SARBP20X Tech Sheet

Customer:	**Saratoga Spas**
Part Number:	59559-01 Titanium 4.0kW
Custom Box Overlay	☐
Box Overlay Part Number	N/A
UL System Model:	BP20-SARBP20X-AS
Software Version ID:	M100_220 V71.0
Software Version:	71.0
File Name:	BP2000_71.0_SARBP20X_2023.hex
Configuration Signature:	B59FEB32
Eng. Project Number:	5793
Control Panels:	
spaTouch™3	Any version
TP700	Any version

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System Revision History

Part #	EPN	Date	Originator	Changes Made
ZT000553	5334	11-15-21	Customer	BP2000-based system with custom Setups, and with spaTouch™3 and TP700 as the only panels expected to be used.
59559	5334	01-11-22	Customer	Approved for production.
ZT-59559-01	5793	06-27-23	Customer	Add 106F Overrange. Add DIP switch to select circ type. Update software to not turn Off Light 1 when in Hold.
59559-01	5793	07-10-23	Customer	Approved for production, and software updated to release version.

bba™2 / bba™3 (Balboa Bluetooth Amp) connection is documented separately.

bba™2 / bba™3 is integrated into graphic display panels (including TP700 and spaTouch™).

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Basic Functions Setup 1-8

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.

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.

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Basic Functions Setup 1-8

System Ouputs:

Pump 1   240VAC   2-Speed   12A max   15-minute timer for High Speed, 15-Minute timer for Low Speed
This is the heater pump in Setups 6–8
Must deliver 20 GPM through heater

Pump 2   240VAC   2-Speed   12A max   15-minute timer
    1-Speed in Setups 4, 7
    Unused in Setups 5, 6, 8

Pump 3   240VAC   2-Speed   12A max   15-minute timer
    1-Speed in Setup 2
    Unused in Setups 3–8

Blower   240VAC   1 Speed   4A max   15-minute timer
    Unused in Setups 1–5, 7, 8

Circ Pump   120VAC**   1-Speed   2A max   24-hour with 3˚F shutoff (outside of filter cycles) or Programmable Filtration Cycles + Polling
This is the heater pump in Setups 1–5
Must deliver 20 GPM through heater

Ozone   120VAC**   .5A max   Slaved to Circ Pump in Setups 1–5
    Independent in Setups 6–8

Spa Light   10VAC   On/Off   2A* max   240-minute timer.

A/V (Stereo)   120VAC   Hot   4A max   Always on

Heater   4.0kW @ 240VAC max

**Both the Circ pump and Ozone can be converted to 240V, however they will be the same voltage after conversion. (Both 120V or both 240V.)

* 2A max limit is shared by On/Off Spa Light and CHROMAZON3™.

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Hardware Setup

Wiring Diagram

SARBP20X - PN 59559-01

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07-10-23

J43 TO J19 (PUMP 3 ON J14) IN SETUPS 1 & 2

| IR RECEIVER J40 | CHROMAZONE™ J34 OR J35 | WIFI TRANSCEIVER J34 OR J35 | TP (MAIN) PANELS J34 OR J35 |

AUX — J5 (A1-A4) OR J8 (A5-A8)

EXPANDER X-P332

LOCATION	DEVICE	VOLTS	AMPS	FROM	TO	FROM	TO
J1	2/1 SPD PUMP 2	240V	12A	W1	GROUP 2	J6	GROUP 3

EXPANDER X-P332

EXPANDER BOARD

PUMP 2 — F1 30A

**J14 (BL/P3) IS:
1-SPEED BLOWER IN SETUP 6
2-SPEED PUMP 3 IN SETUP 1
1-SPEED PUMP 3 IN SETUP 2
UNUSED IN SETUPS 3, 4, 5, 7, 8

