

# SV Series Spa Controls

## Installation & Technical Manual

SV2 / SV2-VH / SV3 / SV3-VH / SV4-VH



**spanet**

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## WARNINGS

Please read the following before installing or connecting this appliance

## RISK OF ELECTRICAL SHOCK

- All electrical connections must be performed by a licensed electrician and must confirm to all national, state and local electrical codes in effect at the time of installation.
- The appliance should be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30mA.
- The appliance must be connected to a suitable rated and weather protected power supply. The supply line should be a dedicated power circuit and means for disconnection must be incorporated in the fixed wiring in accordance with your local wiring regulations. Means for disconnection from the supply mains should have a contact separation in all poles that provide full disconnection under over voltage Category III conditions.
- Earthed appliances must be permanently connected to fixed wiring (European models only).
- The appliance contains no serviceable parts. Do not attempt service of this control pack. Contact your dealer or authorized service agent for assistance.
- Turn the mains power OFF before servicing appliance or modifying any cable connection
- Suitable for indoor use only or when installed under a weatherproof spa skirt. The appliance should be installed in an enclosure such that all electrical connections cannot be accessible to the user without the use of a tool.
- Low voltage or improper wiring may cause damage to this appliance. Read and follow all wiring instructions when connecting to power supply.
- Any damaged cable must be replaced immediately.
- To prevent electric shock hazard and/or water damage to this appliance, all unused receptacles must have a water proof seal in place.
- Parts incorporating electrical components must be located or fixed so that they cannot fall into the bath or spa.
- Parts containing live parts, except parts supplied with safety extra-low voltage not exceeding 12V must be inaccessible to a person in the bath or spa.
- This appliance must not be installed in proximity to highly flammable materials.
- Water temperature in excess of 38°C may cause hyperthermia (heat stress).
- It is the spa manufacturer's and/or installer's responsibility to select suitable loads and configure load shed settings (if required) to ensure the system does not exceed its rated maximum total load.
- It is the installer's responsibility to ensure the floor is capable of supporting the expected load of the bath or spa and an adequate drainage system has to be provided to deal with overflow water.
- A whirlpool spa should incorporate a water filtration system where the required level of water purity can be achieved.
- An adequate drainage system has to be provided if the equipment is to be installed in a pit.

# SV Series Specifications

## Electrical Specifications

Model No	Max Current	Maximum Multi Phase Current	Input Voltage Single Phase*	Input Voltage Three Phase*	Hz	Heater Size
SV2	15A	-	230-240V AC	400-415V AC	50/60	2kW
SV3	45A	-	230-240V AC	400-415V AC	50/60	3kW
SV2-VH	15A	16A per phase	230-240V AC	400-415V AC	50/60	3kW Variable
SV3-VH	45A	25A per phase	230-240V AC	400-415V AC	50/60	6kW Variable
SV4-VH	60A	25A per phase	230-240V AC	400-415V AC	50/60	6kW Variable

\* Range of acceptability (+/-6%)

## Output Ratings

Outlet	Max Current	Output Voltage	Hz	Typical Accessory
Circ	2A	230-240V AC	50/60	Small Circulation Pump
O3/UV	2A	230-240V AC	50/60	Ozone Generator / UV Sanitiser
Blower	6.3A	230-240V AC	50/60	Air Blower
Pump 1	12A	230-240V AC	50/60	2 Spd Jet Pump / 1 Spd Jet Pump
Pump 2	12A	230-240V AC	50/60	1 Speed Jet Pump
Mains 1 ^	12A	230-240V AC	50/60	Mains power outlet (always on)
Pump 3 *	12A	230-240V AC	50/60	2 Spd Jet Pump / 1 Spd Jet Pump
Pump 4 #	12A	230-240V AC	50/60	1 Speed Jet Pump
Mains 2 *^	12A	230-240V AC	50/60	Mains power outlet (always on)
Light 1	1A~	12V AC		LED Light
Light 2 *	1A~	12V AC		LED Light

\* Outlets not available on SV2 / SV2-VH models

# Outlet not available on SV2 / SV2-VH / SV3 / SV3-VH models

^ Dedicated mains power outlets (always ON)

~ 1A maximum current draw. This is split between keypads, expand ports and light sockets.

Each socket is rated to 1A maximum so the full 1A can be drawn from a single socket if required.

## System Specifications

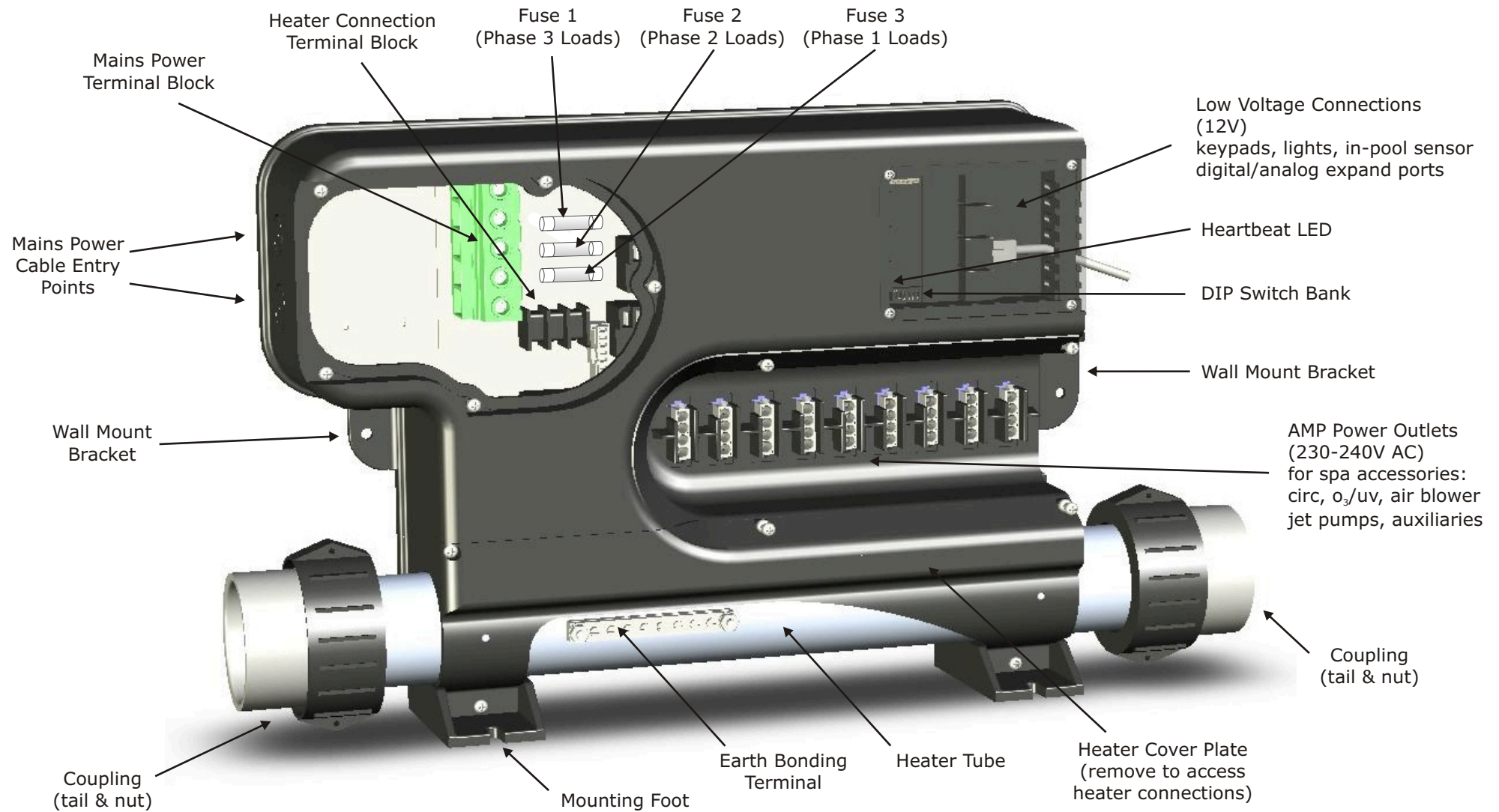
All Models (SV2/SV3/SV2-VH/SV3-VH/SV4-VH)

Maximum Controlled Temperature	41°C
Thermal Cut-Out	47°C +/-3°C
Maximum Ambient Temperature	40°C
Minimum Flow Rate	65 L/min
RCD trip rating	30mA
Weight (without cable)	5kg
Dimensions (with couplings)	544x309x90mm
Enclosure	IPx5
Operating Temperature	0°C to 40°C
Storage Temperature	-25°C to 85°C
Humidity	up to 85% RH (non condensing)



