

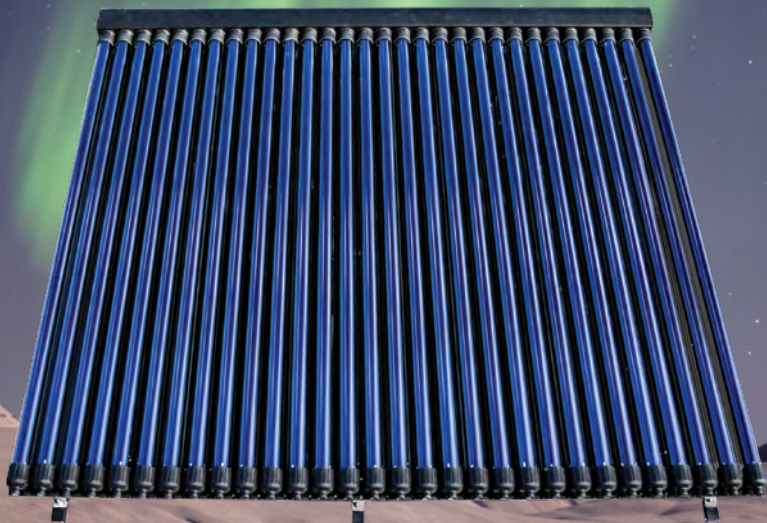
Only The Purest Energy Supplied From Above

Owners Manual

Evacuated Tube
Thermal Water Heating System



Ice Solar



Owner's Manual

Ice Solar evacuated tube solar thermal water heating systems

Congratulations on your purchase, let the savings begin.

Ice Solar is a well trusted New Zealand based company here to help you!
Feel free to call us with any questions about your hot water system.

Hot Water Heating

The information set out in this user manual, shows the basic information and set point details for simple operation and understanding and relevant to the Ice Solar system. See the ICE81Q controller manual, supplied for further information.

Basic Operation

To read the temperatures use the '+' or '-' button. Scrolling through this will take you through temperatures and other values.

T1 = temperature of rooftop collector/s

T2 = bottom of cylinder

T3 = middle of cylinder

T4 = top of cylinder/or AUX

n1% = Pump speed

hR1 = accumulated running time of pump

OTDI = legionella control

DAYS = running time of display

MDAY = running time of controller

SW = software version

SW-M = controller version

When T1 is hotter than T2 by the set differentials the solar pump starts.

When T1 is hotter than T2 by the reduced set differentials the solar pump stops.

T3 is the reading at the approximate midpoint of the cylinder. It is most likely that the water above this point in the cylinder will be equal to or hotter than this temperature. The T3 reading is the most likely that

you will want to check to see what the temperature is for hot water. T4 (when inserted into top of cylinder) is ultimately the temperature of the water as it leaves the cylinder for the hot tap, so if operating extra conservatively you can check before showering, to ensure hot water.

Please note that although this reading may be above 60°C particularly in the Summer, the temperature reducing valve (anti-scalding device) is set to reduce the temperature to the hot water taps to 55°C.

Holiday Mode

If you are going on Holiday, switch to Holiday Mode by holding the Holiday button for 3 seconds until HDAY appears in the display with numbers flashing. Set the number of days you will be away for using '+' or '-', then press holiday again to confirm and a suitcase will appear (holiday icon). Press holiday button once if need to cancel. This will shut down any time heating functions and keep system in check while you're away. IMPORTANT- Do not turn your power off, to the solar system while you're away.

Manual Boost

If you run out of hot water, you can use the manual heating button to heat the water as a one-off boost. The 'Manual Heating' button lets you choose the temperature you desire the water to reach. Press 'Manual Heating' and the temperature will flash on the screen. Press the '+' or '-' button to required temperature (ie 44°C for showering or 55°C for dishes). Press the Heating button again to lock that temperature in. You will hear the relay click, simultaneously a hand symbol will appear and the element symbol will flash on the display in cylinder image to indicate element is activated. The system will automatically turn off the element when the set probe (ie.T3) reaches the temperature you have called for.

Eco Mode

To shut off all back up time heating and intelligent heating press the Eco Mode, a leaf will appear on the display. In Eco Mode, only manual heating is possible. This function works well for Solar/Wetback where element is seldom required.



