VTS20G1 Tech Sheet

Customer: **Balboa Water Group**

Part Number: 59338 800 Incoloy 5.5kW

Custom Box Overlay	☐
Box Overlay Part Number	N/A
UL System Model:	BP20-VTS20G1-AU
Software Version ID:	M100_220 V56.0
Software Version:	56.0
File Name:	BP2000_56.0_VTS20G1.hex
Configuration Signature:	0CC63892
Eng. Project Number:	5451

Control Panels:

generic ST2 Swim	version 2.46 or later
generic ST2 Swim-Aware	version 2.32 or later

Note: Use of non-swim-aware panels with this system is not recommended.

System Revision History

Part #	EPN	Date	Originator	Changes Made
59338	5451	08-27-20	BWG	Generic VITESSE™-based swim system, using BP2000 with no expander board, supporting 2 VITESSE™(VSP) pumps, plus other pumps in various configurations.

bba™ & bba™2 (Balboa Bluetooth Amp) connection is documented seperately.

bba™ is integrated into graphic display panels (TP800, TP900 and spaTouch™).

bba™2 is integrated into graphic display panels (TP800, TP900 and spaTouch™).

M8 feature implemented. See M8 Information Guide (Balboa document PN 42329) for more information.

Basic Functions Setups 1 - 7

Power Requirements:

240VAC, 50/60Hz*, 48A, Class A GFCI-protected service (Circuit Breaker = 60A max.),
4 wires [hot, hot, neutral, ground]

* BP systems automatically detect 50Hz vs 60Hz. However, power frequency (50Hz vs 60Hz) is just one of many differences between North American (UL) and CE power, and it is because of these other differences that different BP systems must be used for UL vs CE territories. Also, there are a few countries that use CE power but 60 Hz (such as South Korea) which need CE systems, and a few countries that use UL power but 50 Hz which need UL systems.

System Ouputs:

Pump 1	240VAC	2-Speed 1-Speed in Setups 5 & 6 Unused in Setup 7 Used as buoyancy pump in Setups 1, 2 & 5, as non-swim pump in other Setups This is the heater pump in Setups 2 & 4 Must deliver 20 GPM through heater	12A max	15-minute timer in high speed, 15 minute timer in low speed
VSP Pump 1	240VAC	On/Off**	12A/14A max***	15-minute timer
VSP Pump 2	240VAC	On/OFF**	12A/14A max***	15-minute timer
Circ Pump	240VAC****	1-Speed This is the heater pump in Setup 1, 3 & 5 - 7 Must deliver 20 GPM through heater	2A max	Programmable Filtration Cycles + Polling
Ozone	240VAC****		.5A max	Slaved to Circ Pump in Circ Setups, Independent in Non-Circ Setups
Spa Light	10VAC	On/Off	2A* max	240-minute timer.
A/V (Stereo)	240VAC*****	Hot	2A max	Always on
Heater	5.5kW @ 240VAC max			

HiPot Testing Note:
Disconnect slip terminal with green wires from J6 prior to performing HiPot test. Failure to disconnect may cause a false failure of the test. Reconnect terminal to J6 after successful completion of HiPot test.

* 2A max limit is shared by On/Off Spa Light and CHROMAZON∃™.

Swim Mode timeouts are documented in the VITESSE™ swim User Guide.

** The relay output for each VSP Pump is On/Off. But through a communications cable, the VSP Pump can be commanded to run at 1 of 25 different speeds.