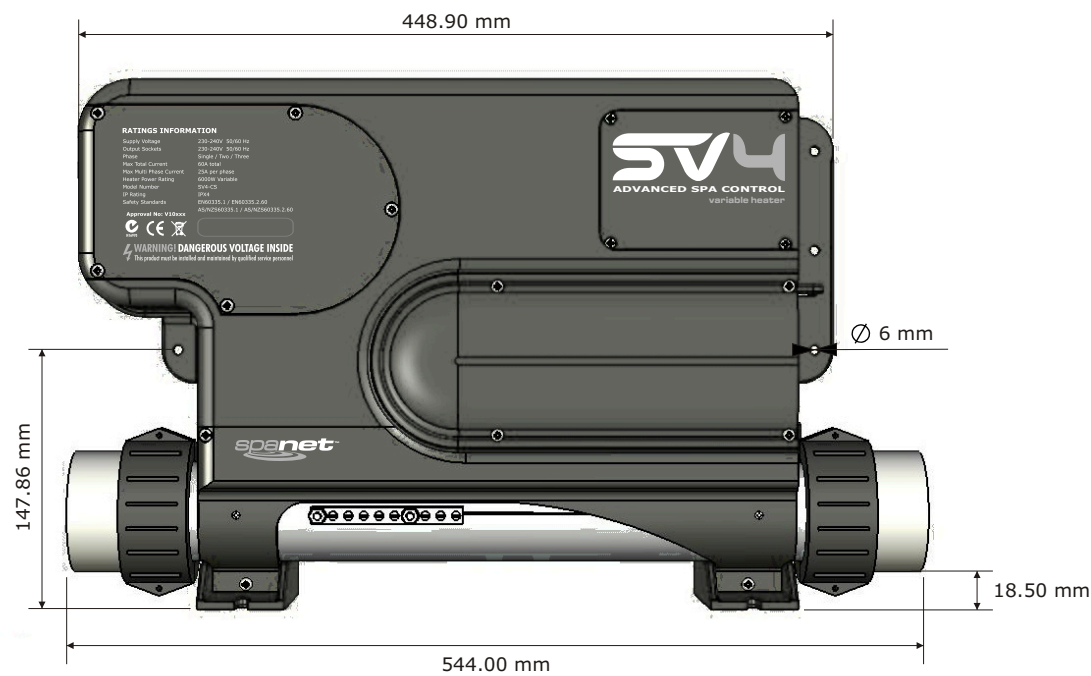


## SV Series Overview

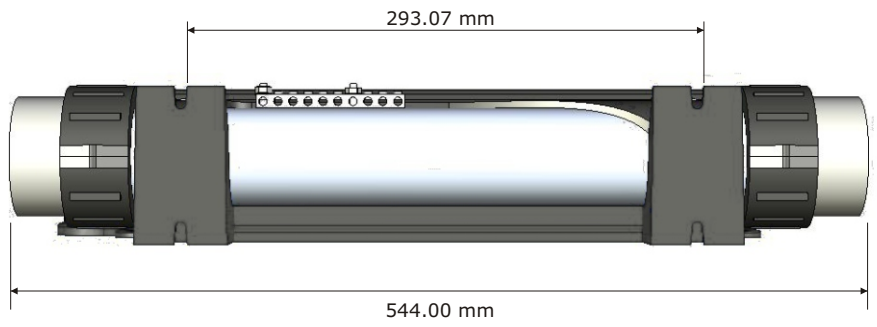


# Spa Pack Dimensions

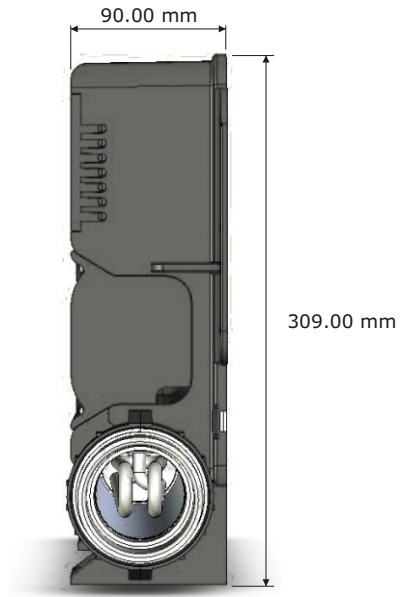
Front View



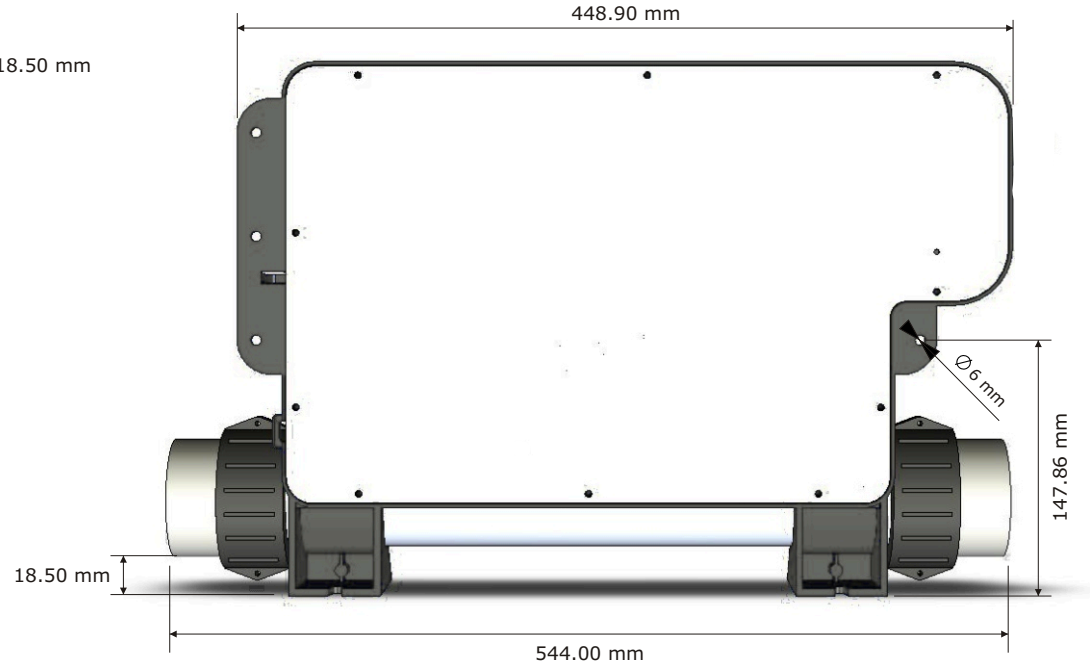
Bottom View



Side View



Rear View



## Keypad Dimensions

### SV2.T keypad

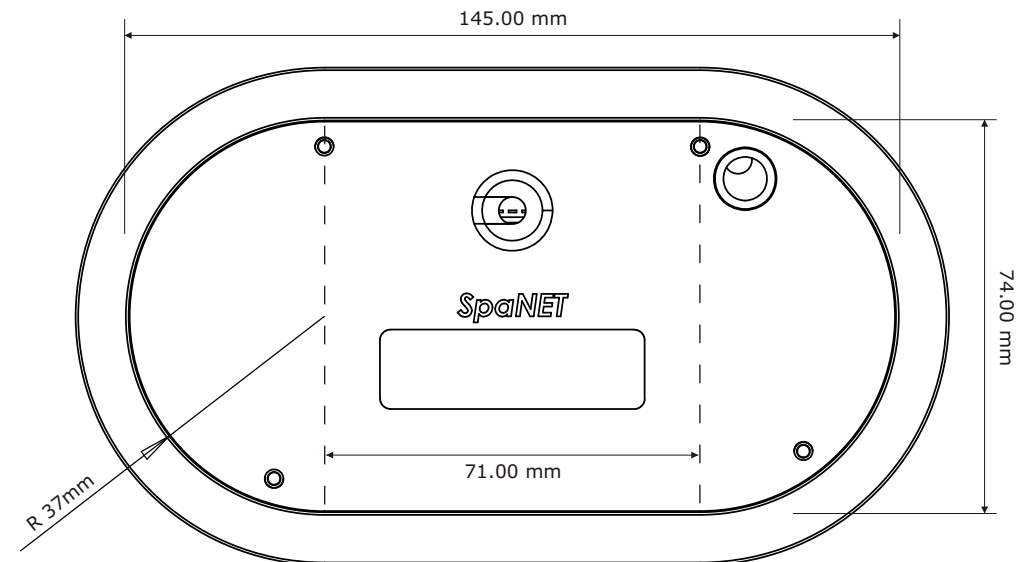
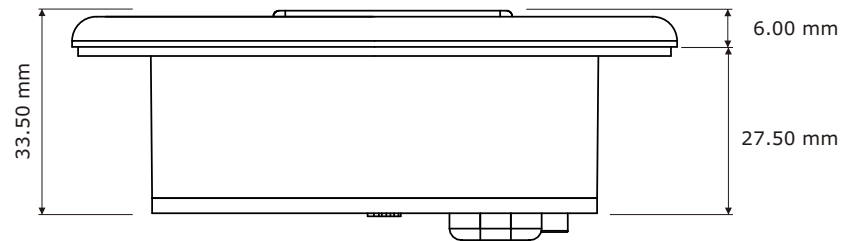
2.75" (70mm) LCD Screen