Auto Time Heating

The backup time heating will only come on if set probe (ie.T3) reads less than temperature entered during these set times. If 'on time' and 'off time' are set to same time, this means time heating setting is off. There are 3 Time Heating (THET) settings to choose from. You can adjust the Time Heating set points to best serve your particular requirements so you can make the most out of the solar gains and reduce the time periods to your desired worst case scenarios. eg. If you wish to have 150Litres of shower temperature water at 5.30AM and you have a mid element on a 300Litre cylinder. Ensure that back up heating is set to sensor 3 (S3), which is the T3 probe at the midpoint of the cylinder near the mid element. There are only two options for the bottom and mid sensors, S2 (T2) and S3 (T3). Press Set twice THTS appears, if already on S2 change to S3 by pressing Set, then press Esc to lock S3 in. Press '+' twice to skip past SMT and on to THET for Time Heating settings (THET). Set TH1o for 3.30am and 42°C (ie 2 hour prior to 5.30) and TH1f for 5.30am and 44°C. This way if the temperature of T3 is already above these settings during the course of this time heating period, then the element will not come on, though if it is not, then at least you will have 150Litres at showering temperature by 5.30am in the morning with the least possible amount of electricity used.

Auto time heating (THET settings) and Manual Heating (manual heating button on display panel) require the controller to be connected to the backup heating element as shown on the system schematic in this manual (ie via HR of controller through relay SR802) and installed as per the Ice Solar installation manual. If the controller is not connected to the element, solar will still work, however, the controller WILL NOT be able to operate the element to give user these functions for higher efficiency and automated back up heating with the extra flexibility these functions offer.

Auto Time heating, Manual Heating & Intelligent Heating use the selected sensor. The system is set to S3 under THTS (time heating

sensor) This is also known as the T3 sensor. It MUST always be left on S3 if you are using a mid element. ONLY turn to S2 (T2 bottom sensor) if you wish to electrically heat the whole cylinder and you only have a bottom element. IMPORTANT: Never have THTS set to S2 (T2) when operating a top element OTHERWISE CONTROLLER WILL NOT SHUT OFF TOP ELEMENT. This is due to elements only being able to heat water above the element position, therefore a lower sensor is not able to read that the temperature has been met.

THET = Time Heating Settings (3 to choose from)

The time heating settings turn on the element in the cylinder (via relay (SR802) for elements over 1500W)

These settings can be personalised to suit user requirements. The factory settings are as below.

THTS = S3 Operating element via T3 probe (sensor 3)

SMT = On Intelligent Heating (see below)

TH1o = 03:00 45°C Time Heating 1 On Time

TH1f = 05:00 48°C Time Heating 1 Off Time

TH2o & f = 10:00 'o' and 'f' are both the same therefore 'OFF' and will skip to next time period

TH3o = 17:00 50°C Time Heating 3 On Time

TH3f = 22:00 55°C Time Heating 3 Off Time

IMPORTANT: check clock is set to local time otherwise time heating will be out of synchronization of real time.

Intelligent Heating

When SMT is ON the system has preset target times and temperatures to ensure the water is at least 50 degrees by 5PM. It does this by checking every hour from 1.00pm that the solar has lifted the temperature in the tank to the minimum temperature that would be required if the tank was to reach 50 degrees by the end of day, ie. starting at 30 degrees with increments of 5 degrees every hour, hence giving the solar gain a chance in days of mixed solar spurts due to cloud cover.



Frost Protection

The Frost protection function (OCFR) is preset for automatic activation in the system. If the T1 sensor on the solar panel drops to 4° then the pump will circulate cooler water from the base of the cylinder in short cycles until T1 reaches 5°.

Set Points

The set points on this controller are set for maximum performance of the Ice Solar system.

WARNING: Adjustments to these set points may affect the performance of this system. Please seek technical assistance for advanced function settings or modification to these set points if required.

LOAD

DTO = 8°C Differential Temperature On

Solar Pump turns on when T1 (roof) is 8°C hotter than T2 (bottom probe in the cylinder)

DTF = 6°C Differential Temperature Off

Solar Pump turns off when T1 (roof) is 6°C hotter than T2 (bottom probe in the cylinder)

DTS = 10°C Differential Temperature Start – Start of incremental pump speed (initiates when 10°C differential between T1 and T2)

RIS = 1.0°C – pump increases/decreases by 10% each time temperature at T1 increases/decreases by 1°C above T2 whilst T1 is also above the DTS set point of 10°C

SMX = 80°C – maximum operating temperature. Sun symbol appears at Solar Max and collection ceases

SMAX = S2 – This allows SMX to be read from S2 or S3 (ie. S3 top probe, S2 bottom probe). S2 allows the whole cylinder to heat via solar.

HYST = 2°C – SMX deactivated when the selected sensor drops 2 degrees below SMX

COL

collector protection

ECM = ON CEM = 130°C protects system ie. water/power loss.