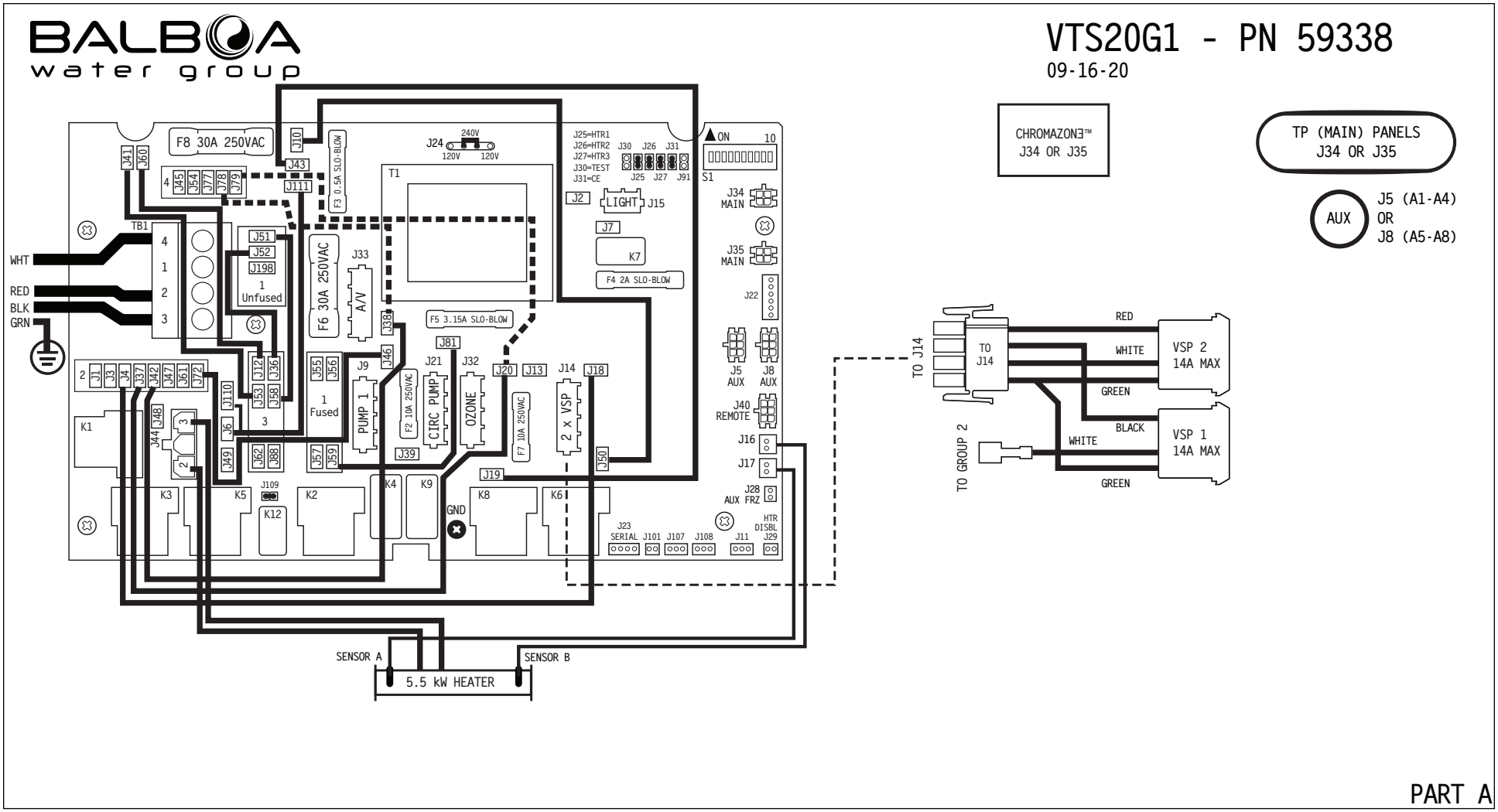
*** The maximum of 12A vs 14A for VSP Pumps is determined by the setting of DIP Switch A7.

**** Circ and Ozone can be converted to 120V, but both must be the same voltage.

***** A/V (Stereo) can be converted to 120V, but in that case is 4A Max.

Hardware Setup

Wiring Diagram



Hardware Setup

Settings

LOCATION	DEVICE	VOLTS	MAX AMPS	FROM	TO
J9	2/1-SP PUMP 1	240V	12A MAX	J46	GROUP 2
J14	VSP 1 + VSP 2	240V	14A + 14A	J18	GROUP 2
	J14 LINE 1 CONNECTION			J43 J10	J19 J50
J15	SPA LIGHT	10V	2A*		
J21	CIRC PUMP	240V***	2A MAX	J20	GROUP 2
J32	OZONE		0.5A		
	CIRC AND OZONE LINE 1 CONNECTION			J81	J59
J33	TV / AV	240V**	2A	J38	GROUP 2
J44	HEATER	240V	5.5 kW		