SENSOR A   SENSOR B   4.0 kW HEATER

PART A

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Hardware Setup

Settings

LOCATION	DEVICE	VOLTS	MAX AMPS	FROM	TO
J9	2-SP PUMP 1	240V	12A MAX	J46	GROUP 2
J14	1-SP BLOWER	240V	4A MAX	J18	GROUP 2
	2/1-SP PUMP 3		12A MAX		
	J14 LINE 1 CONNECTION			J43	J13 (MOVE TO J19 FOR PUMP 3)
				J10	J50
J15	SPA LIGHT	10V	2A*		
J21	CIRC PUMP	120V**	2A MAX	J20	GROUP 4
J32	OZONE		0.5A		
	CIRC AND OZONE LINE 1 CONNECTION			J81	J59
J33	TV / AV	120V	4A	J38	GROUP 4
J44	HEATER	240V	4.0 kW		

* 2A LIMIT IS SHARED BY J15 SPA LIGHT <u>AND</u> CHROMAZONE™

** FOR 240V CIRC PUMP AND OZONE, CONNECT J20 TO GROUP 2

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**
1 MIN HTR COOLDOWN (ELEC)	◄	A7	5 MIN HTR COOLDOWN (GAS)
CIRC: 24HR W/ 3F SHUTOFF	◄	A8	CIRC: PROG FILTERS + POLLING
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

SETUP #	CIRC PUMP	PUMP 1	PUMP 2	PUMP 3	BLOWER	TEMP SCALE
1	YES*	2-SPEED	2-SPEED	2-SPEED	NONE	°F
2	YES*	2-SPEED	2-SPEED	1-SPEED	NONE	°F
3	YES*	2-SPEED	2-SPEED	NONE	NONE	°F
4	YES*	2-SPEED	1-SPEED	NONE	NONE	°F
5	YES*	2-SPEED	NONE	NONE	NONE	°F
6	NONE	2-SPEED	NONE	NONE	1-SPEED	°F
7	NONE	2-SPEED	1-SPEED	NONE	NONE	°F
8	NONE	2-SPEED	NONE	NONE	NONE	°F

* CIRC BEHAVIOR DEPENDS ON
THE SETTING OF DIP SWITCH A8

INSTEAD OF
SETUP #3,
THIS SYSTEM IS
CONFIGURED IN
SETUP #:

Balboa water group
07-10-23

SARBP20X - PN 59559-01
PART B

Balboa water group

Setup Reference Table

Setup #	Circ Pump	Pump 1	Pump 2	Pump 3	Blower	Temp Scale
1	Yes*	2-Speed	2-Speed	2-Speed	None	°F
2	Yes*	2-Speed	2-Speed	1-Speed	None	°F
3	Yes*	2-Speed	2-Speed	None	None	°F
4	Yes*	2-Speed	1-Speed	None	None	°F
5	Yes*	2-Speed	None	None	None	°F
6	None	2-Speed	None	None	1-Speed	°F
7	None	2-Speed	1-Speed	None	None	°F
8	None	2-Speed	None	None	None	°F

System (and any replacement board) **is shipped in Setup 3**

* Circ type is either 24hr/3°F <u>or</u> Programmable Filters + Polling, depending on the setting of DIP switch A8.

