SV Series Spa Controls

Installation & Technical Manual

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

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WARNINGS

Please read the following before installing or connecting this appliance

- 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.

- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

- Children should be supervised to ensure that they do not play with the appliance.

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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

Heater Connection Terminal Block

Mains Power Terminal Block

Fuse 1 (Phase 3 Loads)

Fuse 2 (Phase 2 Loads)

Fuse 3 (Phase 1 Loads)

Low Voltage Connections (12V) keypads, lights, in-pool sensor digital/analog expand ports

Mains Power Cable Entry Points

Heartbeat LED

DIP Switch Bank

Wall Mount Bracket

Wall Mount Bracket

AMP Power Outlets (230-240V AC) for spa accessories: circ, o_3/uv, air blower jet pumps, auxiliaries

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Coupling (tail & nut)

Coupling (tail & nut)

Earth Bonding Terminal

Heater Tube

Heater Cover Plate (remove to access heater connections)

Mounting Foot

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Spa Pack Dimensions

Front View

448.90 mm

RATINGS INFORMATION
Supply Voltage   230-240V 50/60 Hz
Output Sockets   230-240V 50/60 Hz
Phase   Single / Two / Three
Max Total Current   60A total
Max Multi Phase Current   25A per phase
Heater Power Rating   6000W Variable
Model Number   SV4-CS
IP Rating   IP44
Safety Standards   EN60335.1 / EN60335.2.60
Approval No: V10xxx   AS/NZS60335.1 / AS/NZS60335.2.60

WARNING! DANGEROUS VOLTAGE INSIDE
This product must be installed and maintained by qualified service personnel

SV4
ADVANCED SPA CONTROL
variable heater

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⌀ 6 mm

147.86 mm

18.50 mm

544.00 mm

Side View

90.00 mm

309.00 mm

Rear View

448.90 mm

⌀ 6 mm

147.86 mm

18.50 mm

544.00 mm

Bottom View

293.07 mm

544.00 mm

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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
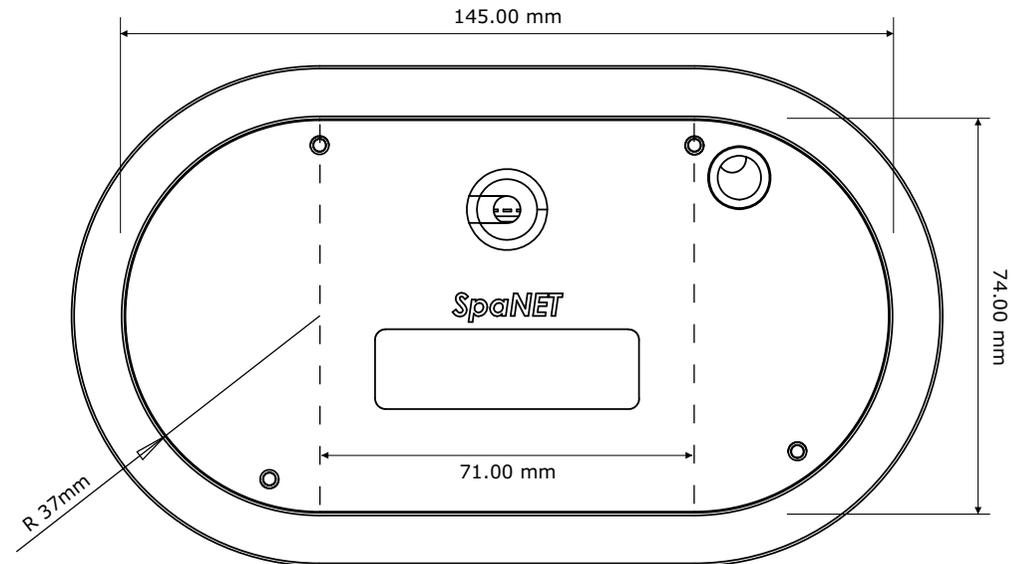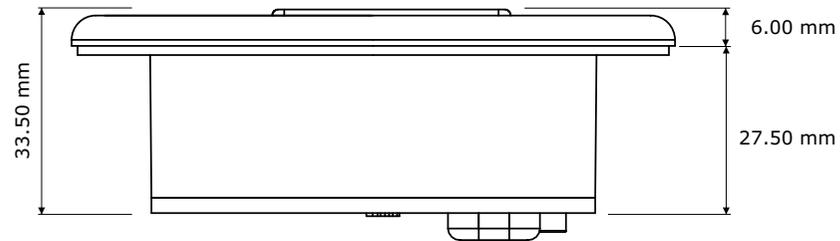
Keypad Dimensions