* 2A LIMIT IS SHARED BY J15 SPA LIGHT AND CHROMAZONE™

** FOR 120V A/V, CONNECT J38 TO GROUP 4. AT 120V, A/V IS 4A MAX.

*** FOR 120V CIRC/OZONE, CONNECT J20 TO GROUP 4. CIRC AND OZONE MUST BE THE SAME VOLTAGE.

SWITCHBANK S1 OFF		SWITCHBANK S1 ON
TEST MODE OFF	◀ A1	TEST MODE ON
DON'T ADD 1 HS PUMP W/HTR	A2 ▶	ADD 1 HS PUMP WITH HEAT
DON'T ADD 2 HS PUMPS W/HTR	◀ A3	ADD 2 HS PUMPS WITH HEAT
DON'T ADD 4 HS PUMPS W/HTR	◀ A4	ADD 4 HS PUMPS WITH HEAT
SPECIAL AMPERAGE RULE A	◀ A5	SPECIAL AMPERAGE RULE B
STORE SETTINGS**	◀ A6	MEMORY RESET**
14A VSP OPERATION	A7 ▶	12A VSP OPERATION
NOT ASSIGNED	◀ A8	NOT ASSIGNED
NOT ASSIGNED	◀ A9	NOT ASSIGNED
NOT ASSIGNED	◀ A10	NOT ASSIGNED

** SWITCH # 6 SHOULD BE SET TO OFF UPON FINAL INSTALLATION.

USE COPPER CONDUCTORS ONLY.
EMPLOYER UNIQUEMENT DES CONDUCTEURS DE CUIVRE.
#6 AWG MIN. WIRE = 90°

FOR SUPPLY CONNECTIONS, USE CONDUCTORS SIZED ON THE BASIS OF 60°C AMPACITY BUT RATED MINIMUM OF 90°C.

TORQUE RANGE FOR MAIN TERMINAL BLOCK (TB1):
27-30 IN. LBS. (31.1-34.5 kg cm)

CONNECT ONLY TO CIRCUITS PROTECTED BY A CLASS A GFCI.

A DISCONNECTING MEANS MUST BE INSTALLED WITHIN SIGHT FROM THE EQUIPMENT AND AT LEAST 5 FEET (1.52 M) FROM THE INSIDE WALLS OF THE POOL, SPA, OR HOT TUB.

TOTAL OUTPUT AMP DRAW NOT TO EXCEED MAX INPUT RATING OF SPA
USE EARTH GROUND CONNECTIONS AS INDICATED INSIDE THE SYSTEM ENCLOSURE

INSTEAD OF SETUP #1, THIS SYSTEM IS CONFIGURED IN SETUP #:

SETUP #	CIRC PUMP	PUMP 1	VSP 1	VSP 2	PUMP 1 FUNCTION	TEMP SCALE
1	PROGRAMMABLE FILTRATION + POLLING	2-SPEED	25-SPEED	25-SPEED	BUOYANCY	°F
2	NONE	2-SPEED	25-SPEED	25-SPEED	BUOYANCY	°F
3	PROGRAMMABLE FILTRATION + POLLING	2-SPEED	25-SPEED	25-SPEED	NON-SWIM	°F
4	NONE	2-SPEED	25-SPEED	25-SPEED	NON-SWIM	°F
5	PROGRAMMABLE FILTRATION + POLLING	1-SPEED	25-SPEED	25-SPEED	BUOYANCY	°F
6	PROGRAMMABLE FILTRATION + POLLING	1-SPEED	25-SPEED	25-SPEED	NON-SWIM	°F
7	PROGRAMMABLE FILTRATION + POLLING	NONE	25-SPEED	25-SPEED	NONE	°F

BALBOA water group

VTS20G1 - PN 59338
09-16-20
PART B

BALBOA water group

Setup Reference Table

Setup #	Circ Pump	Pump 1	Pump 1 Function	VSP 1	VSP 2	Temp Scale
1	Programmable Filtration + Polling	2-Speed	Buoyancy Pump	25-Speed	25-Speed	°F
2	None	2-Speed	Buoyancy Pump	25-Speed	25-Speed	°F
3	Programmable Filtration + Polling	2-Speed	Non-Swim Pump	25-Speed	25-Speed	°F
4	None	2-Speed	Non-Swim Pump	25-Speed	25-Speed	°F
5	Programmable Filtration + Polling	1-Speed	Buoyancy Pump	25-Speed	25-Speed	°F
6	Programmable Filtration + Polling	1-Speed	Non-Swim Pump	25-Speed	25-Speed	°F
7	Programmable Filtration + Polling	None	None	25-Speed	25-Speed	°F

