

MS90U Tech Sheet

Customer: Master Spas

Part Number: 59470 825 Incoloy 4.0kW "3S" heater

Custom Box Overlay ☐

Box Overlay Part Number N/A

UL System Model (4.0kw): BP20-MS90U-BS

Software Version ID: M100_221 V57.0

Software Version: 57.0

File Name: BP1800_57.0_MS90U.hex

Configuration Signature: 615CD7D3

Eng. Project Number: 5446

Control Panels (See later pages for more information):

spaTouch™ 2 Any generic version (version 2.0 or later required for bba™ 2 fully integrated functionality; version 2.19 or later required for CHROMAZON3™ support)

Icon spaTouch™ Any generic version (version 3.36 or later required for bba™ 2 fully integrated functionality)

Menued spaTouch™ Any generic version (version 2.8 or later required for bba™ 2 integrated functionality)

MP800/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 (Version 2.12 or later required for bba™/bba™ 2 On/Off control via menu)

TP400T US Version 2.7 and later (TP400T CE may be used) (Version 2.12 or later required for bba™/bba™ 2 On/Off control via menu)



Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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System Revision History

Part #	EPN	Date	Originator	Changes Made
ZT000545	5446	08-17-20	Customer	Custom BP1800 system with optional expander board, patterned after MS6013XE and MS501X.
ZT000545	5446	09-08-20	Customer	Updated to add Setups from MS40U, change heater to 4.0kW "3S" only, and renamed to MS90U.
59470	5446	09-22-20	Customer	Approved for production.

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

bba™ is integrated into graphic display panels (TP800, TP900 and spaTouch™). With TP600/TP400, use the "BT" entry on the menu to toggle bba™ power On/Off.

bba™2 is integrated into graphic display panels (TP800, TP900 and spaTouch™). With TP600/TP400, use the "BT" entry on the menu to toggle bba™2 power On/Off.

Basic Functions Setup 1-28

Power Requirements:

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

120/240VAC, 50/60Hz*, 16**/40A, Class A GFCI-protected service (Circuit Breaker = 20 /50A max.) - Setups 7, 8, 17, 18, 25 & 26 ONLY,
3 or 4 wires [hot, hot (optional), neutral, ground].

****NOTE:**

The above 120V spec is only when using a wall-mount GFCI / breaker.

If using a GFCI cord, the breaker is 15A and so the service is limited to 12A.

* 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.

Basic Functions Setup 1 - 28

System Outputs:

Pump 1	240VAC	2-Speed	12A max	15-minute timer (120-minute timer for low speed in Non-Circ Setups only)
		This is the heater pump in Setups 2, 4, 6, 8, 12, 14, 16, 18, 22, 24 & 28 Must deliver 20 GPM through heater 1-Speed in Setups 9, 10, 19, 20, 25 & 26		
Pump 2	240VAC	2-Speed	12A max	15-minute timer
		1-Speed in Setups 3 - 6, 9, 10, 13 - 16, 19, 20 Unused in Setups 7, 8, 17, 18, 21 - 26		
Pump 3	240VAC	1-Speed	12A max	15-minute timer
		Used in Setups 3, 4, 9, 13, 14, 19, 27 & 28 only		
Circ Pump	240VAC*	1-Speed	2A max	24-hour with 3°F shutoff (outside of filter cycles)
		This is the heater pump in Setups 1, 3, 5, 7, 9, 10, 11, 13, 15, 17, 19, 20, 21, 23, 25 - 27 Must deliver 20 GPM through heater		
Ozone	240VAC*		0.5A max	Independent in Non-Circ Setups and Slaved to Circ Pump in Circ Setups
Spa Light	10VAC	On/Off	2A** max	60-minute timer.
		Unused in Setups 21 - 24		
A/V (Stereo)	120VAC	Hot	4A max	Always on
Heater	4.0kW @ 240VAC max			