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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.
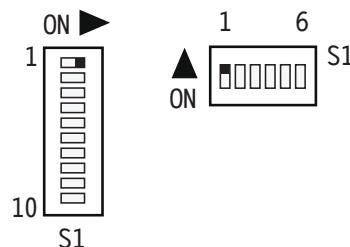
The example screens shown here are from the spaTouch 1 Icon-Driven Panel, but the screens on the spaTouch 2 Panel are similar. The main difference is that the spaTouch 2 display is wider.
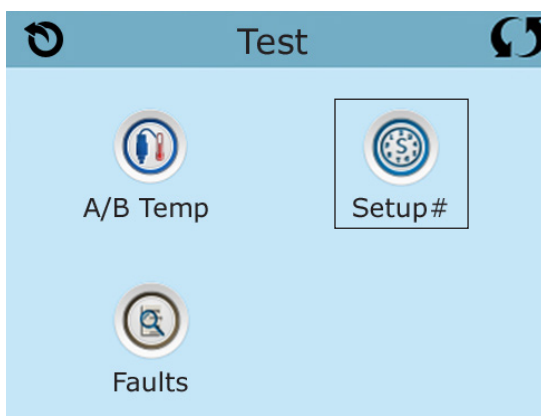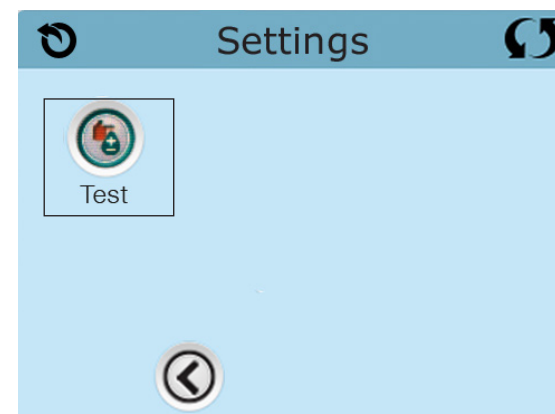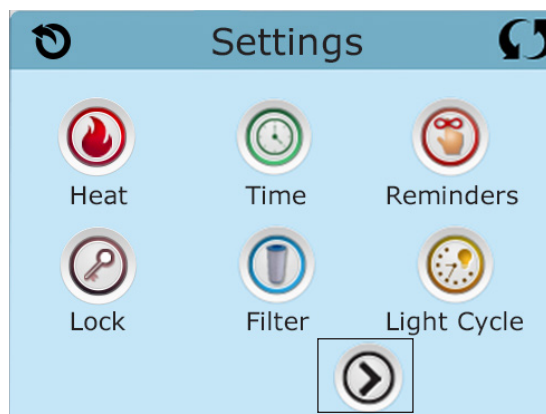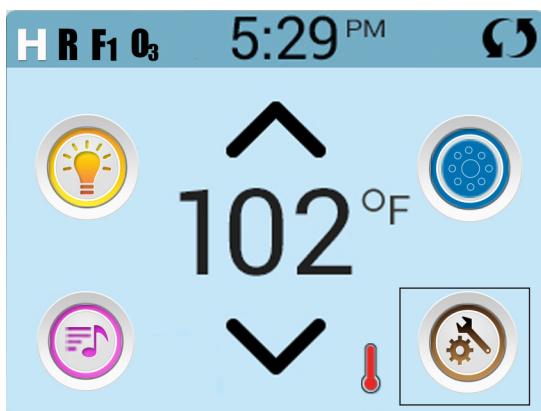
Once on the Setup Selection screen, press the Up or Down icon to select the desired Setup Number, then press the Check Mark icon to confirm and to have the spa restart.

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.

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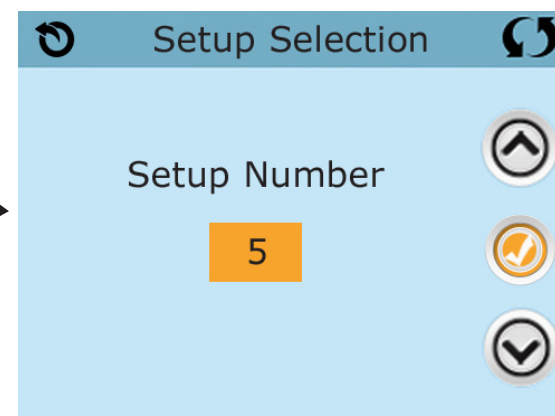
Equipment Expansion

Expansion Features

Control Connection	Default	Fuse
Relay 1 (J101)	Undefined	None
Relay 7/8 (J107)	See Below	30A
	2-Speed Pump 2 in Setups 1, 2, 3	
	1-Speed Pump 2 in Setup 4, 7	
	Unused in Setups 5, 6, 8	
Relay 9/10 (J108)	Undefined	None

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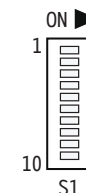
A2, A3, and A4 work in combination to determine the number of high-speed devices and blowers that can run before the heat is disabled. i.e. A2 and A3 in the ON position and A4 in the OFF position will allow the heater to operate with up to 3 high-speed pumps (or two HS Pumps and Blower) running at the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

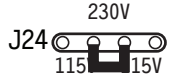*Note:* *A2/A3/A4 all off = No heat with any high-speed pump or blower.*

Assignable DIP Switches

A7   In "ON" position, enables a 5-minute cooldown for some gas heaters (Cooling Time B).
            In "OFF" position, enables a 1-minute cooldown for electric heaters (Cooling Time A).