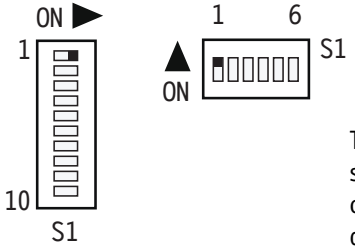
System (and any replacement board) **is shipped in Setup 1**

Changing Software Setups with spaTouch™ Icon-Driven Panels

Test Menu Access (S1, Switch 1 ON) *Service Technician ONLY.*

DANGER! HIGH VOLTAGE WILL BE ACCESSIBLE! SERVICE TECHNICIAN ONLY!

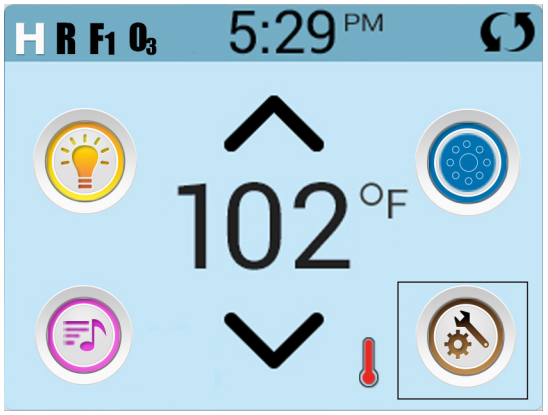
While the system is running, move DIP Switch 1 (on S1 on the Main circuit board) to ON. The system will enter Test Mode.
Moving DIP Switch 1 to OFF will exit Test Mode.

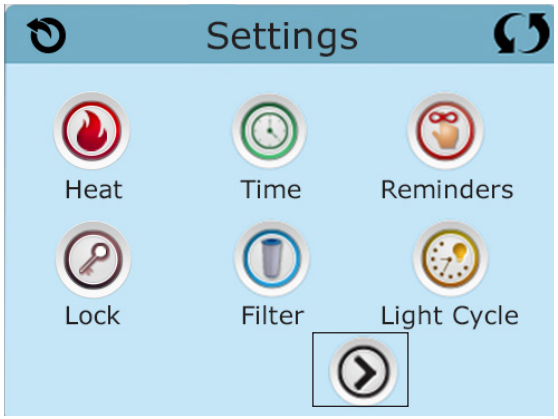


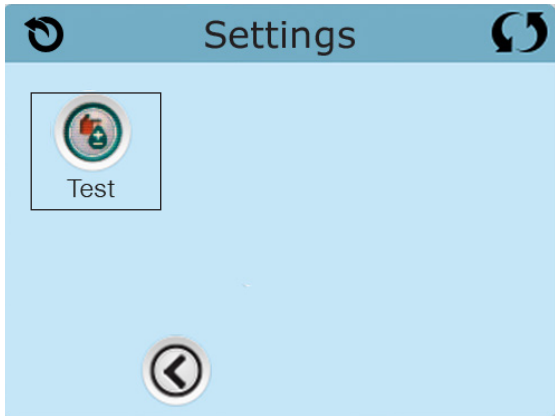
To Change Software Setups:

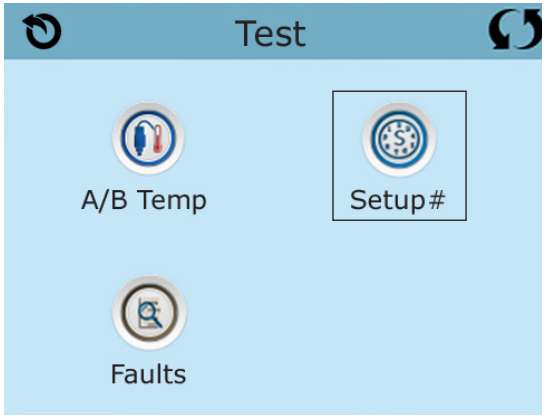
While in Test Mode, press the indicated icons to move from screen to screen.

