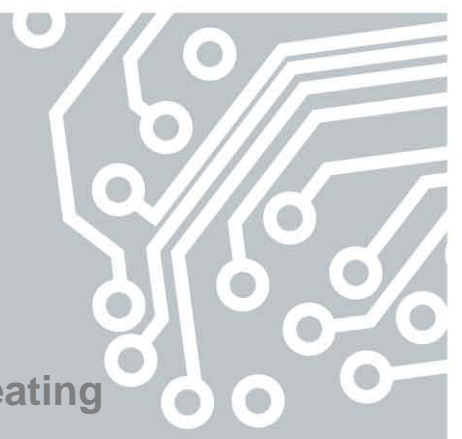


smart energy management

SolaStat™ -2-3

An Intelligent Technology Solution for Water Heating



USER GUIDE



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For technical help contact your installer or maintenance technician.

Installer Details:

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INTRODUCING YOUR SOLASTAT™ CONTROLLER

About Your SolaStat™ Controller

Your SolaStat™ Controller has a microcomputer, which intelligently and automatically controls water flow and energy inputs into your hot water system.

Your SolaStat™ will balance water flow and energy inputs from solar, and electrical sources so you can minimise your energy costs.

It has two main aims:

- To make sure your hot water is being heated cost-efficiently.
 - To make sure you don't run out of hot water when you need it.
-

How Does It Work?

Your SolaStat™ Controller works by measuring and comparing the temperature at three different places in the system: the collector (**ROOF**), the top of your hot water cylinder (**TANK**) and the bottom of your hot water cylinder (**INLET**).

If the temperature at the **ROOF** is higher than the **INLET** temperature by a pre-set amount, then the pump turns on automatically to transfer heated water from your solar collector to your hot water cylinder, and replace it with cooler water from the bottom of the cylinder.

This makes the hot water cylinder heat up and the collector on your roof cool down. When the temperature difference reduces to the pre-set level again, the pump automatically stops.

It can also optimise the timing of heating your water, so heat is only applied to the water in your cylinder when necessary, not all the time.

The SolaStat™ is also designed to protect your hot water system from very high or freezing temperatures, as well as make sure that safe water conditions are maintained (**BioSafe**).

THE DISPLAY PANEL

The **DISPLAY PANEL** shows the temperatures of the relevant sensors in °C or °F. This is factory pre-set and cannot be changed.

The **ROOF, TANK** and **INLET** lights indicate which temperature is being displayed. If any of these lights flashes, the unit is in Smart Shutdown Mode and 'SSd' will be displayed.

The **PUMP** light comes on when the pump is on (in normal or **FROST** operation, or when the **PUMP** button is pressed). The **PUMP** light flashes when the maximum tank temperature has been reached.

HWC
The HWC light is on when the element is on.

The **TOPOUT** light is on when the hot water tank has reached its maximum temperature.

PUMP Button
Press and hold this button to turn the pump on or off (after it has run for ten minutes, it automatically switches off for one minute, to let air escape and prevent overheating)

When in **Programming Mode**, use this to **increase** the display value on the screen.

HWC Button
Press and let go for a one-off user heat up to a maximum temperature – it will then switch off and revert to automatic. Press again to cancel.

When in **Programming Mode**, use this to **decrease** the display value on the screen.

NEXT Button
Press to obtain the next displayed temperature.

TEST Button
Press to test the display of the screen. '888' will be displayed and all the lights will be on at the same time for about two seconds. All the lights (except the **PWR** light) will then flash and the display will show the number of times the pump has been on (up to 999).

The **FROST** (and **PUMP**) light is on when the pump is circulating water to stop the collector from freezing.
CAUTION: Do not turn the power off when the FROST light is on.

SAVING POWER WITH SOLASTAT™

Three Tools to Achieve Power Savings

SolaStat™ has three tools to help you save power:

1. **Controlling the amount of hot water that enters your tank.**

You can alter the amount of water entering your tank using the PUMP function.

Your SolaStat™ is set to make the pump automatically turn on or turn off, depending on the temperature in the tank, at the inlet and at the collector.

2. **Controlling the activity of the heating element.**

To ensure that the water in your tank is not heated by electricity unnecessarily (for example, when the water from your collector is already hot enough), the heat applied to the element is computer controlled.

