BFBP20 Tech Sheet

Customer:	**Bullfrog Spas**
Part Number:	56340-10 825 Incoloy
Custom Box Overlay	☒
Box Overlay Part Number	46090
UL System Model:	BP20-BFBP20-AS
Software Version ID:	M100_220 V43.0
Software Version:	43.0
File Name:	BP2000_43.0_BFBP20_LCE.hex
Configuration Signature:	2067A5B3
Eng. Project Number:	5678

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)
BFTP600 Software Version	50285-XX 2.8 and later (Version 2.12 required for bba™)
BFTP900 Software Version	50284-XX BF 3.7 and later (BF 3.13 or later required for bba™)

Auxiliary Panels

See Page 21

BALBOA water group

System Revision History

Part #	EPN	Date	Originator	Changes Made
56340	3911	09-26-12	BWG	Initial Release BFBP20 based on BFE15 - EL1500
56340-01-X1	3911	11-16-12	Customer	Change Purge Cycle Time to 5 Minutes and Set Reminders to OFF
56340-01	3911	01-24-13	Customer	Change TP600 configuration to use Menu button and custom menu
56340-02	4098	06-27-13	Customer	Add ability to raise set temperature to 106˚F
56340-03	4173	11-20-13	Customer	Update to latest software version to correct Setup 4 behavior in previous version.
56340-04	4173	08-14-14	Customer	Updated to latest software version, adding topside-intergrated bba™ support.
ZT000139	4391	01-07-15	Customer	Add bba™ support on TP600.
56340-05	4391	01-14-15	Customer	Approved for production.
56340-06	4510	04-24-15	Customer	Modify bba™ support on TP600 to increase volume.
56340-07	4573	08-06-15	Customer	Change Circ Pump to 240V.
56340-08	4593	09-09-15	Customer	Enabled light cycle feature.
56340-08	4593	10-05-15	Customer	Approved for production.
56340-09	4784	10-18-16	BWG	Updated to latest software version, adding topside-intergrated bba™2 support. Released to production.
56340-10	5098	08-03-21	BWG	Redesigned BP2000 board + updated software to support CHROMAZON∃™ & M8.
56340-10	5678	04-26-22	BWG	Redesigned expander board, with Voltrex connector J7 instead of soldered wire connnection W12.

bba™ & bba™2 & bba™3 (Balboa Bluetooth Amp) connection is documented seperately.

Basic Functions Setups 1 - 4

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.

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.

System Ouputs:

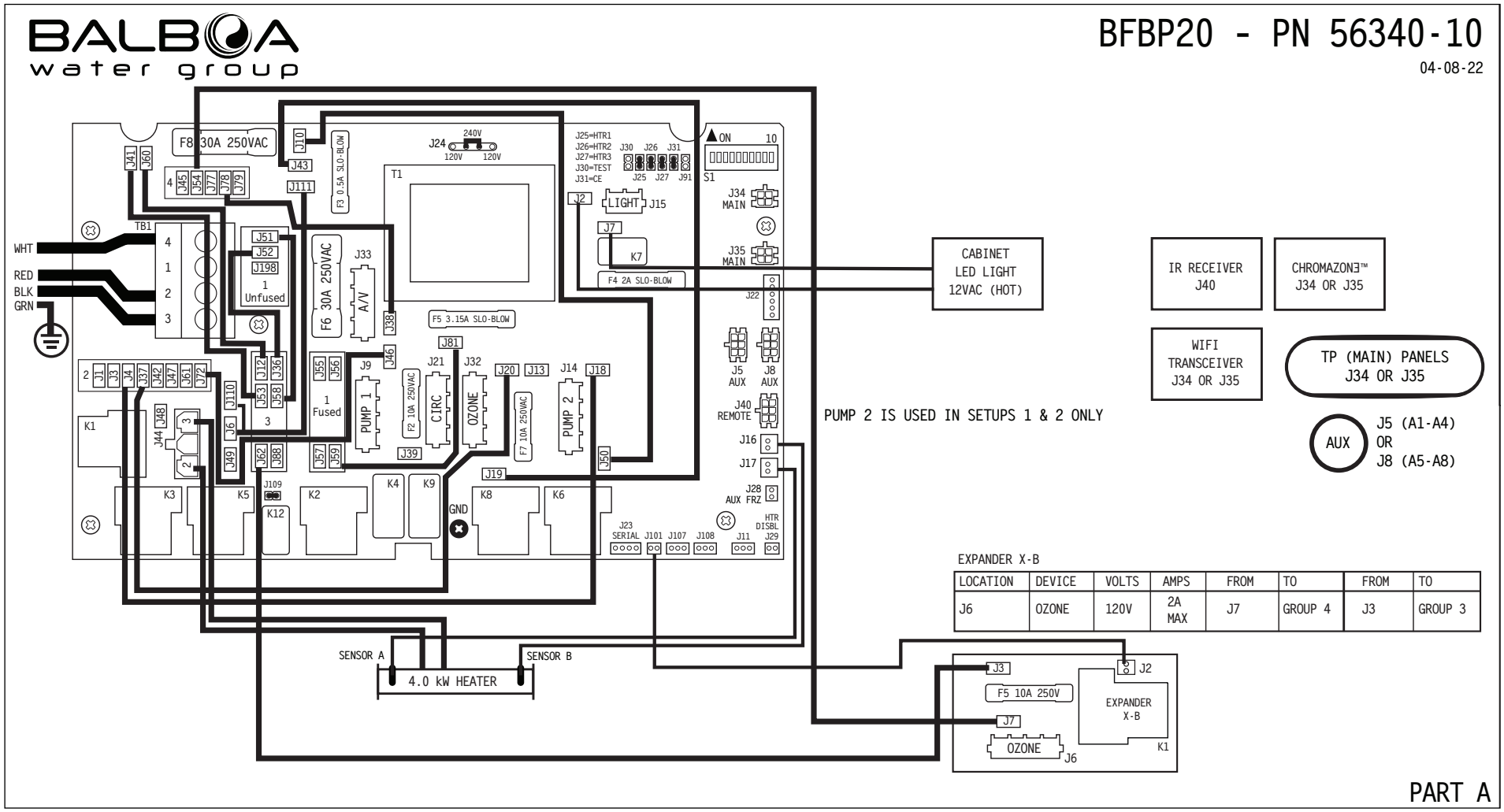
Pump 1	240VAC	2-Speed	12A max	30-minute timer for High Speed, 60-Minute timer for Low Speed (30-minute timer for both speeds in Circ Pump setups)
Pump 2	240VAC	2-Speed	12A max	30-minute timer
Circ Pump	240VAC	1-Speed	2A max	Programmable Filtration Cycles + Polling This is the heater pump except in Setups 2 and 4, where Pump 1 is the heater pump. The heater pump must deliver 20 GPM through heater.
Ozone	120VAC		2A max	
Spa Light	10VAC	On/Off	2A* max	60-minute timer.
Cabinet LED	10VAC	Hot	Power use limit is part of 2A spa light.	
A/V (Stereo)	120VAC	Hot	5A max	Always on
Heater	4.0kW @ 240VAC max			

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

BALBOA water group

Hardware Setup

Wiring Diagram



EXPANDER X-B

LOCATION	DEVICE	VOLTS	AMPS	FROM	TO	FROM	TO
J6	OZONE	120V	2A MAX	J7	GROUP 4	J3	GROUP 3

Hardware Setup

Settings

LOCATION	DEVICE	VOLTS	MAX AMPS	FROM	TO
J9	2-SP PUMP 1	240V	12A MAX	J46	GROUP 2
J14	2-SP PUMP 2	240V	12A MAX	J18	GROUP 2
	J14 LINE 1 CONNECTION			J43 J10	J19 J50
J15	SPA LIGHT	10V	2A*		
J21 J32	CIRC PUMP	240V	2A MAX	J20	GROUP 2
	CIRC LINE 1 CONNECTION			J81	J59
J33	TV / AV	120V	5A	J38	GROUP 4
J44	HEATER	240V	5.5 kW		

PUMP 2 IS USED IN SETUPS 1 & 2 ONLY

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

LOCATION	DEVICE	VOLTS	MAX AMPS	
J6 ON EXPANDER BOARD X-B	OZONE	120V	2A MAX	

SETUP #	CIRC PUMP	PUMP 1	PUMP 2	TEMP SCALE
1	PROGRAMMABLE FILTRATION + POLLING	2-SPEED	2-SPEED	°F
2	NONE	2-SPEED	2-SPEED	°F
3	PROGRAMMABLE FILTRATION + POLLING	2-SPEED		°F
4	NONE	2-SPEED		°F

SYSTEM WILL BE IN SETUP #2 UNLESS MARKED DIFFERENTLY BELOW

PUMP 1 LOW TIMEOUT IS 60 MINUTES.