9 Keys

Blue LED Backlighting

165mm x 94mm x 33.50mm

2.5m lead length



## Keypad Dimensions

### SV3.T / SV4.T keypad

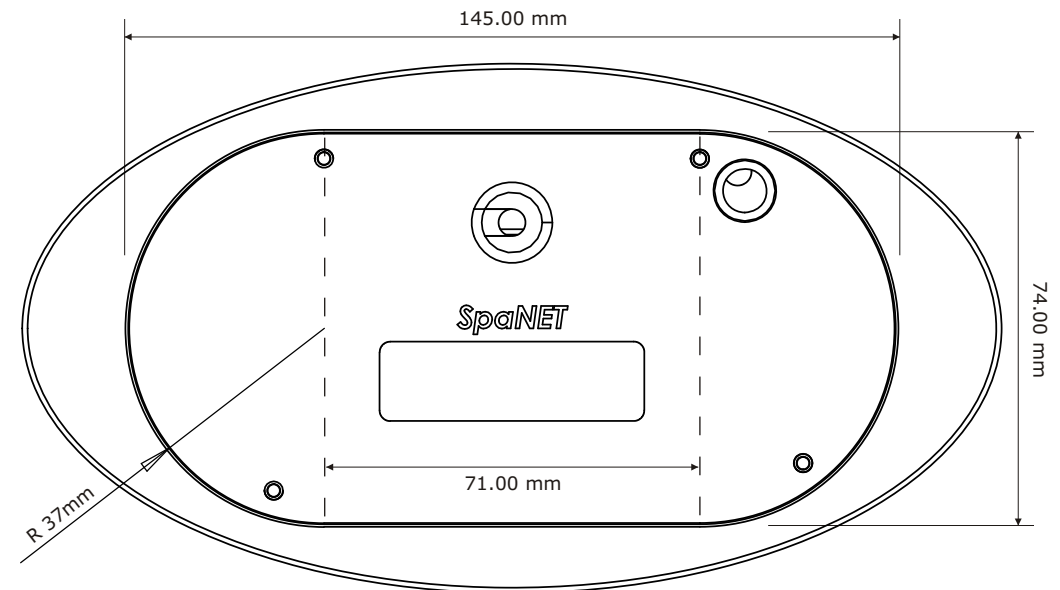
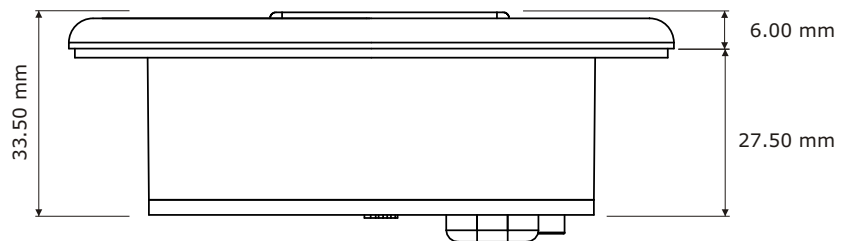
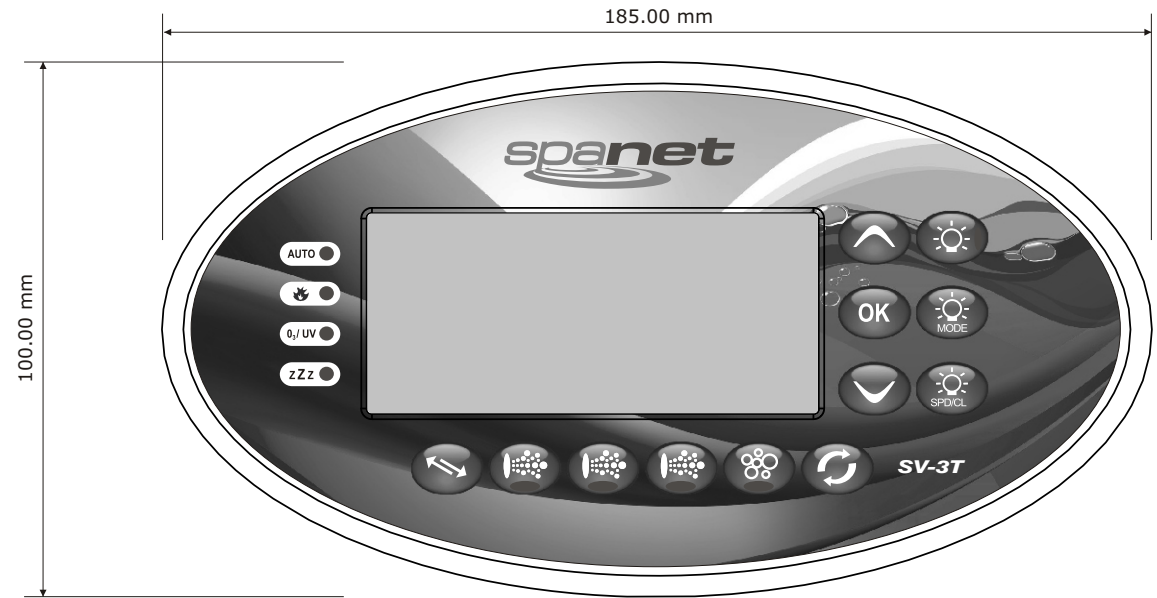
3.5" (90mm) LCD screen

12 keys

RGB colour mixing LED backlighting

185mm x 100mm x 33.50mm

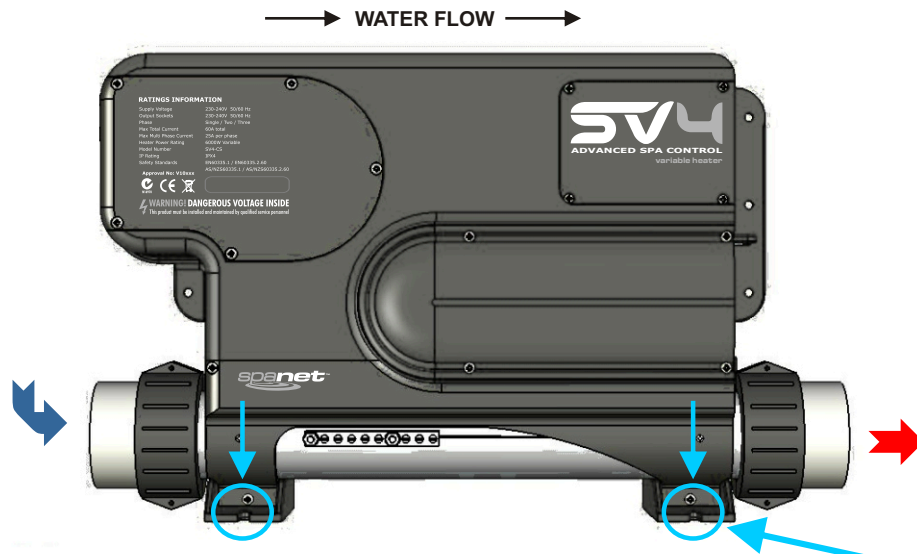
2.5m lead length





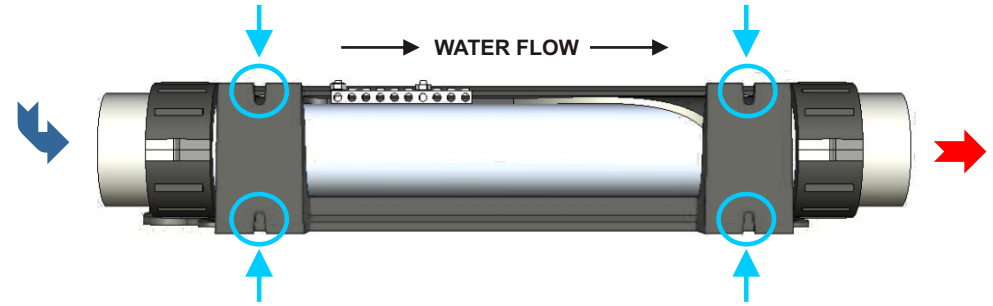
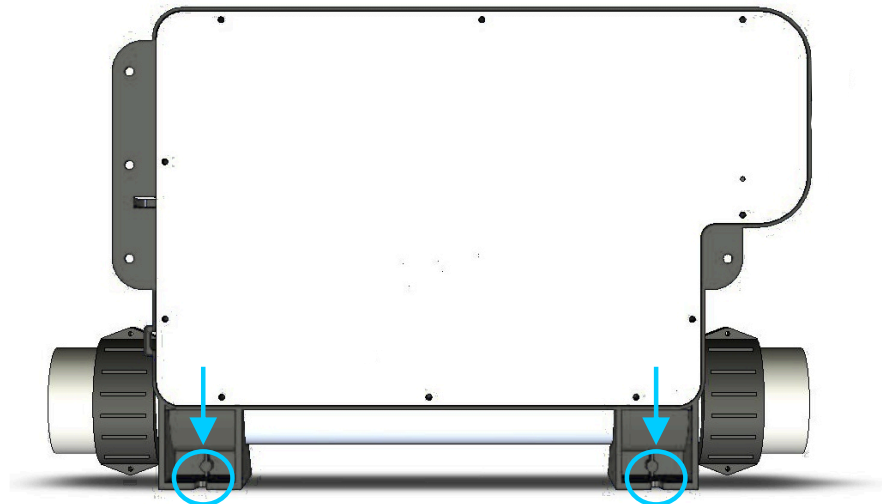
# Spa Pack Installation

Floor mounting procedure



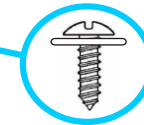
## IMPORTANT NOTE

The spa pack is NOT intended to be used outdoor. The spa pack must be installed in indoor environments only and should be installed in an enclosure so that all electrical connections cannot be accessible without the use of a tool (ie. under spa cabinet).



Due to its flexible design the spa pack can be installed on either the suction side or the discharge side of the filtration pump.

- ▶ Select a suitable location on the spa base and firmly secure spa pack to base using four (4) x screws of appropriate length backed with flat washers.
- ▶ Each screw should be positioned in the moulded cut outs of the mounting feet (refer above & aside). The spa pack should be fixed using ALL four screw locations to provide adequate support (two screws on each side of the spa pack).



Only use pan, round or truss head screws with flat washers



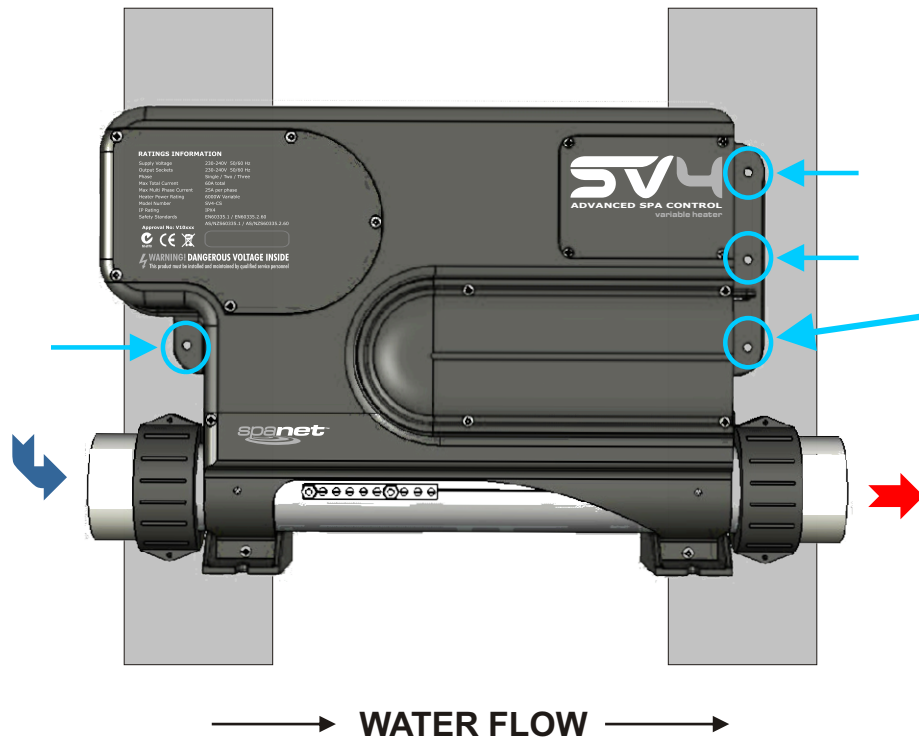
DO NOT use countersunk screws. They may damage or crack the moulded mounting brackets

## NOTES

- The spa pack must be installed with the heater tube horizontal and should be positioned as low as possible in the pipe work of the spa.
- The spa pack must be plumbed so that water flows from left to right for correct water detection and accurate temperature sensing.
- When constructing a spa care should be taken to minimise vibration from the pumps transferring to the spa pack through the base, frame or pipe work. Extended periods of vibration may lead to early component failure.
- The spa pack should be located at least 10cm (4") above potential flood level. If spa floor is on ground level the spa pack should be raised 10cm (4") above spa floor level.
- Install spa pack in a suitable position to prevent water dripping onto the unit. In particular avoid installing spa pack directly underneath keypad mounting location.

