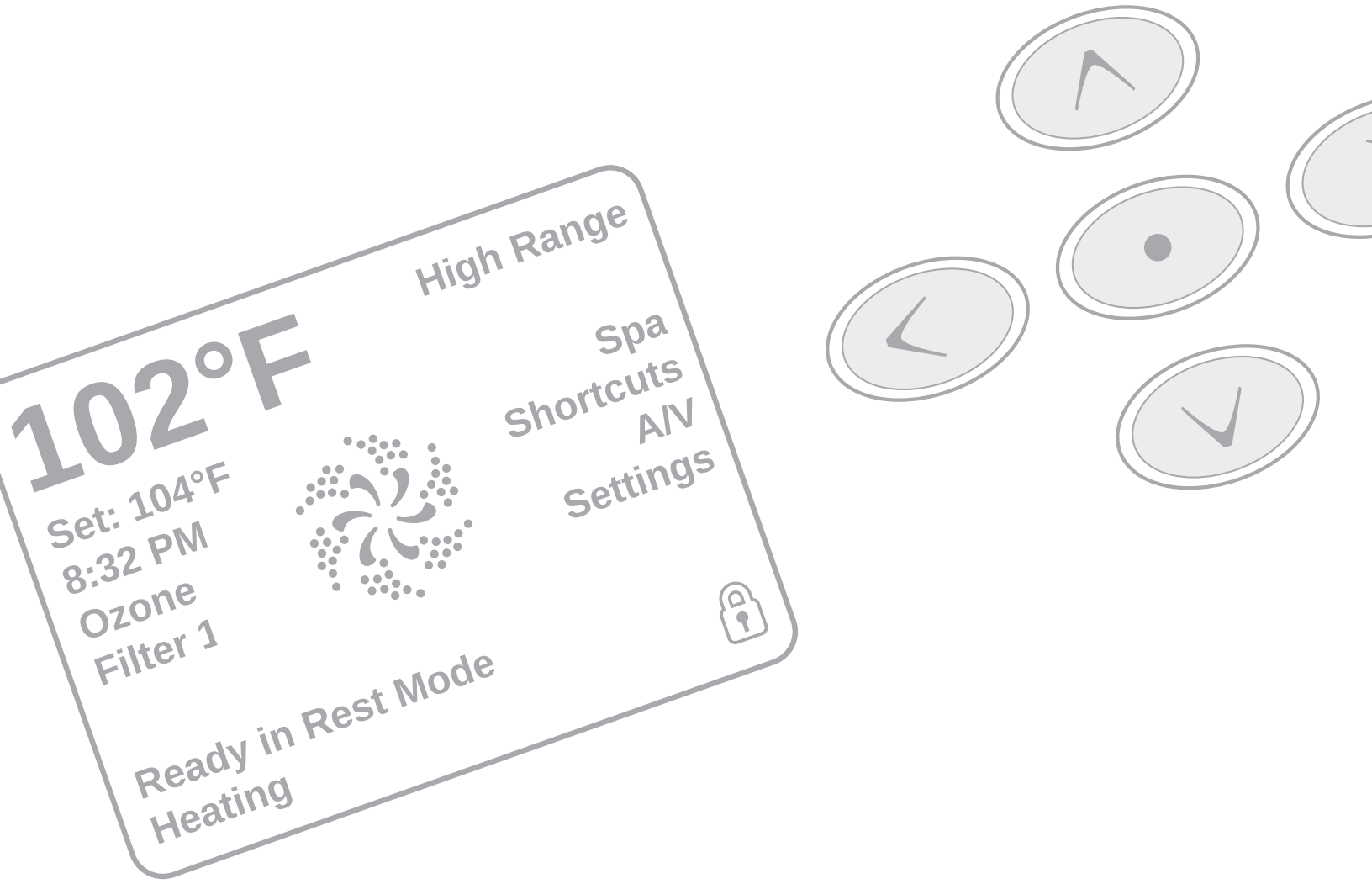
Colossus Series Installation and Setup



User Interface and Programming Guide:
http://service.balboa-instruments.com/zz40985_download.zip

01-25-10

End User Warning:

This Installation Manual is provided solely to aid qualified spa service technicians in installing spas with control systems manufactured by Balboa Water Group. Balboa controls have absolutely no end user serviceable parts. Balboa Water Group does not authorize attempts by the spa owner/user to repair or service any Balboa products. Non-qualified users should never open or remove covers, as this will expose dangerous voltage points and other dangerous risks. Please contact your dealer or authorized repair center for service.

Intellectual Property:

All Intellectual property, as defined below, owned by or which is otherwise the property of Balboa Water Group or its respective suppliers relating to the Balboa Water Group Colossus Spa Control, including but not limited to, accessories, parts, or software relating there to (the "System"), is proprietary to Balboa Water Group and protected under federal laws, state laws, and international treaty provisions. Intellectual Property includes, but is not limited to, inventions (patentable or unpatentable), patents, trade secrets, copyrights, software, computer programs, and related documentation, and other works of authorship. You may not infringe or otherwise violate the rights secured by the Intellectual Property. Moreover, you agree that you will not (and will not attempt to) modify, prepare derivative works of, reverse engineer, decompile, disassemble, or otherwise attempt to create source code from the software. No title to or ownership in the Intellectual Property is transferred to you. All applicable rights of the Intellectual Property shall remain with Balboa Water Group and its suppliers.

Important Notices

Electrical Safety Precautions

1. ⚠ DANGER - Risk of electric shock. Before making any electrical connections, make certain that the Main Power breaker from the house breaker box has been turned off.

2. ⚠ DANGER - Risk of Electric Shock. Do not permit any electric appliance, such as a light, telephone, radio, or television within 5' (1.5m) of a pool or spa.

3. ⚠ Warning - All electrical work must be performed by a qualified electrician and must conform to all national, state, and local codes.

Basic Installation and Configuration Guidelines

Use minimum 6AWG copper conductors only.

Torque field connections between 21 and 23 in-lbs.

Connect only to a circuit protected by a Class A Ground Fault Circuit Interrupter (GFCI) CSA enclosure: Type 2.

Refer to the wiring diagram inside the cover of the control enclosure.

Refer to Installation and Safety Instructions provided by the spa manufacturer.

Caution:

- Test the ground fault circuit interrupter before each use of the spa.
- Read the instruction manual.
- Adequate drainage must be provided if the equipment is to be installed in a pit.
- For use only within an enclosure rated CSA Enclosure 3.
- Connect only to a circuit protected by a Class A ground fault circuit interrupter.
- To ensure continued protection against shock hazard, use only identical replacement parts when servicing.
- Install a suitably rated suction guard to match the maximum flow rate marked.

Warning:

- Water temperature in excess of 38°C may be injurious to your health.
- Disconnect the electrical power before servicing.

The Colossus Manual

This installation and service manual is limited to the Colossus, circulation system, and electronic set up and configuration. Installation of related accessories such as blowers, ozone generators, and lights is limited to only the Colossus configuration.

For plumbing and wiring of accessories, please refer to the manufacturer's installation instructions. High voltage residential wiring schematics are included only as an aid in troubleshooting. Do **not** attempt to repair equipment or wiring that you are not qualified to repair. Tell the owner to call a licensed electrician to repair anything that you suspect is wired improperly or not up to code.

GFCI

It is required by code to install a Ground Fault Circuit Interrupter (GFCI) in the supply power for a spa. This device will trip the breaker if there is an unsafe electrical condition caused by a malfunctioning component or even the slightest short to ground.

Note: Connect the control system only to a circuit protected by a Class A GFCI mounted at least 5' (1.52M) from the inside walls of the spa/hot tub and in line of sight from the equipment compartment.

The newest Balboa EL controls employ a GFCI Trip feature that will test for the presence of a GFCI and will not allow the spa to operate if the GFCI is not installed.

The GFCI Trip feature is also used to cut power to the spa in the event that a pump is stuck in the ON position, which can heat the water beyond the normal high-limit temperature.

⚠ Warning! Shock Hazard! No User Serviceable Parts.

Do not attempt service of this control system. Contact your dealer or service organization for assistance. Follow all owner's manual power connection instructions. Installation must be performed by a licensed electrician and all grounding connections must be properly installed.

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Codes and Compliance

All of the electrical wiring methods and materials used to complete the electrical installation of the Colossus control system must be in accordance with the National Electrical Code or the Canadian Electric Code, as well as any local electrical codes in effect at the time of installation.

The selection of electrical materials required to accomplish this installation and the installation of the control system must be accomplished by, or be under the direct supervision of, a qualified electrician.

The Colossus is classified as a "continuous duty appliance" and is intended primarily for installation at a single family dwelling. The installation recommendations and instructions contained in this manual are directed solely toward these issues.

GFCI Requirements

A Ground-Fault Circuit Interrupter (GFCI) is required to be installed in the electrical supply circuit connected to these products. GFCI's are ultra-sensitive switching devices, providing the ultimate in safety. The most common style of GFCI also provides high-current protection as a circuit breaker. **(See Page 7 for GFCI Breaker. See Page 15 for GFCI Test Feature.)**

One of the two configurations of GFCI's, as shown, will be required for your installation, depending upon the options selected.