INSTEAD OF SETUP #2, 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**
NOT ASSIGNED	◀ A7	NOT ASSIGNED
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

BALBOA water group

08-03-21

BFBP20 - PN 56340-10

PART B

BALBOA water group

Setup Reference Table

Setup #	Circ Pump	Pump 1	Pump 2	Temp Scale
1	Programmable Filtration + Polling	2-Speed	2-Speed	°F
2	None	2-Speed	2-Speed	°F
3	Programmable Filtration + Polling	2-Speed		°F
4	None	2-Speed		°F

System is shipped in Setup 2.

Replacement boards will be shipped in Setup 1.

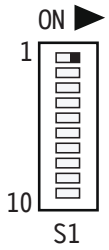
Pump 1 Low timeout is 60 minutes.
(Applies in non-circ setups only).

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

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

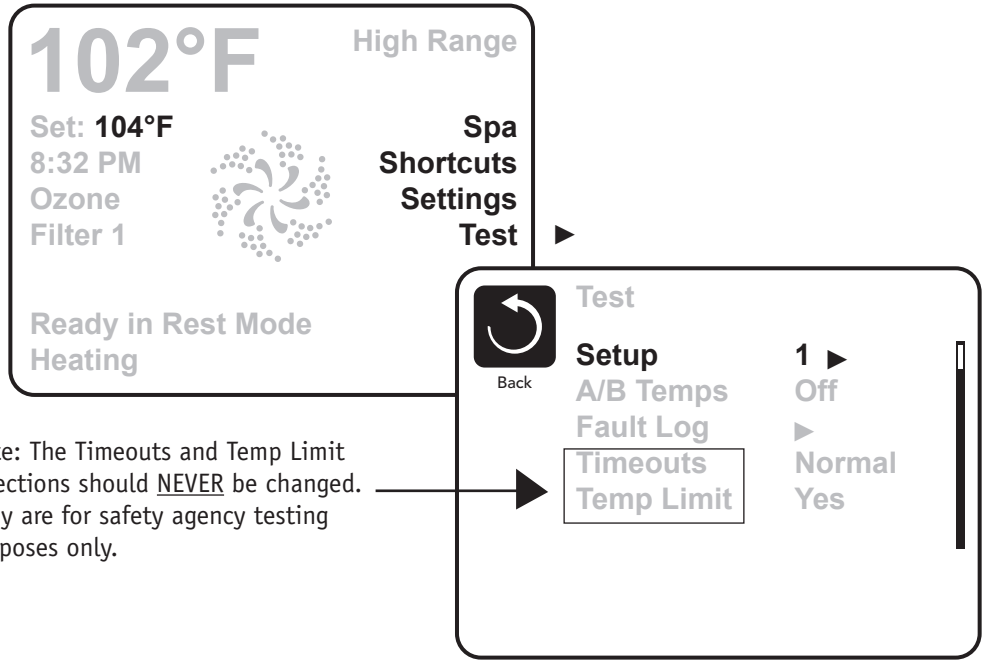
DANGER! HIGH VOLTAGE WILL BE ACCESSIBLE! SERVICE TECHNICIAN ONLY!

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.

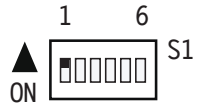
Changing Software Setups with TP600 / TP400

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.

As soon as Switch #1 is placed in the ON position, the temperature will show "T" after it instead of F or C, indicating the System is in Test Mode

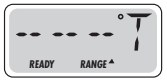


Software Setups

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.

You will have 1 minute to complete the setup change after you manually exit Priming Mode. (Once familiar with the process, the Setup change should take less than 15 seconds.)

