BP21P4BC Tech Sheet

Customer: **Balboa Water Group**

Part Number:

56625-01	800 Incoloy 3kW
56626-01	825 Incoloy 3kW
56627-01	Titanium 3kW

Custom Box Overlay	☐
Box Overlay Part Number	N/A
CE System Model:	BP21-BP21P4BC-RCA3.0K
Software Version ID:	M100_225 V36.0
Software Version:	36.0
File Name:	BP2100_36.0_BP21P4BC_TP6.hex
Configuration Signature:	99DB30F1
Eng. Project Number:	4776

Control Panels:

spaTouch™2	Any version (version 2.0 or later required for bba™2 fully integrated functionality)
Icon spaTouch™	Any version (version 3.36 or later required for bba™2 fully integrated functionality)
Menued spaTouch™	Any version (version 2.8 or later required for bba™2 integrated functionality)
TP900	Version 3.1 and later (Version 3.13 or later required for bba™)
TP800	Version 3.1 and later (Version 3.13 or later required for bba™; version 4.11 or later required for bba™2 integrated functionality)
TP600	Version 2.7 and later

System Revision History

Part #	EPN	Date	Originator	Changes Made
ZT000084	4248	04-10-14	BWG	New generic BP2100 with 4 Pumps plus optional blower and/or Circ.
56625 56626 56627	4248	05-01-14	BWG	Released to production.
56625-01 56626-01 56627-01	4776	10-27-16	BWG	Updated to latest software version, adding topside-intergrated bba™2 support. Also added TP600 support. Released to production.

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

bba™ is only integrated into graphic display panels (TP800, TP900 and spaTouch™). With TP600 the Aux button operation of bba™ must be used.

bba™2 is only integrated into graphic display panels (TP800, TP900 and spaTouch™). bba™2 does not support Aux button operation.

Basic Functions Setup 1-8

Power Requirements:

Single Service [3 wires (line, neutral, ground)] – RESTRICTED OPERATIONS (See page 5)
230VAC, 50/60Hz*, 1þ, 32A, (Circuit Breaker rating = 40A max.)

Dual Service N/A

3-Service [5 wires (line 1, line 2, line 3, neutral, ground)]
230VAC line-to-neutral**, 50/60Hz*, 3þ, 16A, (Circuit Breaker rating = 20A max each phase line.)

* BP systems automatically detect 50Hz vs 60Hz.

** 3-phase service measured line-to-line will read about 400V, but BP systems do not use it line-to-line.

IMPORTANT - Service must include a neutral wire, with a line to neutral voltage of 230VAC.

HiPot Testing Note:
Disconnect slip terminal with green wires from J11 prior to performing HiPot test. Failure to disconnect may cause a false failure of the test. Reconnect terminal to J11 after successful completion of HiPot test.

In 3x16A Service:

Pump 2 and Blower (if any) are on one service.

Pump 3, Pump 4, and the heater are on another service.

Everything else is on the remaining service.

Basic Functions Setup 1-8

System Ouputs:

Pump 1	230VAC	2-Speed 1-Speed in Setups 4 & 5	11A 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	230VAC	2-Speed 1-Speed in Setups 2-5, 7–8	11A max*	15-minute timer
Pump 3	230VAC	1-Speed	8A max*	15-minute timer
Pump 4	230VAC	1-Speed	8A max*	15-minute timer
Blower	230VAC	1 Speed Unused in Setups 1, 3, 5, 6 & 8	5A max*	15-minute timer
Circ Pump	230VAC	1-Speed	2A max*	Programmable Filtration Cycles + Polling
	This is the heater pump in Setups 1–5 Must deliver 20 GPM through heater			
Ozone	230VAC		.5A max*	Slaved to Circ Pump in Setups 1-5 Independent in Setups 6-8
Spa Light	10VAC	On/Off	1A max	240-minute timer.
A/V (Stereo)	230VAC	Hot	2A max*	Always on
Heater	3.0kW @ 240VAC max			

* These are individual maximums but depending on the electrical services they may need to be reduced. See restrictions on next page.

Basic Functions Setup 1-8

Restrictions:

In 3x16A, all equipment (if within the individual maximums listed on page 4) can run together, except the heater turns off with any high-speed pump or blower. (DIP switch A5 must be OFF.)

In 1x32A, DIP switch A5 must be ON. With DIP Switch A5 ON, only 3 pumps (any 3 pumps) can be ON at high speed at any one time, and the blower will not run when 3 pumps are ON at high speed.