The example screens shown here are from the spaTouch 1 Icon-Driven Panel, but the screens on the spaTouch 2 Panel are similar. The main difference is that the spaTouch 2 display is wider.



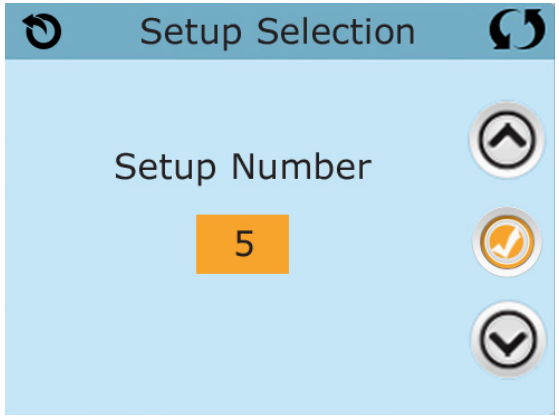






Once on the Setup Selection screen, press the Up or Down icon to select the desired Setup Number, then press the Check Mark icon to confirm and to have the spa restart.

After the system restarts, you may see a message that "The settings have been reset"; this is normal after changing Setups with DIP Switch 6 in the OFF position. Press "Clear" to dismiss this message.



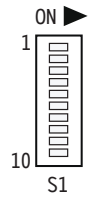
Equipment Expansion

Expansion Features

Control Connection	Default	Fuse
Relay 1 (J101)	Undefined	None
Relay 7/8 (J107)	Undefined	None
Relay 9/10 (J108)	Undefined	None

DIP Switch Functions

Fixed-fuction DIP Switches



A1	Test Mode (normally Off).
A2	In “ON” position, add one high-speed pump (or blower) with Heater.
A3	In “ON” position, add two high-speed pumps (or 1 HS Pump and Blower) with Heater.
A4	In “ON” position, add four high-speed pumps (or 3 HS Pumps and Blower) with Heater.
A5	In “ON” position, enables Special Amperage Rule B. See Special Features section under Configuration Options for functionality with your system. In “OFF” position, enables Special Amperage Rule A.
A6	Persistent memory reset (Used when the spa is powering up to restore factory settings as determined by software configuration).

A2, A3, and A4 work in combination to determine the number of high-speed devices and blowers that can run before the heat is disabled. i.e. A2 and A3 in the ON position and A4 in the OFF position will allow the heater to operate with up to 3 high-speed pumps (or two HS Pumps and Blower) running at the same time. Heat is disabled when the fourth high-speed pump or blower is turned on.

Note: *A2/A3/A4 all off = No heat with any high-speed pump or blower.*

Assignable DIP Switches

A7	In “ON” position, enables 12A operation of the VSP pump. In “OFF” position, enables 14A operation of the VSP pump.

Undesignated switches are not assigned a function.

Jumper Definitions

J109	GFCI Test/Trip Enable ***Note:*** *This feature must be enabled in software as well.*	J109 
J91	Real Time Clock Enable/Disable ***Note:*** *This Jumper should NOT be shorted when the Control Panel can display time of day.*	J91 
J30	Do Not Use	
J31	Non Applicable	
J29	Heater Disable Switch Connection. If J29 is shorted by any means, the heater will not run until J29 is no longer shorted. If J29 is shorted during power-up "J29" will appear on the panel. The message can be dismissed with a button press, and is the only control panel notification of J29 being shorted. No message is displayed if J29 is shorted after power-up, but the heater will not run until J29 is no longer shorted. J29 expects a switch closure (not a voltage) as the command signal. In some areas, a local power company may offer discounts based on voluntary "power shedding" devices that may be installed in conjunction with the spa.	J29 
J25, J26, J27	Heater Type Settings. ***Note:*** *Factory Configured do not change.*	J27  J25   J26
J24	Jumper on center two pins (230V) when system input is running at 240V. Two Jumpers installed; one on left 2 pins and one on right 2 pins (115V) when system input is running at 120V.	230V J24  115V 115V

Warning!

Setting DIP switches or jumpers incorrectly may cause abnormal system behavior and/or damage to system components.

Refer to Switchbank illustration on Wiring Configuration page for correct settings for this system.

Contact Balboa if you require additional configuration pages added to this tech sheet.

