

**DESCRIPTION:**

The V7-RTA is a controller for heating of a swimming pool with a solar collector and a heat pump or gas heater. Two pumps are controlled and the solar pump can be locked to the circulation pump if required for retrofit/integrated plumbing. A valve drive can be optioned in and is used instead of a solar pump on retrofit/integrated systems or it can be used to block thermal syphoning by using a 3-way valve. If the heating system is independent of the filtration then a 3-way valve is required to bypass or send water to the solar collector before returning to the heat-pump or gas heater.

**INSTALLATION INSTRUCTIONS:****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.

**TEMPERATURE SENSORS:**

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 POOL.

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. For encapsulated collector panels use the manufacturer's instructions for roof sensor placement. 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 or near 240V wiring. If the cable is to be extended with non genuine cable a size of 14/020 should be used. **Any cable joins must be soldered and this includes where the cable enters the terminal block at the case base.** 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 as a short circuit fault on the LCD screen. The sensor cable with the thin white trace (or red wire) 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. Do not allow any joins in the cable to be underground.

**PUMP CONNECTIONS:**

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

The solar collector pump plugs into the 240V socket labelled SOLAR PUMP.

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:** (Optional, add V to the part number (RTAV), Actuator and Valve to be ordered separately.)

A valve can be used for selecting or bypassing the solar collector when heating with an auxiliary heater in the independent plumbing configuration. The valve can also be used for selecting or bypassing the solar collector instead of using a solar pump in the retro-fit plumbing configuration or can be used in conjunction with a solar pump to prevent thermal syphoning. 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.

**OPERATING INSTRUCTIONS:**

The controller always starts in automatic mode of operation. To change settings enter the SETTINGS MENU by pushing either the *Up* or *Down* SETTINGS buttons and the following will be displayed;

SETTINGS MENU

1) MAN/BACKWASH

The menu system can be navigated using the *Up* & *Down* SETTINGS buttons, all selectable and changeable values will flash on the LCD screen. Use the *ENTER/MANUAL* button to accept the currently displayed (flashing) item.

All menu items are shown below;

SETTINGS MENU

1) MAN/BACKWASH

2) FILTER TIMER

3) TEMPERATURES

4) AUX. HEATER

5) SOLAR MODE

6) SYSTEM SETUP

7) SAVE & EXIT

**1) MAN/BACKWASH**

ON 4H

ENTER = NEXT/END

This menu is manual control of the circulating pump (filtration), whenever you enter this menu the circulating pump will toggle between on/off and all heating is turned off. You can adjust the period that manual filtration runs for, after the required time the controller reverts to automatic operation. When you scroll through the 24 hour period the pump will toggle between on/off. Pressing the ENTER/MANUAL button will return you to the SETTINGS MENU.

**2) FILTER TIMER**

When the FILTER TIMER is selected the following is displayed;

No. OF TIMES PER

DAY TO RUN: x

Select the number of times per day you wish the circulation pump to operate for filtration purposes. If OFF is selected then the pump will only operate for heating purposes, otherwise the following is displayed;

One time per day menu:

FILTER CYCLE FILTER CYCLE

xx:xx TO xx:xx

xx:xx TO xx:xx

Twice per day FILTER CYCLE 1 menu:

FILTER CYCLE 1 FILTER CYCLE 1

xx:xx TO xx:xx

xx:xx TO xx:xx

Twice per day FILTER CYCLE 2 menu:

FILTER CYCLE 2 FILTER CYCLE 2

xx:xx TO xx:xx

xx:xx TO xx:xx

Adjust the start time and end time for the required filter cycle(s), the circulation pump will run between these times for filtration purposes.

*Note1: Take care not to overlap filter cycle 2 times with the filter cycle 1 times as the result will be one cycle per day.*

*Note2: For 24 hour filtration set to run 1 time per day with the start & end times the same (E.g. 12:00 – 12:00).*

*Note3: If the unit is configured as a series retro-fit and solar is not locked to the filter timer then any solar gain will override the filter timer to operate circulating pump for solar heating.*

*Note4: Aux heater requirements will also override the filtration timer to run the circulation pump for auxiliary heating.*

*Note5: In winter mode the 2<sup>nd</sup> filter cycle does not run if it is set to disabled in winter mode.*

*\*\*Factory Default is ON, one time per day from 09:00 to 17:00 (the 2<sup>nd</sup> cycle default is 17:00-21:00)*

**3) 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 +½°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 ½°C below the temperature limit setting, due to rounding the actually heating hysteresis is ±½°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 than 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**

