
SolaStat

SolaStat-Rmt



Installation Guide.

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SolaStat-Rmt. Remote Display for SolaStat Controllers.



Features.

- **Mimic of SolaStat-Plus or SolaStat-Pool Display.**
 - Remote display in convenient, safe location
- **Powered off SolaStat-Plus or SolaStat-Pool.**
 - No separate power supply required for first SolaStat-Rmt.
- **Long distance cable runs possible.**
 - Remote can be up to 1200 meters away from controller.
- **Tamper free display of parameters.**
 - Impossible to upset critical values by using SolaStat-Rmt.
- **Large 20mm Soft Green Digital LED Display c/w 8 Status Lights.**
- **Easy to Install with External Mounting Holes.**
- **Complies with Safety & EMC standards.**
- **Enclosure UV resistant.**
- **Water Resistant and Rear Cable Entry Options.**



Z495



SolaStat Models Include:

SolaStat-Eco: Controller c/w 4 Status Lights
SolaStat-Plus: Controller c/w Display.
SolaStat-Pool: Pool Controller c/w Display.
SolaStat-Rmt: Remote Display.
SolaStat-Rly: Slave Relay for HWC Control.
SolaData: PC Datalogging & Comms.

Introduction.

SolaStat-Rmt is an Easy to use Remote Display with a single button to examine the sensor temperature readings on a SolaStat-Plus or SolaStat-Pool and all status lights are easy to read and understand. No amount of button pressing can affect any program change back to the SolaStat-Plus or SolaStat-Pool.

SolaStat-Rmt is Convenient as it has the same high quality finish and clearly displayed information as the SolaStat-Plus or SolaStat-Pool but can be positioned in a more suitable and safe environment up to 1200 meters away from the SolaStat-Plus or SolaStat-Pool.

ICM (Instrumentation Control Manufacturing Ltd) has experience in designing and manufacturing Solar Hot Water Controllers to Industrial Electronic Standards for over 15 years. This has earned ICM a reputation for Quality, Accuracy, Efficiency and Reliability.

Ordering Information.

SolaStat-Rmt Standard Unit: Digital Display, 8 status Lights, and RS485 Comms:
SP-Comms-485 board and CA-485-50 Cable 50m.

Water resistant enclosure and rear cable entry options are available.

PSA9V2 Plug Pack 9Vdc, 200mA Output, 230/240Vac $\pm 10\%$ Input.

Only required when more than one SolaStat-Rmt is connected to a SolaStat-Plus or SolaStat-Pool.

Quality Assurance Programme.

The modern technology and strict procedures of the ISO9001 Quality Assurance Programme applied during design, development, production and final inspection grant the long term reliability of the instrument.

SolaStat-Rmt Users Guide.

The SolaStat-Rmt receives display information from the SolaStat-Plus or SolaStat-Pool solar hot water controllers and the OmniStat-Plus Hot Water Controller. On power up the Display flashes 'u00' for SolaStat-Plus-1, 'u01' for SolaStat-Plus-2, 'u02' for SolaStat-Pool, and 'u03' for OmniStat-Plus-1.

Principle of Operation

In your solar hot water system the SolaStat-Plus or SolaStat-Pool is the master and transmits all its display information via a data transmission line. The SolaStat-Rmt is the slave and receives and displays the information from the master.

The SolaStat-Rmt does not send data back to the SolaStat-Plus or SolaStat-Pool so there is no chance of accidental alteration of the systems adjustable values from the remote.

The data transmission system used is RS485 industrial differential standard and is able to transmit information over a twisted pair of wires up to 1200 meters with suitable cable. One SolaStat-Rmt is able to be powered from one SolaStat-Plus or SolaStat-Pool, over a separate pair of wires, so no local power supply is needed. The normal wiring is therefore two twisted pairs.

Multiple SolaStat-Rmt can be run off the SolaStat-Plus or SolaStat-Pool data transmission line. However, only one SolaStat-Rmt can be powered from one SolaStat-Plus or SolaStat-Pool and the voltage drop between the units must not exceed 1V. (Refer 'SolaStat-Rmt Connection Examples'.)