# Spa Pack Installation

## Wall mounting procedure



### IMPORTANT NOTE

The spa pack is NOT intended to be used outdoor. The spa pack must be installed in indoor environments only and should be installed in an enclosure so that all electrical connections cannot be accessible without the use of a tool (ie. under spa cabinet).

Due to its flexible design the spa pack can be installed on either the suction side or the discharge side of the filtration pump.

- ▶ Select a suitable location under the spa and use two (2) x (2x4)" treated timber beams or other suitable timber or metal materials to construct an adequate support structure to mount the spa pack to.
- ▶ The mounting support frame should be capable of supporting the weight of the spa pack and should withstand the force of the pipe work moving each time the filtration pump starts or stops.
- ▶ Firmly secure spa pack to support frame using ALL four (4) x screw hole locations provided on the moulded mounting brackets (refer aside)



Only use pan, round or truss head screws / bolts backed with flat washers



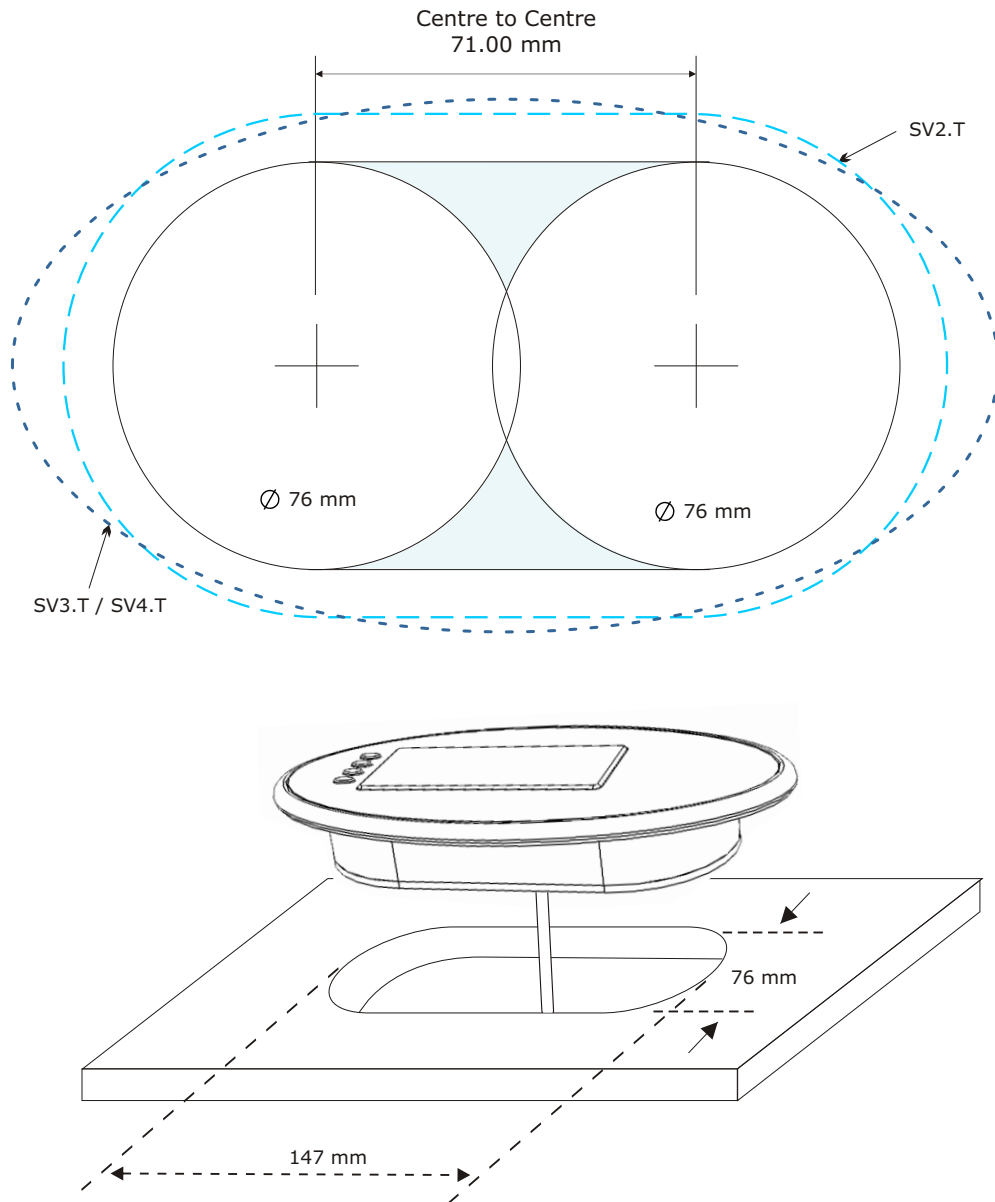
DO NOT use countersunk screws or bolts. They may damage or crack the moulded mounting brackets

### NOTES

- The spa pack must be installed with the heater tube horizontal and should be positioned as low as possible in the pipe work of the spa.
- The spa pack must be plumbed so that water flows from left to right for correct water detection and accurate temperature sensing.
- When constructing a spa measures should be taken to minimise vibration from the pumps transferring to the spa pack through the base, frame or pipe work. Extended periods of vibration may lead to early component failure.
- The spa pack should be located at least 10cm (4") above potential flood level. If spa floor is on ground level the spa pack should be raised 10cm (4") above spa floor level.
- Install spa pack in a suitable position to prevent water dripping onto the unit. In particular avoid installing spa pack directly underneath keypad mounting location.

# Keypad Installation

All Models (SV2.T / SV3.T / SV4.T)



- ▶ Select a suitable keypad location that is above maximum water level and that is easily accessible to the spa user.
- ▶ Before drilling the cut out for the keypad, hold the keypad in place and check there is sufficient cable length to reach the spa pack without the cable being stretched or pulled against sharp edges.

Drill two 76mm diameter holes spaced 71mm apart from centre to centre (as illustrated aside).

Cut out the residual material between the two holes (as illustrated).

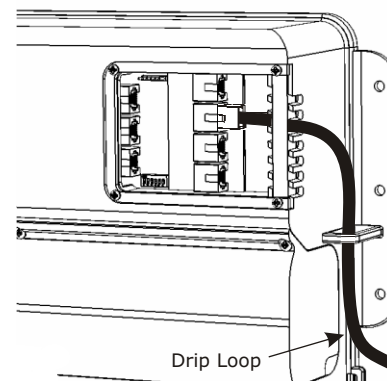
Clean mounting surface to be free of dirt and dust particles, oil and grease. To ensure the keypad adhesive bonds to the spa well the shell must have a clean, smooth and dry surface.

Peel paper backing from adhesive gasket ensuring all of the adhesive is exposed.

Feed cable through opening, align keypad and press firmly onto mounting surface. Ensure keypad is adhered well to surface by pressing evenly around the outside edge of the whole keypad.

## IMPORTANT NOTES

- The keypad mounting location should have adequate drainage to prevent accumulation of water on or around the keypad area.
- If keypad is to be mounted under a spa cover allow sufficient clearance to prevent cover resting directly on keypad.
- Parts incorporating electrical components (ie. keypads) must be fixed so that they cannot fall into the bath or spa