When the panel displays RUN PMPS PURG AIR, press any Temperature button ONCE to exit Priming Mode.
You should see "---T" where the T indicates the system is in Test Mode.



Continued on Next Page.

Changing Software Setups with TP600 / TP400 Continued

Again, **You will have 1 minute** to complete the setup change after you manually exit Priming Mode.

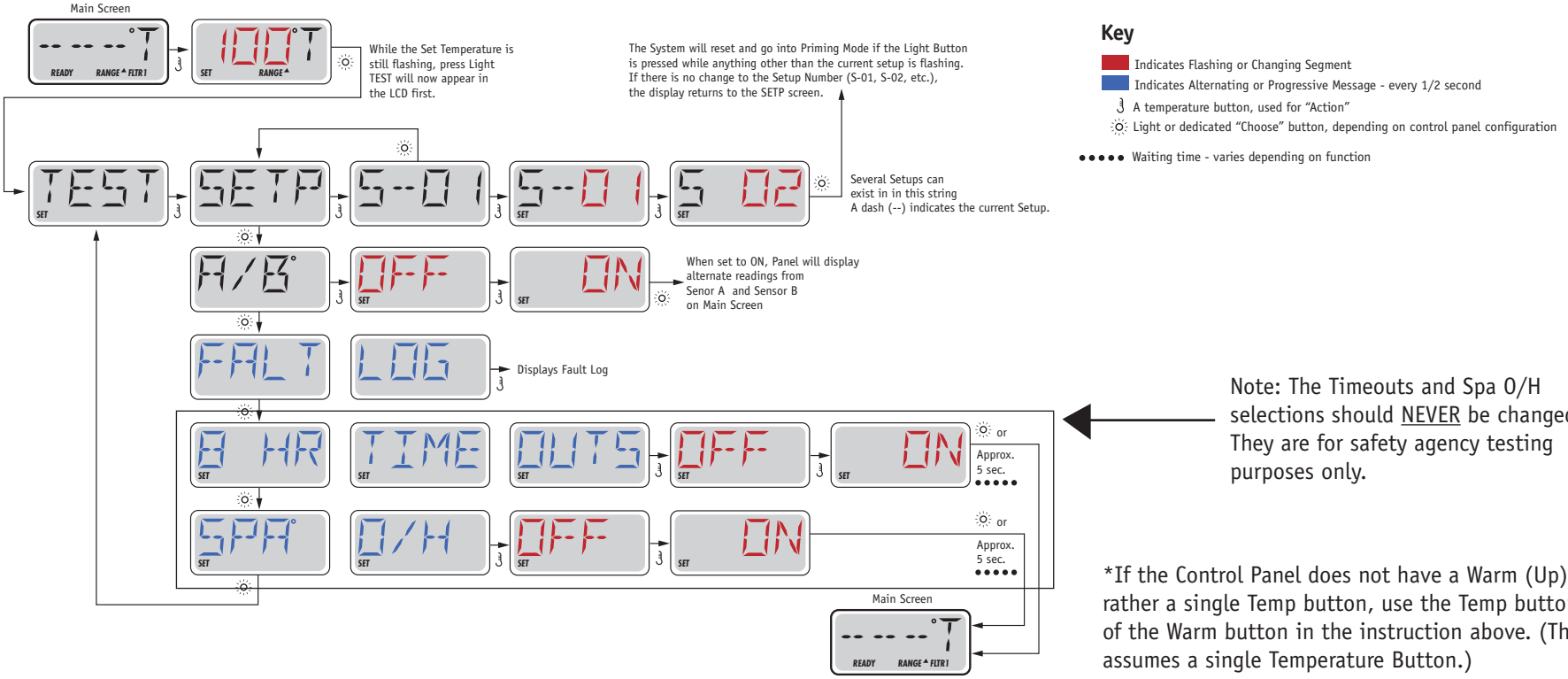
Immediately after exiting Priming Mode, press this sequence of buttons: Warm*, Light, Warm, Warm, Warm, Warm. Continue to press Warm until the diplay shows the Setup Number (S-01, S-02, etc.) you want to switch to. When the correct setup number is showing, press Light once, and the system will reset, using the newly-selected Setup from that point on.