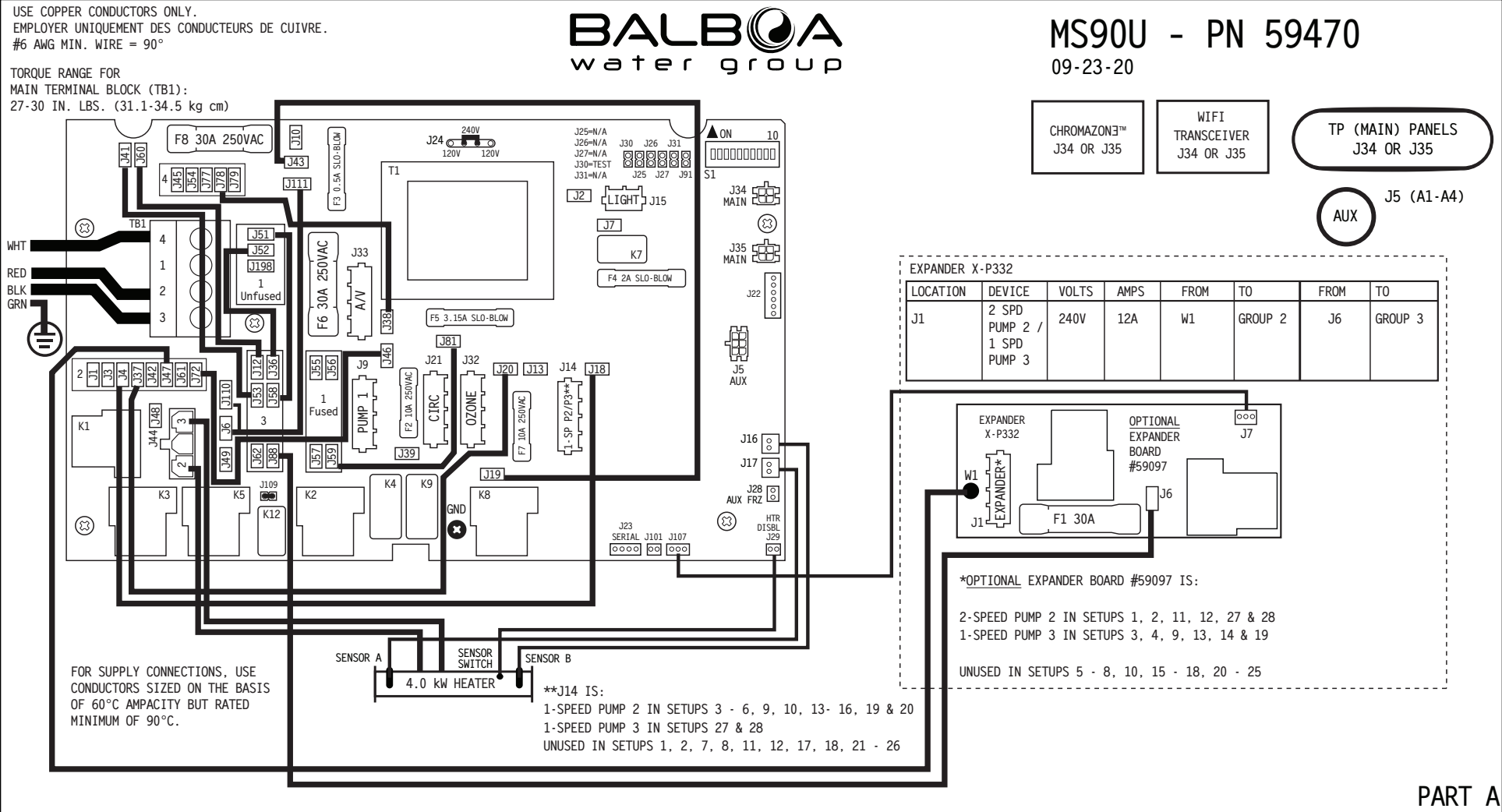
*Circ Pump and Ozone must be the same voltage.

With 120VAC power input (for Setups 7, 8, 17, 18, 25 & 26 only), Pump 1, Circ Pump, and Ozone must be set to 120VAC by moving wires attached to J50, J51 and J32 to area 1 (Neutral).

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

Hardware Setup

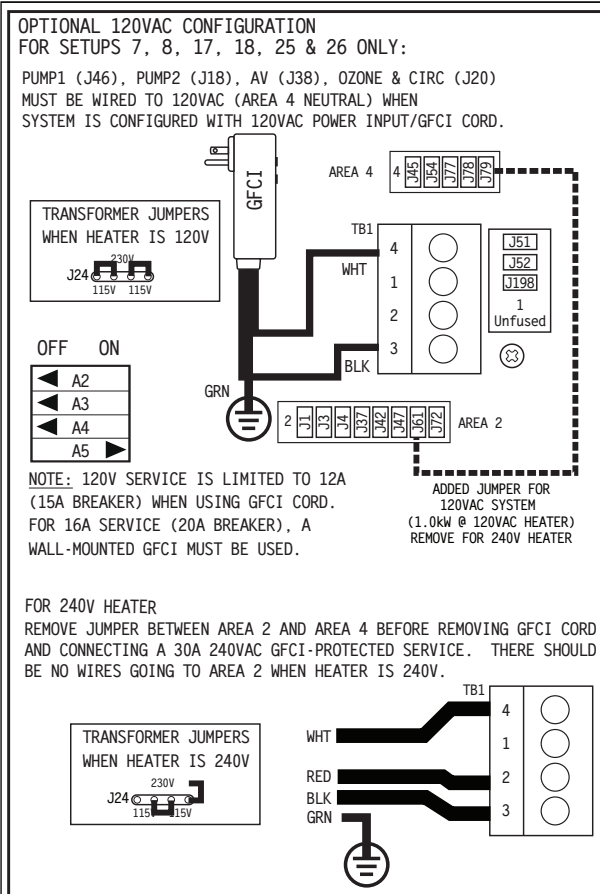
Wiring Diagram for “3S” heater versions



PART A

Hardware Setup

Settings for "3S" heater versions



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MS90U - PN 59470

09-23-20

LOCATION	DEVICE	VOLTS	MAX AMPS	FROM	TO
J9	2-SP PUMP 1	240V	12A MAX	J46	GROUP 2
J14	1-SP PUMP 2/3	240V	12A MAX	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	120V	4A	J38	GROUP 4
J44	HEATER	240V	4.0 kW		