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

185.00 mm

100.00 mm

AUTO

O₃ / UV

zZz

OK

MODE

SPD/CL

SV-3T

6.00 mm

27.50 mm

33.50 mm

145.00 mm

74.00 mm

71.00 mm

R 37mm

SpaNET

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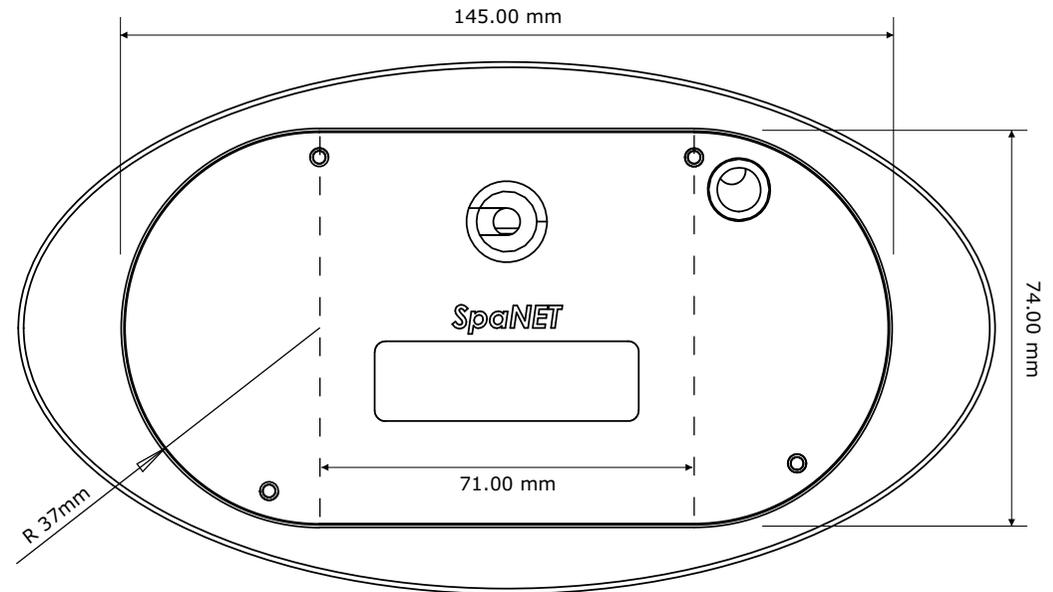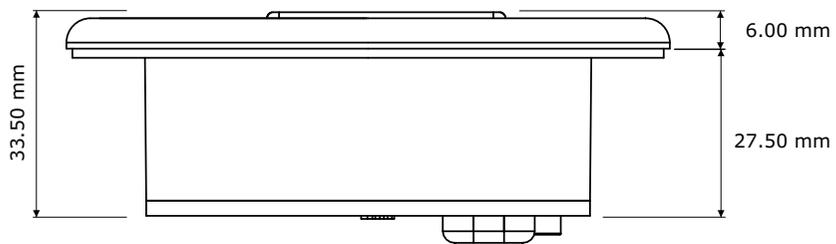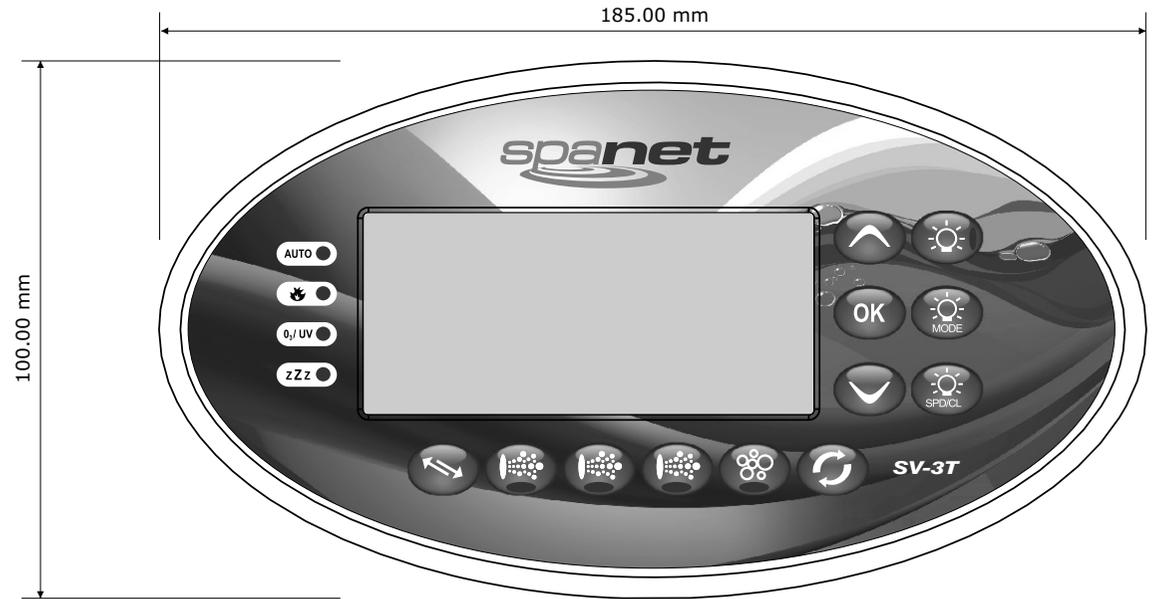
Spa Pack Installation

Floor mounting procedure
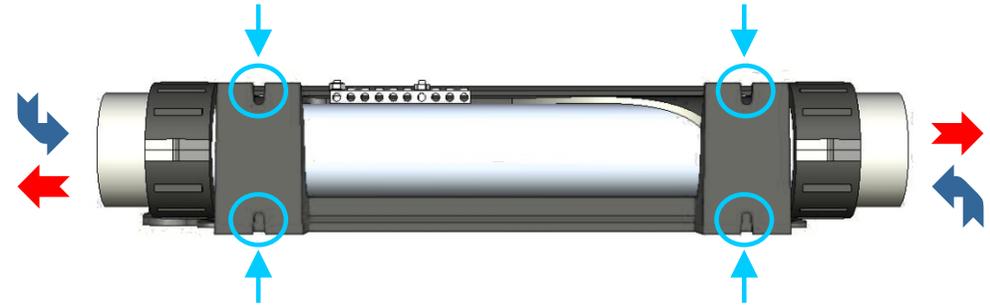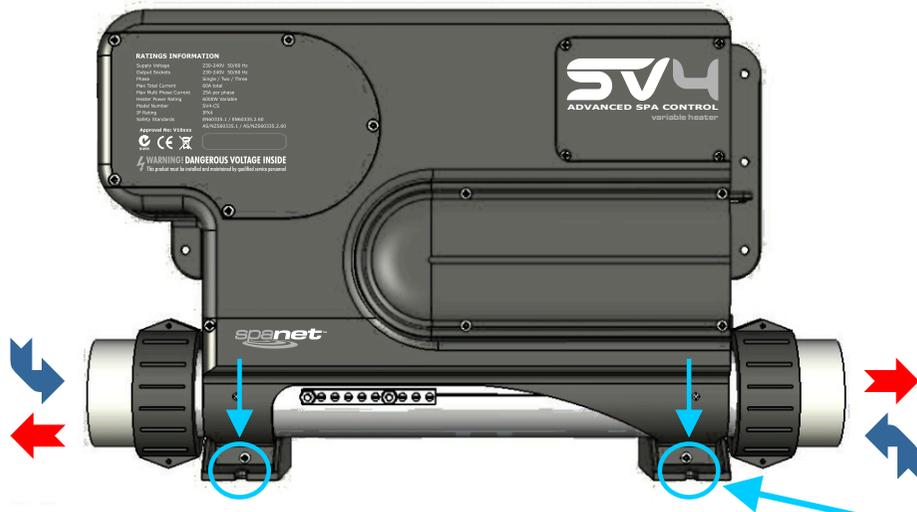
ℹ️ IMPORTANT NOTE

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 can be plumbed for water flow in either direction however the most preferred direction is for water to flow from left to right.