3. **Running BioSafe as a background activity.**

To protect your hot water from harbouring bacteria, hot water tanks need to be run at 60°C/140°F for at least one hour every 72 hours.

Rather than the traditional method of running your tank continuously at 60°C/140°F, and using up valuable energy doing so, your SolaStat™ Controller 'remembers' when your tank was last heated to 60°C and makes sure that it heats up to that temperature once every 72 hours for at least one hour.

USING YOUR SOLA STAT™

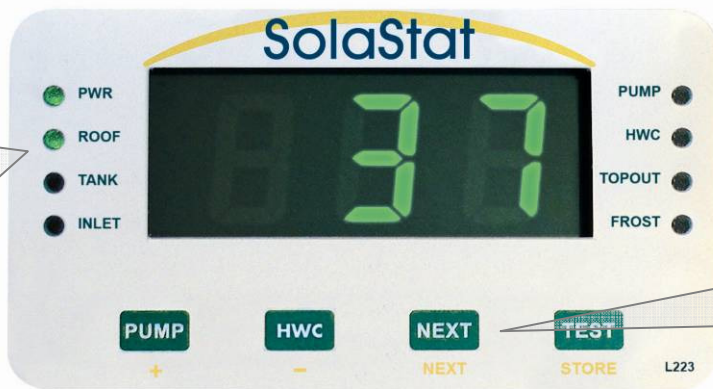
Reading the Display

The Display Lights show where the current display temperature is being read from: **ROOF**, **TANK**, or **INLET**.

To find out the temperature on the other sensors, press the **NEXT** button. The display light will confirm which sensor is being read.

Note that the Sola-2-3at™- ST is factory set to display temperature in degrees Centigrade/ Celsius. The Sola-2-3at™- 2F is factory set to display temperature in degrees Fahrenheit. These settings cannot be changed. Refer to the label on the side of the enclosure and the box.

This indicates that the **ROOF** sensor reading is currently on display, in this case 37°C.



Press **NEXT** to toggle between the ROOF, TANK and INLET sensors.

This indicates that the **TANK** sensor reading is currently on display, in this case 31°C.



Press **NEXT** to toggle between the ROOF, TANK and INLET sensors.

This indicates that the **INLET** sensor reading is currently on display, in this case 40°C.



Press **NEXT** to toggle between the ROOF, TANK and INLET sensors.

