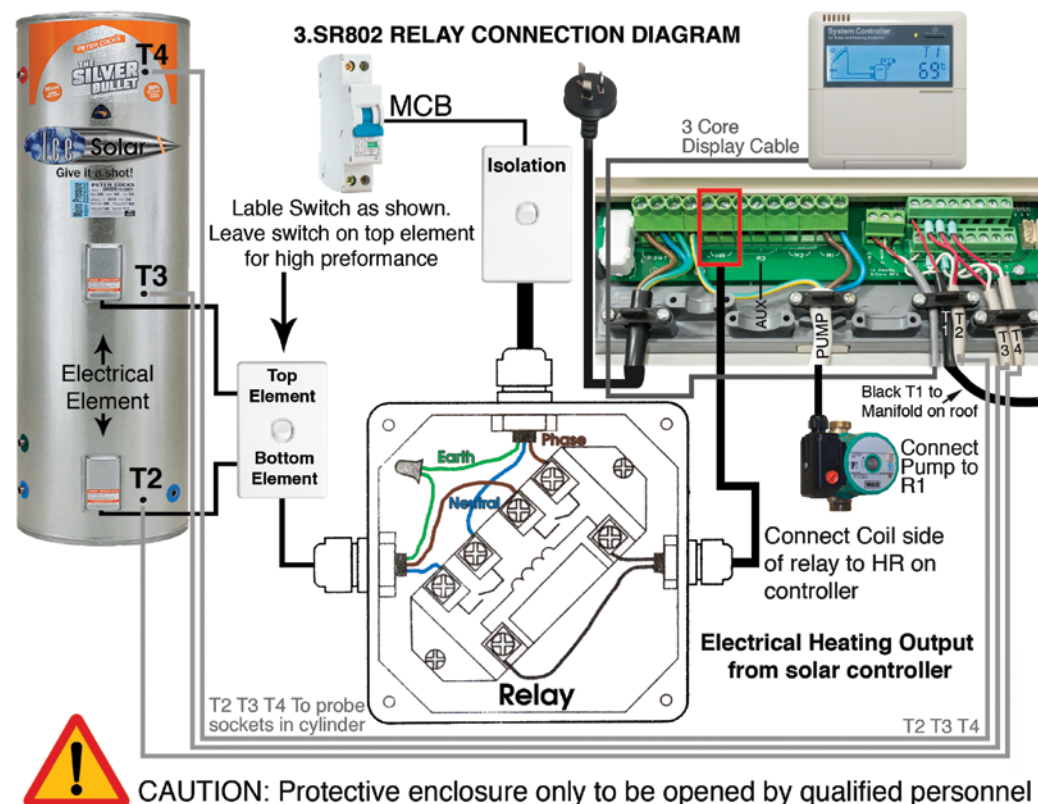


PUMP SPEED



- 1= Mains Pressure
- 2= Medium Pressure
- 3= Low Pressure

RECOMMENDED WIRING DIAGRAM



WARNING

When using the controller to control the element, the element is only activated when the top sensor is under a THET set point and during a time heating period. Most solar cylinders have the T3 sensor too high, this should be at the halfway point, if mid element is being used, and at the same level or slightly higher than the element. If you are controlling a bottom element, the T3 probe should be slightly above the solar return or bottom element (whichever is the highest). Do not put T3 at top of cylinder, otherwise you will not guarantee the user hot water more than the quantity of water above T3 probe. Ensure good contact between probe and inner barrel of cylinder. Poor readings result in poor operation

COMMON PROBLEMS:

1. No Hot Water

- Check element is switched on at the wall.
- Check that the fuse in the thermostat has not popped.
- Check the timing for the element is on for long enough.
- Check probes are getting good readings.

2. System not performing as well as expected

- Check non-return valve is installed and working.
- Check not thermosiphoning via wetback pipes (if wetback fitted).
- Check set points.
- Check probes are getting good readings.

3. Boiling on the roof but not heating cylinder

- Check Non-return valve and pump are round the right way.
- Bleed the pump if making loud noise, is pump connected vertically?
- Check pipe length is not more than 15m each way with small bore pipe (too greater frictional losses for the pump to handle) quick fix is a second pump in series.
- Check possible air intake, tighten joints.
- Check there are no high spots above the solar (will create a steam block) use a steam vent. (AAV).
- Ensure NRV is after the pump.
- Check steam vent (AAV) is working.
- Check no blockages in the solar loop.
- Check enough head of pressure above top of solar panel.

4. System flooding through house (not common)

- This could happen where heat has got through to a polypropylene pipe and melted it. Ensure that only copper is used where this can occur. (NB heat can travel up the cold supply pipe when the whole cylinder is HOT). May require thermal trap on the cold supply (bare copper pipe in a loop).
- Check that the heat dump at the TPR valve can drain away without backing up and flooding.