Note 1. Each **extra** SolaStat-Rmt requires a separate 9volt 100mA local power supply.

Note 2. The e.o.l. (end of line) link must be cut on all but the last SolaStat-Rmt.

SolaStat-Rmt Display Panel Description, Used with the SolaStat-Plus.



Note on the Display above. Where green and yellow writing are next to a light, the green writing applies when used with a SolaStat-Plus.

- The 'PWR' light on indicates that power is being applied to the unit.
- 'ROOF', 'TANK' and 'INLET' lights will be on to indicate which temperature is being displayed. Only 1 of the 3 can be on in normal operation. If more than 1 of these lights are on then it is in Smart Shutdown mode and 'SSd' will be on the display.
- The 'PUMP' light will be on when the pump is ON. The exception to this is, if the Pump Timer is on a 1minute recovery cycle, the light will be on but the pump will not be running during that minute. (See 'Pump Timer' explanation in the SolaStat-Plus Installation Guide.)
- The 'HWC' light indicates the hot water storage tank's electric element status. (SolaStat-Plus-2 Only).
 - If the HWC light is off, there is no power on the electric element.
 - If the light is on, the HWC control is no longer in 'Holdoff Timer' and is maintaining the temperature at a preset value called the 'Reheat Upper' value referred to as Thermostat Mode.
 - The light slowly flashing (once a second) means the hot water tank has become too cold and is now heating up (Reheat).
 - The light quickly flashing (3 times a second) means there might soon be a risk of biological contamination of the water so the tank is heating up to minimize the risk (BioSafe).

SolaStat-Rmt Display Panel Description, Used with SolaStat-Plus continued.

- 'TOPOUT' light on indicates the value stored as the maximum allowable hot water tank temperature has been reached. If lit the pump will be disabled until the temperature drops at least 2C lower.
- The 'FROST' light comes on when the value stored for the onset of a frost condition has been detected on the solar collector. To stop the collector freezing and bursting, the pump will come on just enough to raise the temperature of the collector by 2C. Only a small amount of warm water is needed to protect the collector.
- The 'NEXT' button will step from Roof to Tank to Inlet sensor and the display will show the temperature being measured on the indicated sensor in C. If a sensor is below -20C the display reads 'Lo'. If a sensor is above 140C the display reads 'Hi'. If a sensor is outside the specified temperature range of -40C to 150C then the Display will read 'SSd' and the 'NEXT' button is disabled.

SolaStat-Rmt Display Panel Description, Used with the SolaStat-Pool.

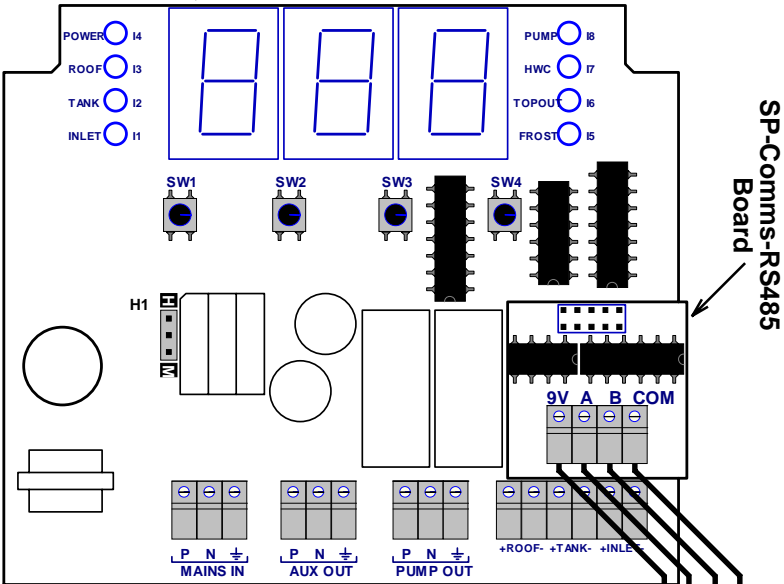


Note on the Display above. Where green and yellow writing are next to a light, the yellow writing applies when used with a SolaStat-Pool.

