V7-SV
Instruction Manual

DESCRIPTION

The V7-SV is a controller for heating of a swimming pool with a solar collector and a heat pump or gas heater. The AUX. PUMP socket is controlled for heating purposes and the SOLAR PUMP is unused (boost pump may be used). A 3-way automatic valve actuator is used to bypass or select the solar collector. An interlock cable controls the heat-pump or gas heater.

INSTALLATION INSTRUCTION

CONTROLLER MOUNTING

Find a suitable location to mount the control box. Ideally as with all pool equipment it should be installed out of direct weather and no closer than 3 meters from the water's edge and a minimum 600mm of the ground. Lift up the two mounting tabs and use two appropriate screws to mount the control box to the wall, keeping in mind that the power cable is 1.8m long and should be plugged directly into a general power outlet, not into an extension lead.

Mount the pump and sanitiser according to the manufacturer's instructions.

PUMP CONNECTION

The pool circulating pump plugs into the 240V socket labelled AUX. PUMP.

If required a solar boost pump may be used in the SOLAR PUMP socket.

The maximum combined load for both sockets is 9.98 AMPS at 2395W.

HEATER CONTROL

Set the heaters temperature limit to maximum (40°C) as control of the heater will be to interrupt the heaters internal control to turn off heating. The heater interlock cable connects to the green socket marked RELAY1 which switches on (closes) the voltage free NO/C relay contacts when the heater is to be turned on. The heater end of the heater interlock cable connects in place of the heater's loop wire (fireman's switch), remove the loop wire and connect the heater interlock cable in its place, contact the manufacturer of the heater for help on locating the heaters loop cable or flow/pressure switch or in some cases. The supplied RELAY1 cable comes with crimps to suit most heaters. The heater interlock is for low-voltage switching only, if the heater's flow or pressure switch circuit is 240Vac then an external relay is to be connected (KIT02) by a licensed electrician.

VALVE CONNECTION

A valve is used for selecting or bypassing the solar collector. Connect the valve to the green socket marked VALVE. If wiring your own supplied valve then wire as per the label on the bottom of the controller (Red, Black then White) red and white are for direction control and black is the common. Ensure the switch on the valve actuator is in the ON position. Refer the valve instructions for mounting requirements, cam adjustments etc.

Maximum power for the VALVE output is 24VA.

POOL SENSOR

The pool sensor must be fitted into the heating circuit, as close to the pool as practical, preferably in a position out of direct sunlight. It is recommended that a 14.5mm hole be drilled in the side of the PVC pipe (not the top of the pipe where water will collect), this can be carried out using a Dontek PD01 grinding drill or a small pilot hole can be drilled with a 14.0mm drill-bit used spinning in a counter clockwise direction to minimize the chance of shattering pipe. Insert the grommet into the pipe and gently push in the sensor barb. Ideally ~30cm of the cable from the sensor should be tied to the shaded side of the pipe to prevent extreme ambient conditions leeching into the sensor via the copper in the cable. The blue sensor plug is to be fitted to the plug socket marked COLD.

ROOF SENSOR

The roof sensor must be fitted into a small piece of rubber collector material away from the main collector but on the same aspect, preferably no more than 50cm from the roof gutter (for ease of sensor replacement). If required the roof sensor can be on a different roof as the solar collector as long as the alignment to the sun is similar to the solar collector. The red sensor plug is to be fitted to the plug socket marked ROOF.

SENSOR NOTES: All excess cable must be removed; coils of cable are not permitted under any circumstances and **must not** be tied to 240V wiring. If the cable is to be extended with non-genuine cable a size of 14/020 should be used. **Any cable joins should be soldered**. Heat shrink is to be used over soldered joints to eliminate moisture ingress. If the cable end is to be refitted to the plug sockets then the polarity must be observed as incorrect polarity will show an error as stated in Fault Diagnosis. The sensor cable with the red wire (or white) is the positive and should be fitted to the right hand cable entry when the screws are in a vertical position. Once cables have been correctly fitted the unit can be turned on.