Electrical Disconnect

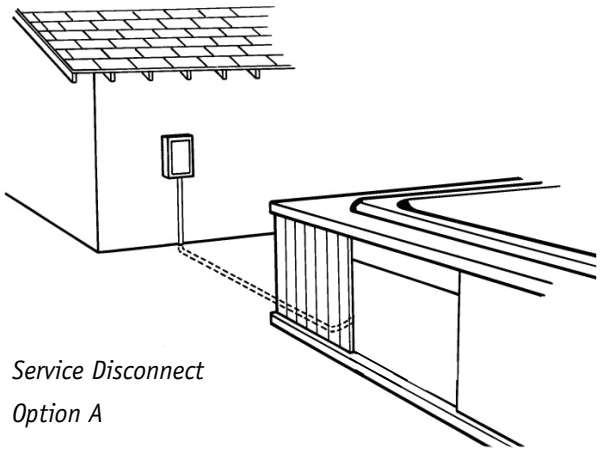
An electrical disconnect (sometimes referred to as a "local disconnect") is installed apart from the main service panel. The electrical disconnect must be installed where readily accessible and within sight of the spa, but at least 5' (1.5 meters) from the inside wall of the spa.

The disconnect must open all ungrounded conductors of the electrical supply connected to the spa.

If the main panel meets the sight-line and distance criteria, a GFCI circuit breaker installed in that panel may be used as the disconnect, as shown in Option A.

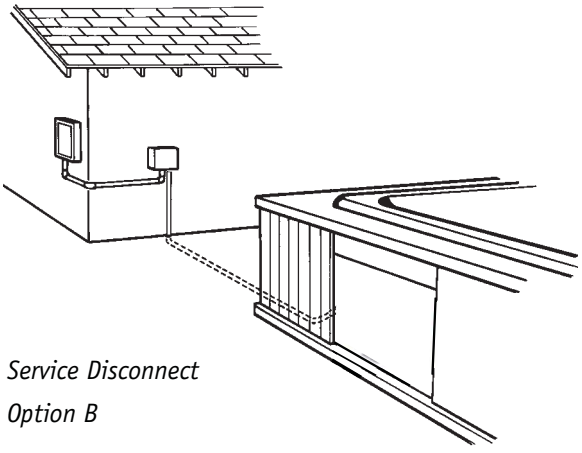
A new sub-panel must be installed to meet the sight-line requirements. Two possible arrangements exist (shown below).

1. The GFCI circuit breaker may be installed in the main panel, and a suitable switch, circuit breaker or other disconnecting device installed in the sub-panel (Option A).
2. The GFCI circuit breaker may be installed in the sub-panel, and a suitably rated circuit breaker (non-GFCI) installed in the main panel (Option B).



Service Disconnect

Option A



Service Disconnect

Option B

Voltage Checks

Set voltmeter to AC Volts. Voltages should check out as follows:

Line 1 Black to Line 2 Red – 240VAC (Range of acceptability: 216VAC – 246VAC)

Either Line to Neutral – 120VAC (Range of acceptability: 108VAC – 132VAC)

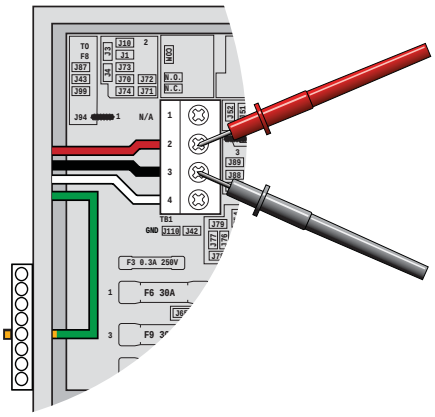
Either Line to Ground – 120VAC (Range of acceptability: 108VAC – 132VAC)

Neutral to Ground – 0 Volts

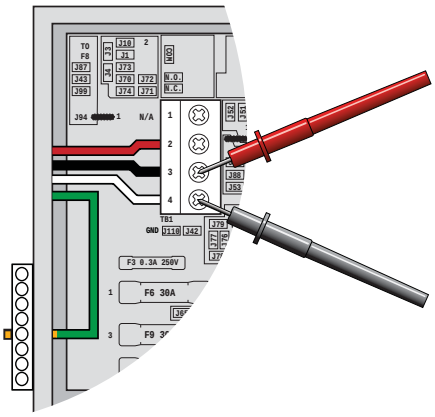
These readings should be consistent at all points in all electrical enclosures and breaker boxes. If the readings are not in the acceptable ranges, do not power up the system and call an electrician to evaluate the installation.

240VAC Service, 60A Max

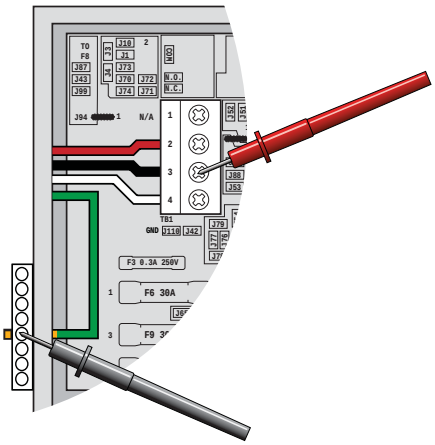
240VAC (216VAC-264VAC)
Line 1 and Line 2



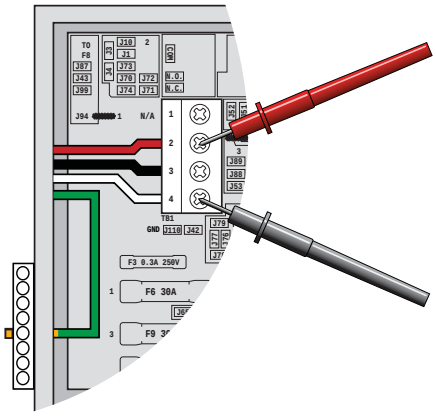
120VAC (108VAC-132VAC)
Line 1 and Neutral



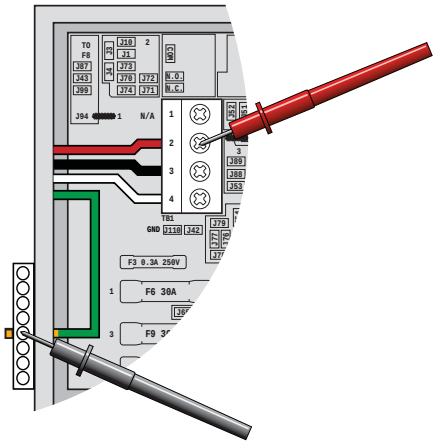
120VAC (108VAC-132VAC)
Line 1 and Ground



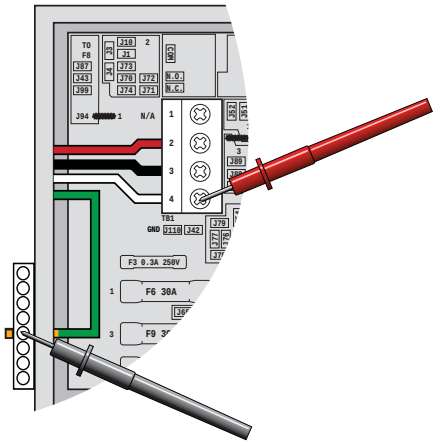
120VAC (108VAC-132VAC)
Line 2 and Neutral