- The 'PWR' light on indicates that power is being applied to the unit.
- 'ROOF', 'POOL' or 'SET' lights will be on to indicate which temperature is being displayed. Only 1 of the 3 can be on in normal operation. If more than 1 of these lights are on then it is in Smart Shutdown mode and 'SSd' will be on the display.
- The 'PUMP' light will be on when the pump is on.
- 'TROPICAL' light is on when Tropical mode is active. This indicates the pool water is warmer than the Comfort adjustable value. When the pool water is being cooled through the solar collectors (usually at night), the pump and 'Pump' light will be on at the same time as the Tropical light.
- The 'COMFORT' light is on when pool water temperature reaches or is close to, the user set Comfort temperature. The pump will not activate now until the pool is below the Comfort adjustable value by 2C or the controller is in active 'TROPICAL' or active 'FROST' mode.
- The 'FROST' light comes on when the value stored for the onset of a frost condition has been detected on the solar collector. To stop the collector freezing and bursting, the pump will come on just enough to raise the temperature of the collector by 2C.
- The 'NEXT' button will step from Roof to Pool to Set and the display will show the relevant temperature in C. If a sensor is below -20C the display reads 'Lo'. If a sensor is above 140C the display reads 'Hi'. If a sensor is outside the specified temperature range of -40C to 150C then the Display will read 'SSd' and the 'NEXT' button is disabled.

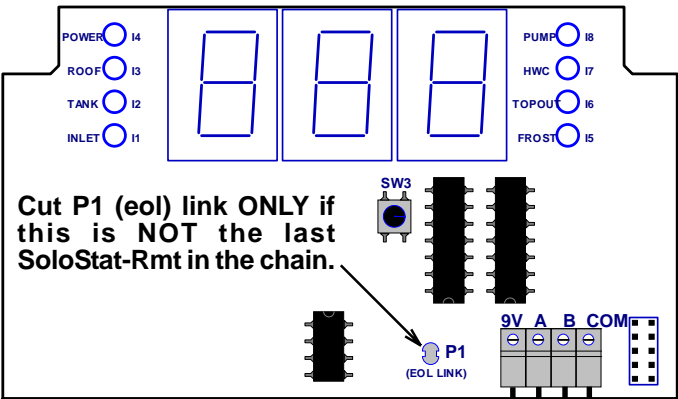
SolaStat-Rmt Connection Examples.

SolaStat-Plus, with RS485 Comms board fitted.



Only one SolaStat-Rmt can be powered from a SolaStat-Plus.

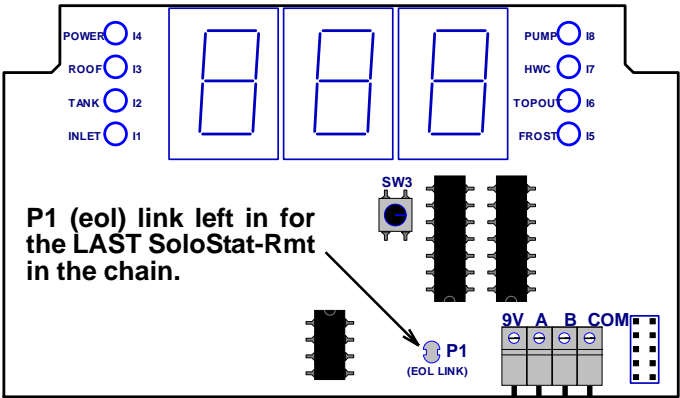
SolaStat-Rmt; Remote Display Unit.



Cat 5 Cable.
Use one twisted pair for the data wires, and another twisted pair for the 9V & Comm wires.
Trim all unused wires back, to avoid shorting.

The first SoloStat-Rmt in the chain does not require an external power supply. It is powered from the SolaStat-Plus.

SolaStat-Rmt; Remote Display Unit.