5. Cylinder making banging noise

- Due to cylinder expansion through heat. Ensure that a cold water expansion valve and a hot water TPR valve are fitted.

6. Sensor Error

- Check that the plastic surrounding the roof sensor has not melted, or been damaged to cause a short. Keep probe cable away from hot pipework.
- Check good connection with electrical extension terminals and not cross copper fibre shorting connection.
- Ensure black PT1000 probe is used on solar thermal collectors manifold. Grey NTC sensors are for cylinder only.
NB Only the metal sensor should be fully inserted into the probe pocket (to read water temperature). Check that the screw into the wire at the control box is screwed into the wire and not the plastic. ensure the sensor is vertically flat against inner barrel for retrofit cylinders to get an accurate reading.

7. Poor, fluctuating and/or odd temperature readings

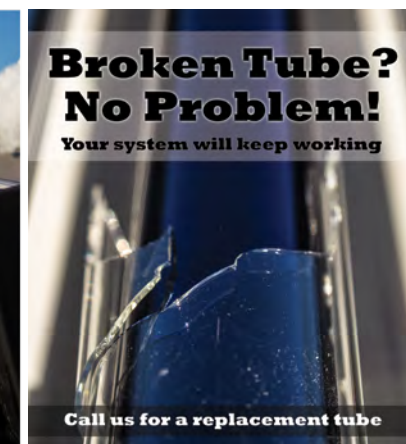
- Check the right sensor is used in the right position. PT1000 (black) for the roof and NTC (grey) for the cylinder.
- Check water has not entered sensor cable causing a cross-wire effect.

8. Element not coming up to 60°C

- Check probe contact with cylinder and allow for losses as described under controller settings for the various types of cylinder materials, Check timing and temp of heating program. Check clock time, check night rate and ripple control potential conflicts with timers.
- Check faulty thermostat.

9. Draining System

- If the system requires to be drained, shut off the isolation valves on the solar loop connecting to the cylinder, then disconnect these pipes into a large container.



Limitations And Clauses required for AS2712:2007 2.9.1

- A.
- I. The solar water heater, parts and fittings are usable up to 10bar pressure/1000kPA.
 - II. Water runs internally through the high-pressure copper pipe inside the manifold, it is therefore not advisable to run swimming pool water directly through the solar system, as copper can affect the water balance of swimming pool.
 - III. In areas of high lime content, the backup electric element should be 'zinc alloy', otherwise Ice solar panels are capable of handling poor water quality. However, it is advisable to run clean water for extra longevity of all your plumbing hardware including the solar system.
- B.
- I. The water heater will be installed in accordance with AS/NZS3500.4 including insulation and piping. Copper piping to be used only throughout and installed as per this installation manual and G12/ AS1 & AS2.
 - II. Cylinders to be installed to allow for draining of system, water expansion and relief of vacuum as per AS/NZS3500.4
 - III. Drain trays to be installed as per AS/NZS3500.4
 - IV. In case of hard water buildup of lime may occur on hot areas, ensure element type is suitable for the water type otherwise softening of water may be required.
- C. The system is designed for level 1 and 2 frost protection, if in areas of long term (extreme frost conditions such as Mount Cook, ie. Well below zero temperatures for extended seasons, these collectors should then be installed as a drain down, drain-back or closed-loop system.
- D. Protection to the collectors may be required in areas of vandalism, golf courses, etc.
- E. In areas of extreme wind conditions specific engineering design may be required. Panels weigh 18.8kg/m2 when full of water.
- F. Solar to be installed as to not compromise the structural integrity of the building.
- G. Please use appropriate fixings per roof type as contained in this manual, for roof types outside of these then refer to the engineering manual otherwise specific engineer design required and be certain that you do not use dissimilar metals that can cause corrosion.
- H. Controller manual and installation man to be supplied to the customer on completion.
- I. Carefully follow the instructions contained for commissioning the system.
- J. Ensure that all systems have an appropriately (high temperature rated) solar capable tempering valve and this is set to 55°C or 45°C for elderly, schools and preschools applications.
We recommend a 20mm+ tempering valve for all low-pressure applications.

Important Checklist for Installer

- Please check these before leaving the site.
- Please ask the customer to be available at the end of the day/estimated completion time for commissioning and go through the paperwork.

Important Checks

- ☐ Check for leaks
- ☐ Ensure probes have good contact
- ☐ Ensure pump works
- ☐ Check heating element switches on and off
- ☐ Controller programmed
- ☐ System brief with customer and review controller settings
- ☐ Clean up the site from boxes, wires, wipe down hand marks, etc

Important Paperwork

- ☐ Code of Compliance for the council where council consent is required
- ☐ Fill out PS3 (Installer producer statement).
- ☐ Electrical CoC form
- ☐ Leave owners manual and this booklet for customer

If commissioning is not possible because the customer is absent please leave your contact details to make another time or discuss via a phone call.

Installer

Date

Contact Phone No.

Leading Solar Specialists

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