AQUASMART 5 SV

Instruction Manual





DESCRIPTION

The Aquasmart5-SV is a controller for heating of a swimming pool with a solar collector and a heat pump or gas heater. The PUMP socket is controlled for heating purposes and the SOLAR is unused (However a Solar boost pump may be used via this socket). 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.

See Installer Setup to set the Circulation pump load settings.

INSTALLATION INSTRUCTIONS

THIS APPLIANCE IS NOT INTENDED FOR USE BY YOUNG CHILDREN OR INFIRM PERSONS WITHOUT SUPERVISION. PLEASE ENSURE THAT YOUNG CHILDREN ARE SUPERVISED TO ENSURE THAT THEY DO NOT PLAY WITH THE APPLIANCE.

Ideally, as with all pool equipment, the controller should be installed out of direct weather.

CONTROLLER MOUNTING	 Find a suitable location to mount the control box. The controller should be no closer than 3 metres from the water's edge and a minimum 600mm above ground. The power cable is 1.8m long and should be plugged directly into a general power outlet, not into an extension lead. Fix the mounting bracket to a solid structure with the screw and wall plug kit provided. Slide the controller on, locking it into place. Adjust the screws on the back of unit to ensure a snug fit. To remove unit, lift and gently pull away from structure.
PUMP CONNECTION	The Circulation pump plugs into the 240V socket labelled PUMP. <u>IF</u> a solar booster pump is being used, it will plug into the 240V socket labelled as SOLAR or AUX. The maximum load is 9.98 AMPS at 2395W.
HEATER CONTROL	Set the heaters temperature limit to maximum (40°C). The heaters internal control will be interrupted, to turn off heating. The heater interlock cable connects to the green socket marked INT which switches on (closes) the voltage free NO/C relay contacts when the heater is to be turned on. The heater end of the interlock cable connects in series with the heater's pressure/flow or fireman's switch. Contact the heater manufacturer for the best location to connect to. The heater interlock is for extra low-voltage (MAX 24V at 1Amp) switching only. If the heater's control circuit is 240Vac, an external relay KIT can be purchased separately and is to be connected by a licensed electrician. For Internal connection to pool heater (check with heater manufacturer). Illustration of a typical installation to the heaters pressure or flow switch.
	Pressure or Flow Switch
VALVE	A valve actuator is used to divert water flow to the solar collector in the retro-fit plumbing configuration. Connect the valve actuator 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 an ON position. Refer to the valve actuator instructions for mounting requirements cam adjustments. Maximum power for the VALVE output is 24VAC.

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 pilot hole drilled, then a 14.0mm drill-bit 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.
ROOF SENSOR	The roof sensor must be fitted into a small piece of 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 to 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 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, and the cable end is to be refitted to the plug sockets. Once cables have been correctly fitted the unit can be then turned on.