120VAC (108VAC-132VAC)
Line 2 and Ground



0 Volts
Neutral and Ground



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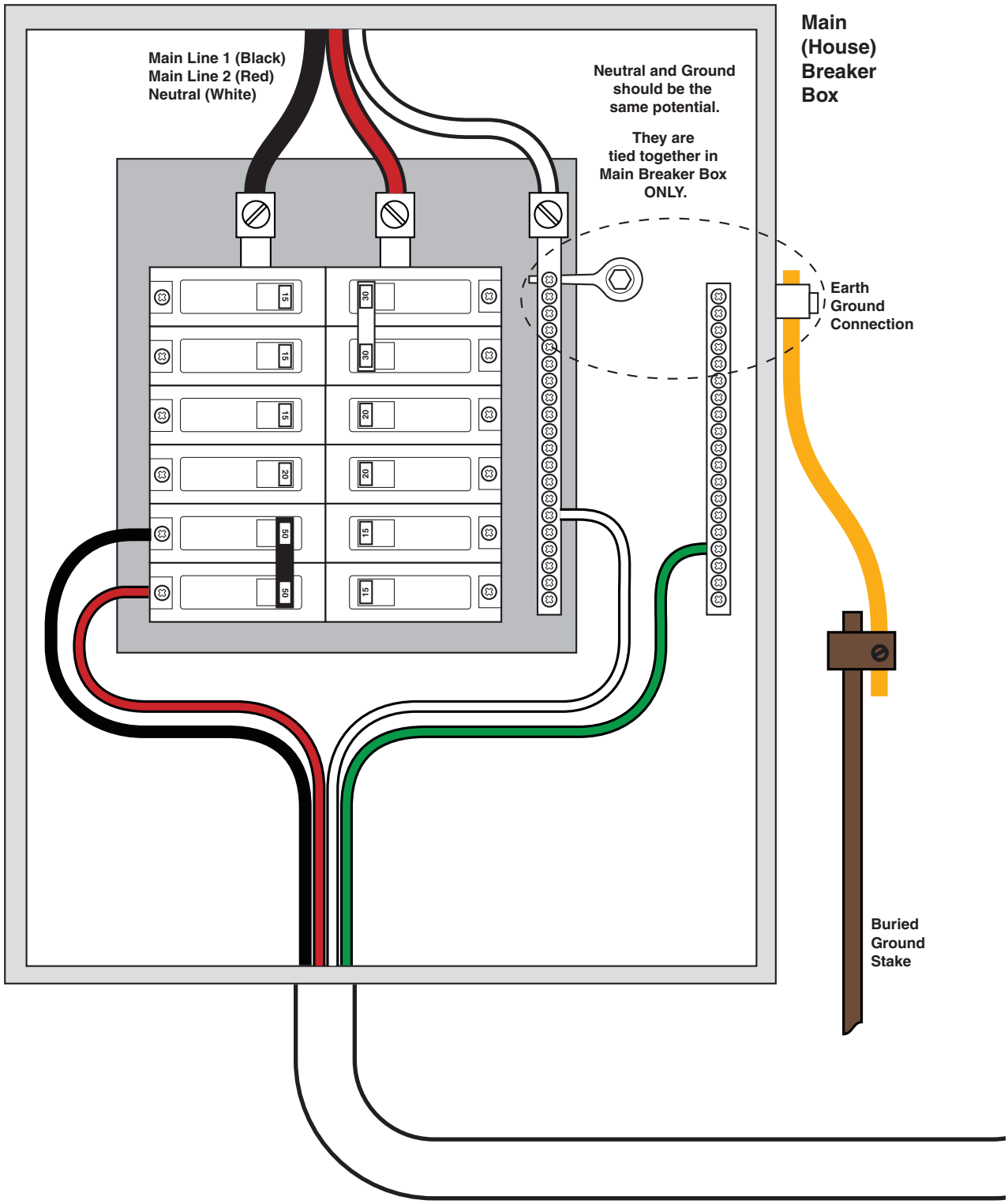
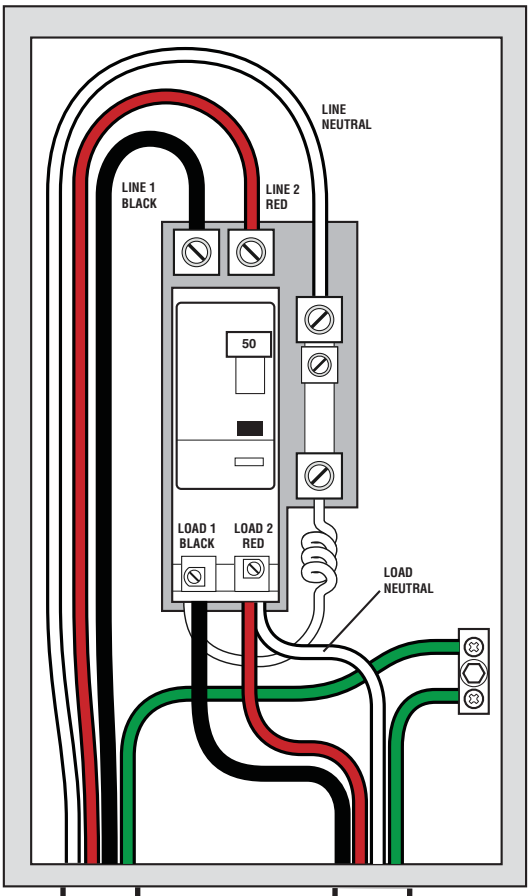
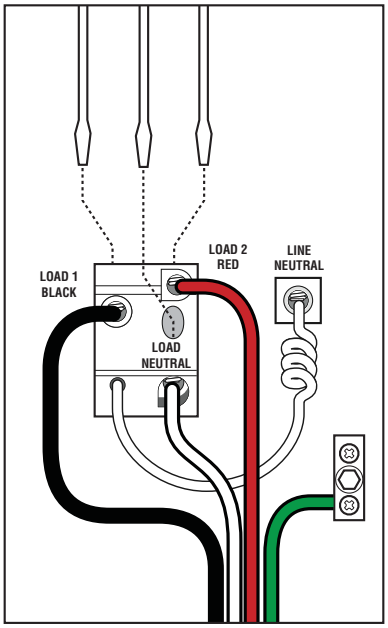
240VAC Wiring Schematic



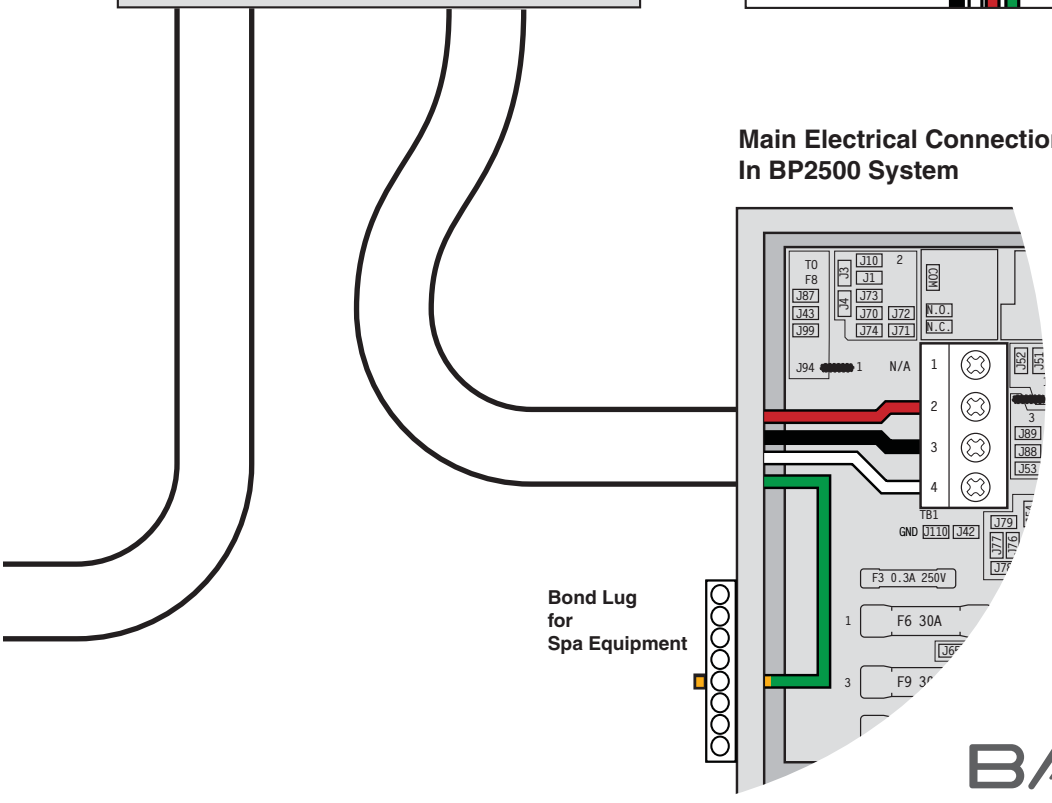


GFCI
Service Disconnect



End View of Square D GFCI Breaker and Load Neutral Connection

Main Electrical Connections In BP2500 System



Bond Lug for Spa Equipment

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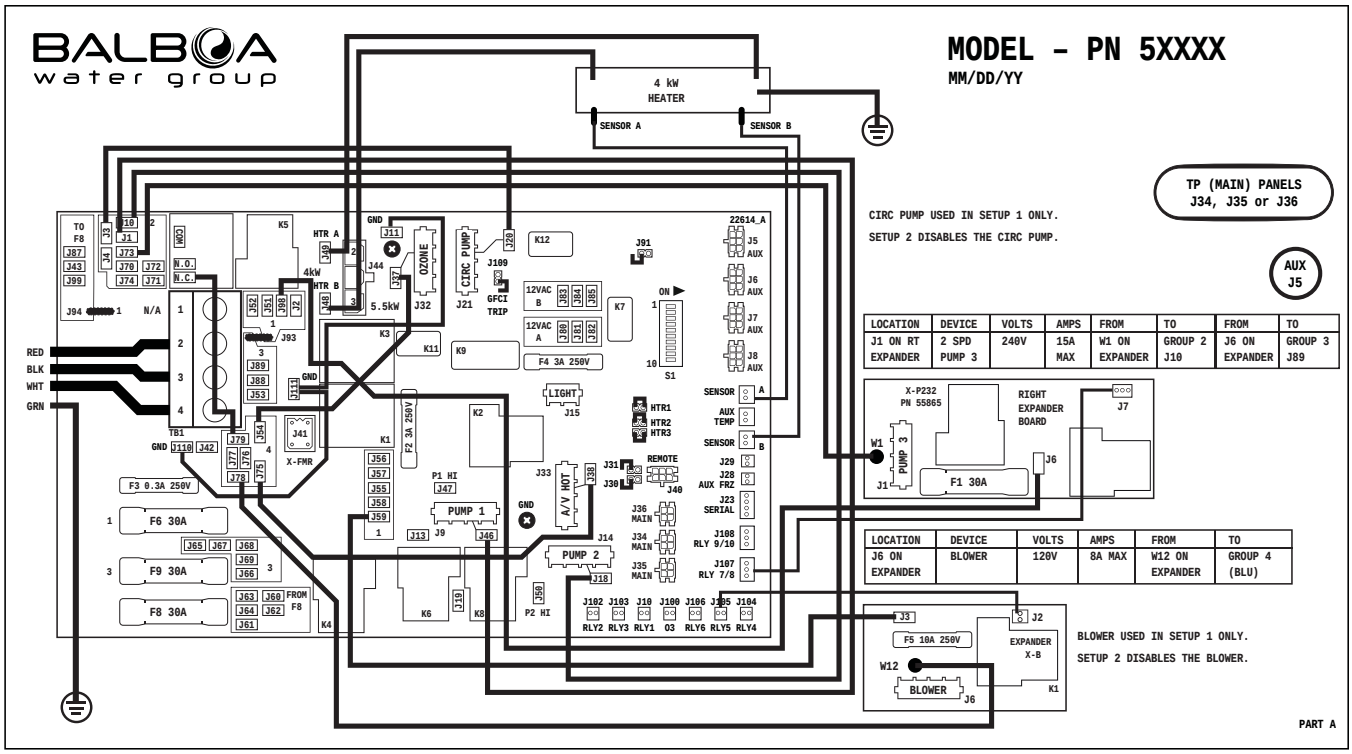
System Wiring and Setup Options