Complete shutdown if T1 over 130

ECCO = ON CMAX = 110°C self-cooling keeps the system in check if

Solar Max reached by short cycles

OCMI = OFF (not required for this system)

OCFR = ON Frost Protection

CFRO = 4°C pump on when T1 (collector) drops to this temperature

CFRF = 5°C pump ceases when T1 (collector) raised to this temperature

OTCO = OFF (not required for this system)

PUMP

ONOF = OFF

PULS = On MINI = 30% MAXI = 100%

PSOL = OFF (not required for this system)

PHEA = OFF (not required for this system)

0 - 10 = OFF (not required for this system)

COOL

advanced heat transfer via a motorised valve or pump to radiator or heat exchanger

OSYC = OFF

OSTC = OFF

OHDP = OFF

AUX

auxiliary relay R3 for advanced use. Choice of timeclock (TIME) or thermostat (AH)

TIME = OFF auxiliary time clock for spare R3 relay. 3 running times to choose from

AH = OFF auxiliary thermostat. Select S2, S3 or S4 for T2, T3 or T4

BEEP = OFF alarm sound for system fault

MAN

manual diagnostic to test relays

R1 = OFF

R2 = OFF

R3 = OFF

HR = OFF

BLPR = OFF blocking protection for pump/s - ie. Turn ON if mineral present in water



KEEPING NEW ZEALAND GREEN

OTDI = ON legionella Control
PDIS = 7 disinfection monitoring period (days)
DDIS = 60 disinfection operating time (minutes)
TDIS = 60°C temperature setting
SDIS = 01:00 disinfection start time
OPAR = OFF advanced parallel relay function (R1 and R3 operate simultaneously)
INVE = OFF inverted parallel relay function (ie. R3 operates in lieu of R1)
OHQM = OFF thermal measuring - requires calibration to flow and medium type
FS flow rate monitoring
GFDS - VFS - OFF
FRT - OFF
UNIT units of measure
TEMP = °C deg or Fahrenheit
ENEG = 1 kWh (kilowatt hours) or Btu (British Thermal Unit)
RST reset
RSTP reset controller to factory settings
CHQM reset accumulated thermal energy
CPT reset accumulated pump running time
PASS password locking adjustment
PWDN set password
PWDG confirm password

*If your system is retrofitted to an existing cylinder, please refer to the settings shown in the installer's Manual for different types of cylinders.

Manual Circuit Button

Press the manual circuit button on display to run the R1 pump. Runs continuously for 1hr.

On Button

Press On button for 3 seconds to turn off the display
 Press On button once to manually run R2 output. If the secondary pump connected to R2, then this will run for 3 minutes