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

SETUP #	CIRC PUMP	PUMP 1	PUMP 2	PUMP 3	LIGHT	MENU TYPE	TEMP SCALE
1+	24HR/3F	2-SPEED	2-SPEED	NONE	1-SPEED	STANDARD	°F
2+	NONE	2-SPEED	2-SPEED	NONE	1-SPEED	STANDARD	°F
3+	24HR/3F	2-SPEED	1-SPEED	1-SPEED	1-SPEED	STANDARD	°F
4+	NONE	2-SPEED	1-SPEED	1-SPEED	1-SPEED	STANDARD	°F
5	24HR/3F	2-SPEED	1-SPEED	NONE	1-SPEED	STANDARD	°F
6	NONE	2-SPEED	1-SPEED	NONE	1-SPEED	STANDARD	°F
7	24HR/3F	2-SPEED	NONE	NONE	1-SPEED	STANDARD	°F
8	NONE	2-SPEED	NONE	NONE	1-SPEED	STANDARD	°F
9+	24HR/3F	1-SPEED	1-SPEED	1-SPEED	1-SPEED	STANDARD	°F
10	24HR/3F	1-SPEED	1-SPEED	NONE	1-SPEED	STANDARD	°F
11+	24HR/3F	2-SPEED	2-SPEED	NONE	1-SPEED	SIMPLE	°F
12+	NONE	2-SPEED	2-SPEED	NONE	1-SPEED	SIMPLE	°F
13+	24HR/3F	2-SPEED	1-SPEED	1-SPEED	1-SPEED	SIMPLE	°F
14+	NONE	2-SPEED	1-SPEED	1-SPEED	1-SPEED	SIMPLE	°F
15	24HR/3F	2-SPEED	1-SPEED	NONE	1-SPEED	SIMPLE	°F
16	NONE	2-SPEED	1-SPEED	NONE	1-SPEED	SIMPLE	°F
17	24HR/3F	2-SPEED	NONE	NONE	1-SPEED	SIMPLE	°F
18	NONE	2-SPEED	NONE	NONE	1-SPEED	SIMPLE	°F
19+	24HR/3F	1-SPEED	1-SPEED	1-SPEED	1-SPEED	SIMPLE	°F
20	24HR/3F	1-SPEED	1-SPEED	NONE	1-SPEED	SIMPLE	°F
21	24HR/3F	2-SPEED	NONE	NONE	NONE	STANDARD	°F
22	NONE	2-SPEED	NONE	NONE	NONE	STANDARD	°F
23	24HR/3F	2-SPEED	NONE	NONE	NONE	SIMPLE	°F
24	NONE	2-SPEED	NONE	NONE	NONE	SIMPLE	°F
25	24HR/3F	1-SPEED	NONE	NONE	1-SPEED	STANDARD	°F
26	24HR/3F	1-SPEED	NONE	NONE	1-SPEED	SIMPLE	°F
27+	24HR/3F	2-SPEED	2-SPEED	1-SPEED	1-SPEED	STANDARD	°F
28+	NONE	2-SPEED	2-SPEED	1-SPEED	1-SPEED	STANDARD	°F

SWITCHBANK S1 OFF

TEST MODE OFF	SWITCHBANK S1 ON
DON'T ADD 1 HS PUMP W/HTR	◀ A1 TEST MODE ON
DON'T ADD 2 HS PUMPS W/HTR	◀ A2 ADD 1 HS PUMP WITH HEAT
DON'T ADD 4 HS PUMPS W/HTR	◀ A3 ADD 2 HS PUMPS WITH HEAT
SPECIAL AMPERAGE RULE A	◀ A4 ADD 4 HS PUMPS WITH HEAT
STORE SETTINGS*	◀ A5 SPECIAL AMPERAGE RULE B
ONLY HEATER PUMP IN FILTER	◀ A6 MEMORY RESET*
REGULAR HIGH RANGE	◀ A7 P1 ASSISTS CIRC IN FILTER
NOT ASSIGNED	◀ A8 ALTERNATE HIGH RANGE
NOT ASSIGNED	◀ A9 NOT ASSIGNED
NOT ASSIGNED	◀ A10 NOT ASSIGNED

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

CONNECT ONLY TO CIRCUITS PROTECTED
BY A CLASS A GFCI.

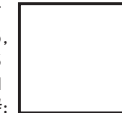
A DISCONNECTING MEANS MUST BE INSTALLED
WITHIN SIGHT FROM A DISCONNECTION MEANS
MUST BE INSTALLED WITHIN SIGHT FROM THE
EQUIPMENT AND AT LEAST 5 FEET (1.52 M)
FROM THE INSIDE WALLS OF THE POOL, SPA
OR HOT TUB.

TOTAL OUTPUT AMP DRAW NOT TO EXCEED MAX
INPUT RATING OF SPA.