Cat 5 Cable.
Use a twisted pair for the data wires.
Trim all unused wires back, to avoid shorting.

PSA9V2 9Vdc Plug-pack external power supply. One per each extra SolaStat-Rmt.

Note: All references to SolaStat-Plus in this drawing also applies to the SolaStat-Pool.

Connecting the Cat5 Cable between SolaStat-Rmt and SolaStat-Plus or SolaStat-Pool.

Refer 'SolaStat-Rmt Connection Examples' on the previous page.

1. Remove the cover of the SolaStat-Rmt enclosure by unscrewing the 4 top screws.
2. Run Cat5 cable into the SolaStat-Rmt by most appropriate method. (e.g. rear entry for a living space gib wall).
3. Wire the Cat5 cable into the SolaStat-Rmt as shown on 'SolaStat-Rmt Connection Examples' wiring diagram. Data cable pair should be twisted pair type (e.g. CAT5 unshielded twisted pair wire). Use one twisted pair for the A & B data wires, and another twisted pair for the 9V & Comm wires. Trim all unused wires back, to avoid shorting. The SolaStat-Plus or SolaStat-Pool must not be wired into the other end of the cable yet or must be de-energized.
4. Replace the cover of the enclosure and screw in the 4 top screws.
5. Install Comms board into SolaStat-Plus or SolaStat-Pool.
 - a. Remove the SolaStat-Plus or SolaStat-Pool mains power supply, preferably remove the plug from the wall socket. Make sure no other power sources are feeding back through other connections.
 - b. Remove the 4 screw covers on each corner of the lid of the enclosure if already in place. This will require a fine tipped tool such as a screw driver. Be careful not to damage the cover. Always press the tool away from you to avoid injury if you slip.
 - c. Remove the 4 screws that hold the cover on.
 - d. Earth yourself to the SolaStat-Plus or SolaStat-Pool, a simple method might be to lightly press a screw driver into the far right sensor terminal screw and touch the screw driver metal shaft. Do not connect to mains earth.
 - e. Briefly hold your fingers across the bottom of the SP-Comms-485 board while repeating section "d" above.
 - f. Press the SP-Comms-485 board into the PROG/COMMS pins (Refer Diagram 'SolaStat-Rmt Connection Examples'.), locating the mounting lugs and ensuring all pins are inserted correctly.
6. Wire in the Cat5 cable from the SolaStat-Rmt. Connect terminal A of the SolaStat-Rmt to terminal A of the SolaStat-Plus. Repeat for terminals B to B, 9V to 9V, and Comm to Comm. Trim all unused wires back, to avoid shorting.
7. To add SolaData into this system or a second SolaStat-Rmt, wire another CAT5 (or similar) cable in parallel to the SolaStat-Rmt cable. Do not attempt to power any RS485 interface or more than one SolaStat-Rmt with the power from the SolaStat-Plus or SolaStat-Pool (9V and Comm terminals) as this may overload the SolaStat-Plus or SolaStat-Pool. Use another power source such as a plug pack (for more information see SolaData Installation Guide). Note: If you are running a SolaStat-Rmt then it is not possible to use a SP-Comms-232 board inside the SolaStat-Plus or the SolaStat-Pool. Only use a SP-Comms-485 board. However the RS485 signal can be converted to a RS232 signal externally with a Comms-NS comms conversion modules.
8. Do not allow the data cable to come within 10mm of the high voltage connectors or components inside the enclosure.
9. Check there are no shorts, broken wires or incorrect wiring.
10. Replace the cover of the enclosure and screw in the 4 top screws.
11. Power up the SolaStat-Plus or SolaStat-Pool and check it is operating normally.
12. Shorted data cable power wires will cause the SolaStat-Plus or SolaStat-Pool to not start up properly and 'flash' it's power light. If this is happening remove power and find the short.
13. Check the SolaStat-Rmt, it should be mimicking what is being displayed on the SolaStat-Plus or SolaStat-Pool. The user can select one of 3 temperatures to display by pressing the 'Next' button. It will only be the same when both units have selected the same reading. This is normal.
14. If all is working correctly then push in 4 screw covers for the SolaStat-Rmt and push in 4 screw covers for the SolaStat-Plus or SolaStat-Pool into each corner of the enclosure lid. (spares available from your distributor or ICM Ltd). Note: there are locating lugs to ensure correct orientation.