● 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.

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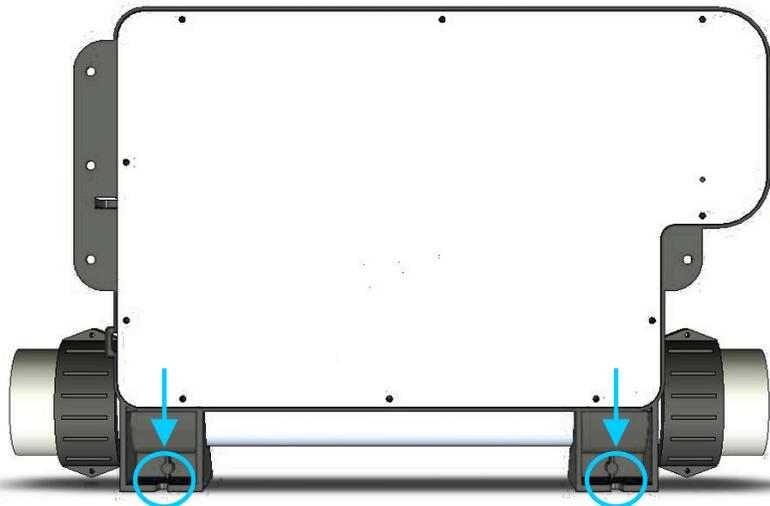
Spa Pack Installation

Wall mounting procedure

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 can be plumbed for water flow in either direction however the most preferred direction is for water to flow from left to right.

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ⓘ **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).

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Keypad Installation

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

Centre to Centre
71.00 mm

SV2.T

SV3.T / SV4.T

⌀ 76 mm

⌀ 76 mm

76 mm

147 mm
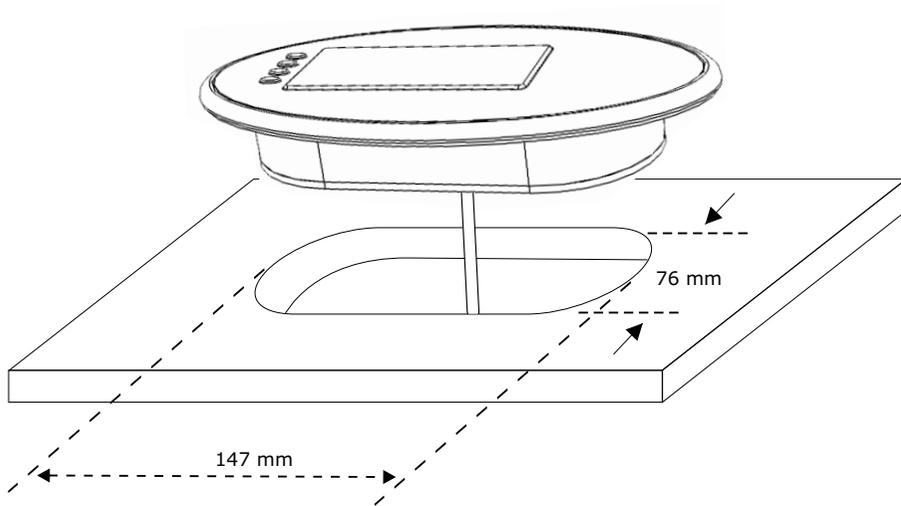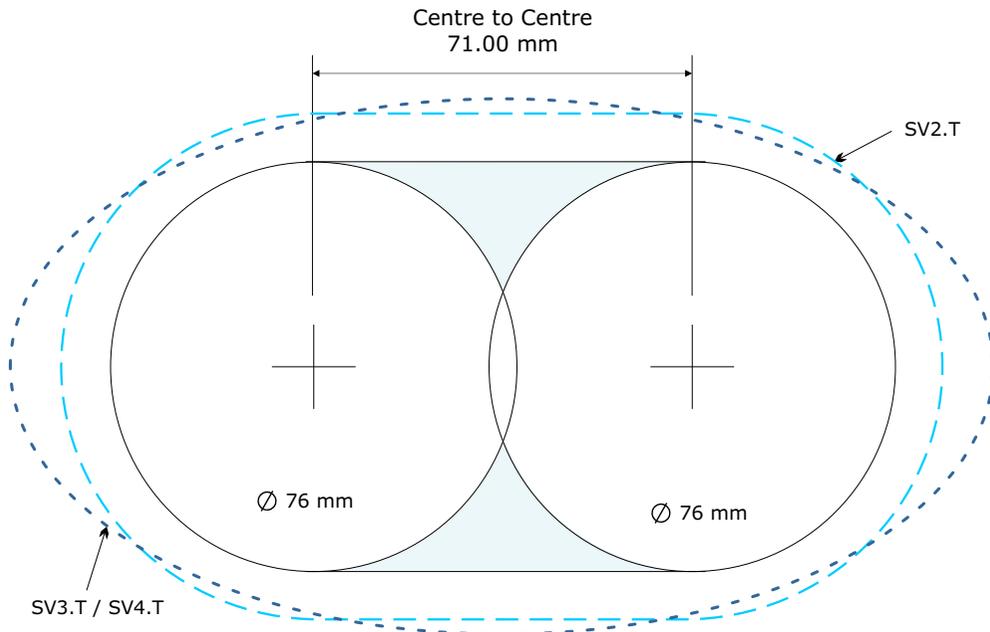
▶ Select a suitable keypad location that is above maximum water level and that is easily accessible to the spa user.

