

SpaNET SV Series PowerSMART spa controllers

There are a host of power smart features in these control systems including multi phase ready terminal block (1/2/3 phase), variable heater technology, load limit function, the world's first dedicated heat pump interface to a spa controller allowing demand heating and cooling of the spa water, programmable filtration, programmable sleep timers, programmable off peak filtration and heating and a host of other features.

POWER SMART FEATURES

Multi Phase Ready Terminal Block

Every SV controller is equipped with a multi phase terminal block ready for connection to either single, two or three phase power supplies up to 60A. Each SV controller is shipped ready for connection to single phase power supply, however if the installing electrician finds it cheaper or easier to use multiple phases they need only remove the phase linking wires and connect the extra 2/3 phase wires straight into the terminal block. Therefore the one control system suits all applications.

This is particularly important as some states are soon to adopt new electrical standards that will limit appliances to a maximum of 20A per phase, and to be able to run heater elements plus multiple pumps at the one time, connecting two or three phases of 20A or 16A each will be required.

Variable Heater Technology

The days of on/off heater control and load shedding are over. The SV controller introduces onboard real-time current sensing and a variable heater that can alter its power level (kW) to suit the available power supply whilst considering any operating loads (i.e jet pumps and blowers). Therefore we can take advantage of a larger heater size (i.e. 6kW) for rapid heat recovery and heat up times when spa is not being used, and relax knowing that the same heater will automatically reduce its power level (kW) to maximise heating input whilst spa is in use and operating loads are running. This helps minimise heat loss when spa is in use and allows spa owners to use their spa for longer.

The variable heater is also a life saver for installs where available power is limited. Most hardwired spas are recommended to have 32A connections but at some households available power is limited to perhaps 20A or 25A. With the SV variable heater you can simply program current limit setting of the controller via the keypad and the SV will automatically limit the heater size to be within the available power limits.

Load Limit Function

Whilst we can govern the amount of power that goes to the variable heater in the SV series, we cannot change the amount of current (power) that the accessory devices (i.e jet pumps and blowers) consume. Pumps and blowers will draw a fixed amount of power. However via software we do have the ability to limit the amount of accessories that can run at the same time to ensure the spa does not exceed the power provided to the spa.

i.e. If you were to connect a 4 x jet pump swim spa to only 20A, you could use the variable heater current limit to limit the heater to 20A, you would also set the load limit function in the software to 2, so that it would limit the controller to only allow 2 x pumps to run at the one time. If you attempt to turn any more pumps on the pump or blower button does not respond until one of the already running pumps is turned off.

ENERGY EFFICIENCY

In terms of optimal energy efficiency the SV Series spa controls stand apart from the competitors in several key areas:

- a) **Smart Filtration** – unlike traditional spa controls that treat filtration and heating separately the SV series recognises that the spa is actually filtering whilst it is heating. The total daily runtime (in hours) for filtration can be programmed as well as how often filtration blocks occur. Each time the filtration pump runs for a filtration block, heating or for manual spa use the SV control keeps a log of the filter pump's runtime for that day. If the spa comes on to heat during the day, the future filtration blocks will be automatically reduced so that the spa control at least achieves the daily filtration runtime that has been programmed but ideally no more. Competitor spa controls run fixed amounts of filtration and do not consider pump runtime whilst heating, so if the spa comes on to heat the runtime of the filter pump is increased therefore increasing energy consumption and daily operating cost. This is avoided with the SV series smart filtration.

 - b) **PowerSAVE off peak filtration and heating software** – the SV series feature power save software to take advantage of smart energy meters and off peak energy tariffs. There are two setting choices, LOW (off peak filtration only), and HIGH (off peak filtration and heating). The spa owner selects the desired level of power save (LOW or HIGH) and the programs in the start and end time of the peak power period. This way the SV series spa control knows not to consume power during that peak period, and carries out its filtration and/or heating during the off peak periods. In addition if the HIGH setting is used the spa control will compensate for temperature lost during the peak power period during the cheaper off peak times.