The BP2500 configurability supports a dynamic manufacturing environment. Circuit board configuration, as well as software configuration work together to create a flexible platform that can support several design options with a single system.

A basic configuration is provided and any optional setups are documented on the wiring diagram.

The as-manufactured setup is mounted inside the lid of the enclosure. This setup is combined with a software setup number that can be accessed via the topside control panel **(See Page 17)**. If the software setup is changed by the manufacturer, that change is noted inside the cover.

Typical wiring diagram (Setup 1) as seen inside the lid of the system.



This example shows an option that does not require wiring changes, just a setup change in software. In this case, no wiring changes are required for the system to be changed from Circ to Non-circ and enabling and disabling the Blower.

Setup 1 includes a Circ pump and Blower.

Setup 2 would disable the Circ Pump and Blower.

Even though a BP2500 wiring diagram may call out a particular option, the system may or may not have that equipment connected to it and will utilize a Setup to support the hot tub's installed equipment.

The Diagram below appears with the wiring section and carries additional information about the system, including optional component connections, and miscellaneous model-specific details.

LOCATION	DEVICE	VOLTS	MAX AMPS	FROM	TO
J9	2-SP PUMP 1	240V	15 A	J46	RED AC
J14	2-SP PUMP 1	240V	15 A	J18	RED AC
J15	SPA LIGHT	12V	2A		
J21	CIRC PUMP	240V	4A	J20	RED AC
J32	OZONE	120V	1A	J32	WHT AC
J33	TV / AV	120V	5A	J38	WHT AC
J44	HEATER	240V	5.5 kW		

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
NOT ASSIGNED	◀ A5	NOT ASSIGNED
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

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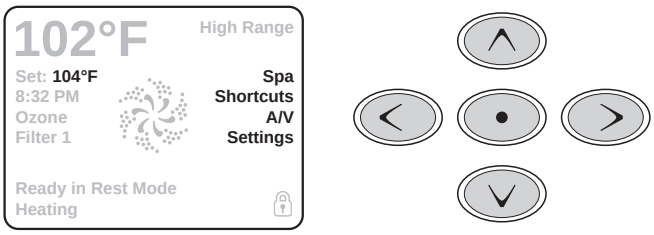
BP2500 - PN 5XXXX

MM/DD/YY

PART B

BALBOA water group

Top-Side Control Panel Installation



The top-side panel is specifically designed to withstand the harsh spa environment and is intended to be mounted in a location on, or close to the spa, in order to provide the spa user with the greatest convenience when controlling the spa equipment.

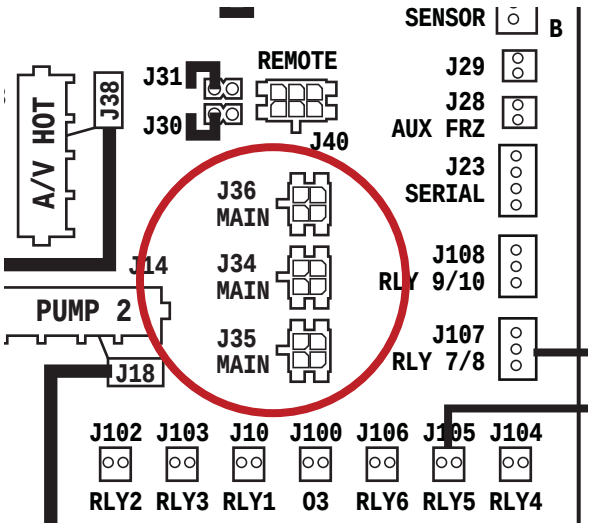
When selecting a mounting location for the top-side panel, several factors should be considered:

- Select a location that is easily accessible. The user should be able to reach the panel without stretching or getting into an awkward position.
- The mounting location should allow the user to see all of the visual indicators and display features of the top-side panel without strain.
- Before drilling the cutout of the panel, test to see that the orientation of the topside panel is correct. Also, be sure that the cable reaches the control system without stretching or being forced against any sharp corners.
- Hold the top-side panel at the desired mounting location and route the connecting cable toward the control system to determine that the cable is long enough to allow it to be connected inside of the unit.
- The mounting area must be above the maximum water level of the spa and in an area with good drainage to prevent the accumulation of any water. The top-side panel must not be submerged.
- If the top-side panel must be mounted underneath a spa cover, select a mounting location that will prevent the cover from resting directly upon the panel, but will allow the cover to seal when closed.

Complete the installation of the top-side panel as follows:

1. Cut a mounting hole with the dimensions shown on the template **(See Page 26 for a cut-out template for the TP900 panel.)** Fit the top-side panel into the hole to make sure the hole is the proper size before proceeding.
2. Remove all dust and particles from the mounting surface around the hole. A clean smooth surface that is dry and oil free is required for the adhesive on the back of the panel to attain a good bond.
3. Remove the paper backing from the adhesive on the rear of the panel. All of the adhesive should be exposed.
4. Route the connecting cable through the opening and place the top-side panel into the opening. Align the panel and press firmly onto the mounting surface.
5. Route the cable to the control system. Remove the front cover to the control system, and remove the cable retaining clamp. Plug the cable connector into any connector labeled J34, J35, or J36. Replace the connector clamp and secure the screw.

   NOTE: Allow for a drip-loop in the panel cable before it enters the enclosure.



Main Menus

Navigation

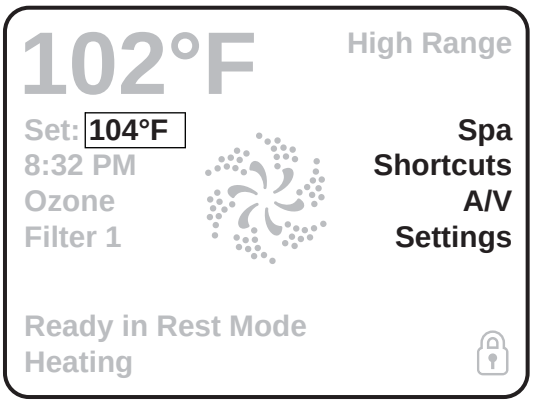
Navigating the entire menu structure is done with the 5 buttons on the control panel.

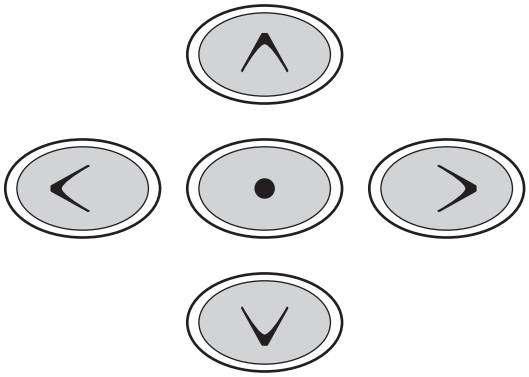
When a text item changes to white during navigation, that indicates the item is selected for action.

Operating or changing a selected item is generally done with the center or “Select” button.

The only item that can be changed on the left side of the Main Screen is the Set Temperature. Press the Left Arrow button to change the Set Temperature number to white. The Set Temperature can then be adjusted with the up and down buttons. Pressing the Select button or the Right Arrow button will save the new set temperature.

On the right side of the screen, the menu selections can be selected with the Up and Down Buttons. Use the Select Button or Right Arrow Button to choose an item. Selecting one of these items will change to a different screen with additional controls.





Messages

At the bottom of the screen, messages may appear at various times. Some of these messages must be dismissed by the user (see page 17).

NOTE:

If the message “Test Software Installed” appears on the panel, navigate to it from the Main Screen by navigating down from the list on the right side of the display until the message is highlighted and press the Select Button.

Press-and-Hold

If an Up or Down button is pressed and held when the Set Temperature is selected, the temperature will continue to change until the button is released, or the Temperature Range limits are reached.

Refer to the TP900 Control Panel User Interface and Programming Guide (BWG Document #40985) for detailed menu descriptions.