▶ 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
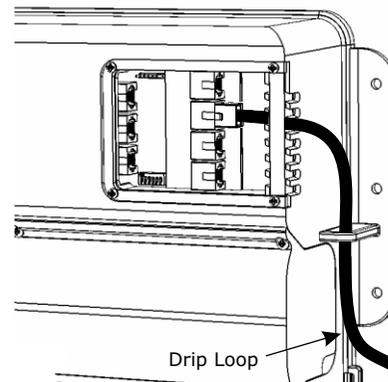
KEYPAD CABLE CONNECTION

▶ 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

Drip Loop

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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

Centre to Centre
71.00 mm

1 Drill both holes with 76mm Hole Saw

2 After drilling both holes remove this material from both sides

⌀ 76 mm

⌀ 76 mm

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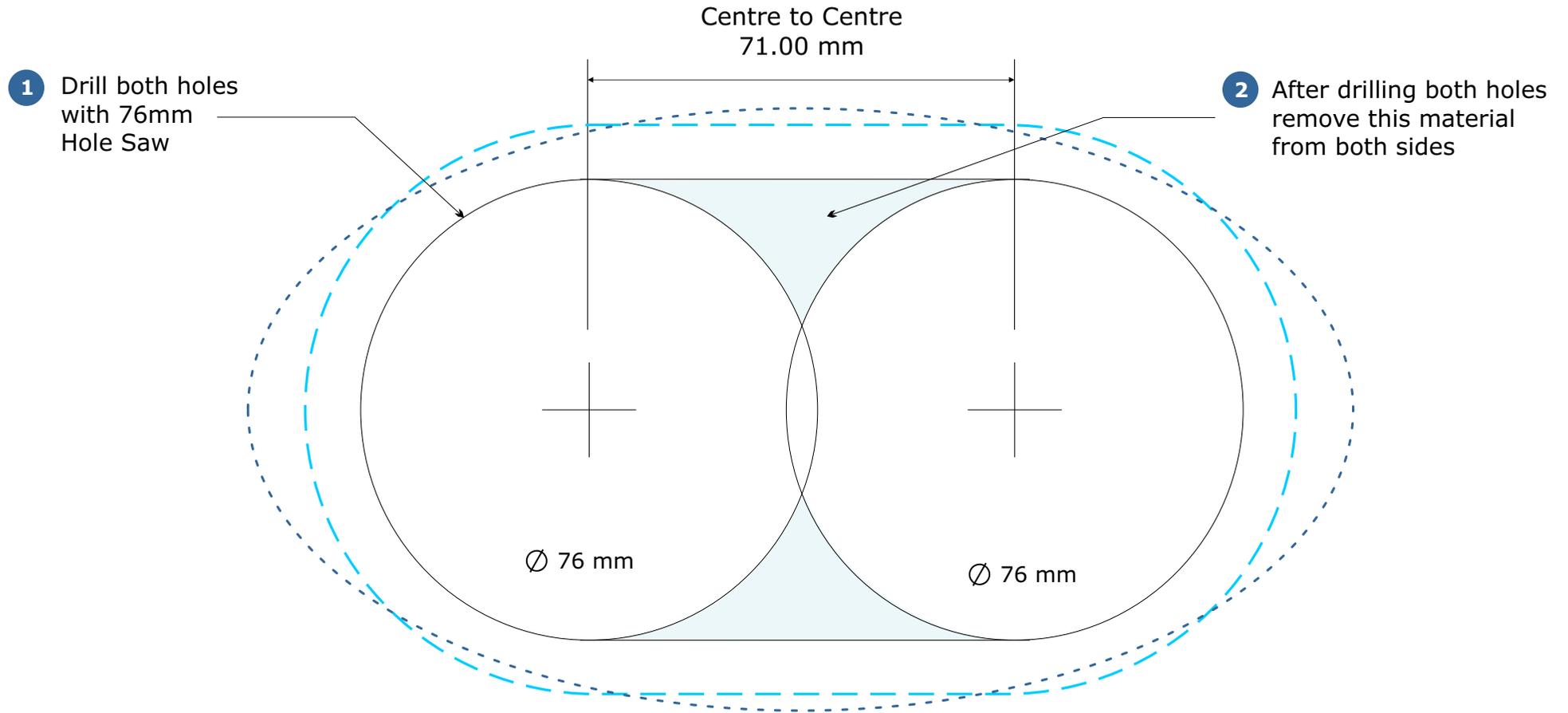
Electrical Wiring (Terminal Block Connections)

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 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.
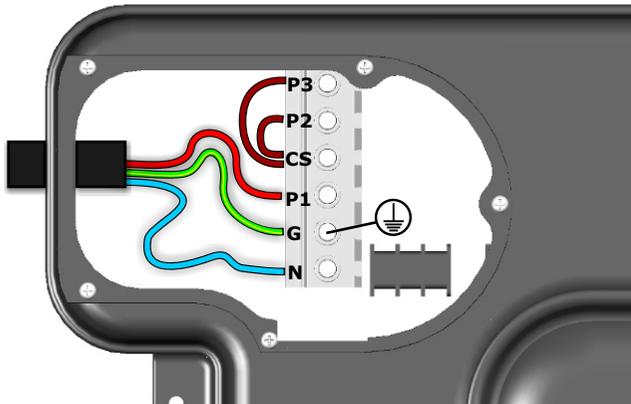
230-240V (3 wire) single phase

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
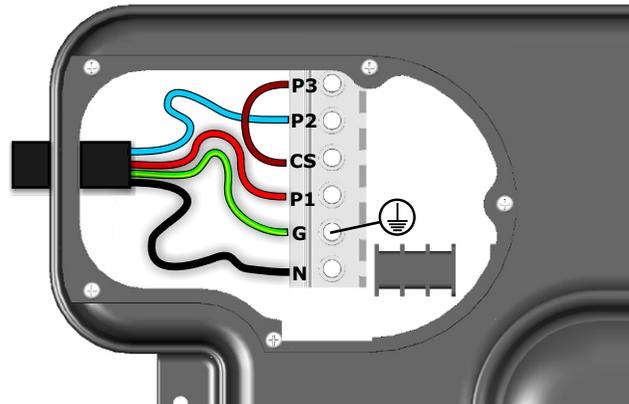
230-240V (4 wire) dual phase