RECOMMENDED PLUMBING

See Diagram under INSTALLER SETUP

OPERATING INSTRUCTIONS

LCD SCREEN

In automatic mode the LCD screen displays the pool and roof temperatures, heating timer settings, heater temperature limit and on/off/locked-out status, solar temperature limit, on/off/locked-out status and the time of day & date (clock). In manual backwash mode the controller displays the pump status and in manual heating mode the controller displays the temperature and set temperature.

LED INDICATORS

AUX. ON – 240V socket labelled AUX. PUMP is ON.
PUMP ON – 240V socket labelled PUMP is ON and solar is selected for the valve direction.

ENTER/MANUAL BUTTON

The controller always starts in automatic mode of operation. When this button is pressed the following is shown on the LCD screen;
FOR MANUAL MODE
PRESS ENTER NOW
The above message is displayed for ~3 seconds, simply wait and the controller will return to automatic operation. Any delays active will be cancelled by this action.
If the ENTER/MANUAL button is pressed for a second time within a 3 second period, the display will indicate you have entered manual heating mode;

MANUAL MODE 4HR
23.5° SET=37.0°
The pump will be turned on and the heater will run according to the temperature limit, timeout is set to 4 hours before it returns to automatic mode. Press the ↑ or ↓ buttons to adjust the temperature limit. Press the ENTER/MANUAL button to return to automatic mode. Solar heating is disabled in this mode.

↑ AND ↓ BUTTONS (CONTROLLER SETTINGS)

To change controller settings enter the SETTINGS MENU by pressing the ↑ or ↓ buttons.
The following will be displayed;

SETTINGS MENU
1) TEMPERATURES

The menu system can be navigated using the ↑ or ↓ buttons, all selectable and changeable values will flash on the LCD screen. Press the ENTER/MANUAL button to accept the currently displayed (flashing) item.
All menu items are shown below;
SETTINGS MENU
1) TEMPERATURES
2) AUX. HEATER
3) SOLAR MODE
4) SYSTEM SETUP
5) SAVE & EXIT

1] TEMPERATURES

When the temperatures menu is selected the following is displayed;

SET TEMPERATURE;

SOL. LIMIT xx.x°

Adjusting the temperature limit will allow the controller to heat pool until the temperature limit $+\frac{1}{2}$°C is achieved, heating will then remain off until the sample wait period expires, if no sample wait period is active the heating will remain off until the pool temperature drops $\frac{1}{2}$°C below the temperature limit setting, due to rounding the actually heating hysteresis is $\pm\frac{1}{2}$°C.

The ability to solar heat the pool will depend on weather conditions.

** The factory default for SOL. LIMIT is 30°C

If the AUX. HEATER is turned on then the following temperature setting is also displayed;

SET TEMPERATURE;

AUX. LIMIT xx.x°

A separate temperature limit can be set for auxiliary heating; the auxiliary temperature limit should be set for the minimum comfort level to obtain higher efficiency of the solar heating. You will not be able to set a higher temperature then SOL. LIMIT for this reason. When the roof temperature probe exceeds the AUX. LIMIT + 15°C then there is enough solar energy to heat the pool and auxiliary heating is switched off to save energy, the auxiliary heater remains switched off until the roof temperature drops below AUX. LIMIT + 10 °C.

 ** Factory default for AUX. LIMIT is 27°C

2] AUX. HEATER

When the AUX. HEATER selected the following is displayed;

No. OF TIMES PER

DAY TO RUN: x

Select the number of times per day you wish the heater to operate. If OFF is selected then the heater will never operate, otherwise the following is displayed;

One time per day menu:

AUX. CYCLE

xx:xx TO xx:xx

Twice per day AUX CYCLE 1 menu:

AUX. CYCLE 1

xx:xx TO xx:xx

Twice per day AUX CYCLE 2 menu:

AUX. CYCLE 2

xx:xx TO xx:xx

Adjust the start time and end time for the required heating cycle(s), the circulation pump and heater will run between these times for heating purposes. Note: For 24 hour heating set to run 1 time per day with the start & end times the same (E.g. 12:00 – 12:00).

**Factory default for AUX HEATER is ON from 06:00 to 22:00

3) SOLAR MODE

When the solar mode menu is selected the following is displayed;

SET SOLAR MODE

SUMMER   WINTER/AWAY TROPICAL

SUMMER MODE is the normal operation of heating the swimming pool.