BALBOA water group

Replacement Parts

PCBA:

Main PCBA:	59339
Expander PCBA:	N/A

HEATER(s):

Plug + Click Heater Kit:	58306 5.5kW 800Inc
Temp Sensor Kit:	53605

CABLES: 25858 Y-Adapter Cable VSP2/VSP1

FUSES:

Part Number	Amperage*	Location
30136	30A	F6, F8
26307	2A	F4
26905	0.5A	F3
26904	10A	F2, F7
26976	3.15A	F5

* The amperages shown above are only intended for identifying fuses on our boards. They are not complete descriptions of those fuses. Please use the part numbers at the left to order fuses directly from Balboa.

BP2000 Configuration Options

General Features

Feature	Default
Pump 1 in Filter Cycle (Circ Only)	No
Pump 1 Low Timer	*15 Minutes*
General Pump Timer	15 Minutes
Blower Timer	15 Minutes
Mister Timer	15 Minutes
Light Timer	240 Minutes
Circ (when enabled)	Programmable + Polling
Cleanup Cycle	*30 Minutes*
Cleanup as Preference setting	*Yes*
Ozone	With Heater Pump*
Ozone Suppression	OFF
Pump Purge	60 Seconds
Blower Purge	30 Seconds
Mister Purge	5 Seconds
Purge Type	Serial - Pumps at lowest speed

* The heater Pump can be either a Circ Pump or Pump 1 Low.

BP2000 Configuration Options

Temperature Features

Feature	Default
Temperature Display	°F

All temperatures must be specified in °F. The system converts °F to °C dynamically. If Celsius is required for default settings, choose a desired °C value that (after rounding) corresponds to a Fahrenheit value.

°C	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
°F	39	41	43	45	46	48	50	52	54	55	57	59	61	63	64	66	68	70	72
°C	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
°F	73	75	77	79	81	82	84	86	88	90	91	93	95	97	99	100	102	104	

Hi-Range Min. Set Temp	80°F
Hi-Range Max. Set Temp	104°F
Hi-Range Default Temp*	100°F
Lo-Range Min. Set Temp	50°F
Lo-Range Max. Set Temp	99°F
Lo-Range Default Temp*	70°F
Freeze Threshold	44°F
Freeze Type	Rotating - Pumps at Low
Temp Lock Type	Temp + Settings
Default Temp Range	*Low Range*

**May be changed by end-user (if enabled)*

BP2000 Configuration Options

Time Features

Feature	Default
Time Format*	12 Hour
Filter 1 Start Hour*	20:00 (8:00 PM)
Filter 1 Duration*	2 Hours
Filter Cycle 2 Default*	OFF
Filter 2 Start Hour*	08:00 (8:00 AM)
Filter 2 Duration*	15 Minutes
Light Cycle	Disabled
Light Cycle Default*	OFF
Light Cycle Start Hour*	21:00 (9:00 PM)
Light Cycle Duration*	15 Minutes

**May be changed by end-user (if enabled)*

BP2000 Configuration Options

Reminder Features

Feature	Default
Reminders Shown*	*Yes*
Check pH	*OFF*
Check Sanitizer	*OFF*
Clean Filter	30 Days
Test GFCI	*65 Days*
Drain Water	*100 Days*
Change Cartridge	OFF
Clean Cover	*OFF*
Treat Wood	*OFF*
Change Filter	365 Days

**May be changed by end-user (if enabled)*

BP2000 Configuration Options

Special Features

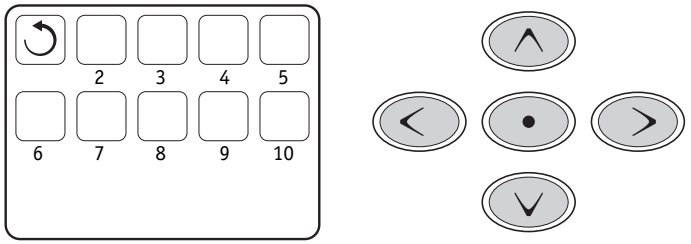
Feature	Default
Special Amperage Rule A	No Limitation
Special Amperage Rule B	No Limitation
Drain Mode	Disabled
Demo Mode	Disabled
GFCI Trip	Enabled
Automatic GFCI Test	Disabled
Ozone Slaved to Heater Pump	*Yes in circ setups* *No in non-circ setups*
Dual Voltage Heater	Always Input Voltage
Safety Suction	Disabled
First Swim Pump	*VSP 1*
Swim Spa Behavior	*No Heating Allowed, No Manifold*
VSP Amperage DIP Switch	*DIP Switch A7*
“Aux” Pump in Swim Mode	*Jets 1 in Setups 1, 2 & 5* *None in other Setups*