A8   In "ON" position, Circ Type is Programmable Filters + Polling (aka Acts Like Pump 1 Low)
            In "OFF" position, Circ Type is as configured under General Features (see page 13)

Undesignated switches are not assigned a function.

Jumper Definitions

J109	GFCI Test/Trip Enable/Disable *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 on UL models *(Used on CE models only)*	J31
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 heater is running at 240V. Two Jumpers installed; one on left 2 pins and one on right 2 pins (115V) when heater is running at 120V.	230V J24 115 15V

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.

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Replacement Parts

PCBA:
  Main PCBA: 59560-01
  Expander PCBA: 59097

HEATER(s):
  Plug + Click Heater Kit: 55625R16 4.0kW Titanium
  Temp Sensor Kit: 53605

CABLES: N/A

FUSES:

Part Number	Amperage*	Location
30136	30A	F6, F8, F1 (Expander)
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.

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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)	*24 hr with 3˚F shutoff (outside of filter cycles)*
Circ Type Select switch	*DIP switch A9 (see page 10)*
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.

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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 Lowest Speed
Temp Lock Type	Temp + Settings
Overrange Enable	*Yes*

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

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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	*ON*
Filter 2 Start Hour	08:00 (8:00 AM)
Filter 2 Duration*	*2 Hours*
Light Cycle	Disabled
Light Cycle Default*	OFF
Light Cycle Start Hour*	21:00 (9:00 PM)
Light Cycle Duration*	15 Minutes
Cooling Time A	1 Minute
Cooling Time B	5 Minutes

May be changed by end-user (if enabled)

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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)

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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

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TP800 Panel Configuration (used for TP700 & spaTouch™)

Button Layout Table

Feature #	3 Pumps & Circ Setup 1	2 Pumps & Circ Setup 2	1 Pump & Circ Setup 3	1 Pump, Blower & NO Circ Setup 4	2 Pumps & NO Circ Setup 5	1 Pump & NO Circ Setup 6
A1	N/A	N/A	N/A	N/A	N/A	N/A
A2	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1
A3	Jets 2	Jets 2	Light 1	Blower	Jets 2	Light 1
A4	Jets 3	Light 1	Invert	Light 1	Light 1	Invert
A5	Light 1	Invert	(Circ Icon)	Invert	Invert	Undefined
A6	Invert	(Circ Icon)	Undefined	Undefined	Undefined	Undefined
A7	(Circ Icon)	Undefined	Undefined	Undefined	Undefined	Undefined
A8	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A9	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A10	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A11	N/A	N/A	N/A	N/A	N/A	N/A
A12	N/A	N/A	N/A	N/A	N/A	N/A
A13	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A14	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A15	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A16	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
B1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1
B2	Jets 2	Jets 2	Undefined	Blower	Jets 2	Undefined
B3	Jets 3	Undefined	Undefined	Undefined	Undefined	Undefined
B4	Light 1	Light 1	Light 1	Light 1	Light 1	Light 1

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TP800 Panel Configuration (used for TP700 & spaTouch™)