Terminal	Wiring
P3	Link to CS
P2	Phase 2
CS	Link to P3
P1	Phase 1
G	Earth
N	Neutral
*Dip Switch 5	ON
*Dip Switch 6	OFF
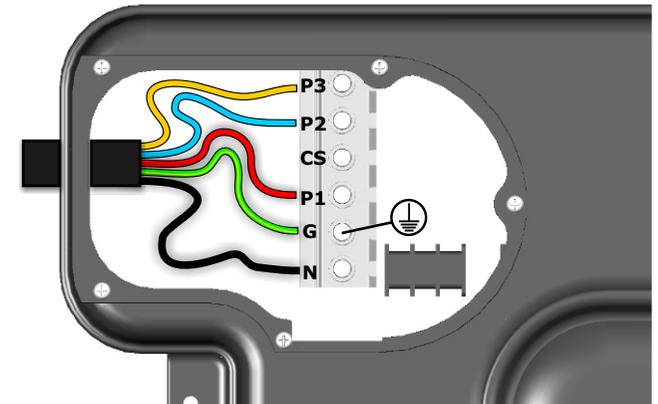
230-240V (5 wire) three phase

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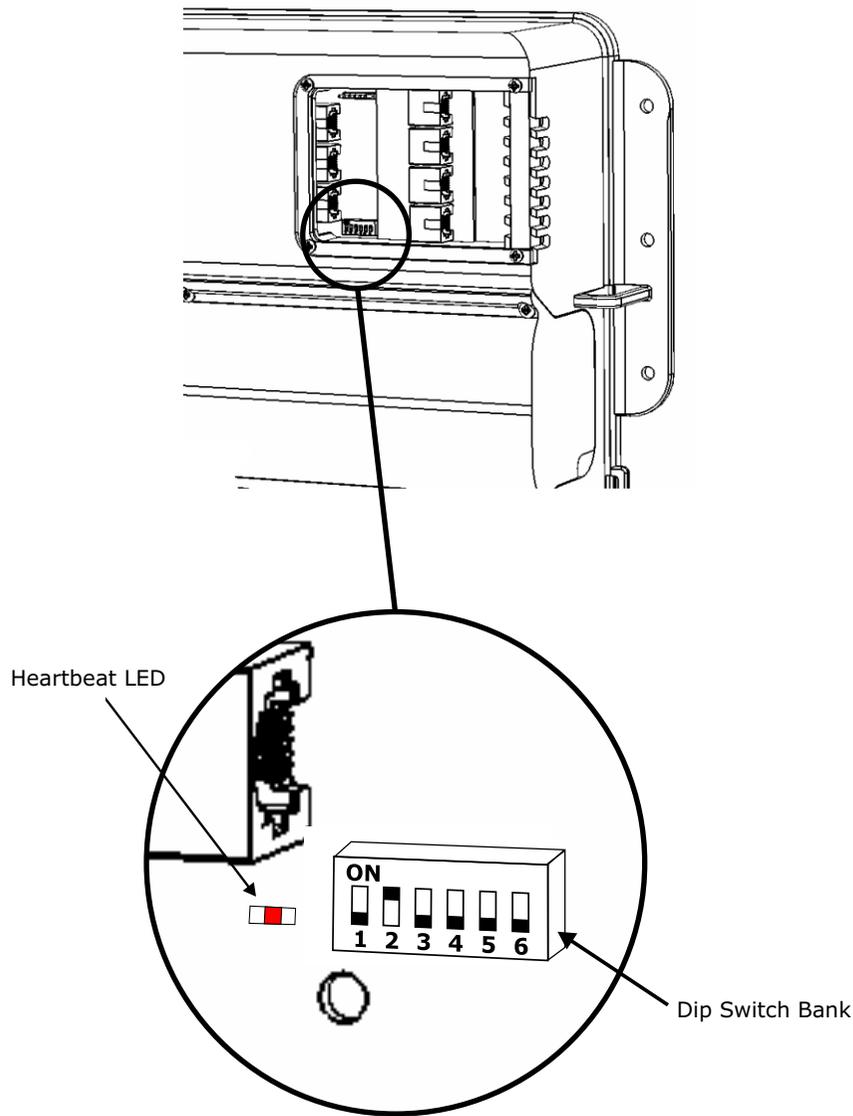
Basic spa configuration is achieved by setting dip switches. The dip switches determine pump configuration and select the number of input phases wired to the spa pack. The installer must correctly configure the dip switches to match the pump and power configuration connected to the spa pack.

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

Dip Switch Bank

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.

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Pump Configurations

System Configuration Reference Table

PUMP CONFIGURATIONS						DIP SWITCH SETTINGS				BUTTON ASSIGNMENTS			
MODEL	CIRC	PUMP1	PUMP2	PUMP3	PUMP4	SW1	SW2	SW3	SW4	PUMP A	PUMP B	PUMP C	PUMP D
SV2	no	1 spd	-	-	-	off	off	off	off	pump1 (on/off/auto)	-	-	-
SV2	no	2 spd	-	-	-	off	on	off	off	pump1 (low/off/auto)	pump1 (high/low)	-	-
SV2	yes	1 spd	-	-	-	on	off	off	off	circ pump (on/off/auto)	pump1 (on/off)	-	-
SV2	yes	2 spd	-	-	-	on	on	off	off	circ pump (on/off/auto)	pump1 (low/high/off)	-	-
SV3	no	1 spd	1 spd	-	-	off	off	off	off	pump1 (on/off/auto)	pump2 (on/off)	-	-
SV3	no	1 spd	1 spd	1 spd	-	off	off	on	off	pump1 (on/off/auto)	pump2 (on/off)	pump3 (on/off)	-
SV3	no	2 spd	n/a	1 spd	-	off	on	on	off	pump1 (low/off/auto)	pump1 (high/low)	pump3 (on/off)	-
SV3	yes	1 spd	1 spd	-	-	on	off	off	off	circ pump (on/off/auto)	pump1 (on/off)	pump2 (on/off)	-
SV3	yes	1 spd	1 spd	1 spd	-	on	off	on	off	pump1 (on/off)	pump2 (on/off)	pump3 (on/off)	-
SV3	yes	2 spd	n/a	1 spd	-	on	on	on	off	circ pump (on/off/auto)	pump1 (low/high/off)	pump3 (on/off)	-
SV4	no	1 spd	1 spd	1 spd	1 spd	off	off	off	on	pump1 (on/off/auto)	pump2 (on/off)	pump3 (on/off)	pump4 (on/off)
SV4	no	2 spd	n/a	1 spd	1 spd	off	on	off	on	pump1 (low/off/auto)	pump1 (high/low)	pump3 (on/off)	pump4 (on/off)
SV4	no	2 spd	n/a	2 spd	n/a	off	on	on	off	pump1 (low/off/auto)	pump1 (high/low)	pump3 (low/off)	pump3 (high/low)
SV4	yes	1 spd	1 spd	1 spd	1 spd	on	off	off	on	pump1 (on/off)	pump2 (on/off)	pump3 (on/off)	pump4 (on/off)
SV4	yes	2 spd	n/a	1 spd	1 spd	on	on	off	on	circ pump (on/off/auto)	pump1 (low/high/off)	pump3 (on/off)	pump4 (on/off)
SV4	yes	2 spd	n/a	2 spd	n/a	on	on	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