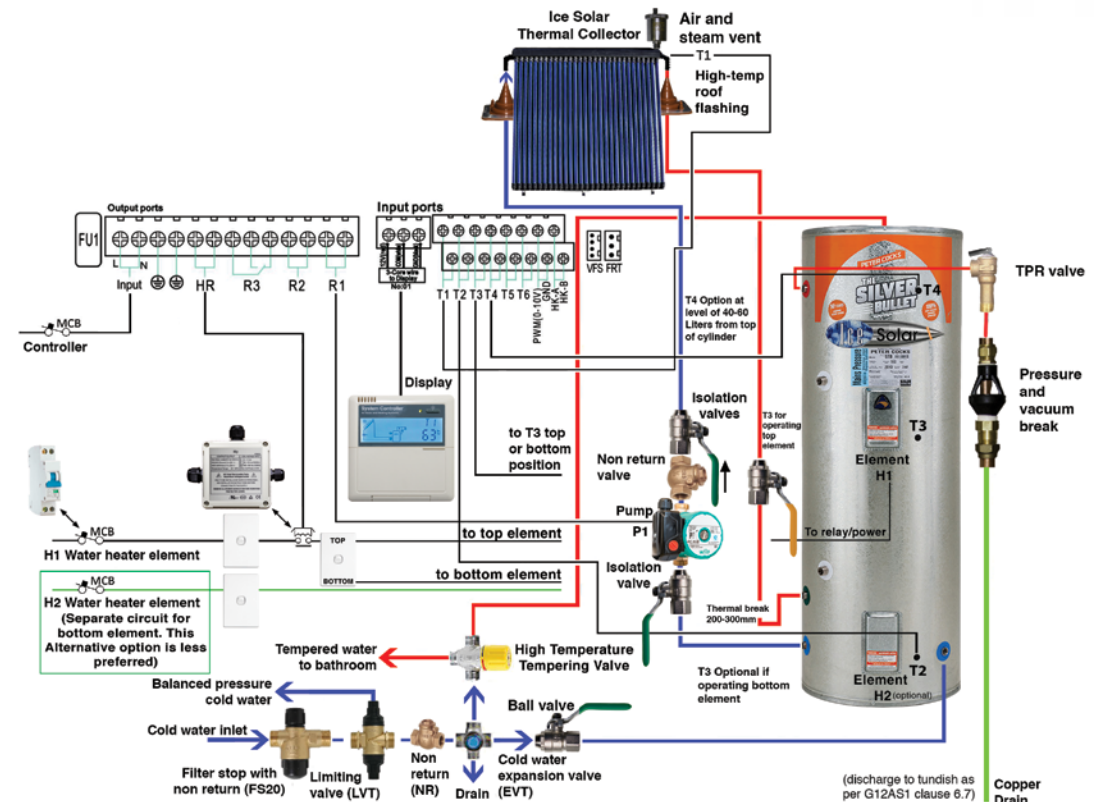
Power Failure

The controller has built in memory protection of set points

Troubleshooting

If error symbol appears check T values press '+' '-'. If T values show '---' then there is a break or insecure connection of cable. T value fluctuating rapidly indicates heat damaged or insecure connection.

Mains Pressure Open Loop Solar System With Electricity



Electrical supply is required for effective operation of this system and for extra protection against freezing and overheating. Electricity supply should not be turned off to the controller at anytime. Use Holiday function when not in use. For extended long term periods of non use, ie. during major renovations, or extended terms of vacancy/non-use, the system should be drained before disconnecting power. If regular draining is required (very rare), a drain could be installed on the solar circuit, to accommodate this requirement.

We appreciate any feedback and photos taken by our customers
 We take genuine interest in how solar is working for you!

So please let us know.

Send feedback to info@icesolar.co.nz

Energy Star Warranty

- Solar Thermal Collectors 10 Year Performance Warranty
- Solar Thermal Collectors 7 Year Manufacturing Warranty
- Pumps & Controllers 2 Year Manufacturing Warranty
- Mains Pressure Hot Water Cylinders 7-10 Year Manufacturing Warranty applicable to Energy Star Warranty (all hot water cylinders as per manufacturers guarantee)
- Low & Medium Pressure Hot Water Cylinders 5 Year Warranty (all hot water cylinders as per manufacturers guarantee) – (low & medium pressure cylinders not applicable for Energy Star Systems – or Energy Star Warranty)
- Elements and Thermostats in cylinders have a 1 year warranty as per all cylinder manufacturers warranty

Ice Solar Products have been tested by Applied Research Ltd to meet Australian & New Zealand Standards. In the unlikely event a solar thermal collector shows a material or manufacturing defect or performance degradation within the guarantee period, you can, in addition to the legal warranty rights, which you have versus your supplier, claim according to the guarantee by Ice Solar Ltd.

This guarantee applies only for solar thermal collectors supplied by Ice Solar Ltd.

Product Guarantee

Scope of the product guarantee

Ice Solar guarantees product performance to 10 years as detailed under Performance Warranty in this warranty document.

If a defect related to material and/or manufacturing occurs within a period of 7 years with the solar thermal collector (2 Year for pumps and Controllers) you can claim based on the guarantee to Ice Solar Ltd. The guarantee is restricted to the following component parts: frame, glass, evacuated tubes, manifold and the parts that make up the solar thermal collector and as supplied to the customer as invoiced by Ice Solar Ltd. The guarantee does not include defects, which are caused by improper handling, product modifications, installation, operational errors or 3rd party influences.

The guarantee period starts from the day you purchased the solar thermal collector from Ice Solar Ltd. The provision of reimbursement within a guarantee claim does not prolong the guarantee period.

Poor water Quality may void this warranty. If you have mineral content in your water it is recommended to have your water tested to ensure stability with copper (solar components) stainless steel (mains pressure) cylinders.

Guarantee claim

Ice Solar will fulfil the guarantee obligations for the defect at its own choice with a free of charge replacement of the defective solar thermal collector. Costs for dismantling/ reinstallation are not covered by Ice Solar Ltd.

The guarantee excludes further claims on Ice Solar Ltd in particular for lost profit, compensation or consequential damage or claims for replacement of products not covered under this guarantee.

Performance Warranty

The following performance warranty is only related to degradation losses of a solar thermal collector and not to further defects of the solar thermal collector.