TROPICAL MODE is selected if you wish to cool an overheated swimming pool, if the pool temperature is equal to or above the solar limit temperature limit by 1.5°C then tropical mode is activated. The solar pump will run if the roof temperature is colder than the pool until SOL LIMIT is obtained; note that this is most likely to occur at night. Note that tropical mode may be activated by the anti-boil function.

WINTER/AWAY MODE, when selected you will be prompted to select the start month of winter and the start month of summer. Winter/Away Mode assists in the systems off-season maintenance and save energy as solar gain may be available but swimming temperature cannot be achieved or solar heating is not desired. A 3 minute flush of the solar collector occurs between the solar start time and the end time, providing the roof temperature is equal or greater than the pool, but if that condition does not occur before 1pm (13:00) then a solar system flush will be forced to occur. Selecting winter mode does not turn off auxiliary heating. A start month of 'always' can be selected which permanently sets the unit into winter mode, you can also start winter mode in August and finish in March if required (i.e. for Northern Hemisphere).

**The factory default for SOLAR MODE is SUMMER MODE

4) SYSTEM SETUP

When the system setup menu is selected 6 options are available;

SET CLOCK, INSTALLER SETUP, FACTORY DEFAULTS, TEST FUNCTION, TEMPERATURE LOGS and EXIT.

The following sub menus are displayed dependent on your selection;

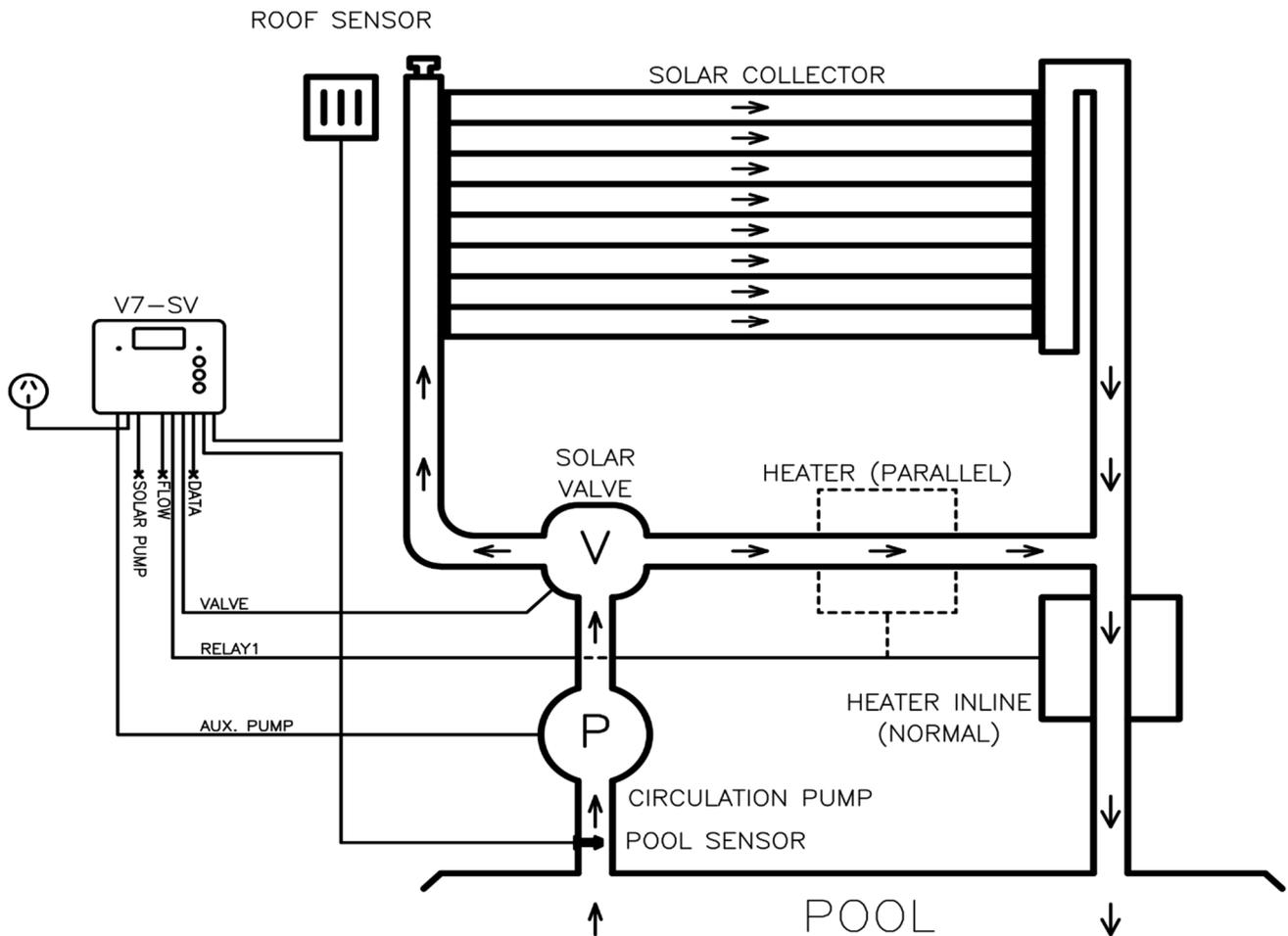SET CLOCK – Allows you to adjust calendar date and time of day.