TP900 / spaTouch Panel Configuration

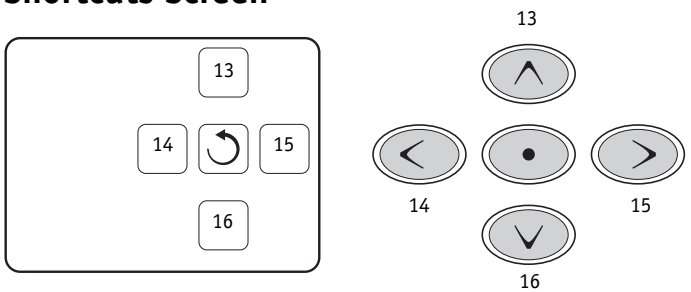
Button Layout Table

Feature #	Setups 2 & 4	Setups 1,3,5 & 6	Setup 7
A1	N/A	N/A	N/A
A2	Jets 1	Jets 1	Undefined
A3	Undefined	Undefined	Undefined
A4	Undefined	Undefined	Undefined
A5	Undefined	Undefined	Undefined
A6	Light 1	Light 1	Light 1
A7	Invert	Invert	Invert
A8	Undefined	(Circ Icon)	(Circ Icon)
A9	Undefined	Undefined	Undefined
A10	Undefined	Undefined	Undefined
A11	N/A	N/A	N/A
A12	N/A	N/A	N/A
A13	Undefined	Undefined	Undefined
A14	Undefined	Undefined	Undefined
A15	Undefined	Undefined	Undefined
A16	Undefined	Undefined	Undefined

Spa Screen



Shortcuts Screen



A Circ Icon will appear when a Circ Pump is configured.

BP2000 Configuration Options

Auxiliary Panel Features on Bank 1* - for use with AX40 (works during Swim Workouts only)

Feature	Default
Aux Button A1	Swim Speed Down
Aux Button A2	Swim Speed Up
Aux Button A3	Swim Stop
Aux Button A4	Swim Pause

Auxiliary Panel Features on Bank 2* - for use with AX42 (round version of 4-button aux panel)

Feature	Default
Aux Button A5	Swim Speed Up
Aux Button A6	Swim Pause
Aux Button A7	Swim Speed Down
Aux Button A8	Swim Stop

*Bank 1 consists of J5 on the Main Circuit Board.
Bank 2 consists of J8 on the Main Circuit Board.
Aux Connection Splitter PN 25257 may be required.

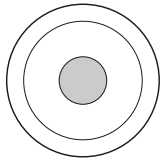
Buttons that are assigned to equipment that is not defined in a Setup will not do anything in that Setup.

BP2000 Configuration Options

Auxiliary Panel Features

AX10 Panels on Bank 1*

A1, AX10A1	No O/L	52803
A2, AX10A2	No O/L	52804
A3, AX10A3	No O/L	55805 ▶
A4, AX10A4	No O/L	52806



AX10 Panels on Bank 2*

A5, AX10A1	No O/L	52803
A6, AX10A2	No O/L	52804
A7, AX10A3	No O/L	52805
A8, AX10A4	No O/L	52806

Call Customer Service for additional information about Auxiliary Panels.

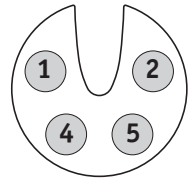
*Bank 1 consists of J5 on the Main Circuit Board.

Bank 2 consists of J8 on the Main Circuit Board.

BP2000 Configuration Options

Remote Panel Features

Feature	Default
Remote Button A1	Undefined
Remote Button A2	Undefined
Remote Button A3	Undefined
Remote Button A4	Undefined
Remote Button A5	Undefined
Remote Button A6	Undefined
Remote Button A7	Undefined
Remote Button A8	Undefined



Buttons that are assigned to equipment that is not defined in a Setup will not do anything in that Setup.

Remote Panel Part Number _____

Overlay Part Number _____