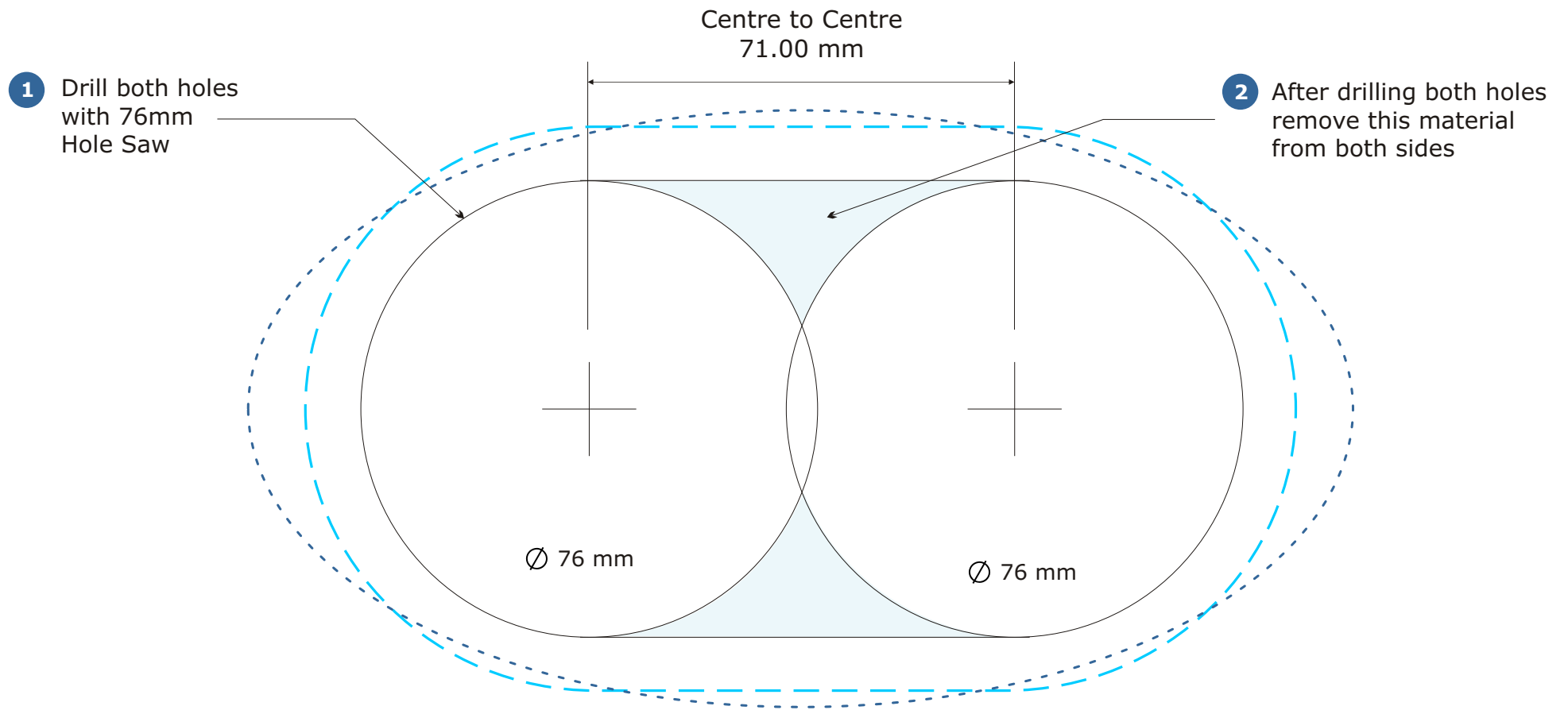
## KEYPAD CABLE CONNECTION

- ▶ Unscrew and remove low voltage connections cover from spa pack enclosure
- ▶ Connect keypad RJ45 plug into either TPAD1 or TPAD2 socket
- ▶ Route the keypad cable through the cable guide provided
- ▶ Ensure the keypad cable has a drip loop before it enters the enclosure

# SVT Keypad Cut Out Template

SV2.T / SV3.T / SV4.T (Scale 1:1)

**NOTE:** To print in 1:1 scale, set Page Scaling to NONE in the print dialog box



## Electrical Wiring (Terminal Block Connections)

AUS / NZ / European Models (230-240V AC)

**Tools Required:** Wire Strippers, Phillips head screwdriver, flat head screwdriver

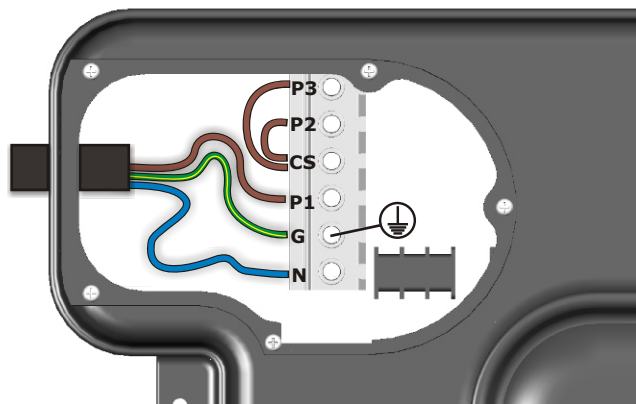
- ▶ Remove five (5) x Phillips screws from mains lid to access terminal block.
- ▶ Cut away appropriate length of outer insulation from mains power cable and strip away 25mm (1") of wire insulation from the end of each wire.
- ▶ Route mains cable through one of the two snap out holes provided and secure the cable with a gland to provide adequate cable strain relief (Tighten gland with use of a tool to ensure supply line anchorage point cannot be removed by hand).

- ▶ Push the wires into the correct terminals as labelled. Refer wiring guide below or on the sticker inside the terminal block area.
- ▶ Tighten all screws on the terminal block with a flat head screwdriver and check to ensure each wire has been firmly secured. Then screw mains lid back on.



### WARNING

- **This appliance must be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30mA.**
- Correct wiring of the main electricity board, RCD and spa pack is critical.
- When installing appliance refer to your local wiring regulations.
- When installing mains power cable providing service loops (additional wire length for future serviceability) to incoming wiring is recommended.



**230-240V (3 wire) single phase**

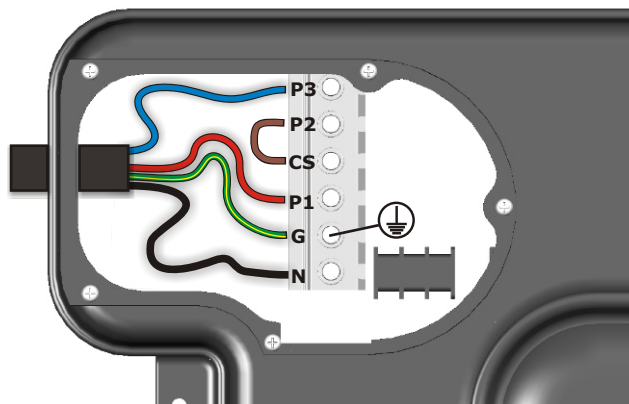
Terminal      Wiring

P3	Link to CS
P2	Link to CS
CS	Link to P3 and P2
P1	Phase
G	Earth
N	Neutral

\*Dip Switch 5    OFF

\*Dip Switch 6    OFF

\* Refer Dip switch information on page 11



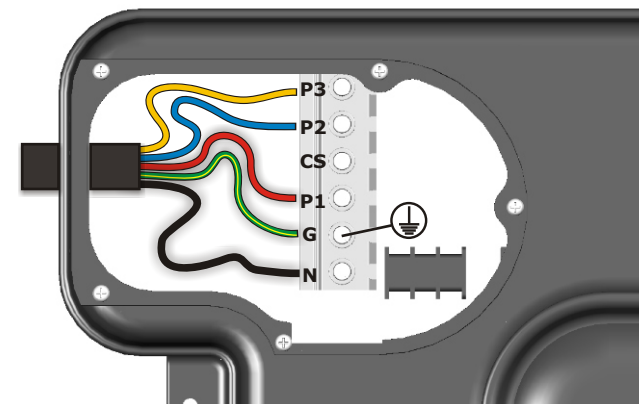
**230-240V (4 wire) dual phase**

Terminal      Wiring

P3	Phase 2
P2	Link to CS
CS	Link to P2
P1	Phase 1
G	Earth
N	Neutral

\*Dip Switch 5    ON

\*Dip Switch 6    OFF



**230-240V (5 wire) three phase**

Terminal      Wiring

P3	Phase 3
P2	Phase 2
CS	Not used
P1	Phase 1
G	Earth
N	Neutral

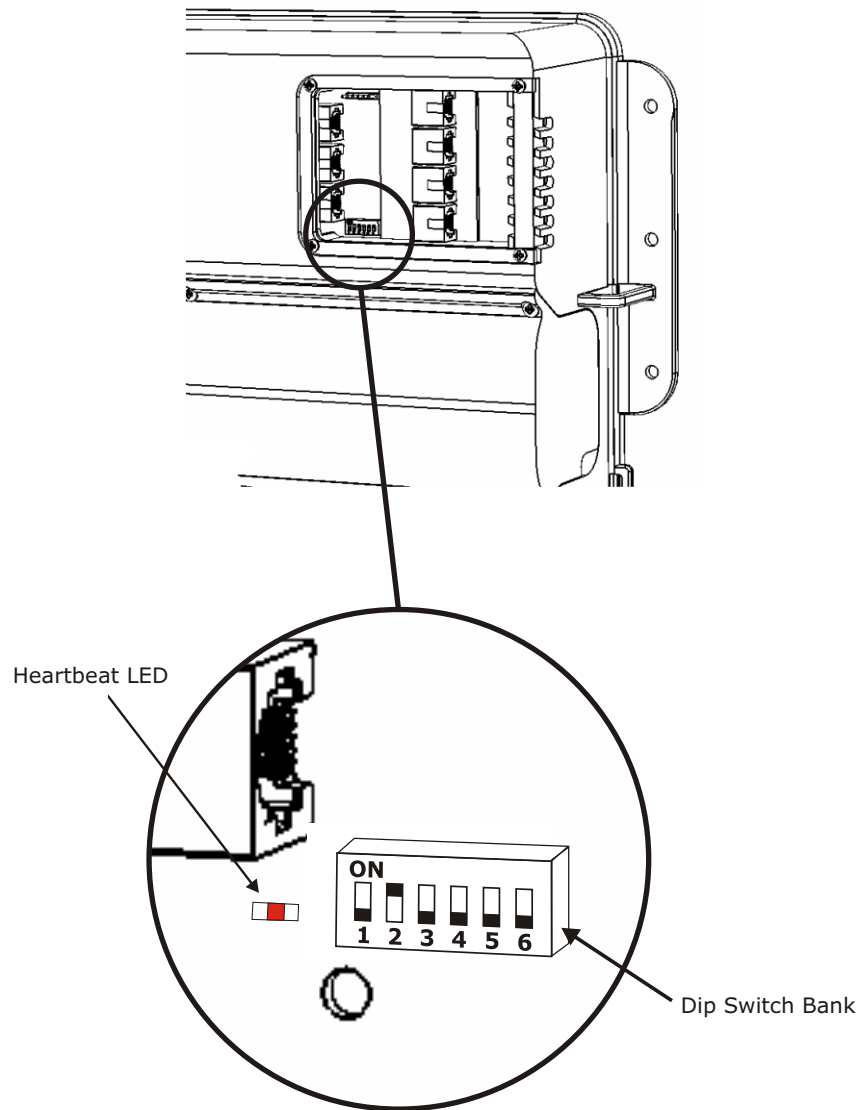
\*Dip Switch 5    ON

\*Dip Switch 6    ON



# DIP Switch Settings

## System Configuration



Basic spa configuration is achieved by setting dip switches. The dip switches determine pump configuration and select the number of input phases wired to the spa pack. The installer must correctly configure the dip switches to match the pump and power configuration connected to the spa pack.