Move DIP Switch 1 to the OFF position to take the spa out of Test Mode. °F or °C will replace °T.

Using a permanent marker, write the Setup number on the Setup label mounted inside the system lid (right). This is very important to any service person in the future who may need to replace a circuit board or system and needs to change the Setup on a replacement part while in the field.

NOTE: Changing the Setup may require wiring changes as well - refer to the wiring diagram or wiring diagram addendum.

THIS SYSTEM IS CONFIGURED AS SETUP #



Note: The Timeouts and Spa O/H selections should NEVER be changed. They are for safety agency testing purposes only.

*If the Control Panel does not have a Warm (Up) button, but rather a single Temp button, use the Temp button in place of the Warm button in the instruction above. (The flow chart assumes a single Temperature Button.)

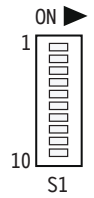
Equipment Expansion

Expansion Features

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

DIP Switch Functions

Fixed-fuction DIP Switches



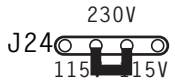
A1	Test Mode (normally Off).
A2	In “ON” position, add one high-speed pump (or blower) with Heater.
A3	In “ON” position, add two high-speed pumps (or 1 HS Pump and Blower) with Heater.
A4	In “ON” position, add four high-speed pumps (or 3 HS Pumps and Blower) with Heater.
A5	In “ON” position, enables Special 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.*

Undesignated switches are not assigned a function.

Jumper Definitions

J109	GFCI Test/Trip enabled when jumper is on both pins of J109. ***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 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.	

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.

Replacement Parts

PCBA:

Main PCBA:	59563
Expander PCBA:	59094-01

HEATER(s):

Plug + Click Heater Kit:	58117R16
Temp Sensor Kit:	53605

CABLES: N/A

FUSES:

Part Number	Amperage*	Location
30136	30A	F6, F8
26307	2A	F4
26905	0.5A	F3
26904	10A	F2, F7
26976	3.15A	F5
30122	10A	F5 (Expander)

* 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.

BFBP20 Configuration Options

General Features

Feature	Default
Pump 1 in Filter Cycle (Circ Only)	No
Pump 1 Low Timer (Non-Circ Only)	*60 Minutes*
General Pump Timer	30 Minutes
Blower Timer	15 Minutes
Mister Timer	15 Minutes
Light Timer	60 Minutes
Circ (when enabled)	Programmable + Polling
Cleanup Cycle	*30 Minutes*
Cleanup as Preference setting	*Yes*
Ozone	With Heater Pump*
Ozone Suppression	*60 Minutes*
Pump Purge	*300 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.

BFBP20 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)*

BFBP20 Configuration Options

Time Features

Feature	Default
Time Format*	12 Hour
Filter 1 Start Hour*	*18:00 (6:00 PM)*
Filter 1 Duration*	2 Hours in Setups 2 & 4 *3 Hours in Setups 1 & 3*
Filter Cycle 2 Default*	*ON*
Filter 2 Start Hour*	08:00 (8:00 AM)
Filter 2 Duration*	*1 Hour*
Light Cycle	*Enabled*
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)*

BFBP20 Configuration Options

Reminder Features

Feature	Default
Reminders Shown*	No
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)*

BFBP20 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	*1 Day*
Ozone Slaved to Heater Pump	NO
Dual Voltage Heater	Always Input Voltage
Safety Suction	Disabled
Menu Style	*Bullfrog (Hold)*

TP600 Panel Configuration

Button Layout Table

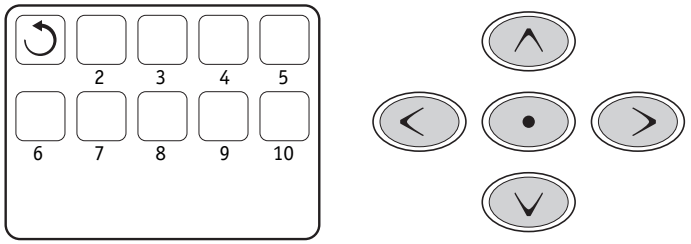
Button #	Pump 2 Setups 1 & 2	No Pump 2 Setups 3 & 4
1	Jets 1	Jets 1
2	Jets 2	Unused
3	Light 1	Light 1
4	Up	Up
5	Menu	Menu
6	Down	Down
LED 1	Jets 1	Jets 1
LED 2	Jets 2	Unused
LED 3	Light 1	Light 1
LED 4	Heat On	Heat On