SolaStat-Rmt Safety Instructions.

Read safety instructions and limit of liability before proceeding with the installation.

General Safety Instructions.

1. This installation guide is for the installation of SolaStat-Rmt remote displays only and is not an installation guide for any other part.
2. The complete installation should be checked at least annually for damage or malfunction.
3. All servicing to be carried out by an authorised service agent only.
4. All aspects of the installation must comply with local electrical regulations.

Installation Precautions.

1. Must be installed away from water sources such as rain, leaking pipes, or wet floors and must not be installed in damp areas like bathrooms.
2. Must be installed away from direct sunlight, flammable liquids or radiant heat sources.
3. Cables must be facing directly down, not sideways or upwards.
4. Must be in a safe environment for users to inspect display panel.

Electrical Precautions.



CAUTION: Dangerous Voltages may be present. The SolaStat has no user serviceable parts. Protective enclosure only to be opened by qualified personnel. Remove ALL power sources before removing protective cover.



1. Data cables and 9Vdc Power Supply cables must run 300mm away from mains cables.
2. Always use within specified voltage, especially when powering additional units from an external power supply, other than the SolaStat-Plus or SolaStat-Pool. If using an external power supply use one rated at 9Vdc with a minimum current of 100mA.
3. When terminating the data cable and 9Vdc Power Supply cable inside the SolaStat-Plus or the SolaStat-Pool enclosure do not allow the cables to come within 10mm of the high voltage connectors or components inside the enclosure.
3. Never use with damaged leads, plugs or sockets.

SolaStat-Rmt Mounting.

Where to mount the SolaStat-Rmt.

1. Against a flat vertical surface with sufficient strength to hold the enclosure and any additional weight from the cables.
2. Cables must be facing directly down, not sideways or up.
3. Safe for users to inspect.
4. The display can be easily read and buttons accessed.
5. Allow for cable run.

Note; The SolaStat-Rmt is supplied without the screw covers fitted as the unit must be opened to wire it into the data cable.

Mounting the SolaStat-Rmt.

1. Allow for the enclosure dropping 5mm from screw centres once mounted (keyhole mounting system).
2. Place drill guide template against wall, checking for level alignment. 4 screws are supplied, 2 are chip board screws and 2 are combination Gib/ wood screws. It is recommended that all 4 mounting holes are used with at least 2 firmly secured into wood. The outer plastic Gib anchors will self tap into Gib board and their inner metal screws fix into the centre of the plastic anchors.
3. Mark and drill/ screw as appropriate leaving the heads of the screws above the surface by approximately 3mm.
4. Place unit over the 4 screw heads, unit should slide down 5mm into the 'key' slots and become secured to the wall. You will need to adjust screw height to obtain a secure fit.

SolaStat-Rmt Specifications.

Power Supply.

Supply Voltage*.	8~14 Vdc
Max power usage.	1 VA

*For a single SolaStat-Rmt the power can be supplied by SolaStat-Plus or SolaStat-Pool master. Additional SolaStat-Rmt's will need a separate isolated power supply. Refer PSA9V2 Plug Pack.

Data Interface.

Physical.	RS485 (Rx only)
Baud Rate.	4800Bd
Format.	8 bit, 1 Stop, No parity
Protocol	Special SolaStat data packets

EMC and Safety Compliances.

Emissions:	EN 55022-A, CTick.
Immunity:	EN 50082-1.
Safety Compliance:	EN 60950, CTick.

General Specifications.