The dip switch bank (illustrated aside) has six individual switches. Switches set to the top of the switch bank are in the ON position. Switches set to the bottom of the switch bank (closest to the numbers) are in the OFF position. Refer to tables below for dip switch settings:

SW	Setting	OFF	ON	Notes	SV2 / SV4 Models
1	Circ Fitted	Not Fitted	Fitted		
2	Pump 1 Type	Single Speed	Two Speed	If set to 'OFF' pump2 assumed fitted	
3	Pump 3 Type	Single Speed	Two Speed	Not used on SV2/SV2-VH models	
4	Pump 4 Fitted	Not Fitted	Fitted	Not used on SV2/SV2-VH models	
5	Phase Selection	Single Phase	2/3 Phase	If set to 'ON' dip switch 6 is enabled	
6	Multi Phase	Two Phase	Three Phase		

SW	Setting	OFF	ON	Notes	SV3 Models
1	Circ Fitted	Not Fitted	Fitted		
2	Pump 1 Type	Single Speed	Two Speed	If set to 'OFF' pump2 assumed fitted	
3	Pump 3 Fitted	Not Fitted	Fitted		
4	Not Used	-	-		
5	Phase Selection	Single Phase	2/3 Phase	If set to 'ON' dip switch 6 is enabled	
6	Multi Phase	Two Phase	Three Phase		

## Heartbeat LED

All SV model spa packs feature a heartbeat LED. The heartbeat LED flashes to indicate the current health/status of the spa pack. When the spa pack is functioning correctly with no errors to report the heartbeat LED emits a single flash in a constant pulse much like a heartbeat (ON, OFF, ON, OFF).

If the spa pack encounters a fault the heartbeat LED will begin flashing in sequence with the error code number being experienced (ie. ER2 = ON,ON; OFF ON,ON; OFF).

The heartbeat LED is located beside the bottom left hand corner of the dip switch bank and will emit its red flash through the tinted low voltage connection cover, making it clearly visible from the front of the spa pack.

# Pump Configurations

## System Configuration Reference Table

PUMP CONFIGURATIONS					
MODEL	CIRC	PUMP1	PUMP2	PUMP3	PUMP4
SV2	no	1 spd	-	-	-
SV2	no	2 spd	-	-	-
SV2	yes	1 spd	-	-	-
SV2	yes	2 spd	-	-	-
SV3	no	1 spd	1 spd	-	-
SV3	no	1 spd	1 spd	1 spd	-
SV3	no	2 spd	n/a	1 spd	-
SV3	yes	1 spd	1 spd	-	-
SV3	yes	1 spd	1 spd	1 spd	-
SV3	yes	2 spd	n/a	1 spd	-
SV4	no	1 spd	1 spd	1 spd	1 spd
SV4	no	2 spd	n/a	1 spd	1 spd
SV4	no	2 spd	n/a	2 spd	n/a
SV4	yes	1 spd	1 spd	1 spd	1 spd
SV4	yes	2 spd	n/a	1 spd	1 spd
SV4	yes	2 spd	n/a	2 spd	n/a

DIP SWITCH SETTINGS			
SW1	SW2	SW3	SW4
off	off	off	off
off	on	off	off
on	off	off	off
on	on	off	off
off	off	off	off
off	off	on	off
off	on	on	off
on	off	off	off
on	off	on	off
on	on	on	off
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off	on	off	on
off	on	on	off
on	off	off	on
on	on	off	on
on	on	on	off

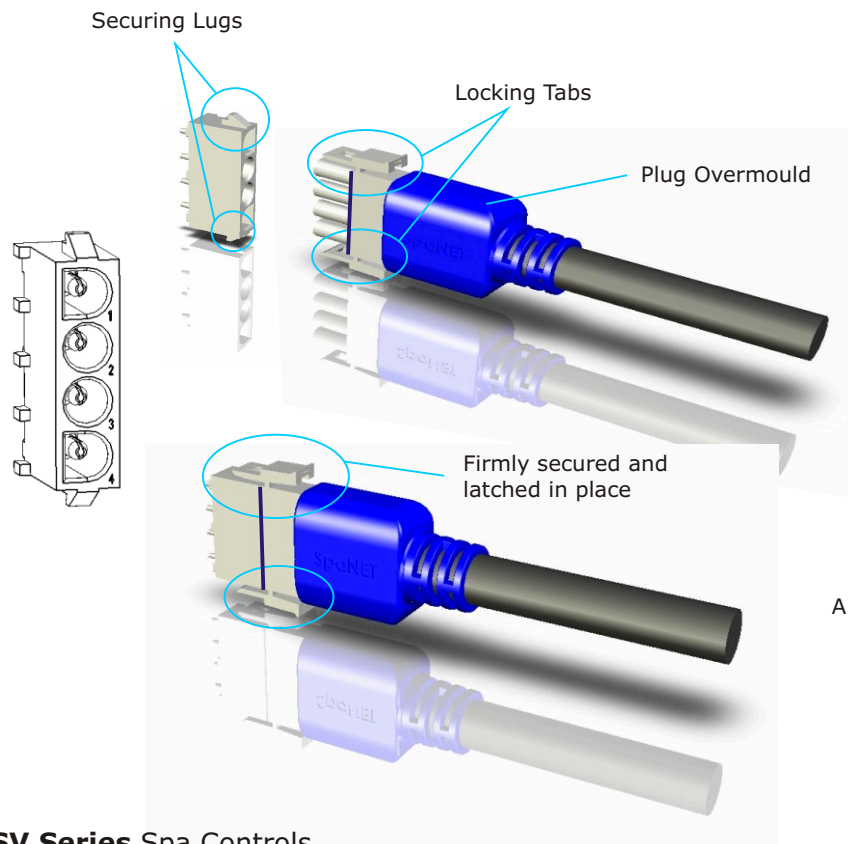
BUTTON ASSIGNMENTS			
PUMP A	PUMP B	PUMP C	PUMP D
pump1 (on/off/auto)	-	-	-
pump1 (low/off/auto)	pump1 (high/low)	-	-
circ pump (on/off/auto)	pump1 (low/high/off)	-	-
circ pump (on/off/auto)	pump1 (on/off)	-	-
pump1 (on/off/auto)	pump2 (on/off)	-	-
pump1 (on/off/auto)	pump2 (on/off)	pump3 (on/off)	-
pump1 (low/off/auto)	pump1 (high/low)	pump3 (on/off)	-
circ pump (on/off/auto)	pump1 (on/off)	pump2 (on/off)	-
pump1 (on/off)	pump2 (on/off)	pump3 (on/off)	-
circ pump (on/off/auto)	pump1 (low/high/off)	pump3 (on/off)	-
pump1 (on/off/auto)	pump2 (on/off)	pump3 (on/off)	pump4 (on/off)
pump1 (low/off/auto)	pump1 (high/low)	pump3 (on/off)	pump4 (on/off)
pump1 (low/off/auto)	pump1 (high/low)	pump3 (low/off)	pump3 (high/low)
pump1 (on/off)	pump2 (on/off)	pump3 (on/off)	pump4 (on/off)
circ pump (on/off/auto)	pump1 (low/high/off)	pump3 (on/off)	pump4 (on/off)
circ pump (on/off/auto)	pump1 (low/high/off)	pump3 (low/high/off)	-

notes n/a = not available

If pump1 = 2 spd, the pump 2 outlet socket cannot be used  
If pump3 = 2 spd, the pump 4 outlet socket cannot be used

## AMP Power Outlets

230-240V AC Output



SV Series Spa Controls

Multiple power output sockets are provided to run spa accessories. Each output socket is clearly labelled including the maximum current for that outlet. In addition the maximum current per phase is labelled. When connecting accessories the installer must consider the current draw of each appliance to be connected and ensure the system does not exceed the maximum load limits.

The output sockets are wired with three sockets per phase (refer table below). The only exception is phase 1 which also powers the heater element (a socket is not provided, the heater is wired internally). Each phase circuit is protected by a fuse.

- ▶ The sum total current draw of all appliances connected to a phase should not exceed the maximum current limit of that respective phase. Refer to ratings information labels on spa pack for current limits.
- ▶ In single phase applications the outlet sockets are still governed by the fuse/current limit of each phase. The power outlet arrangement is as follows:

PHASE 1	PHASE 2	PHASE 3
circulation pump	pump 1	pump 3
sanitiser (ozone/uv)	pump 2	pump 4
blower	mains*	mains*
heater#		

\* Dedicated 230-240V power outlets (always on)

# Heater is connected internally to phase 1. Consider when calculating total current draw of phase 1

### AMP Sockets & Plugs

SV series spa packs utilise AMP mate-N-lok power connectors. The AMP connectors feature a key pattern for fail safe one way connection. When connecting accessory devices be sure to push cordset firmly into socket and ensure both side locking tabs have been secured and latched in place (refer illustrations aside).

### AMP Outlets Cover

For installations where there is insufficient depth under the spa skirt for the cable radius of an over moulded plug the installer can opt to fit the amp outlet cover and use non over moulded plugs to achieve a tighter cable radius.