BALBOA water group

Power-up and Priming

Preparation and Filling

Fill the spa to its correct operating level. Be sure to open all valves and jets in the plumbing system before filling to allow as much air as possible to escape from the plumbing and the control system during the filling process.

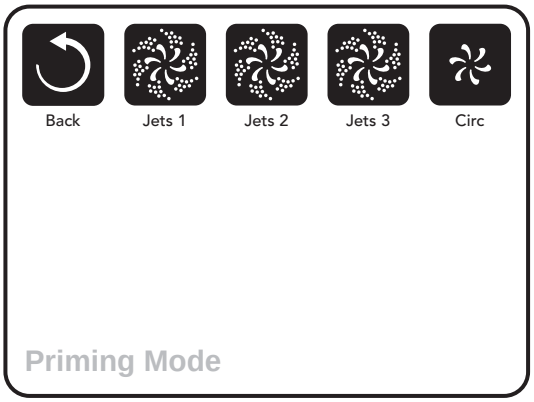
After turning the power on at the main power panel, the top-side panel will display a splash, or startup screen.

Linking the Panel

Shortly after power-up, the panel will display a message asking that a button be pressed to “Link” the panel to the system.

Priming Mode

After the initial start-up sequence, the control will enter Priming Mode and display a Priming Mode screen. Only pump icons appear on the priming mode screen. The system will automatically return to normal heating and filtering at the end of the priming mode, which lasts 4-5 minutes. During the priming mode, the heater is disabled to allow the priming process to be completed without the possibility of energizing the heater under low-flow or no-flow conditions. Nothing comes on automatically, but the pump(s) can be energized by selecting the “Jet” buttons. If the spa has a Circ Pump, it can be turned on and off by pressing the “Circ Pump” button during Priming Mode.



Manually exit Priming Mode by pressing the “Back” Button.

Priming the Pumps

As soon as the Priming Mode screeen appears on the panel, select the “Jets 1” button once to start Pump 1 in low-speed and then again to switch to high-speed. Also, select the other pumps, to turn them on. The pumps should be running in high-speed to facilitate priming. If the pumps have not primed after 2 minutes, and water is not flowing from the jets in the spa, do not allow the pumps to continue to run. Turn off the pumps and repeat the process. Note: Turning the power off and back on again will initiate a new pump priming session. Sometimes momentarily turning the pump off and on will help it to prime. Do not do this more than 5 times. If the pump(s) will not prime, shut off the power to the spa and call for service.

Important: A pump should not be allowed to run without priming for more than 2 minutes. Under NO circumstances should a pump be allowed to run without priming beyond the end of the 4-5 minute priming mode. Doing so may cause damage to the pump and cause the system to energize the heater and go into an overheat condition.

Exiting Priming Mode

You can manually exit Priming Mode by navigating to the “Back” button on the Priming Mode Screen. Note that if you do not manually exit the priming mode as described above, the priming mode will be automatically terminated after 4-5 minutes. Be sure that the pump(s) have been primed by this time.

Once the system has exited Priming Mode, the top-side panel will display the Main Screen, but the display will not show the temperature yet, as shown below. This is because the system requires approximately 1 minute of water flowing through the heater to determine the water temperature and display it.

– – –°F – – –°C

General Spa Behavior

Pumps

On the Spa Screen, select a "Jets" button once to turn the pump on or off, and to shift between low- and high-speeds if equipped. If left running, the pump will turn off after a time-out period. The pump 1 low-speed will time out after 30 minutes. The high-speed will time-out after 15 minutes.

On non-circ systems, the low-speed of pump 1 runs when the blower or any other pump is on. If the spa is in Ready Mode, Pump 1 low may also activate for at least 1 minute every 30 minutes to detect the spa temperature (polling) and then to heat to the set temperature if needed. When the low-speed turns on automatically, it cannot be deactivated from the panel, however the high speed may be started.

Circulation Pump Modes

If your system is equipped with a circ pump, it may be configured to work in one of three different ways:

1, The circ pump operates continuously (24 hours) with the exception of turning off for 30 minutes at a time when the water temperature reaches 3°F (1.5°C) above the set temperature (most likely to happen in very hot climates).

2, The circ pump stays on continuously, regardless of water temperature.

3, A programmable circ pump will come on when the system is checking temperature (polling), during filter cycles, during freeze conditions, or when another pump is on.

Other device options may be available, like Blower, Light, Mist, etc.

Filtration and Ozone

On non-circ systems, Pump 1 low and the ozone generator will run during filtration. On circ systems, the ozone will generally run with the circ pump, but can be limited to filtration cycles.

The system is factory-programmed with one filter cycle that will run in the evening (assuming the time-of-day is properly set) when energy rates are often lower. The filter time and duration are programmable.
A second filter cycle can be enabled as needed.

At the start of each filter cycle, the water devices like blower, mist device (if these exist) and other pumps will run briefly to purge the plumbing to maintain good water quality.

Freeze Protection

If the temperature sensors within the heater detect a low enough temperature, then the water devices automatically activate to provide freeze protection. The water devices will run either continuously or periodically depending on conditions.

In colder climates, an optional additional freeze sensor may be added to protect against freeze conditions that may not be sensed by the standard sensors. Auxiliary freeze sensor protection acts similarly except with the temperature thresholds determined by the switch itself. See your dealer for details.

Clean-up Cycle (optional)

When a pump or blower is turned on by a button press, a clean-up cycle begins 30 minutes after the pump or blower is turned off or times out. The pump and the ozone generator will run for 30 minutes or more, depending on the system. On some systems, you can change this setting.

BALBOA water group

Utilities Menu

A/B Temps

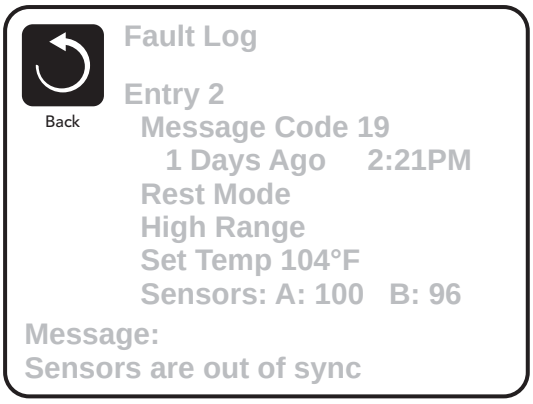
When this is set to On, the temperature display will alternate to display temperature from Sensor A and Sensor B in the heater. This allows the temperature difference between the sensors to be seen. A delta approaching 6 degrees F might indicate a flow problem. Lower deltas may be normal operation, depending on the plumbing and pump configuration. A 1° or 2° delta is typical when the heater is running.

Demo Mode

Demo Mode is not always enabled, so it may not appear. This is designed to operate several devices in a sequence in order to demonstrate the various features of a particular hot tub.

Fault Log

The Fault Log is a record of the last 24 faults that can be reviewed by a service tech.



GFCI Test

GFCI Test is not always enabled, so it may not appear. This screen allows the GFCI to be tested manually from the panel and can be used to reset the automatic GFCI test feature. If the GFCI Test Feature is reset, the GFCI will trip within 7 days. (See Page 15)

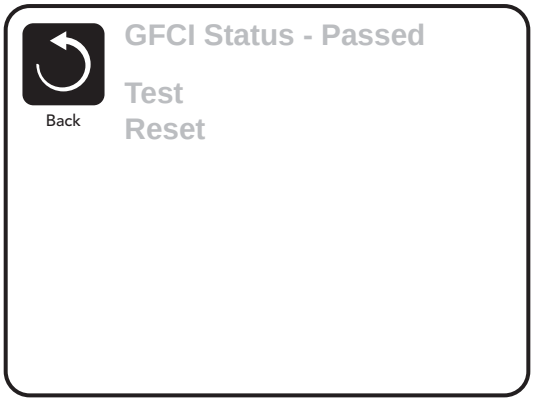
The GFCI Test Feature (Utilities Menu)

Used for verifying a proper installation

The GFCI is an important safety device and is required equipment on a hot tub installation.

Your spa may be equipped with a GFCI Protection feature. If your spa has this feature enabled by the manufacturer, the GFCI Trip Test must occur to allow proper spa function.

Within 1 to 7 days after startup, the spa will trip the GFCI to test it. (The number of days is factory programmed.) The GFCI must be reset once it has tripped. After passing the GFCI Trip Test, any subsequent GFCI trips will indicate a ground fault or other unsafe condition and the power to the spa must be shut off until a service person can correct the problem.



Forcing the GFCI Trip Test

The installer can cause the GFCI Trip Test to occur sooner by initiating it using the above menu.

The GFCI should trip within several seconds and the spa should shut down. If it does not, shut down the power and manually verify that a GFCI breaker is installed and that the circuit and spa are wired correctly. A licensed electrician may be required. Verify the function of the GFCI with its own test button. Restore power to the spa and repeat the GFCI Trip Test.

Once the GFCI is tripped by the test, reset the GFCI and the spa will operate normally from that point. You can verify a successful test by navigating to the above menu. PASS should appear after a temp button is pressed from the GFCI screen.

Warning:

The end-user must be trained to expect this one-time test to occur and how to properly reset the GFCI.