BASE PLATE



FACE PLATE



PLUMBING CONFIGURATION



OPERATING INSTRUCTIONS

LCD SCREEN	The LCD screen displays the pool and roof temperatures, solar temperature limit, pump on
	status, on/off/locked-out status and the time of day & date (clock).
LCD INDICATORS	There are arrow icons on the LCD screen that point to current mode text on the label.
	Pressing this button changes to the next mode of operation. Once the mode button is no
	longer being pressed then the selected mode of operation is automatically saved.
	 Heating mode (Auto) is the normal operating mode for heating the pool.
	• Standby mode of operation is for off-season/holiday maintenance or if pool heating is
	not required. This is a better option than turning the controller off, as it will flush
	treated pool water through the solar system, and prolong solar pump bearing and
	mechanical seal life. Pump will run for 3 minutes a day before 1pm.
	**Note - Solar and Auxiliary Heating are disabled.
	Night Cool mode is for situations where the pool water overheats beyond the set
	temperature limit due to direct heating from the sun. The controller will start the solar
	pump when the roof temp drops below the pool temp to cool the pool.
	**NOTE - Note for the cooling function to work properly, it is best if the solar run hours have
	been left at the factory default (See Installer Setup). This allows the controller to take the
MODE	best advantage of evening and early morning hours to cool the pool.
BUTTON	• <i>Filter Manual</i> is for switching the filter pump on or off. This mode can be used for a
borron	3min (Backwash), for running the filter pump for up to 24hrs, or for ensuring that the
	filter pump doesn't turn on for system maintenance.
	**NOTE: Once Manual is selected the filter pump will start. Once the pump has started, use
	ENTER butten will taggle the number of decrease the length of time that Filter Manual Mode times
	evit the unit will return to the previous mode, or you can press the Mode button to return to
	normal operating Mode
	Solar Manual is for testing the solar nump installation on a cold or cloudy day. Once
	manual mode is selected the nump will start. After manual mode times-out, unit will
	return to the previous mode.
	 Heat To Limit will ignore the run timer (Heater Cycles) to run the pump until the
	desired temperature limit is achieved. Once the temperature limit is reached the
	controller revert to Heating mode and run the heating during the set run times.
	**The factory default MODE is HEATING MODE
	Adjusting the temperature limit will allow the controller to heat the 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 ½°C
	below the temperature limit setting. Due to rounding the actual heating hysteresis is $\pm \frac{1}{2}$ °C.
	***TEMP RANGE: OFF, 20° – 40° ***
	The ability to solar heat the pool will depend on weather conditions and other factors.
	Pressing the 1 Button will display
1 AND ↓	SOLAB LIMIT
BUTTONS	Select this option and the following will display
(TEMPERATURE	SET TEMPERATURE;
SETTING)	Sol. Livin XXX The julion to cave the temperature, then the following will be displayed
	create and the save the temperature, then the following will be displayed
	SET TEMPERATURE;
	AUX. LIWIT XX.X The factory default for AUX. LIWIT is ON and 27 C.
	Press the ENTER Button to save the temperature settings.
	Pressing the \downarrow button will display
	HEATER LIMIT
	Select this will bypass the setting of the solar limit going straight to AUX. LIMIT.
If the controller is m	nanually put into STANDBY MODE using the Mode button, you will need to reset your AUX
Heating settings to	be ON and set the required temperature when the controller put back into HEATING MODE.
This does not apply when using Auto Standby Mode.	

ENTER BUTTON

Pressing the ENTER button will turn on the LCD backlight. Pressing the ENTER button while the backlight is lit will enter the SETTINGS MENU. The following will be displayed:

1) EXIT, the menu system can be navigated using the \uparrow or \downarrow buttons. All selectable and changeable values will flash on the LCD screen. Press the ENTER button to accept the currently displayed (flashing) item.

All menu items are shown below:

1) EXIT

2) HEATER TIMERS

3) SYSTEM

1) EXIT	Will save changes and return to automatic operation.
	HEATER RUN TIMES – When the HEATER RUN TIMES is selected the following is displayed: No. OF TIMES PER
	Select the number of times per day you wish the AUX Heating to operate. If OFF is selected then the pump will only operate for Solar Heating purposes, otherwise the following is displayed:
	HEATER CYCLE 1 menu:
	HEATER CYCLE xx:xx TO xx:xx
	Twice per day HEATER CYCLE 2 menu:
2) HEATER	HEATER CYCLE 1HEATER CYCLE 2xx:xx TO xx:xxxx:xx TO xx:xx
TIMERS	Adjust the start time and end time for the required heater cycle(s). The circulation pump will run between these times for AUX heating purposes.
	**Factory Default is ON, ONE TIME PER DAY FROM 06:00 to 22:00.
	Note 1 : Take care not to overlap heater cycle 2 times with the heater cycle 1 times as the result will be one cycle per day.
	<u>Note 2</u> : For 24hr heating, set the heating to run 1 time per day with the start & end times the same (E.g. $12:00 - 12:00$).
	Note 3: If the unit is configured to run the heater parallel to the solar, the controller will not run the heater in conjunction with the solar collectors. It will only run them individually.
	<u>Note 4:</u> When the roof temp probe exceeds the AUX LIMIT + 15°C, there is enough solar energy to heat the pool. The auxiliary heating is switched off to save energy. The auxiliary heater remains switched off until the roof temperature drops below AUX LIMIT + 10°C. It won't matter if the controller has been configured to run the heater parallel or in-line with the solar for this to occur.
3) SYSTEM	EXIT - Press ENTER on this menu to return to automatic operation.
	SET CLOCK – Allows you to adjust calendar date and time of day.
	<i>LCD BACKLIGHT</i> – Adjust the number of seconds the backlight remains on after the time a button was pressed. (Select NONE for always on.)