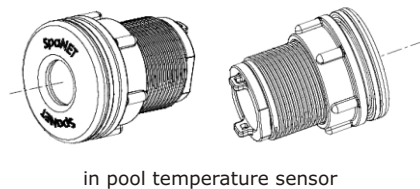
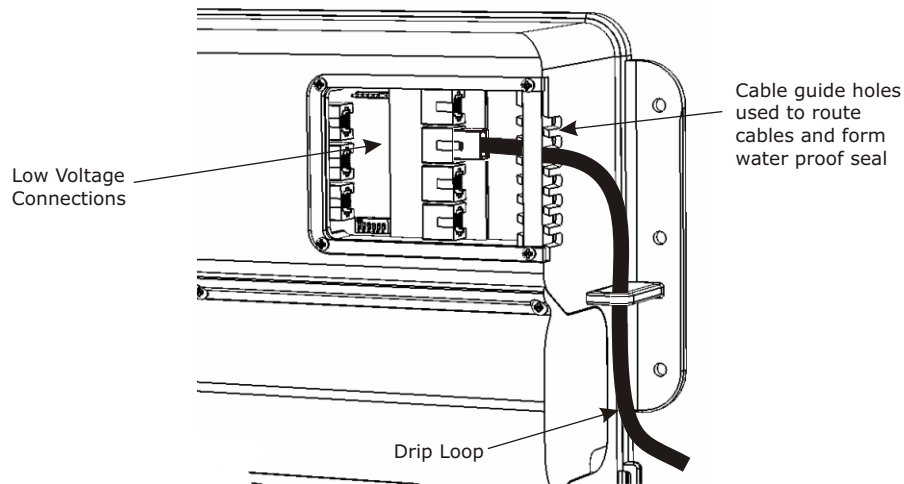
**If accessories are connected with non over moulded AMP plugs the AMP outlet cover MUST be installed and fixed with screws.**

The AMP outlet cover features snap out sections to be cut away at point of install to suit quantity of cords in use.

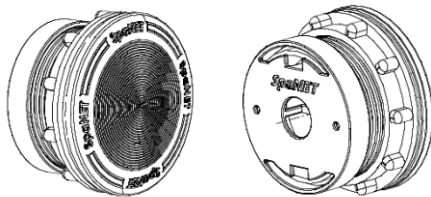


## Low Voltage Connections

12V AC



in pool temperature sensor



colour LED spa light

The low voltage connections are located on the top right hand corner of the spa pack. RJ45/RJ11 sockets are used for connection and are located inside the spa pack enclosure. The low voltage connections cover must be fitted and secured with screws for water proofing seal to work.

The SV controllers feature the following low voltage connections:

Socket	Accessory
TPAD1	Keypad #1
TPAD2*	Keypad #2
IPTS	In pool temperature sensor
EXPAND1	Digital expansion port
EXPAND2	Analogue expansion port
LIGHT1	LED Light Output
LIGHT2*	LED Light Output

\* Sockets not available on SV2/SV2-VH models



### IMPORTANT NOTES

- 1A maximum 12V current draw. This is split between keypads, expand ports and lights. Each socket is rated to 1A maximum so the full 1A can be drawn from a single socket if required.
- Ensure each low voltage cable is routed through the cable guide hole on the side of the spa pack and allow for drip loops before entry to the enclosure.

### Port current sensing

The SV series spa packs monitor the RMS current drawn from the low voltage ports at all times. 12V current drawn by keypads, in pool temp sensors, expand ports and lights are measured. If the current is above 1.1A the controller will shut down and latch fault code (Er6 - 12V overload).

### Digital expand port

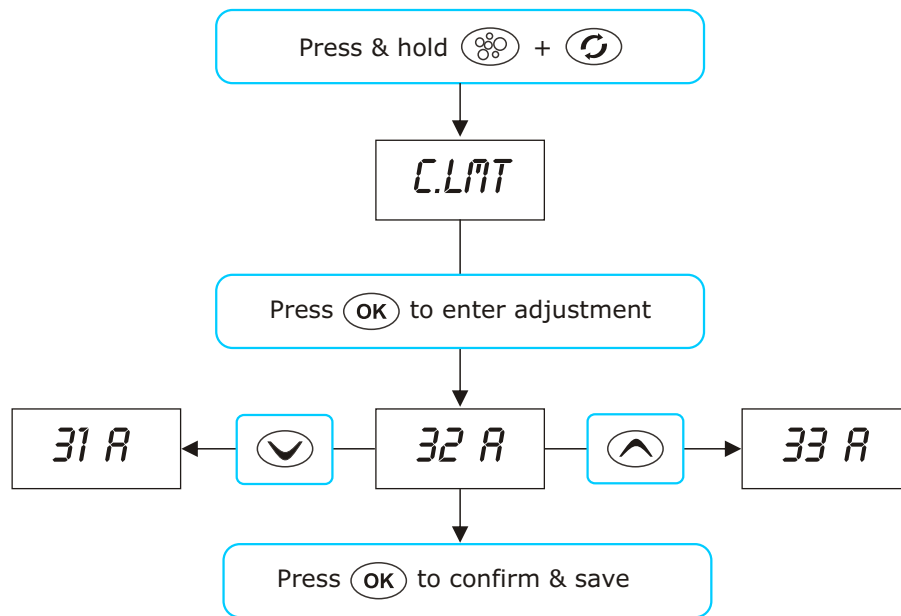
A PC communications and general purpose digital interface port. Most suited to interfacing to other digital equipment such as stereos, remote controls etc

### Analog expand port

An analog expansion port that contains two analog inputs and a digital I2C bus. The I2C bus is shared with touch pad 1 port and allows connection of NXP I2C family of devices.

## Program Circuit Breaker Rating

For variable element operation



### IMPORTANT NOTES

- The installer must program the C.LMT (current limit) setting to match the rating of the circuit breaker that feeds the spa pool for correct controller operation and safe power management.
- The C.LMT (current limit) setting is stored in non volatile memory (EEPROM) so it is remembered when power is turned off. The C.LMT setting only needs to be programmed once. C.LMT value is not adjusted by EEPROM reset.
- If the C.LMT (current limit) setting is not matched to the circuit breaker rating correctly the spa owner may experience either tripping circuit breakers or "Er10 Over Current" latching errors.

### Current sensing

Each "VH" (variable heater) model of SV controller contains mains current measurement hardware that allows the controller to monitor the RMS current draw. The current sensing hardware is only installed on Phase 1. Phases 2 and 3 can also be monitored if they are wired to terminal "CS" of the mains terminal block (refer wiring information on page 10).

Current measurement is used for variable element operation. The purpose is to automatically adjust heater size to match the residual current available when accessory devices (ie pumps and/or blower) are operating. The aim is to maximise heating input whilst spa is in use, but still remain within the current limit of the controller.

The OEM menu item C.LMT (current limit) should be set to match the rating of the circuit breaker that feeds the spa pool. To take full advantage of the variable element and maximise heater size when spa in manual use the circuit breaker rating must be programmed correctly.

The SV controller will shut down and latch fault code (Er10 - over current) if the SV controller detects a mains current above 110% of C.LMT. The actual current draw of the spa pack can be viewed at anytime via the diagnostics menu or by using the SpaNET Link PC application. The default current limit (C.LMT) values for each model are as follows:

Model	Default C.LMT
SV2-VH	15 amp
SV3-VH	32 amp
SV4-VH	40 amp

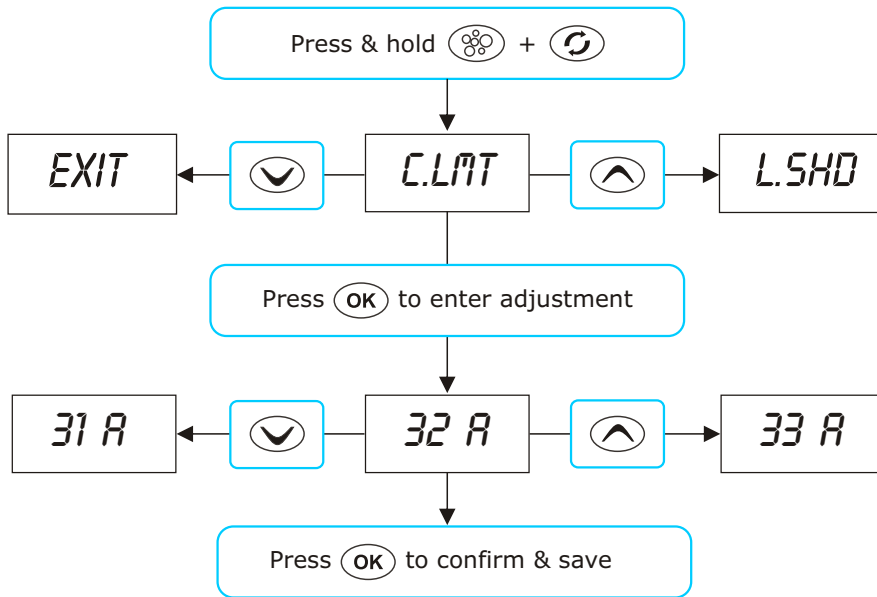
### How to program the current limit (C.LMT) :

- ▶ Press and hold and buttons together until C.LMT is displayed
- ▶ Press button to enter current limit (C.LMT) adjustment
- ▶ Press or to adjust current limit to match circuit breaker rating
- ▶ Press button to confirm and save setting



## OEM Configuration Menu

Access via keypad



### IMPORTANT NOTES

- The OEM menu item settings are stored in non volatile memory (EEPROM) and are remembered when power is turned off. No need to reprogram settings when power is restored.
- During an EEPROM reset all menu items will be restored to the factory default settings except C.LMT/1.LLM/2.LLM/3.LLM/V.MAX.
- A ten (10) second idle menu time out period exists. If a button press is not detected for 10 seconds the menu will time out and the screen will return to the default display mode.

The SV controllers feature a hidden OEM configuration menu which allows complete customisation of the spa pack. Menu item options are detailed in the list below.