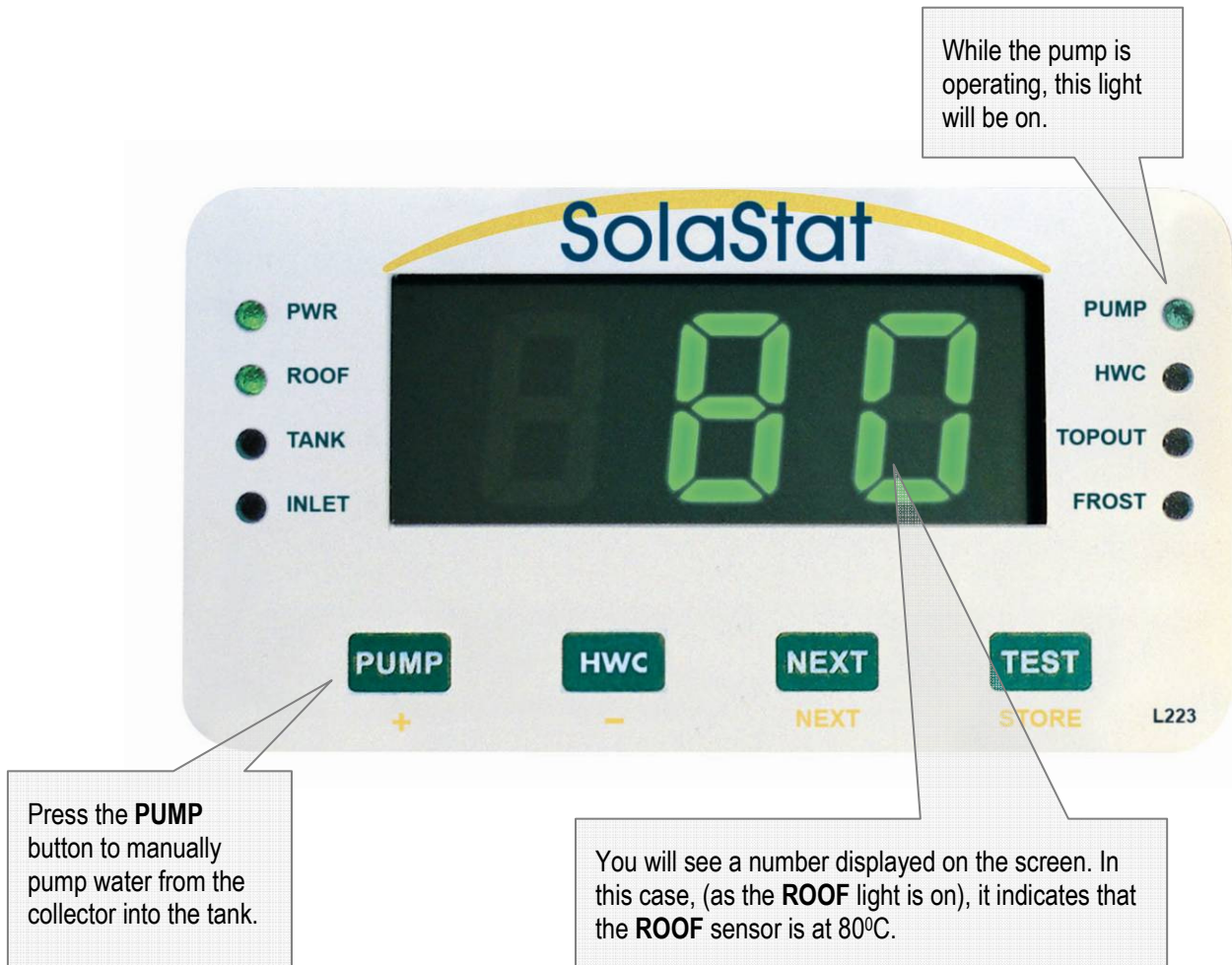
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USING YOUR SOLAStat™, CONTINUED

Pump Activation

Press and hold the **PUMP** button to manually operate the pump. It will circulate the water between the panel and the hot water tank.

After it has run for ten minutes (on automatic or manual), the pump automatically switches off for one minute, to let air escape and prevent overheating.



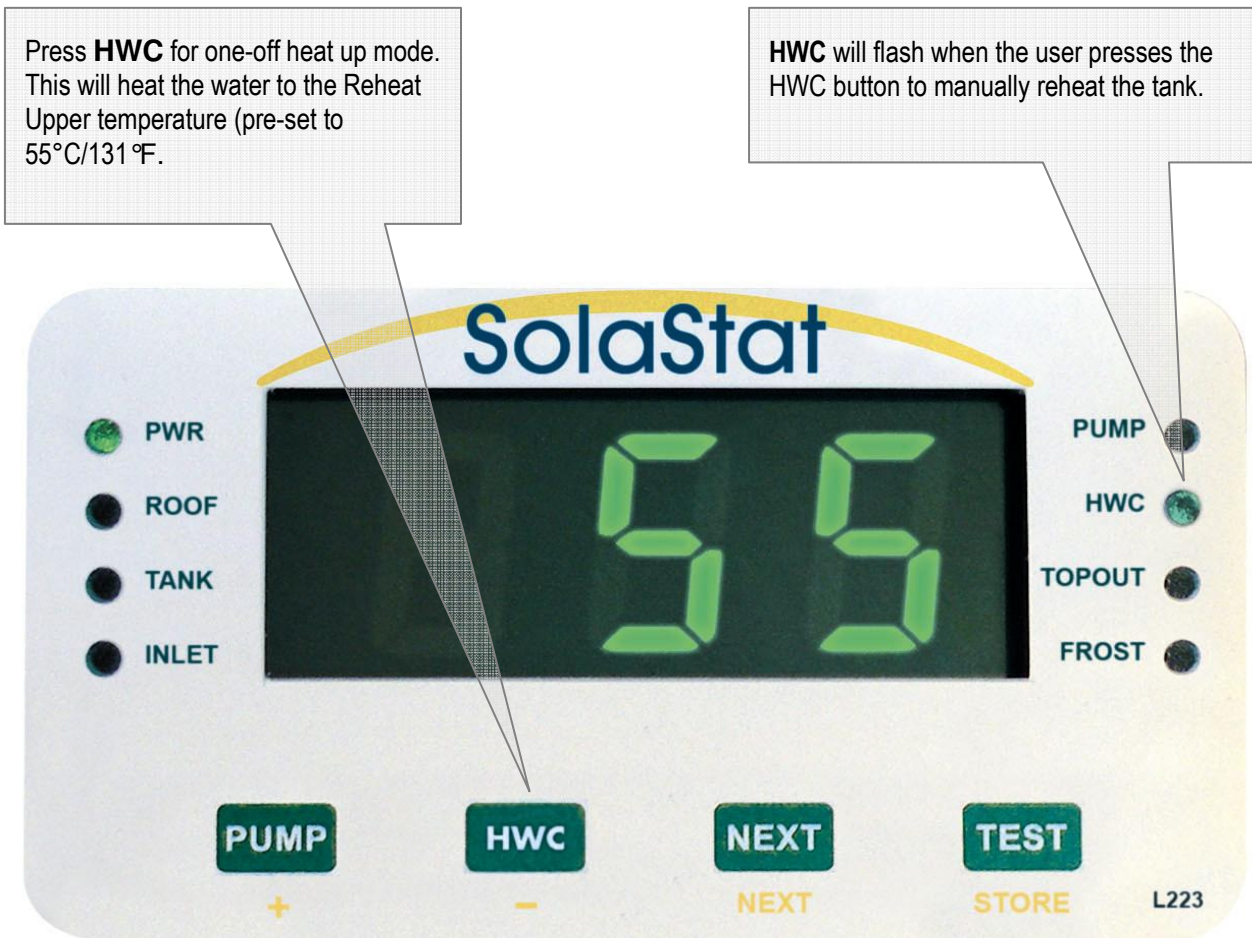
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USING YOUR SOLAStat™, CONTINUED