Display range	-20 ~ +140C
Operating Temperature:	0~60°C
Operating Humidity:	90% RH Max. Non-Condensing
Enclosure Construction	Polycarbonate - Impact Resistant UL94 V-2 Non Burning, UV Stabilized Water resistant or rear entry option available.
Dimensions	L=167, W=142, H=40mm
Weight.	Standard model + packaging = 700gram

PSA9V2 Plug Pack Specifications.

Required when more than one SolaStat-Rmt is connected to a SolaStat-Plus or SolaStat-Pool.

Input Voltage	230/240Vac $\pm 10\%$; 50mA; 50/60Hz.
Output Voltage	9Vdc, 200mA
Australian Approval	N14866.
Polarity	White Stripe = +Ve.

Product Liability.

This information describes our products. It does not constitute guaranteed properties and is not intended to affirm the suitability of a product for a particular application. Due to ongoing research and development, designs, specifications, and documentation are subject to change without notification. Regrettably, omissions and exceptions cannot be completely ruled out. No liability will be accepted for errors, omissions or amendments to this specification. Technical data are always specified by their average values and are based on Standard Calibration Units at 25C, unless otherwise specified. Each product is subject to the 'Conditions of Sale'.

Warning:

These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independent fail-safe back-up system must always be implemented.

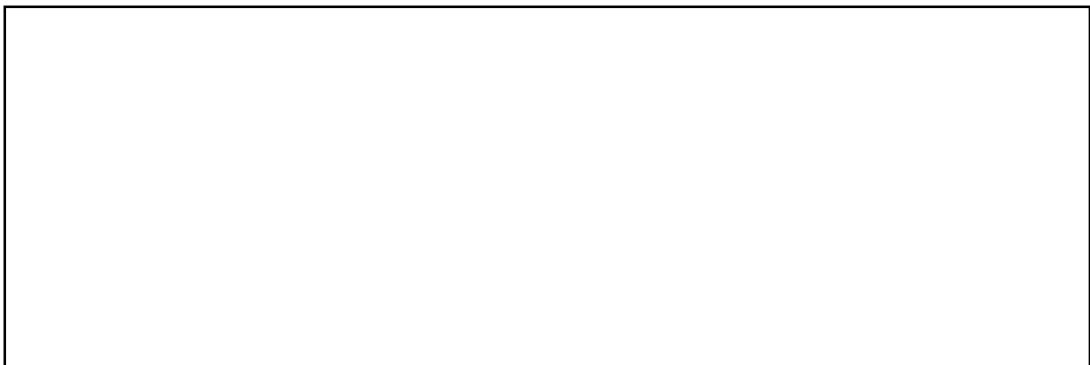
SolaStat-Rmt Trouble-shooting Guide.

This is intended as an initial guide to minimise service calls. For more Trouble-Shooting information also refer to the Trouble-Shooting Guides in the SolaStat-Plus or SolaStat-Pool Installation Guides as applicable.

Trouble Shooting		
Symptom	Cause	Solution
No operation, no display and no lights	a. No power	a. Check SolaStat-Plus or SolaStat-Pool (or power supply) is on. b. Check connections
No operation, no display, no lights and SolaStat-Plus or SolaStat-Pool are not functioning correctly. Power light is flashing on SolaStat-Pool or SolaStat-Plus.	a. 9V and comm terminals are shorted on interface.	a. Remove power to SolaStat-Plus or SolaStat-Pool while condition is present. Find short circuit between 9V and Comm terminals/ wiring
Display is blank, power light is on.	a. No valid data being received from SolaStat-Plus or SolaStat-Pool.	a. Check data connections are correct also not shorted or open circuit. or Check SolaStat-Plus or SolaStat-Pool are on. or Check any other possible shared interfaces are not causing a problem.
Value displayed is not same as on SolaStat-Plus or SolaStat-Pool.	a. Select same reading as SolaStat-Plus or SolaStat-Pool. b. Data comms problems.	a. The user can select one of 3 temperatures to display by pressing the 'Next' button. It will only be the same when both units have selected the same reading. This is normal. b. For Data errors see Symptom 'Display is blank, power light is on'.

Notes.

SolaStat Distributor.



Email: sales@solastat.com