EXIT - Will return you to 4) SYSTEM SETUP with no changes.

TEMPERATURE LOGS – Logs min/max temperatures & time of occurrence, also displays run times for pumps and heater, NO support is offered for this feature.

TEST FUNCTION – Turns on the internal relays in sequence then turns all relays off.

FACTORY DEFAULTS – Restores ALL the settings to the factory default state.

INSTALLER SETUP

INSTALLER SETUP - This sub-menu is for installer's ONLY;

USE SOLAR DRAIN? NO/YES

If NO is selected then the valve will close if solar heating is no longer required. If YES is selected the follow menu is presented;

DRAIN IS TO STOP

PUMP FOR xx MINS

[RANGE = 03-15 MINUTES]

The controller stops all pumps for the selected number of minutes, the valve is left in the solar collector position for the first minute (even) then the valve is turned to bypass the solar collector for the second minute (odd) this repeats for the selected duration for odd and even numbered minutes elapsed. This allows for the water to drain out of the solar collectors before the pool pump is restarted. If the pool is not at solar limit during the drain process and solar heating becomes available the system will resume heating. The system may delay the drain process if the pool is below limit and if the roof temperature is above the pool temperature.

ALLOW SOLAR FROM

xx:xx TO xx:xx

[RANGES = 06:00-12:00 AND 12:00-21:00]

This setting will not allow the solar system to run outside of the times set. (Select 12:00-12:00 to always allow solar.)

USE LIVE SENSOR? NO/YES

You have the option to select a 'LIVE' sensor, select YES for a commercial system where the pool sensor is in constant water flow, selecting NO [recommended] will turn on the sampling feature where the controller assumes that pipe temperature is not always pool temperature.

SAMPLE TIME: [NOT SHOWN IF 'LIVE SENSOR' WAS SELECTED ABOVE]

xx:xx (hh:mm)

[RANGE = 0:15-8:45]

If the temperature limit is achieved the controller will turn off the pump and begin a sample wait period before further heating can occur. After the sample time period has expired the pump will run for 3 minutes to sample the water temperature and if after the 3 minute sample heating is

required then the pump will continue to run and the heating (solar or auxiliary) is switched on.

SAMPLING NOTES

1. The sample wait may be cancelled if solar gain becomes available and the pool is below the solar limit setting.
2. If AUX. HEATER is set to OFF then sample time for solar is 3 hours.
3. Sampling is only activated outside of filtration times.

When the sample time has been selected the following menu is displayed;

HEATER COOL DOWN
xx   MINUTE(S)
[RANGE = OFF-20 MINUTES]
Once the heater achieves temperature or if the heating time period ends then the heater is switched off, the cool down timer ensures that the circulation pump continues to operate to cool the heater before the pump switches off.

If the 'use solar valve' option is selected then a reduced cool-down (one minute) is used before a valve turn (a full cool-down will still occur before the circulation pump is switched off).