USE EARTH GROUND CONNECTIONS AS INDICATED
INSIDE THE SYSTEM ENCLOSURE.

'+' AFTER THE SETUP NUMBER MEANS THAT SETUP
NEEDS THE #59097 EXPANDER BOARD INSTALLED

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



PART B

Setup Reference Table

Setup #	Circ Pump	Pump 1	Pump 2	Pump 3	Lights	Menu Type	Temp Scale
1+	24hr/3°F	2-Speed	2-Speed	None	1-Speed	Standard	°F
2+	None	2-Speed	2-Speed	None	1-Speed	Standard	°F
3+	24hr/3°F	2-Speed	1-Speed	1-Speed	1-Speed	Standard	°F
4+	None	2-Speed	1-Speed	1-Speed	1-Speed	Standard	°F
5	24hr/3°F	2-Speed	1-Speed	None	1-Speed	Standard	°F
6	None	2-Speed	1-Speed	None	1-Speed	Standard	°F
7	24hr/3°F	2-Speed	None	None	1-Speed	Standard	°F
8	None	2-Speed	None	None	1-Speed	Standard	°F
9+	24hr/3°F	1-Speed	1-Speed	1-Speed	1-Speed	Standard	°F
10	24hr/3°F	1-Speed	1-Speed	None	1-Speed	Standard	°F
11+	24hr/3°F	2-Speed	2-Speed	None	1-Speed	Simple	°F
12+	None	2-Speed	2-Speed	None	1-Speed	Simple	°F
13+	24hr/3°F	2-Speed	1-Speed	1-Speed	1-Speed	Simple	°F
14+	None	2-Speed	1-Speed	1-Speed	1-Speed	Simple	°F
15	24hr/3°F	2-Speed	1-Speed	None	1-Speed	Simple	°F
16	None	2-Speed	1-Speed	None	1-Speed	Simple	°F
17	24hr/3°F	2-Speed	None	None	1-Speed	Simple	°F
18	None	2-Speed	None	None	1-Speed	Simple	°F
19+	24hr/3°F	1-Speed	1-Speed	1-Speed	1-Speed	Simple	°F
20	24hr/3°F	1-Speed	1-Speed	None	1-Speed	Simple	°F
21	24hr/3°F	2-Speed	None	None	None	Standard	°F
22	None	2-Speed	None	None	None	Standard	°F
23	24hr/3°F	2-Speed	None	None	None	Simple	°F
24	None	2-Speed	None	None	None	Simple	°F
25	24hr/3°F	1-Speed	None	None	1-Speed	Standard	°F
26	24hr/3°F	1-Speed	None	None	1-Speed	Simple	°F
27+	24hr/3°F	2-Speed	2-Speed	1-Speed	1-Speed	Standard	°F
28+	None	2-Speed	2-Speed	1-Speed	1-Speed	Standard	°F

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

'+' after the Setup number means that
Setup needs the #59097 expander
board installed

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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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!

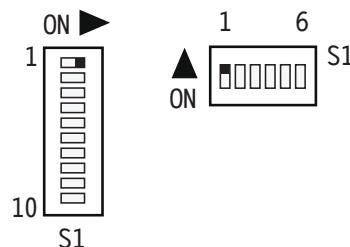
While the system is running, move DIP Switch 1 (on S1 on the Main circuit board) to ON.

The system will enter Test Mode.

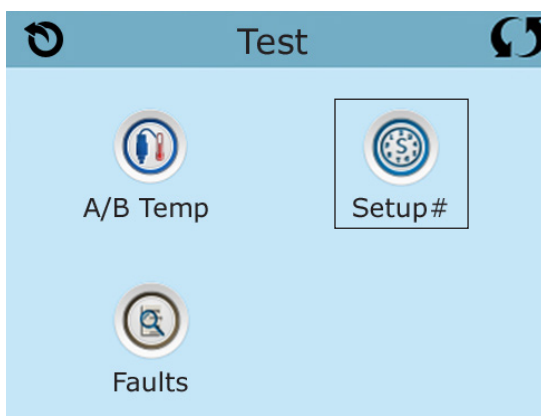
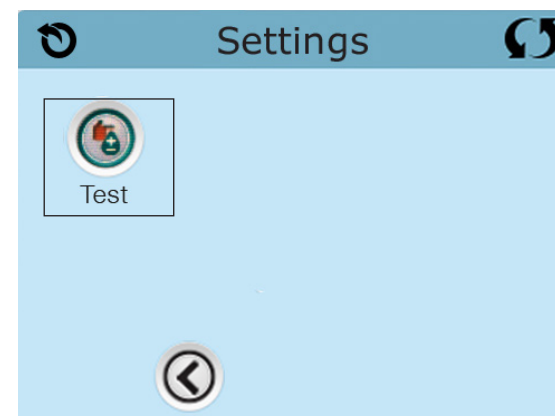
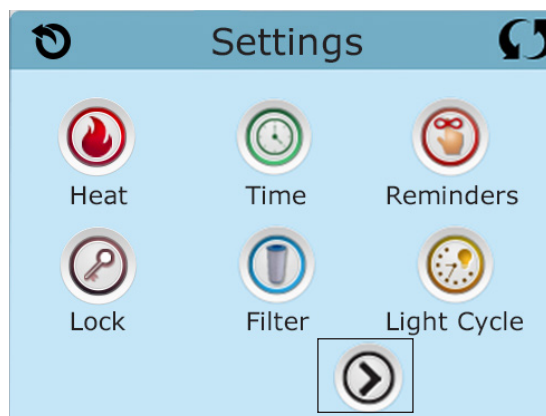
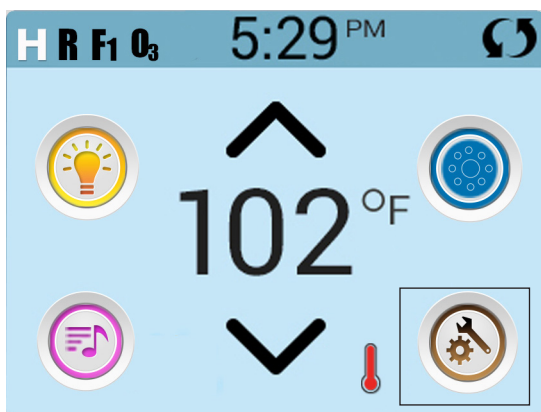
Moving DIP Switch 1 to OFF will exit Test Mode.