In 1x40A, with DIP switch A5 ON, it works just like at 1x32A.

To be able to use 1x40A with DIP switch A5 OFF (ie, no restrictions except for the heater), all the 230V equipment used in the spa (except for the heater) must add up to no more than 39.5 Amps. This means all 4 pumps, the blower (if any), the circ pump (if any), the ozone, and A/V (if any). (There is 0.5 Amps at 230V reserved for board and panel power as well as 10V equipment including the spa lights. That is why the 230V equipment must add up to 39.5 Amps rather than 40.0 Amps.)

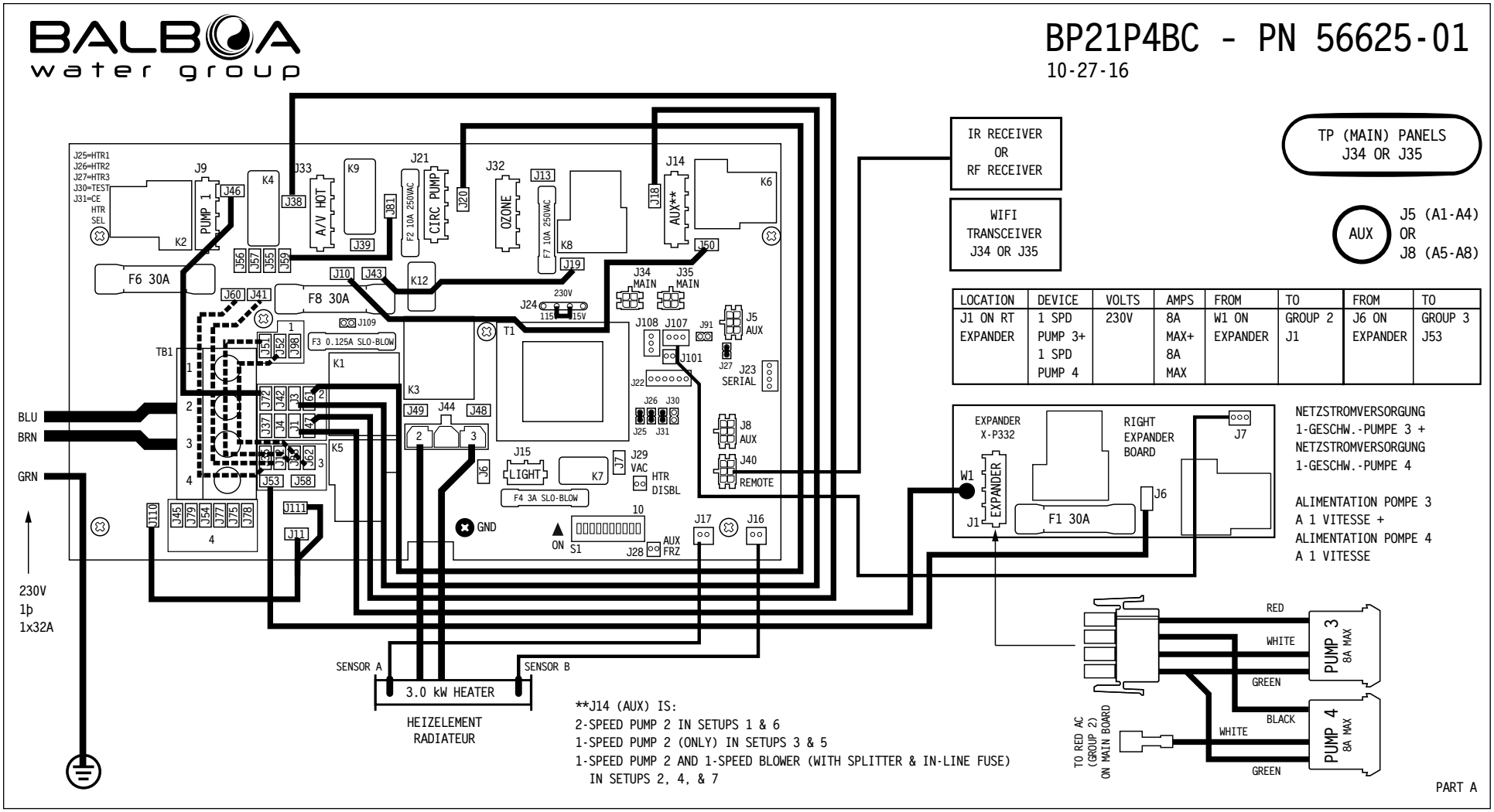
See this chart for some 1x40A examples:

Pump 1	11A	11A	8.5A
Pump 2	11A	11A	8.5A
Pump 3	8A	8A	7.5A
Pump 4	8A	8A	7.5A
Blower	3A	None	3A
Circ	2A	None	2a
Ozone	0.5A	0.5A	0.5A
A/V	None	None	2A
Total	42.5A	38.5A	39.5A
Will it work?	No	Yes	Yes

BALBOA water group

Hardware Setup

Wiring Diagram



Hardware Setup

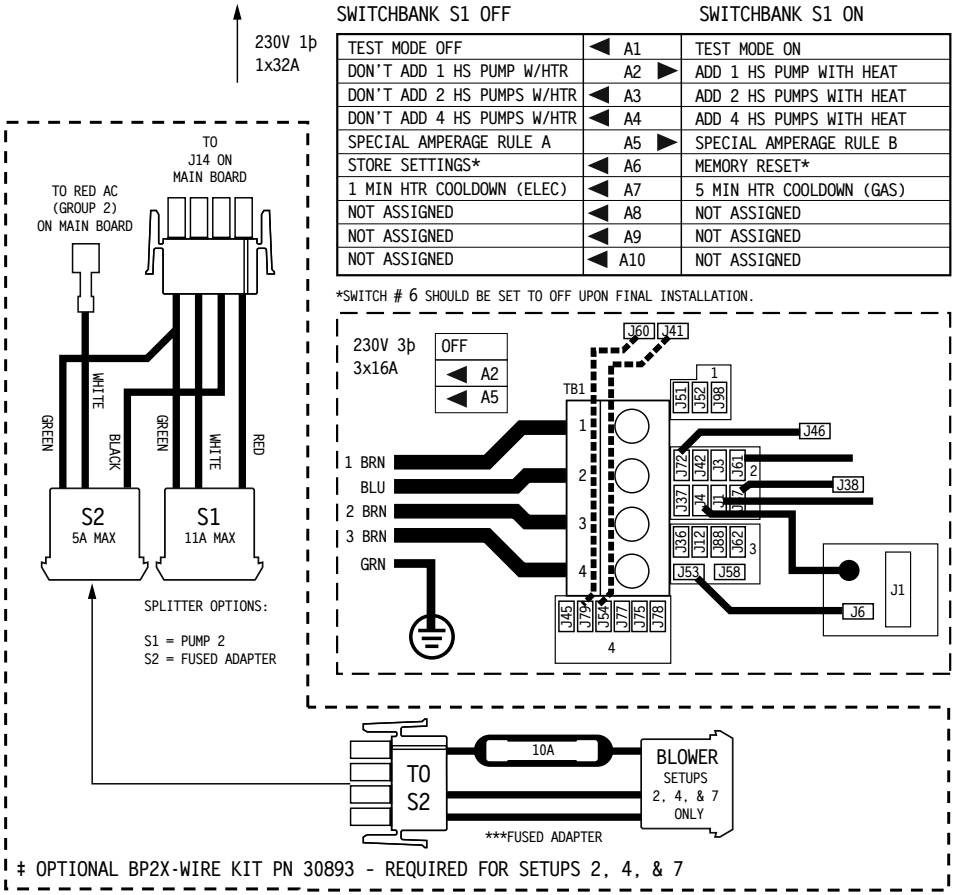
Settings

SINGLE SERVICE 230V 1þ / 1x32A, THREE-SERVICE 230V 1þ / 3x16A

LOCATION	DEVICE
J9	NETZSTROMVERSORGUNG 2-GESCHW.-PUMPE 1 ALIMENTATION POMPE 1 A 2 VITESSES 2-SPEED PUMP 1
J14	AUX**
	AUX LINE 1 CONNECTION J19 to J43, J50 to J10
J15	10V BELEUCHTUNG ECLAIRAGE BAIN HYDRO SPA LIGHT
J21	KREISLAUF PUMPE POMPE DE CIRCULATION CIRC PUMP (SETUPS 7-14, 16)
J32	OZONGENERATOR GENERATOROZONE OZONE GENERATOR
	CIRC AND OZONE LINE 1 CONNECTION J81 to J59
J33	TV / AV
J40	IR RECIEVER
J5, J8	AUX PANEL(S) - AX10, AX20, AX30, AX40