HEATER CONFIG
INLINE WITH SOLAR/PARALLEL WITH SOL
Heater configuration tells the controller where the heater is located in the return water path (see diagram under PLUMBING CONFIG). The normal path is for the solar to return through the heater back into the pool, this is called INLINE WITH SOLAR, if water from the solar collectors returns to the pool without going through the heater then select PARALLEL WITH SOLAR, note that this will also change how the controller operates; the heater will not operate with solar. The recommended setup for the heater is in the return line after the solar collector 'T' junction.

ROOF TEMPERATURE
START DIFF x.x°
[RANGE = 4.0°-40.0°C]

ROOF TEMPERATURE
STOP DIFF   x.x°
[RANGE = 1.0°-(START -2°C)]

ROOF TEMPERATURE
MIN. ROOF xx.x°
[RANGE = OFF, 10.0°C-60.0°C]
You can choose to modify the differentials, the start differential is the temperature the roof needs to rise above the pool temperature to start the

pump; the end differential stops the pump when the roof drops below the pool temperature plus the end differential. Minimum Roof temperature is minimum temperature for the roof sensor for the system to start (Off = feature disabled).

FREEZE PROTECT? OFF/ON
(RANGE 1.0°C-6.0°C)
An adjustable anti-freeze feature is provided for freeze protection, when the roof temperature drops to the anti-freeze temperature the pumps are run for 3 minutes followed by a 30 minute rest period, this will continue until the roof temperature rises above the anti-freeze set point.

BOIL PROTECT? OFF/ON
[RANGE = 55.0-99.0°C]

ANTI BOIL RUNS PUMP FOR xx
[RANGE = 03-59 MINS]
An adjustable anti-boil feature is provided to prevent overheating of plastics on encapsulated collector panels. When the roof temperature rises above the anti-boil set point the pumps are run for an adjustable period followed by the sample wait period, note that a pool temperature of 38°C or higher will prevent anti-boil from starting and that it will force tropical mode of operation this usually indicates a fault, i.e. pump not priming, rectify the fault and re-select summer mode.

**Factory default for installer setup is series retro-fit, no valve used, no solar drain, solar locked to filtration, no live sensor used, Sample time of 1 hour, 3 minute heater cool-down, Heater in-line with solar, Start Differential of 8°C End differential of 4°C, Minimum Roof of 20°C, Freeze protect is OFF, Boil protect is OFF.

CALIBRATE POOL SENSOR BY: x.x
[RANGE -5.0 TO +5.0°C]
This is for the + series sensor only (TS02P), the TS02SC is internally calibrated and therefore the calibrate value will be ignored.

5) SAVE & EXIT

When this menu is selected, push the ENTER/MANUAL button to save ALL settings, the controller will then return to automatic operation.
NOTE: If any of the menu items are left unattended for 3 minutes the menu will time out and automatically save all settings and return to automatic operation.

NOTES:

1. If a sensor fault is detected the controller will display which sensor and what the fault is.
2. Should power be interrupted for any reason, the controller will resume normal operation when power is restored, all information will have been kept.
3. The sensor cable with the red trace is the positive and is usually fitted to the right hand side of the plug when looking at the plug screws, incorrect polarity may be displayed as a short circuit or reversed fault.
4. If the controller has stopped pumping and is displaying a higher temperature than expected it may be caused by a pump which is failing to prime, check the pump and if necessary prime the pump as per the pump manufacturers' instructions then reset the controller by turning it off/on.
5. Maximum combined rated output load for the 240V socket(s) is 9.98 Amps / 2395 Watts.
6. Degree of protection against moisture: IP23.

WARRANTY - V7 SV

This range of product is covered by a limited 3 year warranty against component failure or faulty workmanship from the date of installation. Faulty units should be returned in the first instance to the dealer from which the unit was purchased. Damage to the unit due to misuse, power surges, lightning strikes or installation that is not in accordance with the manufacturer's instruction may void the warranty. Valves and actuators are covered by a twelve month warranty at the discretion of their manufacturer.

Warranty does not cover travel costs to or from installation site.

If the power cord is damaged, do not use the controller; return the unit to the supplier for repair.

CUSTOMER RECORD [To be retained by the customer]

DEALER/INSTALLER NAME

SERIAL NUMBER

DATE INSTALLED

For service assistance phone 1300 130 693

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