To Change Software Setups:

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

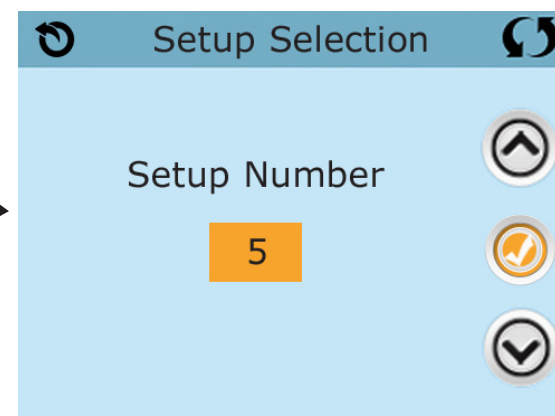


The example screens shown here are from the spaTouch 1 Icon-Driven Panel, but the screens on the spaTouch 2 Panel are similar. The main difference is that the spaTouch 2 display is wider.



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.



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

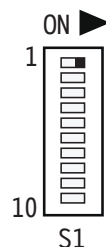
Test Menu Access (S1, Switch 1 ON) *Service Technician ONLY.*

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.

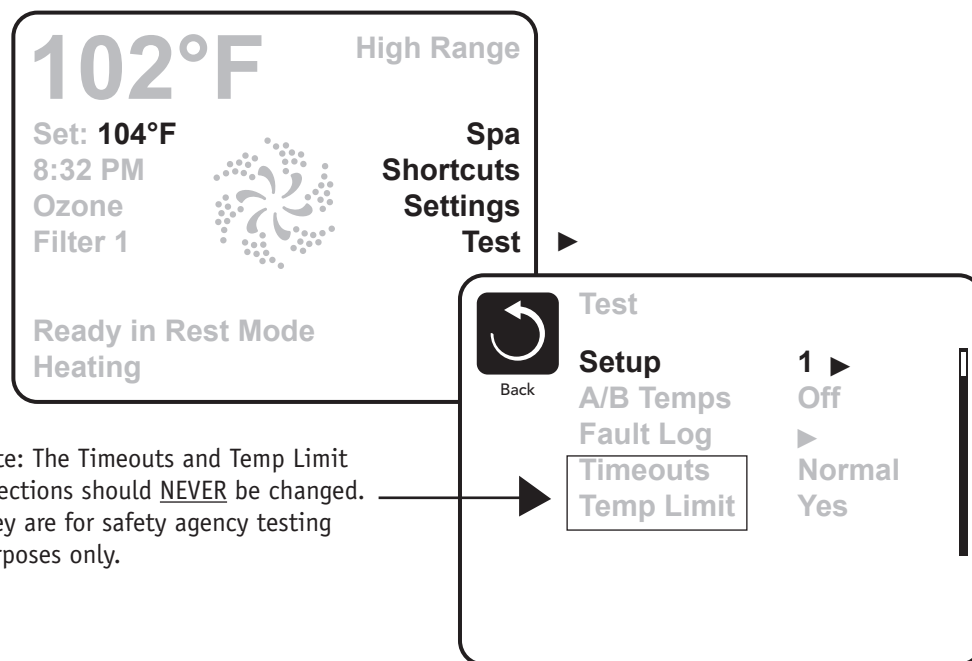
Moving DIP Switch 1 to OFF will exit Test Mode.



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

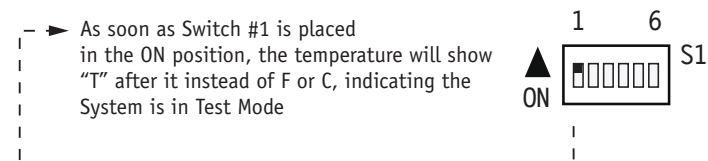
Test Menu Access (S1, Switch 1 ON) *Service Technician ONLY.*

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.