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AMP Power Outlets

230-240V AC Output

AMP Power Outlets

Securing Lugs

Locking Tabs

Plug Overmould

Firmly secured and latched in place
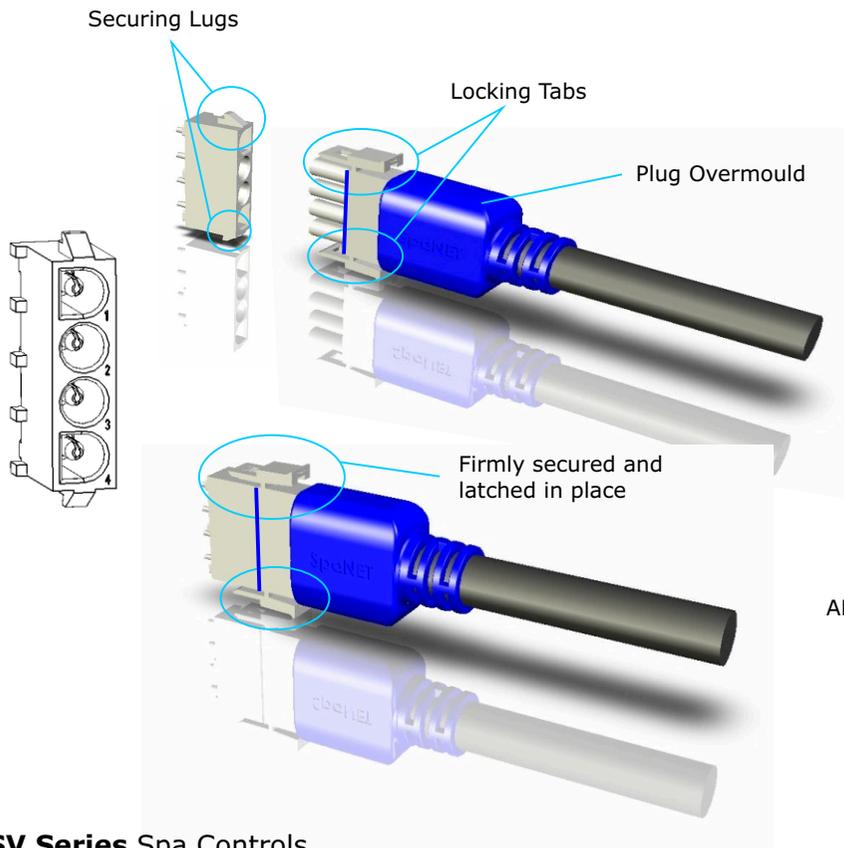
Multiple power output sockets are provided to run spa accessories. Each output socket is clearly labelled including the maximum current for that outlet. In addition the maximum current per phase is labelled. When connecting accessories the installer must consider the current draw of each appliance to 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 taps have been secured and latched in place (refer illustrations aside).

AMP Outlets Cover

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.

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Low Voltage Connections
12V AC

Low Voltage Connections

Cable guide holes used to route cables and form water proof seal

Drip Loop

in pool temperature sensor

colour LED spa light
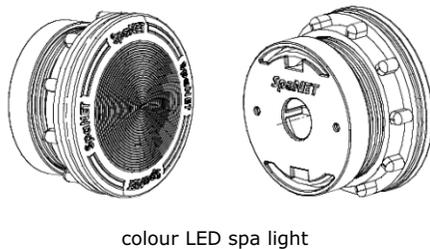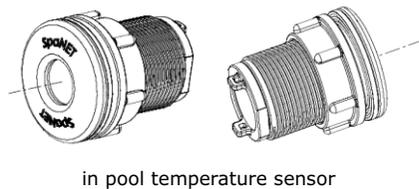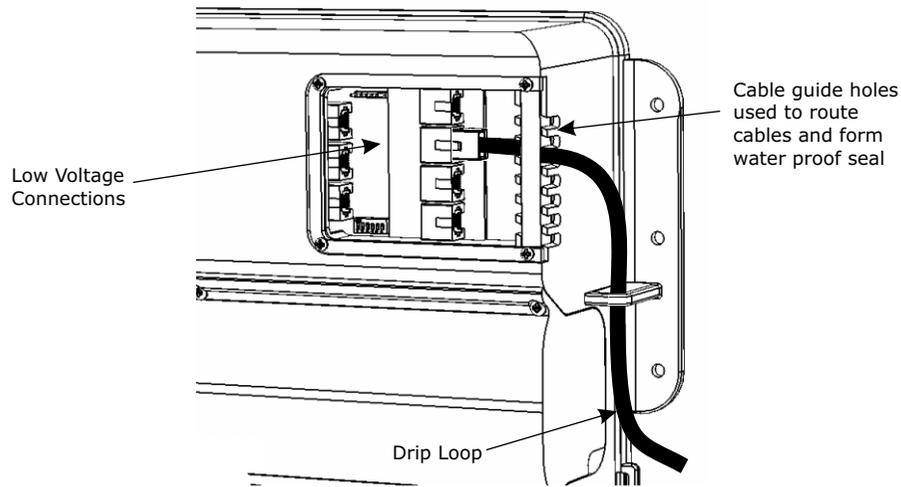
The low voltage connections are located on the top right hand corner of the spa pack. RJ45/RJ12 sockets are used for connection and are located inside the spa pack enclosure. The low voltage connections cover must be fitted and secured with screws for water proofing seal to work.