Manual/User Reheat

To manually start a reheat of the water in your tank, press the **HWC** button. Press the **HWC** button again to turn it off.

However, if Reheat is already on, pressing the **HWC** button will not turn it off.



Continued on next page

USING YOUR SOLA STAT™, CONTINUED

Testing Mode Pressing the **TEST** button will make sure the display panel and all lights in the system are working.

All the lights will stay on, and '888' will be shown for about two seconds.

Then all lights will flash and the display shows how many times the pump has been activated (up to 999) for three seconds.

Press the **TEST** button to check that all lights in the system are working.

For the next two seconds, all the lights come on and '888' is shown on the screen.



Then, all the lights (except the **PWR** light) will flash, and the display will tell you how many times the pump has been activated (in this case, 123 times).



Continued on next page

USING YOUR SOLAStat™, CONTINUED

Smart Shutdown Mode

'Smart Shutdown' is a mode that your controller will enter to minimise damage. It can be activated when the temperature at the ROOF sensor is less than -40 °C/-40 °F or more than 142 °C/288 °F.

This may occur because:

- there is a fault in the sensor wiring, OR
- the Solar Collector has reached a very high temperature.

If Smart Shutdown Mode is activated, you will see SSd on the display as shown on the screen below.

SSd on the display shows the controller is in Smart Shutdown Mode – i.e. there is a fault condition.



When **SSd** is displayed, the **ROOF**, **TANK** or **INLET** will be on or flashing to indicate which sensor is faulty. In this case, a faulty **ROOF** sensor has been detected.

The ROOF sensor temperature may reduce to a safe level by itself and the unit will return to normal operation. 'SSd' will no longer appear on the display.

This is a normal condition and it is not necessary to contact your installer or maintenance technician unless 'SSd' is on the display for more than 12 hours.

Continued on next page

USING YOUR SOLA STAT™, CONTINUED

Lockout Mode The Lockout Mode is activated when the water temperature in the collector is less than 20°C/68°F. In this case, the collector will not contribute any useful heat, even to cold water.

In this (Lockout) mode, the controller will not turn on the pump even if the correct temperature differential is reached.

However, if a frost condition is detected, this Lockout Mode is overridden and the pump operates to protect the system from freezing.

Frost Mode The **FROST** value is set by your installer. It is shown in the Programming Table on Page 11.