Software Setups

Under the TEST Menu, the Setup screen will allow changing the Setup from 1 to any number established by the Manufacturer.

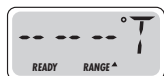
Changing the Setup may require wiring changes as well.

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.

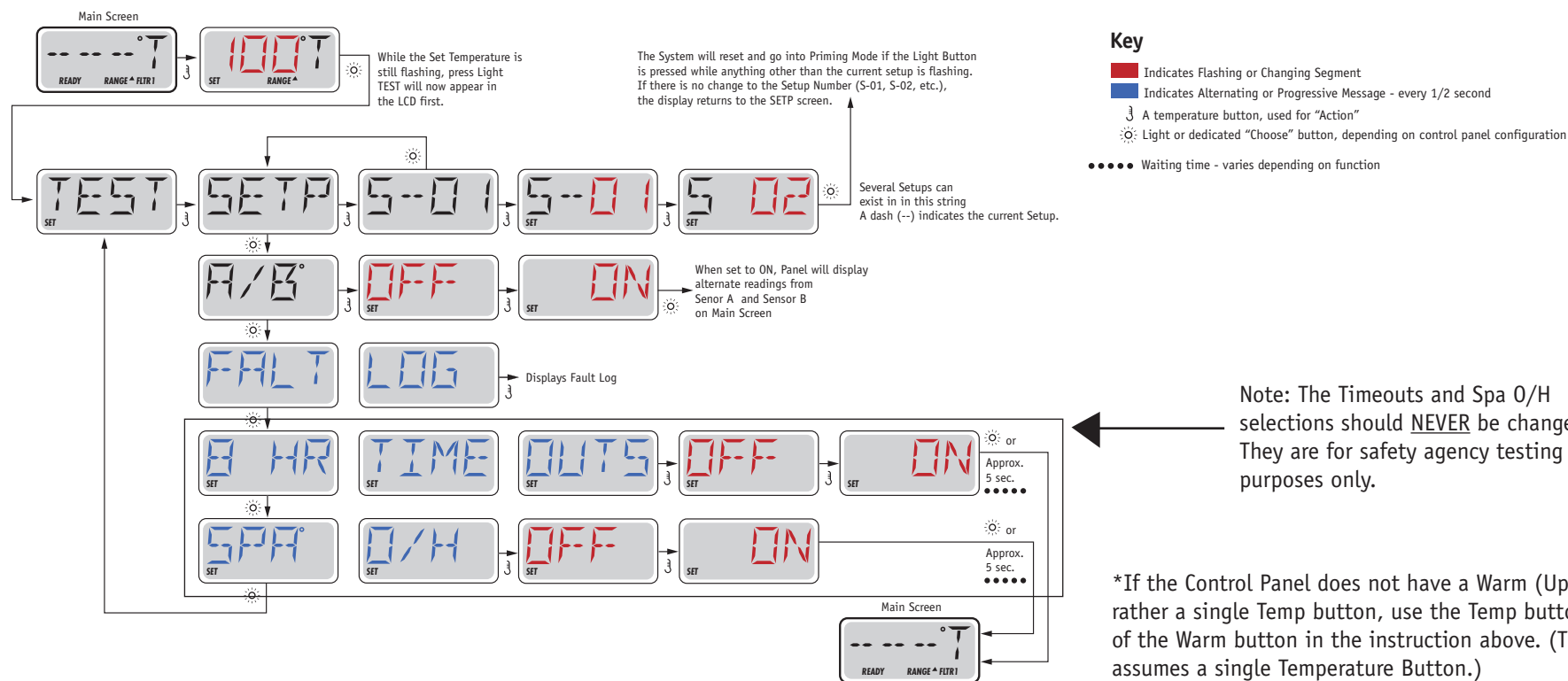
Immediately after exiting Priming Mode, press this sequence of buttons: Warm*, Light, Warm, Warm, Warm, Warm. Continue to press Warm until the display shows the Setup Number (S-01, S-02, etc.) you want to switch to. When the correct setup number is showing, press Light once, and the system will reset,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



Equipment Expansion

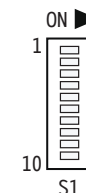
Expansion Features

Control Connection	Default	Fuse
Relay 1 (J101)	Undefined	None
Relay 7/8 (J107)	2-Speed Pump 2 or 1-Speed Pump 3	30A

DIP Switch Functions

Fixed-function 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.



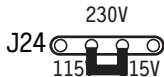
Note: A2/A3/A4 all off = No heat with any high-speed pump or blower.