INSTALLER SETUP;

TO ACCESS MENU PRESS ENTER AND SCROLL DOWN TO SYSTEM AND PRESS THE MODE BUTTON. WARNING PROFESSIONAL ONLY SETTINGS!!

FACTORY DEFAULT? NO/YES	Restore back to factory defaults.
USE AUTO STANDBY? YES/NO	 When selected you will be prompted to select the start month of Standby and the start month of Heating. Standby Mode assists in the solar systems off-season maintenance and saves energy as solar gain may be available but swimming temperature cannot be achieved, or solar heating is not desired. A 3min flush of the solar collector occurs between the solar start time and the end time, providing the roof temperature is equal to or greater than the pool, but if that condition does not occur before 1pm (13:00) a solar system flush will be forced to occur. A start month of 'always' can be selected which permanently sets the unit into Standby mode. <u>Note</u>: In Auto Standby mode the 2nd filter cycle does not run or the Single Filter Cycle is be and the solar cycle and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single Filter Cycle is be and the solar cycle does not run or the single filter cycle does not run or the single filter cycle does not run or the sol
LISE SOLAR DRAIN?	If NO is selected then the solar nump will stop if solar heating is no longer required
NO/YES	If YES is selected the following menu is presented;
DRAIN IS TO STOP PUMP FOR?	 PUMP FOR xx MINS (RANGE = 03-15 MINUTES) The controller stops all pumps for the selected number of minutes. 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 can option to select a 'LIVE' sensor. Select YES for a commercial system where the pool sensor is in constant water flow. If you select NO (recommended) to enable the sampling feature. The controller assumes that pipe temp is not always pool temp.
USE A HEATER? YES/NO	Selecting NO will disable the AUX heating function, and Heater Run Times will not be displayed or selectable under 2. TIMERS. When YES is Selected, the following menu is presented:
SAMPLE TIME:	 xx:xx (hh:mm) The pump stops for the selected time period once the temperature limit 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 actual heating hysteresis is ±½°C.
HEATER TYPE?	GAS HEATER / ELECTRIC HEATER This setting lets you to select the type of Auxiliary Heater used. Electric heaters/ Heat pumps require no cool down. If GAS HEATER is selected the following will be displayed:

HEATER COOL DOWN?	OFF 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, a reduced cool-down (1 min) is used before a valve turn (a full cool-down still occurs before the circulation pump is switched off).
	INLINE WITH SOLAR/PARALLEL WITH SOL
HEATER CONFIG?	Heater configuration tells the controller where the heater is located in the return water path (see diagram on pg4). The normal path is for the solar to return through the heater back into the pool (heater is located in the return line after the solar collector 'T' junction). This is called INLINE WITH SOLAR.
	If water from the solar collectors returns to the pool without going through the heater, select PARALLEL WITH SOLAR.
	Note: The heater will not operate in conjunction with solar when the configuration is set to Parallel.
	ROOF TEMPERATURE START DIFF x.x° (4.0°-40.0°C)
	ROOF TEMPERATURE STOP DIFF x.x° (1.0°-(START -2°C))
ROOF	ROOF TEMPERATURE MIN. ROOF xx.x° (OFF,10.0°-60.0°C)
TEMPERATURE?	You can modify the differentials. The Start differential is the temperature the roof needs to rise above the pool to start the pump.
	The Stop differential stops the pump when the roof drops below the pool temp plus the stop differential.
	Minimum roof is the roof temperature required for the solar to start heating (Off = feature disabled).
	Ensure that the filtration pump is plugged into the outlet labelled as PUMP and the Sanitiser is plugged into the SANITISER power outlet of the controller.
	The controller will ask you if you would like the current detection to be ON or OFF. Use the \uparrow or \downarrow buttons to select the required option and press the Enter button.
	If OFF is selected the unit will operate as a standalone solar controller and the PUMP socket will be powered constantly .
	Note: The valve actuator may open in this instance (due to there being solar gain) even if no water is flowing through the system (ie out of heating time).
	If ON is selected then the filtration pump will start.
PRIME PROTECT? YES/NO	Ensure the filtration pump is operating (and at the required speed for variable speed pumps) via the controller's PUMP socket and is primed, then use the \uparrow or \checkmark buttons to
-, -	select either SET AUTO or SET MAN and press the Enter button.
	If you select SET AUTO - the unit will display the pump's load value for 5 seconds then automatically sets the threshold levels and returns to automatic operation. If the current draw of the filtration pump drops below the selected threshold levels then the solar pump is forced to switch off.
	If you select SET MAN the unit will display the pump's load value for 5 seconds, take note of this value. When the LCD screen displays RUN=>xxx it indicates the minimum load required to allow solar to run, set this value 15% lower than displayed LOAD value.
	Note – SET MAN is usually the best option when setting the pump load settings for a variable speed pump as the load value can fluctuate more.

FREEZE PROTECT? NO/YES (RANGE 1.0°C-6.0°C)	Anti-freeze function, when switched to ON will start the pump when the roof temperature drops to the selected temperature. It will operate for 3 minutes every 30 minutes until the roof temperature rises above the selected temperature. Default setting is NO.
BOIL PROTECT? NO/YES (Range 55°C - 99°C) (Range 3 - 59mins)	Anti-boil function. If you select NO, the next option will be offered. If you select YES, the pump will start when the roof temperature rises to the selected temperature. It will operate for the selected number of minutes, where the controller will then take a roof temperature reading and either start the solar pump again (if roof temp is still above selected temperature) or stop running the pump if the temperature has dropped below the selected temperature. Default is NO. If you select Boil Protect to be YES, the controller will display 99°C for 3mins. Adjust to required temperature and time.
PIPE PROTECTION? NO/YES Range 50°C - 95°C	For use when solar collectors are flooded, flat and may require a wetted roof sensor for this mode. The controller will allow the pool to heat to the selected pool temperature, where it will then force the controller to stop any further solar heating of the system by not allowing the solar pump to run once the roof temperature reads above the selected Pipe Protection setting. The solar pump will be allowed to run once the roof temp drops below the selected Pipe Protection temperature. <i>Default is NO. If you select Pipe Protect to be YES, the controller will display 80°C.</i> <i>Adjust to required temperature.</i> <i>Note – Pipe Protection will not be offered if Boil Protection has been turned ON.</i>
CALIBRATE POOL SENSOR BY:	X.X (RANGE -5.0 TO +5.0°C) This is for the + series sensor only (TS02P).
NOTES:	 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. If a sensor fault is detected, the controller displays which sensor and what the fault is. Should power be interrupted for any reason, the controller will resume normal operation when power is restored. All information will have been kept for up to 10 days. If the controller has stopped the pump 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. MAX combined rated output load for the 240V socket(s) is 9.98 Amps / 2395 Watts. Degree of protection against moisture: IP33. Store pool chemicals safely, at least 3 metres away from all pool equipment.

TROUBLE SHOOTING

NO POWER TO THE DISPLAY:

Power point is faulty. Test power point with a known working appliance. If the power point is operational, check the controller in another power point and if there is still no display then send the controller for repair.