 - c) **Dynamic Thermal Tuning** – competitor spa controls have fixed thermostat points which depending on temperature sensor location and environment that the spa pool is located in will most often lead to unnecessary cycling of the filter pump and heater when regulating water temperature. The SV series feature a dynamic thermostat point which will adapt and tune (change) itself to match the thermal properties of the spa pool in its environment, day to day, season to season, to reduce demand heat cycling and therefore lower operating costs whilst maintaining a consistent water temperature.
- 1) **Integrated Heat Pump** – SpaNET SV series heat pumps are the world's first to feature a dedicated interface for seamless integration to a SpaNET SV series spa control. The heat pump and spa control have been designed to work in synergy resulting in a single spa control system that operates smoothly, reliably and efficiently. The SV heat pump interface revolutionises the way spas operate in that we can now offer both **demand heating and cooling**, to heat or cool the spa water (from 10°C - 40°C) and maintain that selected temperature, all conveniently controlled via the spa-side keypad.

Air sourced heat pumps are the most energy efficient method of heating and maintaining water temperature in a spa pool. They consume **75% less energy** than a conventional immersion heating element, and are **50% more efficient** compared to gas, resulting in an eco-friendly and amazingly cost efficient appliance. Being an electric appliance they can also be powered by renewal energy sources compared to burning a fossil fuel such as gas.

With ever increasing regulation and restriction on power consuming appliances such as spa pools the need for integrated heat pumps to spas has never been more important. With a heat pump, by utilising refrigeration, only a compressor needs to be powered to generate the heating (or cooling). Therefore only a small amount of input power is consumed to generate a large amount of heating output.

The table below shows SGS test results for 5.5kw and 8.8kw heat pumps.

Model	SN-HP-55	SN-HP-90
Heating capacity	5.5kw	8.8kw
Heating input	1.4kw	2.1kw
Cooling capacity	3.3kw	5.4kw
Cooling input	1.2kw	2.0kw

For example the 5.5kw heat pump provides 5.5kw of heat output whilst only consuming 1.4kw of electrical power. This is a factor of 3.9x power in to heat out (COP). The 8.8kw heat pump achieves a factor of 4.2x power in to heat out (COP).

Note: The above test results were carried out by SGS at **Ambient Temp = 45°C, Water Temp=35°C**. Differing COP levels will be achieved as ambient and water temperatures vary. **Under normal circumstances with ambient temperatures of around 20°C – 30°C the COP level will be as high as 5.1x power in to heat out**, therefore increasing efficiency dramatically over the above test results, which would further reduce the running costs and increase the savings.

The SV heat pump interface also enables the SV spa controller to completely control all heat pump functions and components. Its real time monitoring ensures the fan, valves, defrost elements and compressor are all switched on and off in the correct sequence required for reliable heat pump operation and long term life expectancy. Low ambient temperatures and defrost needs are taken into account and dealt with appropriately. Unlike competitors' generic heat pump installs where the heat pump will be operating and the spa controller will simply cut power to it. The result is that the heat pump components are not switched in the correct sequence resulting in dramatic degradation of the components through temperature and pressure spikes, leading to short expected life. Defrost cycles are cut short or missed completely and any accumulated run data that the heat pump has recorded is lost when the power is cut off unexpectedly.

Another advantage of the SV series integrated heat pump is the benefit of the electric element boost function for rapid heat recovery. Although not related to energy efficiency and whilst this feature is automatically defaulted OFF when a SV heat pump is connected to a SV series spa control, the spa owner has the ability to alter a user adjustable menu option to run both the heat pump and the spa control's internal electric element for rapid heat recovery if desired. Competitor spa controls are not designed to integrate with a heat pump and only understand heating. Therefore if a generic heat pump is installed to a spa with a non SpaNET spa control, the heating element must be physically disconnected from the heater terminals inside the control itself, potentially voiding warranty and product approvals. This also means that non SpaNET spa controls cannot provide an element boost function with a heat pump, and also cannot maintain and regulate cool water temperatures in summer months in an easy and efficient manner like the SV heat pump can.