Assignable DIP Switches

- | | |
|----|---|
| A7 | In "ON" position, Pump 1 (at lowest speed) assists Circ Pump in Filter Cycles (on Circs Setups only).
In "OFF" position, only the heater pump runs during Filter Cycles. |
| A8 | In "ON" position, High Range is replaced by Alternate High Range settings (see page 19)
In "OFF" position, the regular High Range settings are used |

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	Not used on BP1800 board.	
J30	Do Not Use	
J31	Not used on BP1800 board.	
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	Not used on BP1800 board. Note: Factory Configured do not change.	
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.	J24 

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.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. © Copyright 2014 Balboa Water Group.

Replacement Parts

PCBA:

Main PCBA:	59471
Expander PCBA:	59097

HEATER(s):

Plug + Click Heater Kit:	58442KIT 4.0kW 825 Inc "3S" heater
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.

BP1800 Configuration Options

General Features

Feature	Default	
Pump 1 in Filter Cycle (Circ Only)	No	
Pump 1 Low Timer	<i>120 Minutes</i>	Applies in non-circ Setups (configurations) only
General Pump Timer	15 Minutes	Applies to all pumps, except Pump 1 low in Non-Circ Setups
Blower Timer	15 Minutes	
Mister Timer	15 Minutes	
Light Timer	<i>60 Minutes</i>	
Circ (when enabled)	<i>24 hr with 3°F shutoff (outside of filter cycles)</i>	
Cleanup Cycle	<i>60 Minutes</i>	
Cleanup as Preference setting	<i>Yes</i>	
Ozone	With Heater Pump*	
Ozone Suppression	<i>60 Minutes</i>	
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.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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BP1800 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
Alternate Hi-Range Min. Set Temp	50°F
Alternate Hi-Range Max. Set Temp	99°F
Alternate Hi-Range Default Temp*	85°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)*

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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BP1800 Configuration Options

Time Features

Feature	Default
Time Format*	12 Hour
Filter 1 Start Hour*	20:00 (8:00 PM)
Filter 1 Duration*	<i>4 Hours 30 Minutes</i>
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)*

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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BP1800 Configuration Options

Reminder Features

Feature	Default
Reminders Shown*	<i>Yes</i>
Check pH	<i>OFF</i>
Check Sanitizer	<i>OFF</i>
Clean Filter	30 Days
Test GFCI	<i>OFF</i>
Drain Water	<i>180 Days</i>
Change Cartridge	OFF
Clean Cover	<i>OFF</i>
Treat Wood	<i>OFF</i>
Change Filter	<i>180 Days</i>

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

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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BP1800 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	Not Applicable for CE Models
Ozone Slaved to Heater Pump	<i>Yes in circ setups</i> <i>No in non-circ setups</i>
Dual Voltage Heater	Always Input Voltage
Safety Suction	Disabled

TP800 Panel Configuration

Button Layout Table

Feature #	Setups 4 & 28	Setups 2 & 6	Setups 3, 9 & 27	Setups 1, 5 & 10	Setups 7 & 25	Setup 8	Setup 21	Setup 22
A1	N/A	N/A	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	Jets 1	Jets 1
A3	Jets 2	Jets 2	Jets 2	Jets 2	Light 1	Light 1	Invert	Invert
A4	Jets 3	Light 1	Jets 3	Light 1	Invert	Invert	(Circ Icon)	Undefined
A5	Light 1	Invert	Light 1	Invert	(Circ Icon)	Undefined	Undefined	Undefined
A6	Invert	Undefined	Invert	(Circ Icon)	Undefined	Undefined	Undefined	Undefined
A7	Undefined	Undefined	(Circ Icon)	Undefined	Undefined	Undefined	Undefined	Undefined
A8	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A9	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A10	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A11	N/A	N/A	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	N/A	N/A
A13	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A14	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A15	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A16	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
B1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1
B2	Jets 2	Jets 2	Jets 2	Jets 2	Undefined	Undefined	Undefined	Undefined
B3	Jets 3	Undefined	Jets 3	Undefined	Undefined	Undefined	Undefined	Undefined
B4	Light 1	Light 1	Light 1	Light 1	Light 1	Light 1	Undefined	Undefined

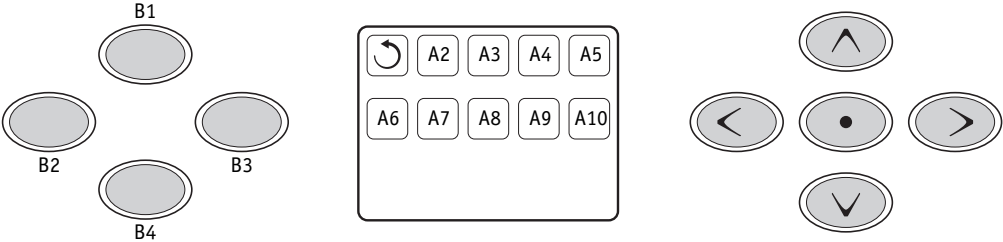
TP800 not supported in Setups 11 - 20, 23, 24 & 26.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