RTC-FAIL – This can occur if the unit has been turned off for a prolonged period of time, leave the unit on for ~30 seconds, then turn it off for ~30 seconds before turning it back on.

PIPE/ROOF SENSOR FAULTS:

The following are error messages caused by pool or roof sensor faults;

SENSOR DISCONNECTED OR OPEN CIRCUIT

Sensor cable unplugged from controller, cable damaged, bad cable join or sensor is damaged.

SENSOR SHORT CIRCUIT OR REVERSED

Sensor cable or cable join polarity is incorrect, or sensor is damaged. The positive side of the cable (grey coloured wire) should be wired to the righthand side of the plug, with the screws facing towards you and the sensor cable entry at the bottom of the plug. If the cable has been joined ensure no polarity reversal occurs.

ISOLATING SENSOR FAULTS:

Swap the sensor locations. Put the pipe sensor in the roof socket and the roof sensor in the pipe socket.

If the fault moves from pipe to roof or vice versa then it is likely that there is a sensor fault.

If the fault remains the same then the controller may need to be repaired.

PUMP FAULTS:

Ensure the controller has working sensors; otherwise the pump will not operate.

CIRCULATION PUMP WILL NOT START:

Ensure that the Circulation pump is plugged into the Aquasmart5 SV PUMP power socket properly.

Check the AUX Heating and Solar Heating times set in the Aquasmart5 SV controller, adjust if required.

If it still won't start plug the filtration pump straight into a power point and turn on. IF the pump doesn't start then you have an issue with your pump. If the pump is ok, your controller requires repair.

PUMP WILL NOT STOP:

Turn off power to the controller and ensure the pump stops. If the pump continues to operate then unplug it from the power point and connect it to the 240Vac socket marked PUMP at the bottom of the controller.

If the pump is plugged into the controller and won't stop, check to see what is displayed on the controller screen. The controller may be running for heating purposes.

If the pump is still running, and the controller states that nothing should be running, your controller requires repair.

TROUBLE SHOOTING CONTINUED

POOL NOT HEATING:

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.

Check the controller LCD screen to see if any sensor faults are present and fix as required.

Check to see if the error message "Circulation Pump Failed to Prime" appears. If so either reset the Pump Load Settings (refer to Prime Protection settings in the Installer Setup menu), or disable the Prime Protection feature (refer to Prime Protection settings in the Installer Setup menu).

If the controller is in Standby Mode, the controller won't heat the pool using solar heating, no matter what the roof temperature is. If it is consistently warm enough, switch the controller back into Heating Mode to start heating your pool.

Check the controller settings to ensure that the AUX temperature and runtime settings are correct.

Check and ensure that the Heater Interlock cable is connected to the plug properly and that the plug is pushed in.

Check and make sure that the heater has power connected.

Check and ensure that the Heater Interlock cable is connected to the appropriate position inside the heater, according to the heater manufacturer's instructions.

VALVE ACTUATOR NOT TURNING:

Check and ensure that the wires are screwed into the plug properly and in the correct order (Red, Black, White, from left to right with the screws of the plug facing upwards towards you).

Check and ensure that the plug is pushed into the Valve socket properly.

Check and ensure that the toggle switch of the actuator is in either of the ON positions and not in the middle OFF position.

Check the settings of the controller to ensure that the Solar is not turned off, controller is not in 'Auto Standby Mode', and that both sensors are ready.

Make sure that the valve can be turned manually to ensure that the valve isn't jammed (debris inside the valve, or valve actuator seized/not working).

If the above all checks out, then you controller needs repair.

FACTORY RESET:

Hold down ENTER when power is off, hold down after powering up, releasing after 5 seconds.

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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. (Return to Base)
- Damage to the unit due to misuse, power surges, corrosion from pool chemical fumes, lightning strikes and or installation that is not in accordance with the manufacturer's instruction may void the warranty.
- Warranty does not include on-site labour or travel costs to or from installation site.
- Valves and actuators are covered by a 12 month warranty at the discretion of their manufacturer.

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 visit www.dontek.com.au