SETUP #	CIRC PUMP	PUMP 1	PUMP 2	PUMP 3	PUMP 4	BLOWER	TEMP SCALE
1	PROGRAMMABLE FILTRATION + POLLING	2-SPEED	2-SPEED	1-SPEED	1-SPEED	NONE	°C
2	PROGRAMMABLE FILTRATION + POLLING	2-SPEED	1-SPEED	1-SPEED	1-SPEED	1-SPEED	°C
3	PROGRAMMABLE FILTRATION + POLLING	2-SPEED	1-SPEED	1-SPEED	1-SPEED	NONE	°C
4	PROGRAMMABLE FILTRATION + POLLING	1-SPEED	1-SPEED	1-SPEED	1-SPEED	1-SPEED	°C
5	PROGRAMMABLE FILTRATION + POLLING	1-SPEED	1-SPEED	1-SPEED	1-SPEED	NONE	°C
6	NONE	2-SPEED	2-SPEED	1-SPEED	1-SPEED	NONE	°C
7	NONE	2-SPEED	1-SPEED	1-SPEED	1-SPEED	1-SPEED	°C
8	NONE	2-SPEED	1-SPEED	1-SPEED	1-SPEED	NONE	°C

INSTEAD OF SETUP #5, THIS SYSTEM IS CONFIGURED IN SETUP #:



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)
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.

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

USE COPPER CONDUCTORS ONLY. EMPLOYER UNIQUEMENT DES CONDUCTEURS DE CUIVRE.

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

BALBOA water group

BP21P4BC - PN 56625-01

10-27-16

PART B

BALBOA water group

Setup Reference Table

Setup #	Circ Pump	Pump 1	Pump 2	Pump 3	Pump 4	Blower	Temp Scale
1	Programmable Filtration + Polling	2-Speed	2-Speed	1-Speed	1-Speed	None	°C
2	Programmable Filtration + Polling	2-Speed	1-Speed	1-Speed	1-Speed	1-Speed	°C
3	Programmable Filtration + Polling	2-Speed	1-Speed	1-Speed	1-Speed	None	°C
4	Programmable Filtration + Polling	1-Speed	1-Speed	1-Speed	1-Speed	1-Speed	°C
5	Programmable Filtration + Polling	1-Speed	1-Speed	1-Speed	1-Speed	None	°C
6	None	2-Speed	2-Speed	1-Speed	1-Speed	None	°C
7	None	2-Speed	1-Speed	1-Speed	1-Speed	1-Speed	°C
8	None	2-Speed	1-Speed	1-Speed	1-Speed	None	°C

System (and any replacement board) **is shipped in Setup 5**

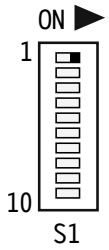
Color Key	Output
	XP332 and Splitter
	J14 (Aux) and splitter and in-line Blower fuse
	J14 (Aux) on Main Board

Changing Software Setups with TP800 / TP900 / spaTouch™ Menued Panel

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

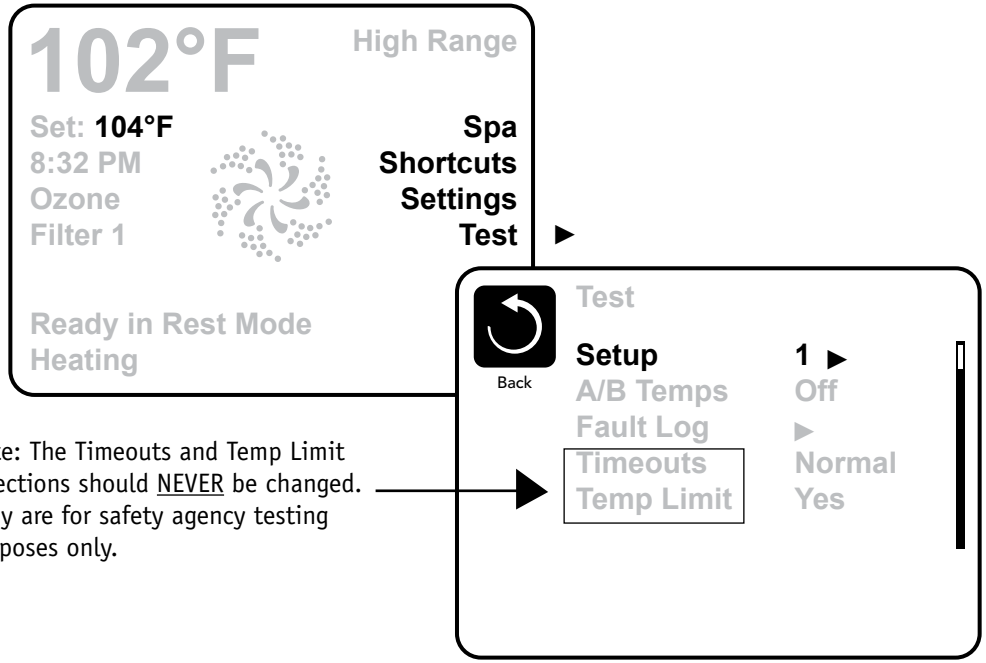
DANGER! HIGH VOLTAGE WILL BE ACCESSIBLE! SERVICE TECHNICIAN ONLY!