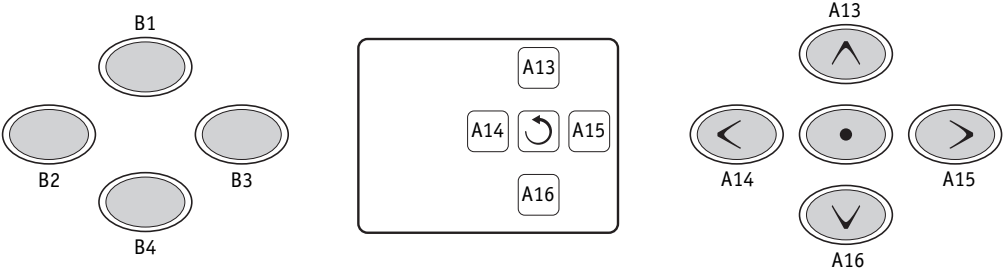
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TP800 Panel Configuration

Spa Screen



Shortcuts Screen



Note: Buttons 11 and 12 are not used in this configuration.
Button 1 is fixed.

Panel Part Number	50204-XX
Overlay Part Number	N/A

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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TP600 Panel Configuration

Button Layout Table

Button #	Setups 11, 12, 15, 16 & 20	Setups 17, 18, 23, 24 & 26	Setups 13,14 & 19
1	Jets 1	Jets 1	Jets 1
2	Jets 2	Undefined	Jets 2
3	Invert	Invert	Jets 3
4	Up	Up	Up
5	Light 1	Light 1	Light 1
6	Down	Down	Down
LED 1	Jets 1	Jets 1	Jets 1
LED 2	Jets 2	Undefined	Jets 2
LED 3	Light 1	Light 1	Light 1
LED 4	Heat On	Heat On	Heat On

TP600 not supported in Setups 1 - 10, 21, 22, 25, 27 & 28.

In Setups 23 & 24, which have no Light output, the only functions of button 5 are:

- Activates Circ Pump during Priming Mode.
- Acts as navigation button for menus.

TP600

55676-XX

No Overlay



TP400 Panel Configuration

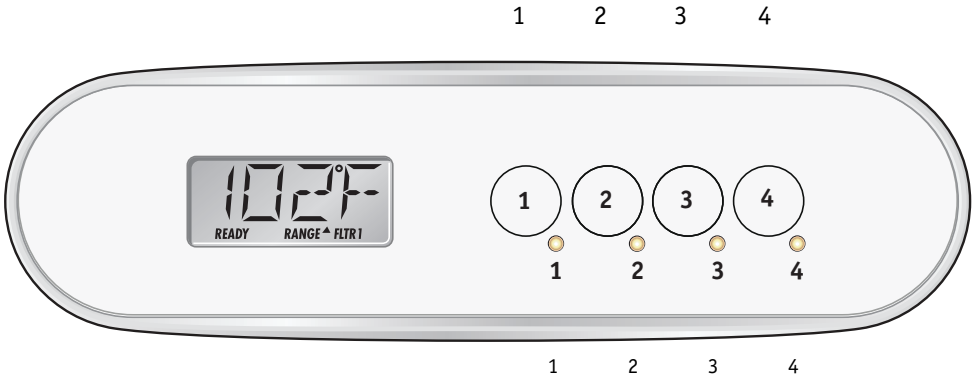
Button Layout Table for TP400T

Button #	Setups 11, 12, 15, 16 & 20	Setups 17, 18, 23, 24 & 26
1	Temperature	Temperature
2	Jets 1	Jets 1
3	Light 1	Light 1
4	Jets 2	Undefined
LED 1	Heater ON	Heater ON
LED 2	Jets 1 ON	Jets 1 ON
LED 3	Light ON	Light ON
LED 4	Jets 2 ON	Undefined

TP400T not supported in Setups 1-10, 13, 14, 19, 21, 22, 25, 27 & 28.

In Setups 23 & 24, which have no Light output, the only functions of button 3 are:

- Activates Circ Pump during Priming Mode.
- Acts as navigation button for menus.



TP400T US

50380-XX

Includes overlay PN 12511.

BP1800 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

*Bank 1 consists of J5 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.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

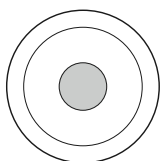
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BP1800 Configuration Options

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

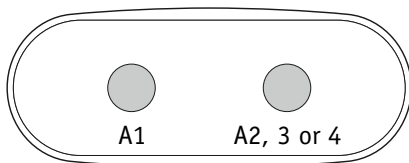


Call Customer Service for additional information about Auxiliary Panels.

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

AX20

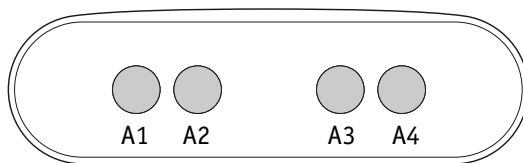
AX20 A1A2	No O/L	52800
AX20 A1A3	No O/L	52801
AX20 A1A4	No O/L	52802



AX20 Auxiliary Panel plugged into Bank 1 will operate A1 + A2, A3 or A4.

AX40

AX40	No O/L	52799
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AX40 Auxiliary Panel plugged into Bank 1 will operate A1 + A2, A3 and A4.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

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