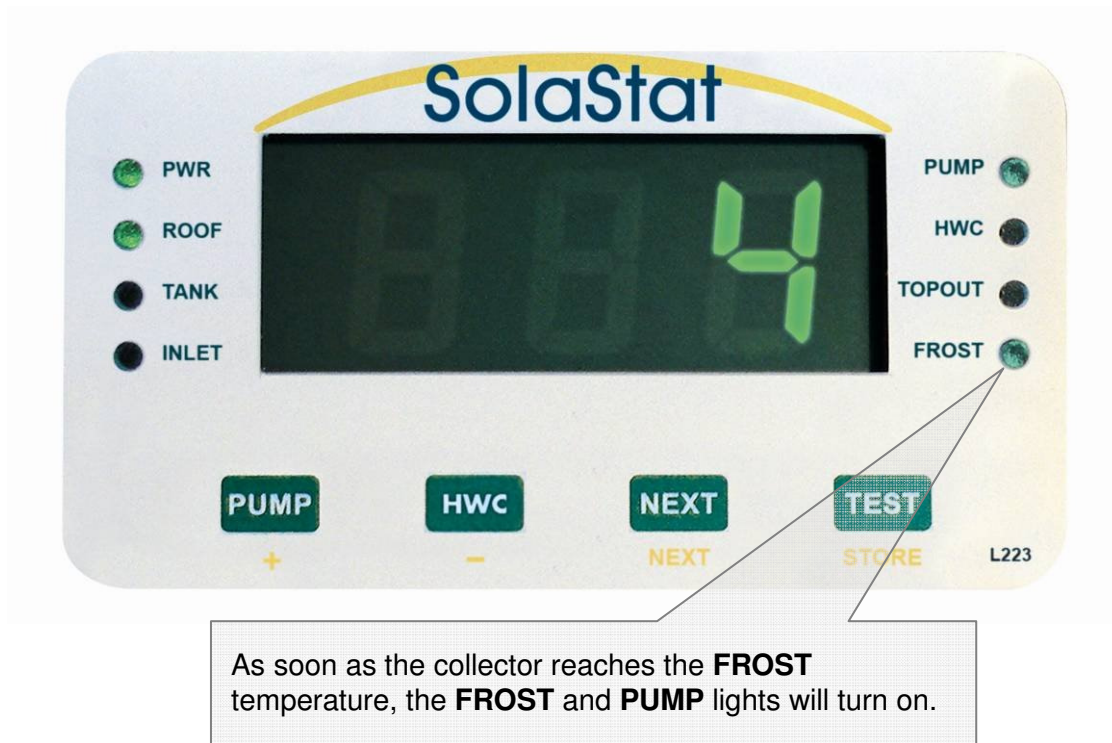
This function is designed to protect your collector and hot water system from freezing and bursting.

When the **FROST** temperature is reached, the pump will come on just enough to raise the temperature of water by 2-3°C/4-6°F.

Only a small amount of warm water is needed to protect the collector and plumbing.

When the unit is in Frost Mode, the **FROST** and **PUMP** lights will come on.

CAUTION: Do not turn the power off when the **FROST** light is on.