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.



Software Setups

Under the TEST Menu, the Setup screen will allow changing the Setup from 1 to any number established by the Manufacturer. Changing the Setup may require wiring changes as well.



Note: The Timeouts and Temp Limit selections should NEVER be changed. They are for safety agency testing purposes only.

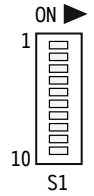
Equipment Expansion

Expansion Features

Control Connection	Default	Fuse
Relay 1 (J101)	Undefined	None
Relay 7/8 (J107)	See Below 1-Speed Pump 3 And 1-Speed Pump 4 (With Splitter)	30A
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.

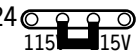
Note: *A2/A3/A4 all off = No heat with any high-speed pump or blower.*

Assignable DIP Switches

A7	In “ON” position, enables 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).

Undesignated switches are not assigned a function.

Jumper Definitions

J109	Non Applicable on CE models	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	Jumper on 1 pin with 2.0kW or smaller heater Jumper on 2 pins with a 3.0kW or higher heater	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  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:	56628-01
Expander PCBA:	55137

HEATER(s):

Plug + Click Heater Kit:	58300 3.0kW 800Inc
	58301 3.0kW 825Inc
	58302 3.0kW Titanium
Temp Sensor Kit:	53605

CABLES: 25093 P3/P4 Adapter

FUSES:

Part Number	Amperage	Location
30136	30A	F6, F8, F1 (Expander)
20600	3A	F4
26397	1/8A	F3
30122	10A	F2, F7

BP2100 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*
Cleaup 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.

BP2100 Configuration Options

Temperature Features

Feature	Default
Temperature Display	°C

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

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

BP2100 Configuration Options

Time Features

Feature	Default
Time Format*	24 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
Cooling Time A	1 Minute
Cooling Time B	5 Minutes

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

BALBOA water group

BP2100 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)*

BP2100 Configuration Options

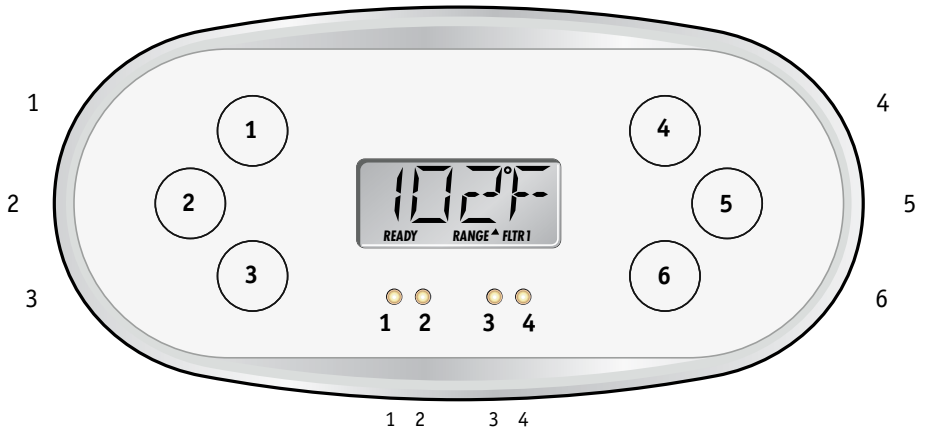
Special Features

Feature	Default
Special Amperage Rule A	No Limitation
Special Amperage Rule B	3 high-speed pumps max. Blower turns off with 3 high speed pumps
Drain Mode	Disabled
Demo Mode	Disabled
GFCI Trip	Not Applicable for CE Models
Ozone Slaved to Heater Pump	*Yes in circ setups* *No in non-circ setups*
Dual Voltage Heater	Always Input Voltage
Safety Suction	Disabled