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

(i) 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.

Heat Pump Installation

How to connect a heat pump to a SVx-VH controller

All variable heater models of the SV Series spa controllers have the capability to seamlessly integrate and control a heat pump for efficient heating and cooling of the spa water. Not all heat pumps can be connected to an SV controller. Only a SpaNET approved heat pump fitted with a SpaNET heat pump expansion module can be used.

If connected the SV controller will automatically detect the heat pump and take control of its operation. All heat pump functions including heating / cooling / temperature adjustment / defrost cycles / over temp protection / diagnostics and monitoring are all controlled by the SV spa controller and the SV spa side touch pad.

HEAT PUMP CONNECTION

▶ Connect power to the heat pump from either:

  a) a dedicated 230V mains outlet on the SV controller itself
  Note: Check ratings information of heat pump to be connected and ensure maximum current limit for the SV mains outlet is not exceeded

  b) a suitably rated and protected power supply

▶ The heat pump should be plumbed in-line before the SV controller so that water flows from the heat pump through the SV controller and then returns into the spa pool.

▶ The heat pump MUST be installed according to the air space requirements detailed in the SV Series Heat Pump Installation Manual. Failure to do so will void heat pump warranty.

▶ Connect the heat pump data cable into the Expand2 (EXP2) data socket of the SV controller

▶ Finally configure the H.PMP (heat pump operating mode) and H.ELE (SV element boost) SETUP menu options to your desired specification (refer Setup menu section of SV Series User Manual)

ⓘ IMPORTANT NOTES

● Not all heat pumps can be connected to an SV controller. Only a SpaNET approved heat pump fitted with a SpaNET heat pump expansion module can be used.

● If the ambient temperature is below the operational limit of the heat pump (-10 'C) the SV heater element will be enabled regardless of the H.ELE setting, and the heat pump is disabled.

● If H.ELE is set to ON the SV heater element will operate in conjunction with the heat pump to boost heating only if the water temperature is 2'C or more below the set temperature point or the heat pump has been operating for more than 1 hour and the set temperature point has not been reached.

● A defrost cycle will run for a minimum of 3 minutes and a maximum of 10 minutes

● If the heat pump being used is fitted with a flow switch, the flow switch must close within 30 seconds of filtration pump operation otherwise a flow error will occur

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Program Circuit Breaker Rating

For variable element operation

Press & hold ⊛ + ↻

C.LMT

Press OK to enter adjustment

31 A ← ∨ | 32 A | ∧ → 33 A

Press OK to confirm & save
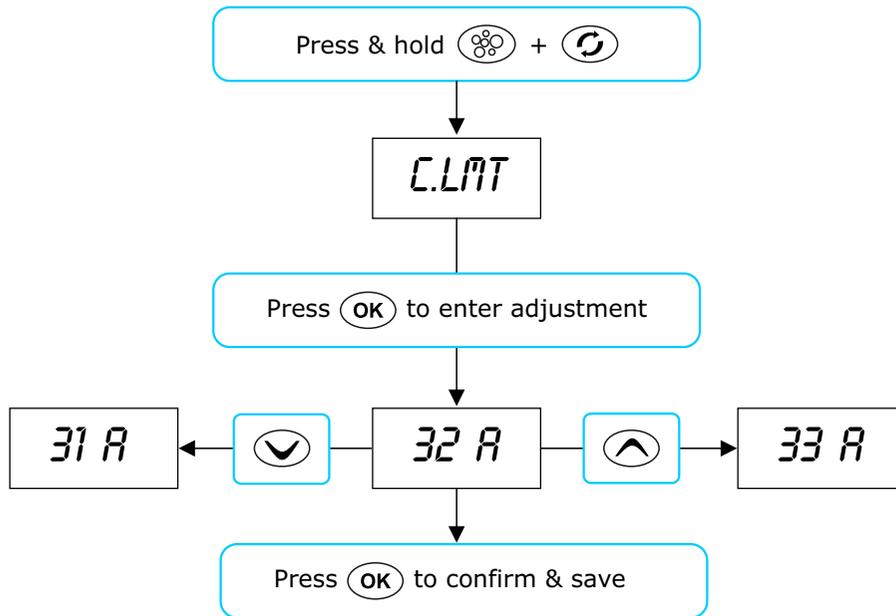
ℹ **IMPORTANT NOTES**

- The installer must program the C.LMT (current limit) setting to match the rating of the circuit breaker that feeds the spa pool or for multi-phase installs the rating of the current limit of Phase 1.

- 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.
  (Note: 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 power level 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. In multi phase installations the C.LMT should be set to match the current limit of Phase 1. To take full advantage of the variable element and maximise heater power level 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 controller 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 OK button to enter current limit (C.LMT) adjustment