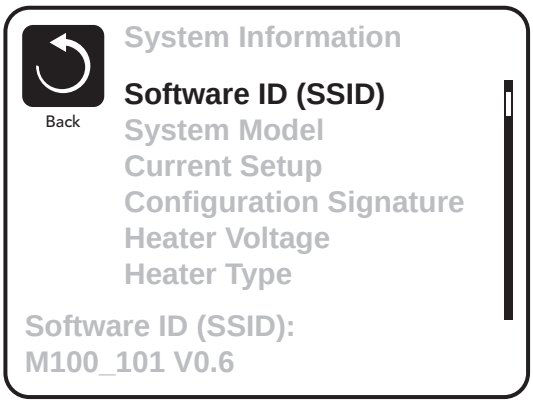
If freezing conditions exist, the GFCI should be reset immediately or spa damage could result.

BALBOA water group

Information

System Information

The System Information Menu diplays various settings and identification of the particular system. As each item in the menu is highlighted, the detail for that item is displayed at the bottom of the screen.



Software ID (SSID)

Displays the software ID number for the System.

System Model

Displays the Model Number of the System.

Current Setup

Displays the currently selected Configuration Setup Number.

Configuration Signature

Displays the checksum for the system configuration file.

Heater Voltage

Displays the operating voltage configured for the heater.

Heater Type

Displays a heater type ID number.

Dip Switch Settings

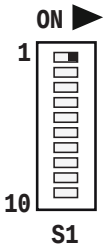
Displays a number that represents the DIP switch positions of S1 on the main circuit board.

Panel Version

Displays a number of the software in the topside control panel.

Test Menu (S-1 ON) *Service Tech Only*

Getting Into Test Mode



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

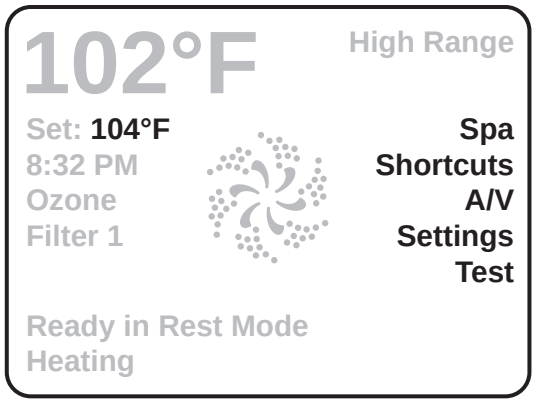
While the system is running, move DIP Switch 1 (on S1 on the Main circuit board) to ON.
The system will enter Test Mode.
Moving DIP Switch 1 to OFF will exit Test Mode.

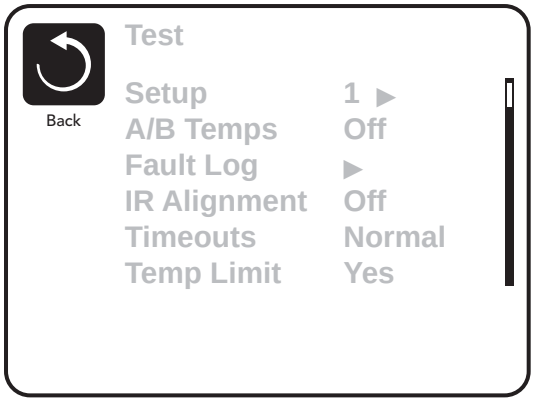
Software Setups

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.

A/V Setup Note

The "IR Blaster" must be pointed at the device (stereo, etc) that it is to be controlled by the AV Module, but pointing it may require some trial and error. To aid in this, you can use the IR Align feature, only accessible in Test mode (from the Test menu). Set IR Alignment to On to continuously output a Volume Down command to all IR-controlled devices. (Then experiment with placement and aiming angle of the "IR Blaster".) Set IR Alignment to Off to stop this continuous output. (Exiting the Test menu will also stop this continuous output.)





BALBOA water group

Diagnostic Messages

Diagnostic Messages are displayed on the Topside Panel for various reasons. Some are simply reminders and others are more important or indicate serious problems.

Refer to the TP900 Control Panel User Interface and Programming Guide (BWG Document #40985) for a complete list of Diagnostic Message descriptions and definitions.

Most messages and alerts will appear at the bottom of the normally used screens. Several alerts and messages may be displayed in a sequence.

Some messages can be reset from the panel. Messages that can be reset will appear with a "right arrow" at the end of the message. This message can be selected by navigating to it and pressing the Select button.

– – –°F – – –°C

Water Temperature is Unknown

After the pump has been running for 1 minute, the temperature will be displayed.

Possible freezing condition

A potential freeze condition has been detected, or the Aux Freeze Switch has closed. All water devices are activated.

In some cases, pumps may turn on and off and the heater may operate during Freeze Protection.

This is an operational message, not an error indication.

The water is too hot - (OHS)

The system has has detected a spa water temp of 110°F (43.3°C) or more, and spa functions are disabled. System will auto reset when the spa water temp is below 108°F (42.2°C). Check for extended pump operation or high ambient temp.

On some systems even when spa is shut down, some equipment may occasionally turn on to continue monitoring temperature or if freeze protection is needed.

The following are examples of messages that can be reset with a button press, but will not prompt the user with a subsequent message.

Sensors are out of sync -- Call for service*

The temperature sensors ARE out of sync. The fault above has been established for at least 1 hour.
Call for Service.

Program memory failure*

At Power-Up, the system has failed the Program Checksum Test. This indicates a problem with the firmware (operation program) and requires a service call.

The settings have been reset (Persistent Memory Error)*

Contact your dealer or service organization if this message appears on more than one power-up

The clock has failed*

Contact your dealer or service organization.

Hot fault (A Pump Appears to have been Stuck ON when spa was last powered)

POWER DOWN THE SPA. DO NOT ENTER THE WATER. Contact your dealer or service organization.

BALBOA water group

Spa Design Guidelines

Whether replacing an older control system, or if designing a new spa system, keep these guidelines in mind.

1. The suction system for the 2-speed pump or for the circ pump must be dedicated. There must not be any other pumps connected to this suction system.
2. The suction system for the 2-speed pump or for the circ pump must include the following:
    a. 2 suction fittings, or
    b. 1 suction fitting and a skimmer.
3. If the suction system for the 2-speed pump or for the circ pump includes a filter, it is desirable that the filter incorporate a by-pass around the filter cartridge that opens when the cartridge gets dirty. (Spring tension holding the by-pass valve closed must be overcome by the vacuum of the pump.) This by-pass should be capable of flowing a minimum of 20 GPM during the low speed operation of the 2-speed pump or during circ pump operation with the cartridge 100% blocked. The inclusion of a suction fitting appropriately plumbed into the suction circuit in conjunction with a vacuum filter may also meet this requirement.
4. The pressure system for the 2-speed pump or for the circ pump must be dedicated. There must not be any other pumps connected to this pressure system.
5. The pressure system for the 2-speed pump or for the circ pump must discharge water freely into the spa.
6. If the pressure system for the 2-speed pump includes a diverter valve, or a diverter jet, there must not be an "off" position that would stop water flow from the pump or any other position that would throttle or reduce water flow from the pump.
7. If the pressure system for the 2-speed pump includes flow adjustable jets that can be 100% closed, at least 2 non-adjustable jets must be included in each possible inlet circuit so that a minimum of 20 GPM can flow during low pump operation with all the jets closed. Any other means of by-passing flow around the closed jets is acceptable as long as the by-pass means is down stream from the heater and allows a minimum of 20 GPM to flow through the heater during low speed operation.
8. If the pressure system for the 2-speed pump includes flow adjustable jets that do not close 100%, at least 20 GPM must flow during low speed operation through each possible inlet circuit with all the jets closed.
9. If the pressure system for a 2-speed pump or for a circ pump includes a filter, the filter must be equipped with a by-pass around the cartridge that opens when the cartridge gets dirty. (Spring tension holding the by-pass valve closed must be overcome by the pressure of the pump.) This by-pass must be capable of flowing a minimum of 20 GPM during low pump operation with the cartridge 100% blocked.
10. If the pressure system for a 2-speed pump or for a circ pump includes branch circulation lines such as circuits intended to operate ozone injection systems, these branch circulation lines must be connected downstream from the heater.
11. Avoid inter-connection of the plumbing circuits for the 2-speed pump or for the circ pump with other pumps in the spa plumbing system for the purpose of freeze protection. The Colossus control system will provide freeze protection. There is also provision for remote sensing freeze protection if required.
12. Position inlets and jets in the spa so that they do not direct water flow towards suction fittings or skimmers. This will avoid a "thermal short circuit" and prevent excessive heater and pump cycling.
13. If service valves are a part of the circulation system for the 2-speed pump or for the circ pump, be sure to use valves that incorporate a means of "locking" in the open position.
14. If the 2-speed pump or the circ pump is replaced in the field by service personnel, the replacement used must equal or exceed the hydraulic specifications of the original pump.
15. To assure adequate performance, the spa plumbing must be 11/2" minimum. The use of 2" is highly recommended. Either schedule 40 or flexible PVC pipe is acceptable.
16. It is recommended that shut-off valves be installed in the suction and discharge lines.