Scope of the performance warranty

If within a period of ten 10 years from the date of sale through Ice Solar Ltd the performance of the solar thermal collector falls below 80% of the minimum output value of the solar thermal collector, as specified in the Performance Data, Ice Solar Ltd will at its sole discretion, insofar Ice Solar Ltd deems this degradation to be a degradation of the evacuated tube, glass or film and after first validating any heat loss with standard measurement devices under standard test conditions, determine to repair or replace the solar thermal collector or provide additional evacuated tube heat pipes to cover the loss in heat generated. The guarantee applies to fixed installations only and excludes mobile installations.

Exemptions of warranty

This performance warranty does not include any performance losses which are caused by inappropriate treatment, operational errors or 3rd party influences.

The performance warranty especially does not include performance losses caused

- by faulty system components, mounting system construction including fittings and accessories supplied and/or installed by others.
- in the case of controllers, water damage or damage by external electromagnetic, power surge, or similar circumstances that the controller could not reasonably cope with.
- by installation via untrained and unprofessional personnel.
- by coupling Ice Solar thermal collectors with components of a different specification.
- by incorrect system layout, system configuration and mounting.
- by incorrect connection and installation work or through faulty handling during such work.
- by operation in unsuitable environmental conditions or through unsuitable methods deviating from the specifications, operating manuals or labelling.
- by unsuitable maintenance and unsuitable testing, glass breakage caused by outside influences, flying objects or outside forces such as vandalism or theft, forces of nature or civil unrest.
- by the effects of soiling on the front glass, defects caused by smoke, salt, chemicals and other types of soiling.
- by usage on mobile units like ships, boats, or other vehicles.
- by natural forces (like earthquakes, typhoons, twisters, floods, lightning strike, indirect lightning strike, snow, avalanche, mudslide, insects) or other unforeseeable circumstances.

Scope of warranty

Costs for de-installation and re-installation, tests conducted by the customer, and other indirect costs are not covered by Ice Solar Ltd.

Making claims against product guarantee or performance warranty

In order to claim against this product guarantee or performance warranty, you need to provide the receipt, from which the purchase date can be seen, the exact model name.

The claim must be sent in writing to info@icesolar.co.nz

The defect or performance degradation has to be claimed within the respective warranty period. A copy of the receipt must be enclosed with the letter.

Ice Solar Ltd does not accept any returns of solar thermal collectors without prior written approval.

Periodic Maintenance & Faultfinding

To ensure correct system operation and to retain your component warranty, the system must be maintained in accordance with the recommended levels of maintenance outlined below. Periodic maintenance should consist of the following;

Faults

- If the pump indicator on the controller is flashing indicating pump is on and the pump is not operating – check power to the pump – if still not working call a solar technician
- If a power surge occurs, controller may default to factory setting – ensure the controller is reset to the setpoints as provided in this manual to ensure proper protection and operation of the system. Surge protection is advised.
- If there is a power outage or water disruption the temperature on the roof may pass the emergency protection settings and the system will shut down to avoid overheating in the lines when power/water is restored. The system will reset overnight as the system cools. If there is disruption to the water lines, it is advisable to bleed air from the solar pump by loosening the silver screw on the body of the pump until water drips through the screw and opening the TPR valve on top of the cylinder to allow any air to escape. This may cause some banging noises in the cylinder. When the banging noises stop and the water is flowing freely from the TPR, close off the TPR and screw in the silver screw on the pump until the water stops dripping. This procedure will rid any airlocks. Always turn the pump off before opening the bleed screw.
- If an airlock is created in the solar line this may cause the solar pump to burn out. Air in the line is most commonly detected when banging noises come from the cylinder. Follow the procedure above to solve this issue.
- If the error symbol appears, check T values press '+' '-'. If T values show '---' then there is a break or insecure connection of cable. T value fluctuating rapidly indicates heat damaged or insecure connection.

Annually

- Wash off dirt & debris from collectors (if required)
- Check drains free of obstructions
- Check solar panels for shading
- Check thermal and pressure relief valves for correct operation
- Check tempering valve for correct water temperature
- Check for worn seals around the solar panel
- Check cables to thermocouple sensors for best conductivity
- Check temperature differential and controller set-points
- Check electrical relay and water booster elements
- Check pump for leaks and bleed any airlock

3 years

- Check system and connections for leaks
- Check any deterioration to insulation and lagging

WARNING: Glass tubes are fragile when removed from the Solar Panel. Care must be taken around the glass and appropriate safety precautions taken when climbing on roofs. Hazard from slipping and falling around glass could result in serious injury.