▶ Press ∧ or ∨ to adjust current limit to match circuit breaker rating

▶ Press OK button to confirm and save setting

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OEM Configuration Menu

Access via keypad

Press & hold ⊛ + ↻

↓

| EXIT | ← | ⌄ | C.LMT | ∧ | → | L.SHD |

↓

Press OK to enter adjustment

↓

| 31 A | ← | ⌄ | 32 A | ∧ | → | 33 A |

↓

Press OK to confirm & save
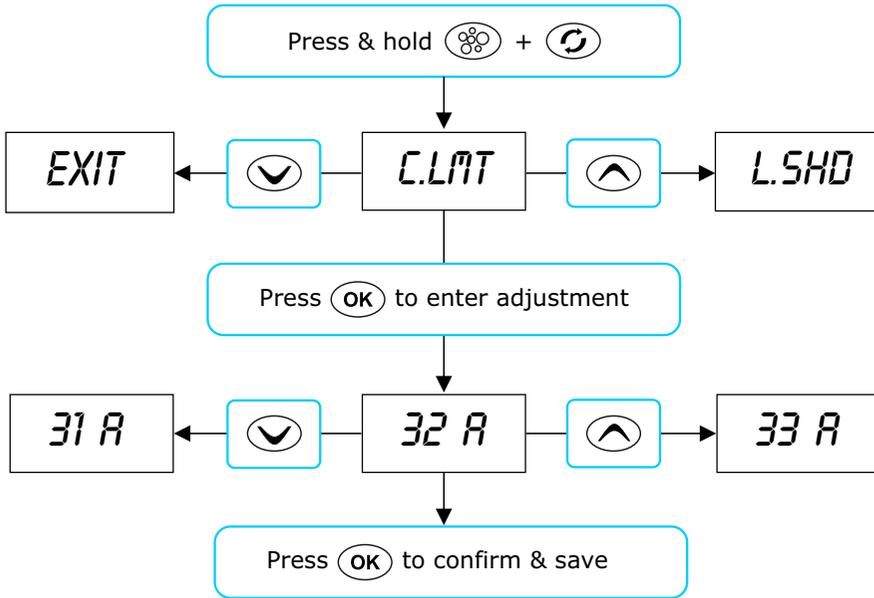
ⓘ IMPORTANT NOTES

- 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/V.MAX/1.LLM/2.LLM/3.LLM.

- 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 controller. 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 OK to enter menu item adjustment

▶ Press ∧ or ⌄ to adjust setting

▶ Press OK 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_3/uv) on with spa use	on / off
C.JET	Circ pump on with jet pump operation	on / off
V.ELE	Variable element	on / off
V.MAX	Maximum variable element power	3A to 25A
H.USE	Heat pump operation when spa in use	on / off
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_3/uv) on 24 hrs	on / off
C 24	Circ pump on 24 hrs	on / off
CAL	Calibration 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
H.AMB	Heat pump ambient temp reading	DO NOT adjust without advice from SpaNET
H.CON	Heat pump condenser temp reading	DO NOT adjust without advice from SpaNET
EXIT	Exit calibration submenu	
SERT	Service timers menu	
1.SER	Service timer 1 [service filters]	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	
D.FST	Heat pump defrost calibration menu	DO NOT adjust without advice from SpaNET
EPRM	Reset EEPROM values to factory default	All values reset except C.LMT / x.LLM / V.MAX
EXIT	Exit OEM configuration menu	

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OEM Configuration Menu

Menu item details

L.SHD   Load Shed Count

This setting determines the load shed behaviour of the heating element or heat pump (if fitted). 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 (o₃/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)

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 power level 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 maximum current the heating element draws (3A to 25A) via the V.MAX menu item. This enables the installer to reduce the heater current draw 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 current if more power became available.

The V.MAX setting ranges from 3A to 25A
Default setting = 23A

H.USE   Heat Pump Operation (when spa pool is in use)

This setting determines whether the heat pump will operate if spa pool is in use. The benefit being that some spa owners may not wish to hear the noise of the heat pump running whilst they are using the spa. The setting choices are:

ON   heat pump operation ENABLED whilst spa is in use (default)
OFF   heat pump operation DISABLED whilst spa is in use

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OEM Configuration Menu

Menu item details

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.

UNIT   Temperature Format

Used to select desired temperature format °C or °F

A.HYS   Adaptive Hysteresis (Dynamic Thermal Tuning)

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 the 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 Submenu

Every SV controller is calibrated for mains voltage and current measurement during production. However, should the SV controller readings not agree with a true RMS 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	

V.ADJ   Field adjustment of the voltage reading should follow the following procedure:

1) Measure the mains voltage using a **true RMS** multi meter.
2) Adjust the voltage reading using V.ADJ to match the multi meter.

C.ADJ   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 **true RMS** 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.

OEM Configuration Menu

Menu item details

CAL   **Calibration Submenu (continued)**

In spa configurations where a heat pump is installed the Calibration "CAL" sub menu will offer a further two options:

H.AMB	Heat pump ambient temp reading	adjust with up/down buttons
H.CON	Heat pump condenser temp reading	adjust with up/down buttons

H.AMB   Field adjustment of the heat pump ambient temperature reading should follow the following procedure:

    1) Measure the ambient temperature around the heat pump external ambient thermistor using a **true RMS** multi meter thermistor.
    2) Adjust the temperature reading using H.AMB to match the multi meter reading.

H.CON   Field adjustment of the heat pump condenser temperature reading should follow the following procedure:

    1) Remove the heat pump external cabinet to gain access to the area where the condenser thermistor is located.
    2) Measure the temperature of the heat pump condenser at the point where the heat pump condenser thermistor is located using a **true RMS** multi meter thermistor.
    2) Adjust the temperature reading using H.CON to match the multi meter reading.

> **NOTE:**   **All SV controllers and SV series heat pumps are shipped pre-calibrated. <u>DO NOT</u> adjust the H.AMB or H.CON settings unless specifically directed to by SpaNET.**

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.

The x.SER setting ranges from 0 to 52 weeks.

Default Values:

1.SER [SERVICE FILTERS] = 2 weeks
2.SER [SERVICE 2] = 0 weeks (disabled)
3.SER [SERVICE 3] = 0 weeks (disabled)

D.FST   **Heat Pump Defrost Calibration Submenu**

These settings allow adjustment of various heat pump defrost parameters. **All settings are pre-configured by SpaNET during production and should NOT be adjusted unless specifically directed to by SpaNET.** Incorrect calibration could cause the heat pump to malfunction in cold conditions and this may void your product warranty. DO NOT ADJUST.

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OEM Configuration Menu

Menu item details

EPRM   EEPROM Reset

Use this feature to reset all OEM menu and User menu items back to their default values. All values will be reset to their default setting except:

C.LMT / V.MAX / 1.LLM / 2.LLM / 3.LLM

The above values are NOT reset because they will have been customised to suit the particular spa pool and its available power supply by the spa manufacturer or installing electrician.

EXIT   Exit OEM Menu

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Diagnostics Menu

Access via keypad

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 OK 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	If IPTS not fitted, display will show 9997
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%
H.AMB	Heat pump ambient temperature	
H.CON	Heat pump condensor temperature	
EXIT	Exit menu	

Press & hold 🎛️ + 🔄 + ☀️

EXIT ← ⌄ WARN ⌃ → S.DAT

Press OK to view diagnostic information

ℹ️ 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 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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