#### 4) 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;

<u>One time per day menu:</u>		<u>Twice per day AUX CYCLE 1 menu:</u>		<u>Twice per day AUX CYCLE 2 menu:</u>	
AUX. CYCLE	AUX. CYCLE	AUX. CYCLE 1	AUX. CYCLE 1	AUX. CYCLE 2	AUX. CYCLE
xx:xx TO xx:xx	xx:xx TO xx:xx	xx:xx TO xx:xx	xx:xx TO xx:xx	xx:xx TO xx:xx	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 OFF (06:00-22:00, 20:00-22:00, sample @ 1 hour, 3 minute cool-down)**

#### 5) SOLAR MODE

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

SET SOLAR MODE	SET SOLAR MODE	SET SOLAR MODE
SUMMER MODE	WINTER/AWAY MODE	TROPICAL MODE

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. Once the winter months have been set an option to disable the 2<sup>nd</sup> filter cycle is displayed, selecting 'NO' will not allow the filter cycle 2 to run during the selected winter months. 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**

#### 6) 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 dependant on your selection;

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

EXIT - Will return you to 6) 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. There is an option to 'use as H7SV' select 'yes' if this configuration is required, this will select series retro-fit plumbing and the pump is to plug into the AUX.

PUMP socket. Adjust heater configuration and cool down as required.

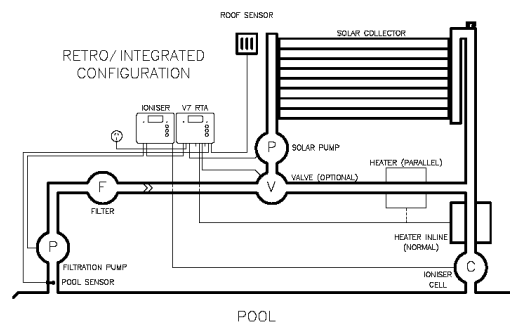
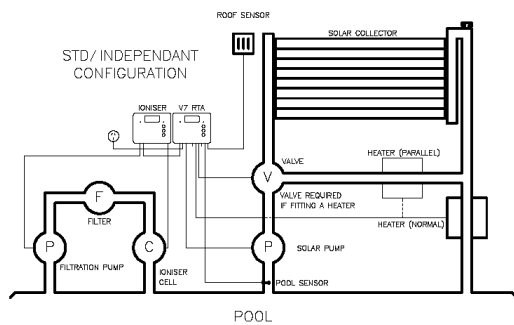
INSTALLER SETUP - This sub-menu is for installer's ONLY;

The following sub menus are available under installer setup;

**PLUMBING CONFIG:  
INDEPENDENT/STD**

Select series retro-fit (integrated) if the solar pump requires feed from the circulating pump, select independent/std if the solar system and heater are plumbed separate from the filtration line. See images below for typical set-ups.

**PLUMBING CONFIG:  
SERIES RETRO-FIT**



**\*\*Warn the customer not to change from series retro-fit as damage may occur\*\***

**USE SOLAR VALVE? NO/YES**

Select YES if a valve is used, this adds the delay that allows the valve to turn before any other action is allowed. For independent plumbing with a heater a valve is a mandatory requirement.

**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.

**LOCK TO FILTER? NO/YES (ONLY SHOWN FOR SERIES RETRO-FIT)**

Selecting NO allows the solar to override the filter timer to run the circulation pump for solar heating during the allowed solar times. Selecting YES will only allow the solar to run while the filter timer is active.

**ALLOW SOLAR FROM (NOT SHOWN IF 'YES' WAS SELECTED ABOVE)**

**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.

*Note1: The sample wait may be cancelled if solar gain becomes available and the pool is below the solar limit setting.*

*Note2: If AUX. HEATER is set to OFF then sample time for solar is 3 hours.*

*Note3: Sampling is only activated outside of filtration times for series retro-fit systems.*

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° (4.0°-40.0°C)

#### ROOF TEMPERATURE

STOP DIFF x.x° (1.0°-(START -2°C))

#### ROOF TEMPERATURE

MIN. ROOF xx.x° (OFF,10.0°-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 is the roof temperature required for the solar to start heating (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.

#### 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.

*\*\*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.*

## 7) 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.

### The *ENTER/MANAL button*.

#### FOR MANUAL MODE

PRESS ENTER NOW

Pressing the *ENTER/MANUAL button* once will display the above message for ~3 seconds, simply wait and the controller will return to normal 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 *UP* or *DOWN* buttons to adjust the temperature limit. Hold the *ENTER/MANUAL* button to return to automatic mode. Solar heating is disabled in this mode.

**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

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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