TP600 Panel Configuration

Button Layout Table

Button #	Setups 1 - 8
1	Jets 1
2	Jets 2
3	Jets 3
4	Temperature
5	Light 1
6	Jets 4
LED 1	Jets 1
LED 2	Jets 2
LED 3	Light 1
LED 4	Heat On



In all Setups, the button labeled “AUX” on overlay 13579 (shown below) controls Jets 4.

In Setups 2, 4, 7 (which have a Blower), an AX10A3 auxiliary panel plugged into J5 (Bank 1) must be used to control the Blower.

TP800 Panel Configuration

Button Layout Table

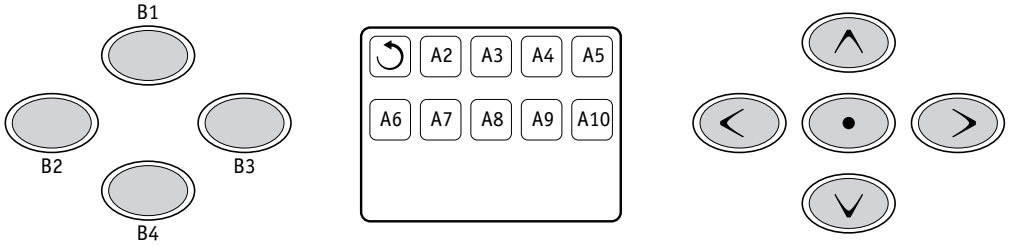
Feature #	Blower & Circ Setups 2 & 4	NO Blower & Circ Setups 1, 3, & 5	Blower & No Circ Setup 7	NO Blower & No Circ Setups 6 & 8
A1	N/A	N/A	N/A	N/A
A2	Jets 1	Jets 1	Jets 1	Jets 1
A3	Jets 2	Jets 2	Jets 2	Jets 2
A4	Jets 3	Jets 3	Jets 3	Jets 3
A5	Jets 4	Jets 4	Jets 4	Jets 4
A6	Blower	Light 1	Blower	Light 1
A7	Light 1	Invert	Light 1	Invert
A8	Invert	(Circ Icon)	Invert	Undefined
A9	(Circ Icon)	Undefined	Undefined	Undefined
A10	Undefined	Undefined	Undefined	Undefined
A11	N/A	N/A	N/A	N/A
A12	N/A	N/A	N/A	N/A
A13	Jets 1	Jets 1	Jets 1	Jets 1
A14	Jets 2	Jets 2	Jets 2	Jets 2
A15	Jet 3	Jet 3	Jet 3	Jet 3
A16	Jet 4	Jet 4	Jet 4	Jet 4
B1	Jets 1	Jets 1	Jets 1	Jets 1
B2	Jets 2	Jets 2	Jets 2	Jets 2
B3	Blower	Jets 3	Blower	Jets 3
B4	Light 1	Light 1	Light 1	Light 1

Overlay Part Number 12512.

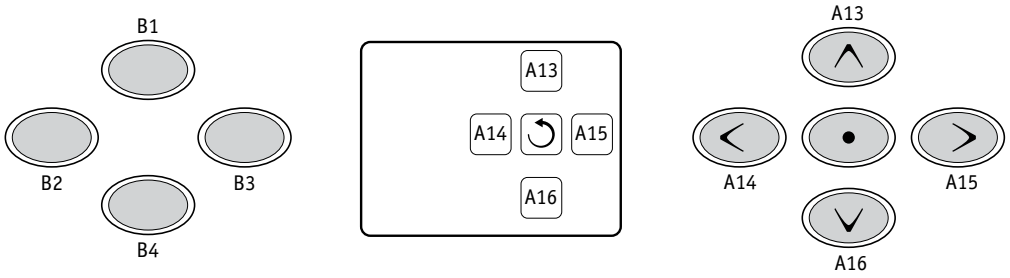
Button labled “AUX“ controls Blower in Setups 2, 4, & 7, and controls Jets 3 in all other Setups.

TP800 Panel Configuration

Spa Screen



Shortcuts Screen



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.