Spa Screen

B1

B2   B3

B4

| ↺ | A2 | A3 | A4 | A5 |
| A6 | A7 | A8 | A9 | A10 |

∧
< • >
∨

Shortcuts Screen

B1

B2   B3

B4

A13

A14 ↺ A15

A16

A13
∧
< • >
A14   A15
∨
A16
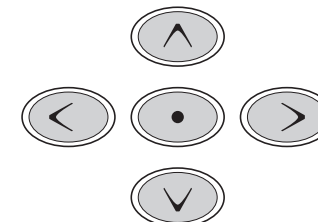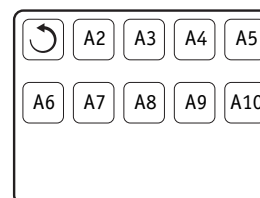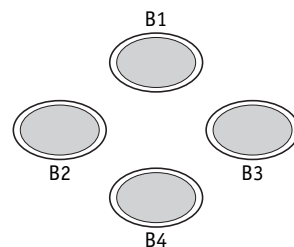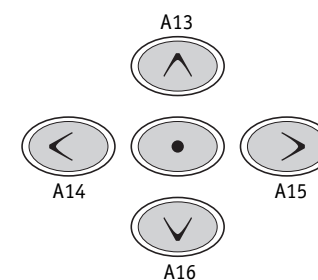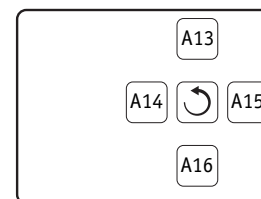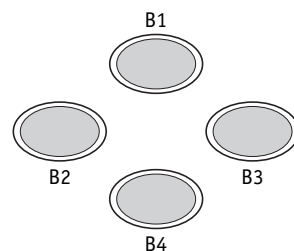
Note: *Buttons 11 and 12 are not used in this configuration.*

Button 1 is fixed.

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

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BP2000 Configuration Options

Auxiliary Panel Features on Bank 1*

Feature	Default
Aux Button A1	Jets 1
Aux Button A2	Jets 2
Aux Button A3	Blower
Aux Button A4	Light

Auxiliary Panel Features on Bank 2*

Feature	Default
Aux Button A5	Jets 1
Aux Button A6	Jets 2
Aux Button A7	Jets 3
Aux Button A8	Light

*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.

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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   52805 ▶
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

AX20

AX20 A1A2   No O/L   52800
AX20 A1A3   No O/L   52801
AX20 A1A4   No O/L   52802

A1   A2, 3 or 4

AX40

AX40   No O/L   52799

A1   A2   A3   A4
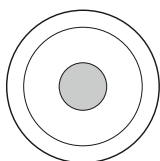
Call Customer Service for additional information about Auxiliary Panels.

*Bank 1 consists of J5 on the Main Circuit Board.
 Bank 2 consists of J8 on the Main Circuit Board.
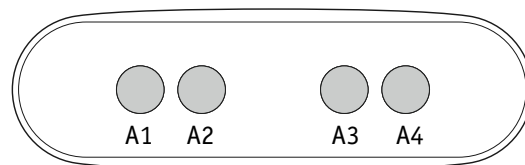 **Aux Connection Splitter PN 25257 may be required.**
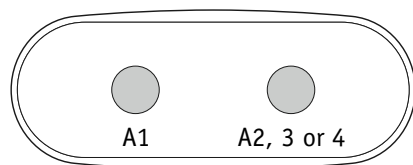
AX20 Auxiliary Panel plugged into Bank 1 will operate A1 + A2, A3 or A4.

**AX20 Auxiliary Panel plugged into Bank 2 will operate A5 + A6, A7 or A8.**

AX40 Auxiliary Panel plugged into Bank 1 will operate A1 + A2, A3 and A4.

AX40 Auxiliary Panel plugged into Bank 2 will operate A5 + A6, A7 and A8.

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BP2000 Configuration Options

Remote Panel Features

Feature	Default
Remote Button A1	Jets 1
Remote Button A2	Jets 2
Remote Button A3	Jets 3
Remote Button A4	Blower
Remote Button A5	Light
Remote Button A6	Undefined
Remote Button A7	Undefined
Remote Button A8	Undefined
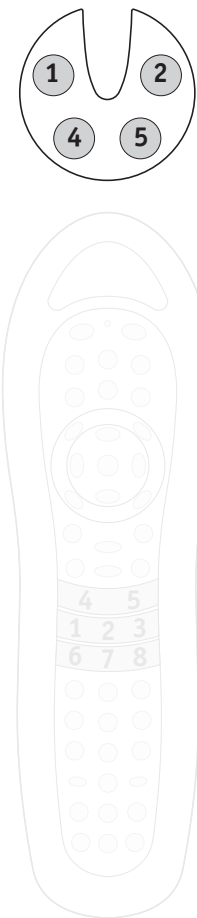
Buttons that are assigned to equipment that is
not defined in a Setup will not do anything in that Setup.

Remote Panel Part Number _____

Overlay Part Number _____

BALBOA
water group