- ▶ To enter menu press and hold and buttons until [C.LMT] is displayed
- ▶ Press or to navigate through menu item list
- ▶ Press to enter menu item adjustment
- ▶ Press or to adjust setting
- ▶ Press to confirm setting and exit menu

Menu Item	Setting	Notes
C.LMT	Current Limit (circuit breaker rating)	10 to 60A
L.SHD	Load Shed Count	1 to 7
SANI	Sanitiser (o <sub>3</sub> /uv) on with spa use	on / off
C.JET	Circ pump on with jet pump operation	on / off
F.CYC	Filtration cycle block time adjustment	1,2,3,4,6,8,12,24 hrs
V.ELE	Variable element	on / off
V.MAX	Maximum variable element power	30 to 100% (5% increments)
1.LLM	Phase 1 load limit	1 to 5
2.LLM	Phase 2 load limit	1 to 5 (item disappears if set to 1 phase)
3.LLM	Phase 3 load limit	1 to 5 (item disappears if set to 1 or 2 phase)
UNIT	Temperature format	°C or °F
A.HYS	Adaptive hysteresis limit	0 to 20°C, 0.2°C increments (0=disabled)
S 24	Sanitiser (o <sub>3</sub> /uv) on 24 hrs	on / off
C 24	Circ pump on 24 hrs	on / off
CAL	Calibration Adjust Menu	
C.ZER	Mains current zero	push OK button to zero reading
C.ADJ	Mains current reading	adjust with up/down buttons
V.ADJ	Mains voltage reading	adjust with up/down buttons
EXIT	Exit calibration submenu	
SERT	Service timers menu	
1.SER	Service timer 1 [service filter]	0 to 52 wks (0 wks = disabled)
2.SER	Service timer 2 [service 1]	0 to 52 wks (0 wks = disabled)
3.SER	Service timer 3 [service 2]	0 to 52 wks (0 wks = disabled)
EXIT	Exit service timers submenu	
EPRM	Reset EEPROM values to factory default	All values reset except C.LMT/1.LLM/2.LLM/3.LLM
EXIT	Exit OEM configuration menu	

# OEM Configuration Menu

## Menu item details

### **L.SHD Load Shed Count**

This setting determines the load shed behaviour of the heating element. Load shedding is governed by the load shed count (1 to 7). Load shed count = number of loads required to be turned ON for the heater to load shed and turn OFF. The filtration pump is not counted as a load, the blower and all other pumps are.

Example:

Load Shed Count = 2

When any two loads in addition to the filtration pump are turned ON the heater load sheds and turns OFF.

The L.SHD setting ranges from 1 to 7.

1 = maximum load shed (default)

7 = load shed disabled

### **SANI Sanitiser (o<sub>3</sub>/uv) Operation**

Determines how the sanitiser power outlet operates during manual spa use. The setting choices are:

ON sanitiser ON with pool use

OFF sanitiser OFF with pool use (default)

### **C.JET Circ on with Jet Pump**

Determines behaviour of circ pump when jet pump is turned on for manual spa use. The setting choices are:

ON circ pump forced ON with jet pump use

OFF circ pump controlled automatically (default)

### **F.CYC Filtration Cycle Blocks**

Filtration cycles can be programmed to run as often as every hour or as little as once every 24 hours. Use this setting to adjust the frequency of the filtration cycle periods. The F.CYC setting choices are for filtration to occur every 1,2,3,4,6,8,12 or 24 hours.

### **V.ELE Variable Element Operation**

Variable element operation allows the SV controller to automatically adjust the heater power level to match the residual current available when accessory devices (ie pumps and/or blower) are operating. The benefit of this feature is the element can automatically reduce its size and remain on instead of load shedding and turning off when spa is in manual use and jet pumps have been activated.

The setting choices are:

ON variable element enabled (default)

OFF variable element disabled

Note: If disabled the heating behaviour is the same as a standard element. Load shed settings may need to be configured to ensure the spa pack does not exceed its maximum current limit.

### **V.MAX Maximum Variable Element Size**

If variable element operation is enabled the installer also has the ability to limit the power level supplied to the heating element (30 to 100%) via the V.MAX menu item. This enables the installer to reduce the heater size where available power is limited, without the need to replace the heater element or spa pack. It also allows for the heater to be returned to maximum size if more power became available.

The V.MAX setting ranges from 30% to 100%

Default setting = 100%

### **x.LLM Load Limit Settings (Phases 1/2/3)**

This setting allows the installer to select the maximum number of loads (1-5) allowed to run at the one time. Different load limits can be set for each phase.

1.LLM = Phase 1 Load Limit

2.LLM = Phase 2 Load Limit

3.LLM = Phase 3 Load Limit

Example:

1.LLM = 2

This will allow 2 x accessories (pump(s) and/or blower) to run at the one time, but as soon as you try and turn the 3rd accessory on the button will not work until you turn one of the other accessories off first. Only 2 x loads will ever be allowed to run at the one time.

# OEM Configuration Menu

## Menu item details

### UNIT Temperature Format

Used to select desired temperature format °C or °F

### A.HYS Adaptive Hysteresis

The SV controllers feature adaptive hysteresis for heat control to reduce demand heating cycling. Adaptive hysteresis control tunes the temperature sensing to that particular spa pool and environment. It is particularly advantageous when in heater temperature sensing is employed. The A.HYS menu item allows the installer to set the maximum range that hysteresis can be adjusted.

The A.HYS setting ranges from 0 to 20°C  
A value of 0 disables adaptive hysteresis  
Default = 20°C

### S 24 Sanitiser (24 hours)

The setting allows the sanitiser power outlet to be powered ON 24 hours per day  
The setting choices are:

ON sanitiser power outlet always ON  
OFF sanitiser power outlet automatically controlled (default)

### C 24 Circ Pump (24 hours)

The setting enables the circ pump outlet to be powered ON 24 hours per day  
The setting choices are:

ON circ pump power outlet always ON  
OFF circ pump power outlet automatically controlled (default)

### CAL Calibration Adjustment Submenu

Every SV controller is calibrated for mains voltage and current measurement during production. However, should the SV controller readings not agree with a multi meter reading they can be adjusted.

The "CAL" sub menu offers the following options:

C.ZER	Mains current zero	push OK button to zero reading
C.ADJ	Mains current reading	adjust with up/down buttons
V.ADJ	Mains voltage reading	adjust with up/down buttons
EXIT	Exit calibration submenu	

Field adjustment of the voltage reading should follow the following procedure:

- 1) Measure the mains voltage using a good quality multi meter.
- 2) Adjust the voltage reading using V.ADJ to match the multi meter.

Field calibration of the current reading should follow the following procedure:

- 1) Stop any current draw by disconnecting any fixed 230V loads and switching off heating, pumps, blower etc
- 2) Zero the current reading using C.ZER.
- 3) Apply maximum pump loads and measure the current draw using a good quality multi meter.
- 4) Adjust current reading using C.ADJ to match multi meter reading.

The SV measures the mains current that flows from "Phase 1" terminal to phase 1 loads (heater, blower, ozone, circ). Any other loads connected via the CS terminal are also measured.

### x.SER Service Timers

These settings are used to enable and adjust service timers.  
A value of 0 results in the timer being disabled.  
Maximum timer value is 52 weeks.

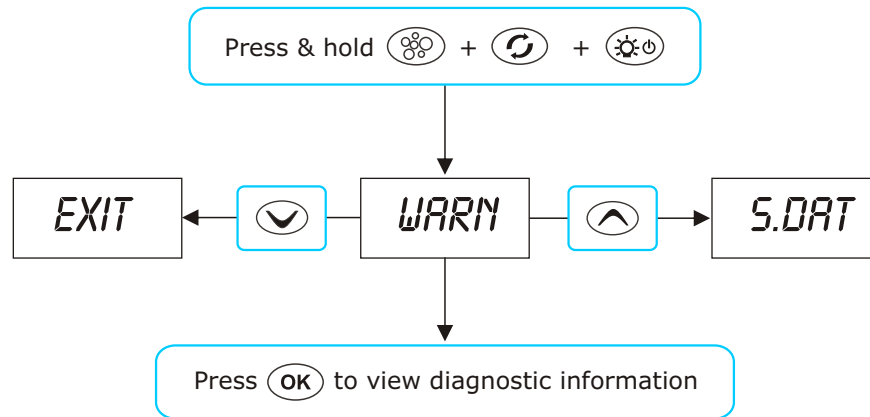
Independent counters are stored in RAM and therefore reset to 0 at power up. Counters for each service timer are incremented everyday at 8am. When the counter is greater or equal to the service timer value x 7, the touch pad will beep and scroll a message twice every 60 seconds.

- 1.SER message = "SERVICE FILTERS"
- 2.SER message = "SERVICE 2"
- 3.SER message = "SERVICE 3"

The particular counter is reset by pressing the OK button whilst the service message is scrolling.

## Diagnostics Menu

Access via keypad



### IMPORTANT NOTE

A ten (10) second idle menu time out period exists. If a button press is not detected for 10 seconds the menu will time out and the screen will return to the default temperature display mode.

The SV controllers feature a hidden diagnostics menu which allows the installer / spa user to view onboard diagnostics and historical details about the spa controller. Menu item options are detailed in the list below.

- ▶ To enter menu press and hold and and buttons
- ▶ Press or to navigate through menu item list
- ▶ Press to view diagnostic information on the selected item

Menu Item	Setting	Notes
WARN	Warnings scroll	IPTS presence, W8, mode, Vmax/Vmin
S.DAT	State date scroll	Date displayed in DD - MM - YY
S.VER	Software version scroll	
TYPE	Controller type scroll	
PUMP	Pump selection scroll	
LIMS	Limits scroll	Refer table below for further Limits details
IPTS	Current IPTS reading	
H.TMP	Current heater temperature reading	
C.TMP	Current case temperature	
AMPS	Current mains current draw	
VOLT	Current mains voltage	
V.ELE	Current variable element power level	0 to 100%
EXIT	Exit menu	

The limits scroll provides a scrolling list of all current, phase and load limit settings as programmed in the OEM menu or set by dip switches. This feature is a quick way to verify controller settings. The list of items that will be displayed are:

C.LMT	Current limit setting (10 to 60A)
L.SHD	Load shed count (1 to 7)
PHSE	Phase configuration (1,2 or 3 phase)
1.LLM	Phase 1 load limit (1 to 5)
2.LLM	Phase 2 load limit (1 to 5)
3.LLM	Phase 3 load limit (1 to 5)
P.HYS	Current pool temperature sensor adaptive hysteresis value (0-200; where 1 = 0.1'C)
H.HYS	Current heater temperature sensor adaptive hysteresis value (0-200; where 1 = 0.1'C)

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