TROUBLE SHOOTING GUIDE

Symptom	Cause	Solution
No operation, no display and no lights.	<ul style="list-style-type: none"> No power/fault. 	<ul style="list-style-type: none"> Check mains outlet. Check fuses.
POWER light ON but no display or corrupted display.	<ul style="list-style-type: none"> Power brown out (mains power not running at full voltage). Unit faulty. 	<ul style="list-style-type: none"> Switch off power while mains power is in brown out condition. Switch off power for 10 minutes, switch on power and see if unit is operating. If not, unit needs repair. Contact installer.
Display on, pump not running, but sunny outside. Pump light ON.	<ul style="list-style-type: none"> Pump damaged or disconnected. Pump timer has turned pump off. 	<ul style="list-style-type: none"> See if the pump has become unplugged. Wait one minute for the pump to restart.
Pump is running continuously.	<ul style="list-style-type: none"> Pump is cavitating. Special installation. Setting is incorrect. Airlock in pipe. 	<ul style="list-style-type: none"> If pump sounds like stones are passing through it, the pump may be cavitating. Contact your installer or maintenance technician. Long pump running times may be normal for a special installation. Contact your installer or maintenance technician.
Hot water drops significantly at night, yet little or no draw off be user.	<ul style="list-style-type: none"> System is reverse thermo-siphoning. System is in a high frost area. Tank is losing heat. 	<ul style="list-style-type: none"> The non-return valve is not fitted correctly or is malfunctioning. Discuss non-frost sensitive options with your energy provider. Install better insulation on the hot water tank.
HWC light never comes on.	<ul style="list-style-type: none"> Collectors are heating tank to greater than adjustable values. 	<ul style="list-style-type: none"> Normal operation.
HWC light flashing.	<ul style="list-style-type: none"> HWC Reheat Upper adjustable value has not been reached. Tank Thermostat incorrectly set 	<ul style="list-style-type: none"> Wait for the tank to heat up to Reheat Upper temperature. Contact your installer or maintenance technician.
'Lo' on display.	<ul style="list-style-type: none"> Sensor below -20 °C/-4 °F. 	<ul style="list-style-type: none"> Check outside temperature.
'Hi' on display.	<ul style="list-style-type: none"> Sensor above 139 °C/284 °F. 	<ul style="list-style-type: none"> Check collector has water in it.
'SSd' on display.	<ul style="list-style-type: none"> System is in 'Smart Shutdown' Mode. 	<ul style="list-style-type: none"> Contact your installer or maintenance technician if the display shows 'SSd' for more than 12 hours.

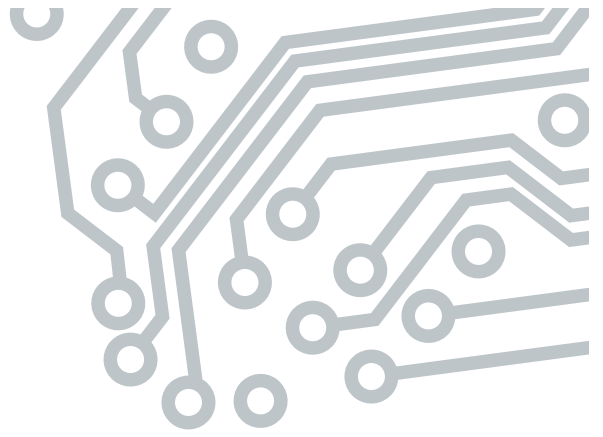
Note: When power is removed, the internal timer will keep running for at least 7 days.

PROGRAMMING TABLE

Your installer may enter special programming information for your controller in the table below. Settings can be changed by a qualified installer or maintenance technician.

Programming Table for Adjustable Values					
Adjustable Values	Function	Light indication	Pre-Set Value	Range	Installation Values
Pump Off	The temperature difference between the Roof and the Tank that will turn the pump off.	PUMP Flash	6°C 11°F	1-20°C 2-36°F	___ °C ___ °F
Pump On	The temperature difference between the Roof and the Tank that will turn the pump on.	PUMP On	12°C 22°F	2-21°C 4-38°F	___ °C ___ °F
Holdoff Timer	How long the timer will override the element coming on (as long as the tank temperature is above Reheat Lower).	HWC on	4 hours	1-23 hours >23 hours = OFF <1 hour = thr	___ hours
Reheat Lower	The tank temperature at which the heating element will automatically start to reheat the water in your cylinder.	HWC slow flash	40°C 104°F	1-70°C 34-158°F <1°C = OFF Set Holdoff Timer to thr = OFF	___ °C ___ °F
Reheat Upper	The temperature (in the tank) at which the heating element will automatically stop reheating the water in your cylinder.	HWC fast flash	55°C 131°F	2-90°C 36-194°F Set Holdoff Timer to off = OFF	___ °C ___ °F
BioSafe	BioSafe target temperature.	No lights (except PWR)	60°C 140°F	50-70°C 122-158°F <50°C = OFF	___ °C ___ °F
Topout	Maximum allowable tank temperature before the pump is de-activated to protect system from overheating.	TOPOUT on	80°C 176°F	1-120°C 34-248°F <1°C = OFF	___ °C ___ °F
Frost	Minimum allowable panel temperature before the pump is activated to protect system from freezing damage.	FROST on	4°C 39°F	1-10°C 34-50°F >10°C = OFF	___ °C ___ °F

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