Equipment Configuration Considerations

System Orientations Supported

The Colossus supports two basic different system configurations. When installing the Colossus, keep in mind the following characteristics that each system has. It will help in determining where to place and how to configure the Colossus. Follow these guidelines.

Two Circulation Systems

Non-circ System

A non-circ system uses a 2-speed pump to heat and filter the spa.

Circ System

A circ system uses a dedicated 1-speed pump to heat and filter the spa. The circ pump motor must not exceed 2 amps.

NOTE: The only difference is that the amperage limitation for the Circ Pump must be adhered to so as not to overload the printed circuit board ampacity. The location and the mounting of the system is important.

Pressure and Suction Side Mounting

The Colossus can be used in most any application. If installing in a newly built spa system, study the diagrams in order to plan the location of the Colossus. Also, keep in mind that:

The heater requires at least 20 Gallons per Minute (GPM) of flow for proper function.

Some systems may require at least 25 GPM.

Pressure-Side System

A pressure side heater system is a heater that is located on the discharge side of the pump.

Vacuum-Side System

A vacuum side heater is a heater that is located on the suction side of the pump.

Mounting

Colossus technology allows mounting flexibility. The Colossus can be mounted on either the suction or pressure (discharge) side of the pump. However, it must be mounted on a flat surface parallel to the ground.

To improve reliability, take steps to minimize vibration from the pump(s) that could be transmitted to the control system.

Use rubber isolation pads under the pumps and flexible PVC between the filtration pump and the heater to help minimize vibration.

Mount the system with the heater horizontal and as low as possible in the equipment compartment.

To avoid any potential for water to drip directly on the system, do not mount the system directly under the control panel mounting location.

Allow a drip-loop in the control panel wires to keep any water that may travel down the wire from wicking onto the system box.

Suction-Side System Mounting

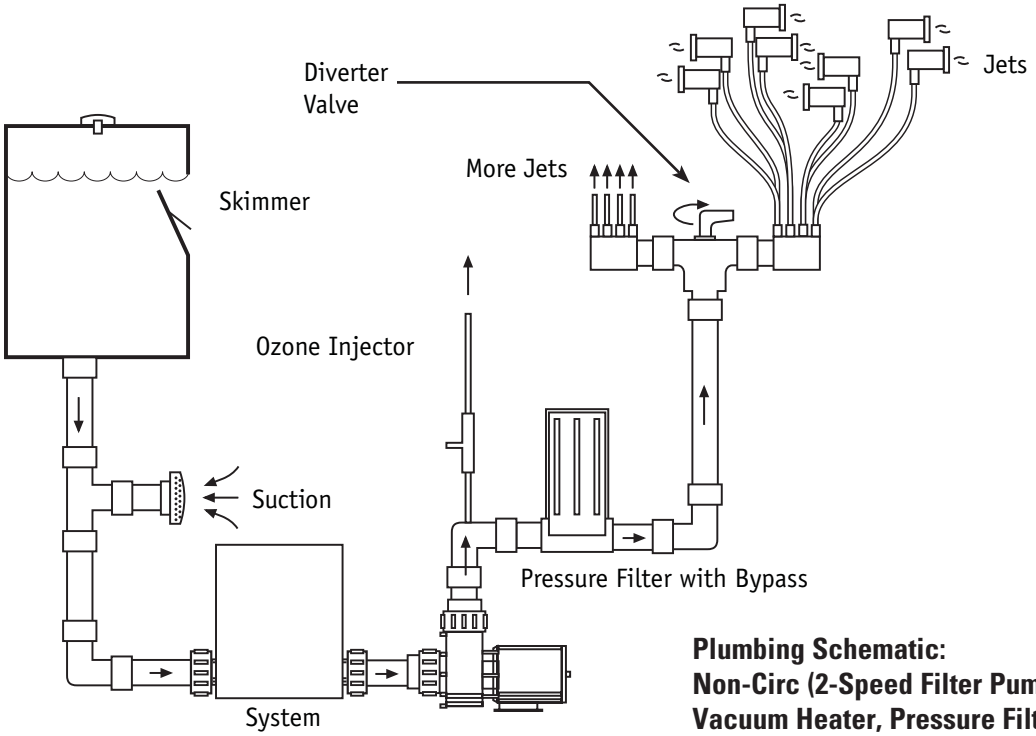
When mounting the system on the suction (vacuum) side of the pump, care must be taken to mount the system in such a way that it is aligned with the suction port on the pump wet-end. The suction-side mounting can generally be done much lower in the system, making it easier to keep proper water flow in the heater at all times. The system should be mounted with appropriate fasteners.

Note: When employing suction-side mounting, the system may need to be placed on a spacer block so that it complies with UL height requirements for electrically live components, in the same manner as a pump motor.

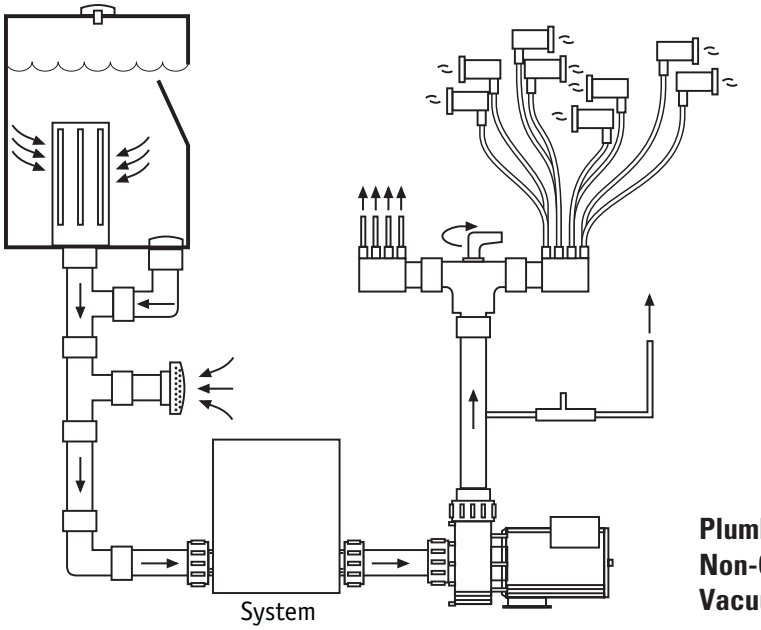
BALBOA water group

2-Speed Pump 1 Plumbing Schematics

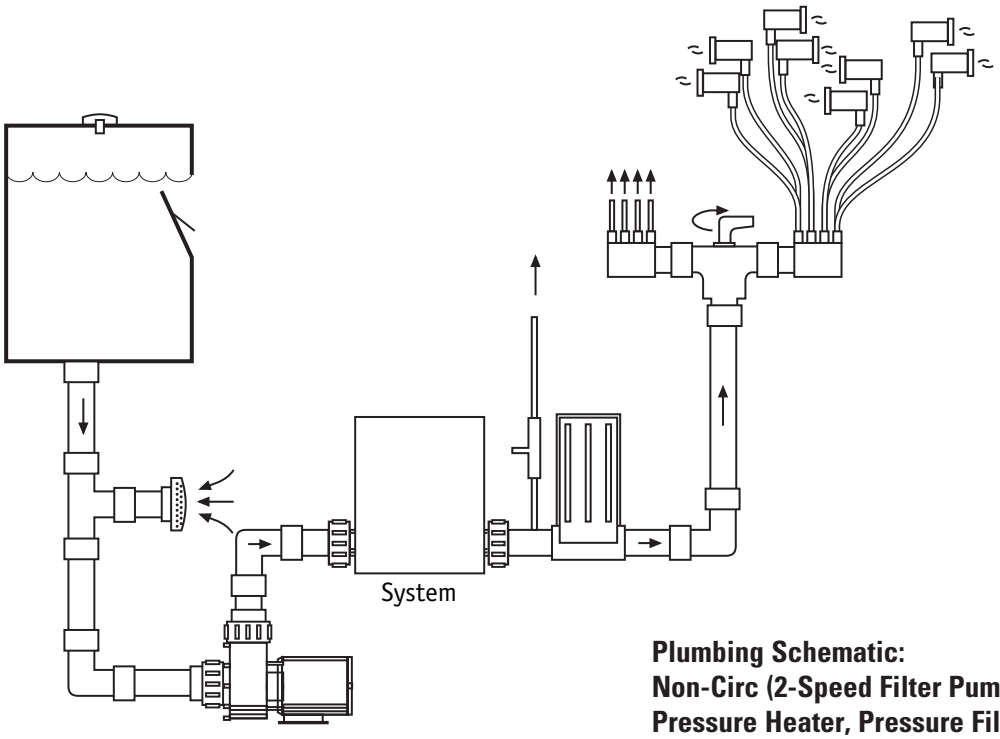
Non-Circ Systems must use a 2-speed Pump 1 for filtration and heating.