TP900 Panel Configuration

Button Layout Table

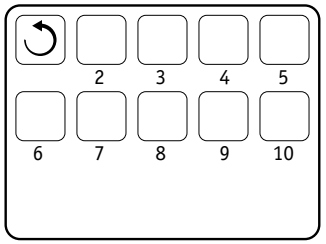
Feature #	Blower & Circ Setups 2 & 4	NO Blower & Circ Setups 1, 3, & 5	Blower & No Circ Setup 7	NO Blower & No Circ Setups 6 & 8
A1	N/A	N/A	N/A	N/A
A2	Jets 1	Jets 1	Jets 1	Jets 1
A3	Jets 2	Jets 2	Jets 2	Jets 2
A4	Jets 3	Jets 3	Jets 3	Jets 3
A5	Jets 4	Jets 4	Jets 4	Jets 4
A6	Blower	Light 1	Blower	Light 1
A7	Light 1	Invert	Light 1	Invert
A8	Invert	(Circ Icon)	Invert	Undefined
A9	(Circ Icon)	Undefined	Undefined	Undefined
A10	Undefined	Undefined	Undefined	Undefined
11	N/A	N/A	N/A	N/A
12	N/A	N/A	N/A	N/A
13	Jets 1	Jets 1	Jets 1	Jets 1
14	Jets 2	Jets 2	Jets 2	Jets 2
15	Jets 3	Jets 3	Jets 3	Jets 3
16	Jet 4	Jet 4	Jet 4	Jet 4

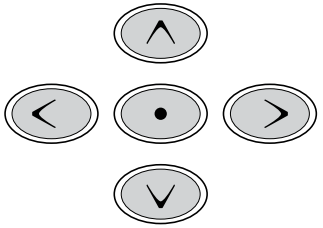
A Circ Icon will appear when a Circ Pump is configured.

TP900 Panel Configuration

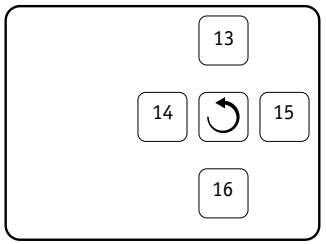
Button #
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

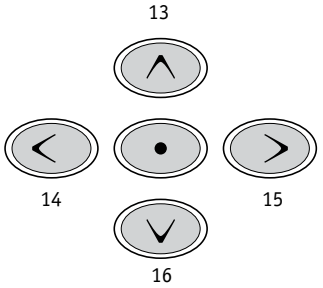
Spa Screen





Shortcuts Screen





BP2100 Configuration Options

Auxilliary 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

Auxilliary 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	*Jets 4*

*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.

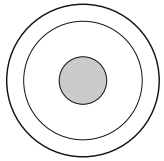
Buttons that are assigned to equipment that is not defined in a Setup will not do anything in that Setup.

BP2100 Configuration Options

Auxilliary 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



Call Customer Service for additional information about Auxiliary Panels.

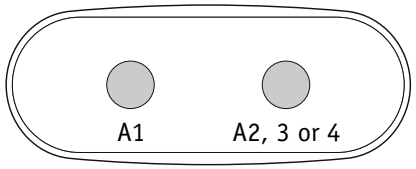
AX10 Panels on Bank 2*

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

*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

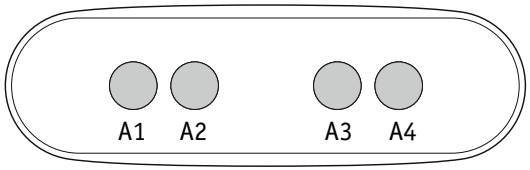
AX20 A1A2	No O/L	52800
AX20 A1A3	No O/L	52801
AX20 A1A4	No O/L	52802



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

AX40	No O/L	52799

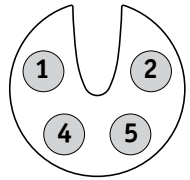


AX40 Auxiliary Panel plugged into Bank 1 will operate A1 + A2, A3 and A4.
AX40 Auxiliary Panel plugged into Bank 2 will operate A5 + A6, A7 and A8.

BP2100 Configuration Options

Remote Panel Features

Feature	Default
Remote Button A1	Jets 1
Remote Button A2	Jets 2
Remote Button A3	*Undefined*
Remote Button A4	*Jets 3*
Remote Button A5	*Jets 4*
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 _____