TP900 Panel Configuration

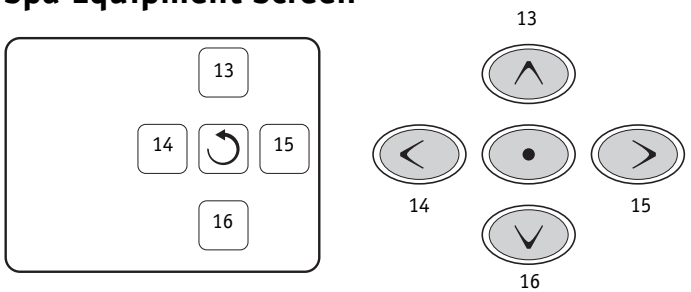
Button Layout Table

Button #	Pump 2 & Circ Pump Setup 1	Pump 2 & No Circ Pump Setup 2	No Pump 2 & Circ Pump Setup 3	No Pump 2 & No Circ Pump Setup 4
1	N/A	N/A	N/A	N/A
2	Jets 1	Jets 1	Jets 1	Jets 1
3	Jets 2	Jets 2	Light 1	Light 1
4	Light 1	Light 1	Invert	Invert
5	Invert	Invert	(Circ Icon)	Undefined
6	(Circ Icon)	Undefined	Undefined	Undefined
7	Undefined	Undefined	Undefined	Undefined
8	Undefined	Undefined	Undefined	Undefined
9	Undefined	Undefined	Undefined	Undefined
10	Undefined	Undefined	Undefined	Undefined
11	N/A	N/A	N/A	N/A
12	N/A	N/A	N/A	N/A
13	Light 1	Light 1	Light 1	Light 1
14	Jets 1	Jets 1	Jets 1	Jets 1
15	Jets 2	Jets 2	Undefined	Undefined
16	Invert	Invert	Invert	Invert

Spa Screen (Not used in custom Bullfrog panel)



Spa Equipment Screen*



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

* Using the custom Bullfrog panel, the “Spa Equipment” screen is accessed from the Main Screen via the “Spa” menu choice.

BFBP20 Configuration Options

Auxiliary Panel Features on Bank 1*

Feature	Default
Aux Button A1	Jets 1
Aux Button A2	Jets 2
Aux Button A3	Jets 3
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

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

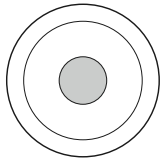
*Bank 1 consists of J5 on the Main Circuit Board.
Bank 2 consists of J8 on the Main Circuit Board.
Aux Connection Splitter PN 25257 may be required.

BFBP20 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



Call Customer Service for additional information about Auxiliary Panels.

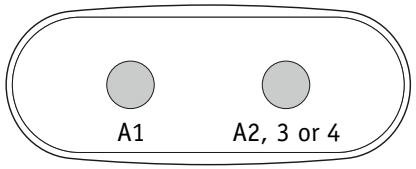
AX10 Panels on Bank 2*

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

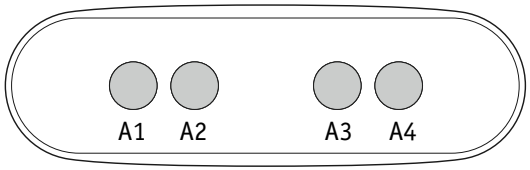
AX20 A1A2	No O/L	52800
AX20 A1A3	No O/L	52801
AX20 A1A4	No O/L	52802



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

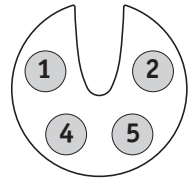


AX40 Auxiliary Panel plugged into Bank 1 will operate A1 + A2, A3 and A4.
AX40 Auxiliary Panel plugged into Bank 2 will operate A5 + A6, A7 and A8.

BFBP20 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	Undefined
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 _____