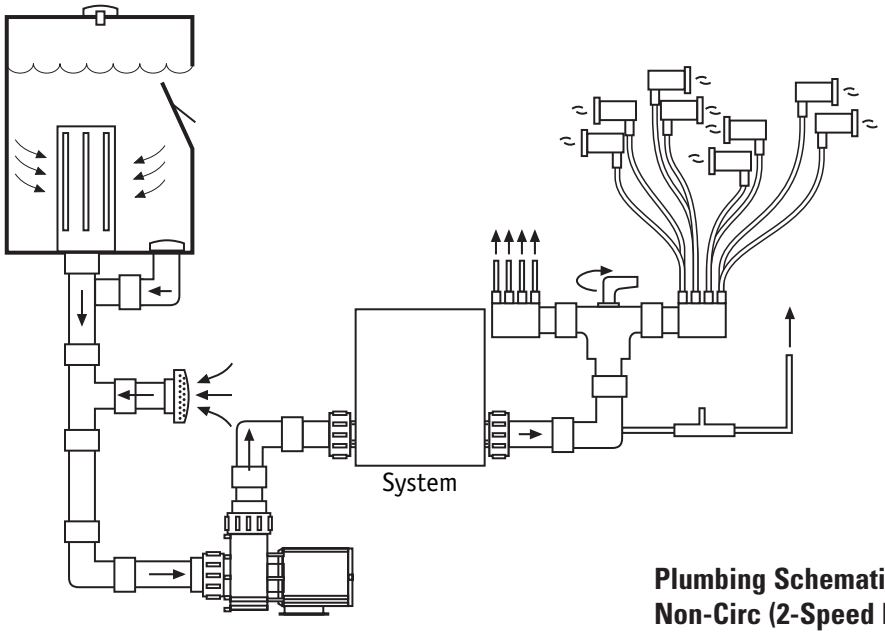
Plumbing Schematic:
Non-Circ (2-Speed Filter Pump),
Vacuum Heater, Pressure Filter



Plumbing Schematic:
Non-Circ (2-Speed Filter Pump)
Vacuum Filter, Vacuum Heater



Plumbing Schematic:
Non-Circ (2-Speed Filter Pump),
Pressure Heater, Pressure Filter

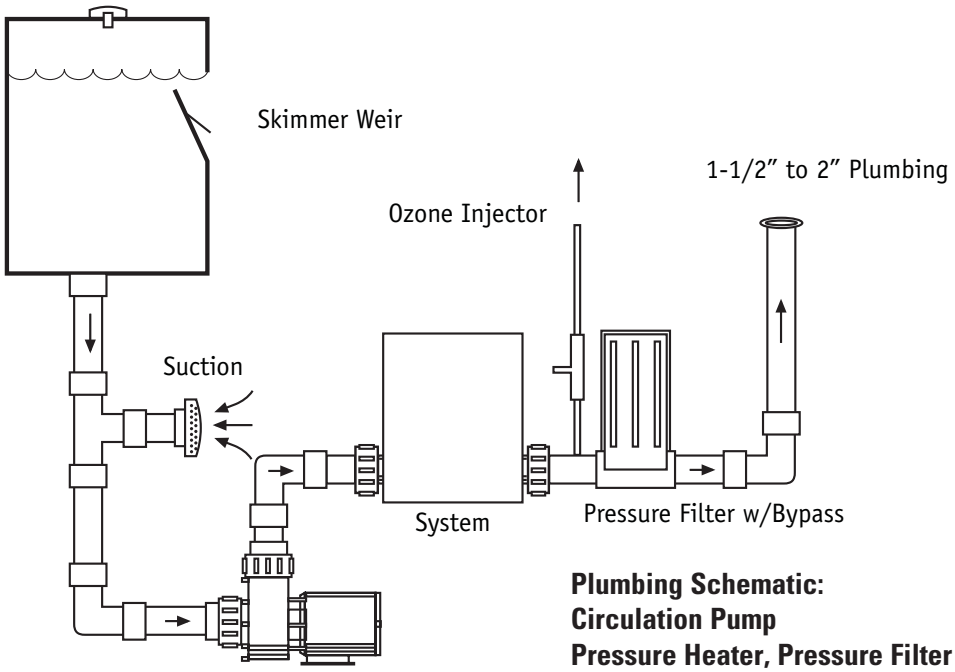


Plumbing Schematic:
Non-Circ (2-Speed Filter Pump),
Vacuum Filter, Pressure Heater

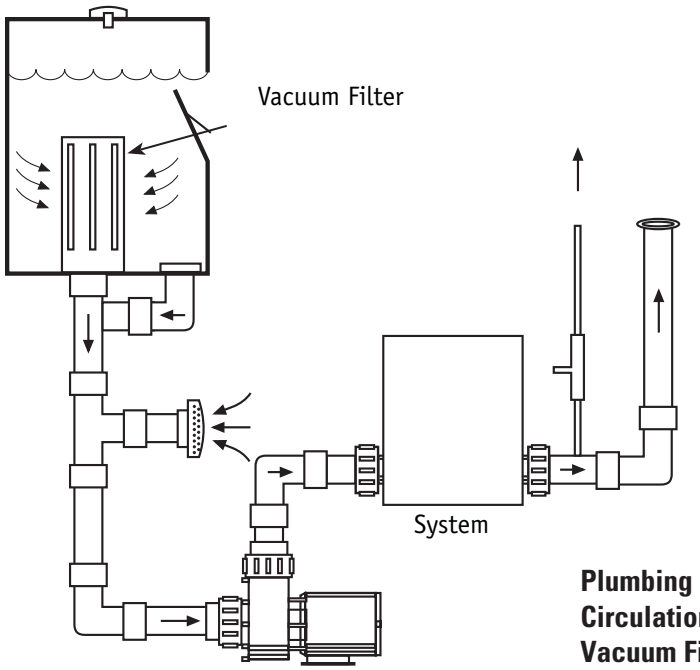
BALBOA water group

Circ Pump Plumbing Schematics

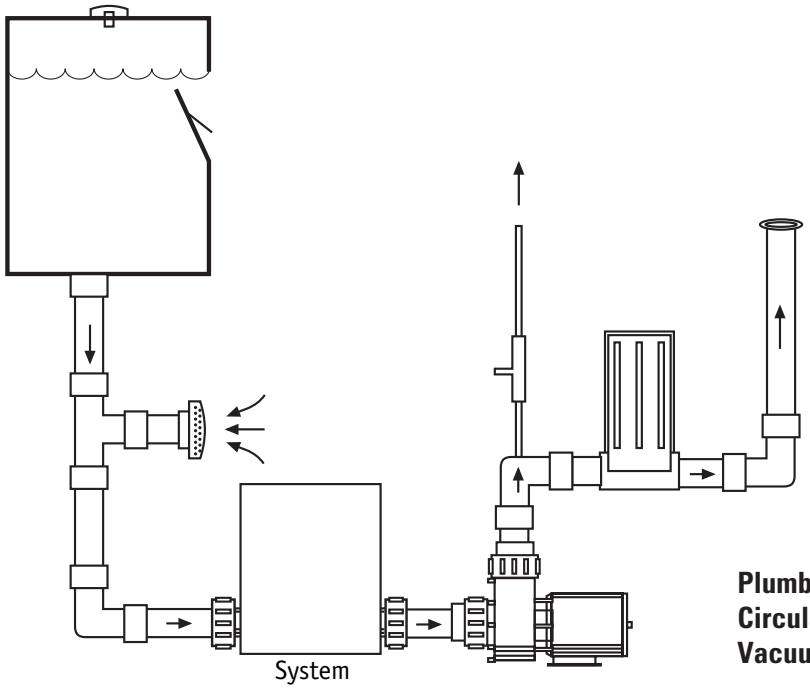
Circ Pump Systems must provide a minimum of 20 Gallons per Minute through the heater to maintain proper function.



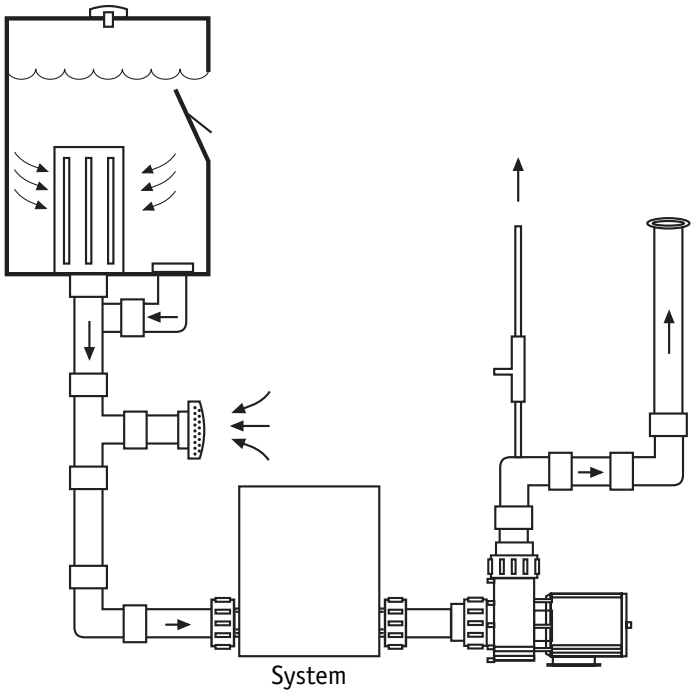
Plumbing Schematic:
Circulation Pump
Pressure Heater, Pressure Filter



Plumbing Schematic:
Circulation Pump,
Vacuum Filter, Pressure Heater



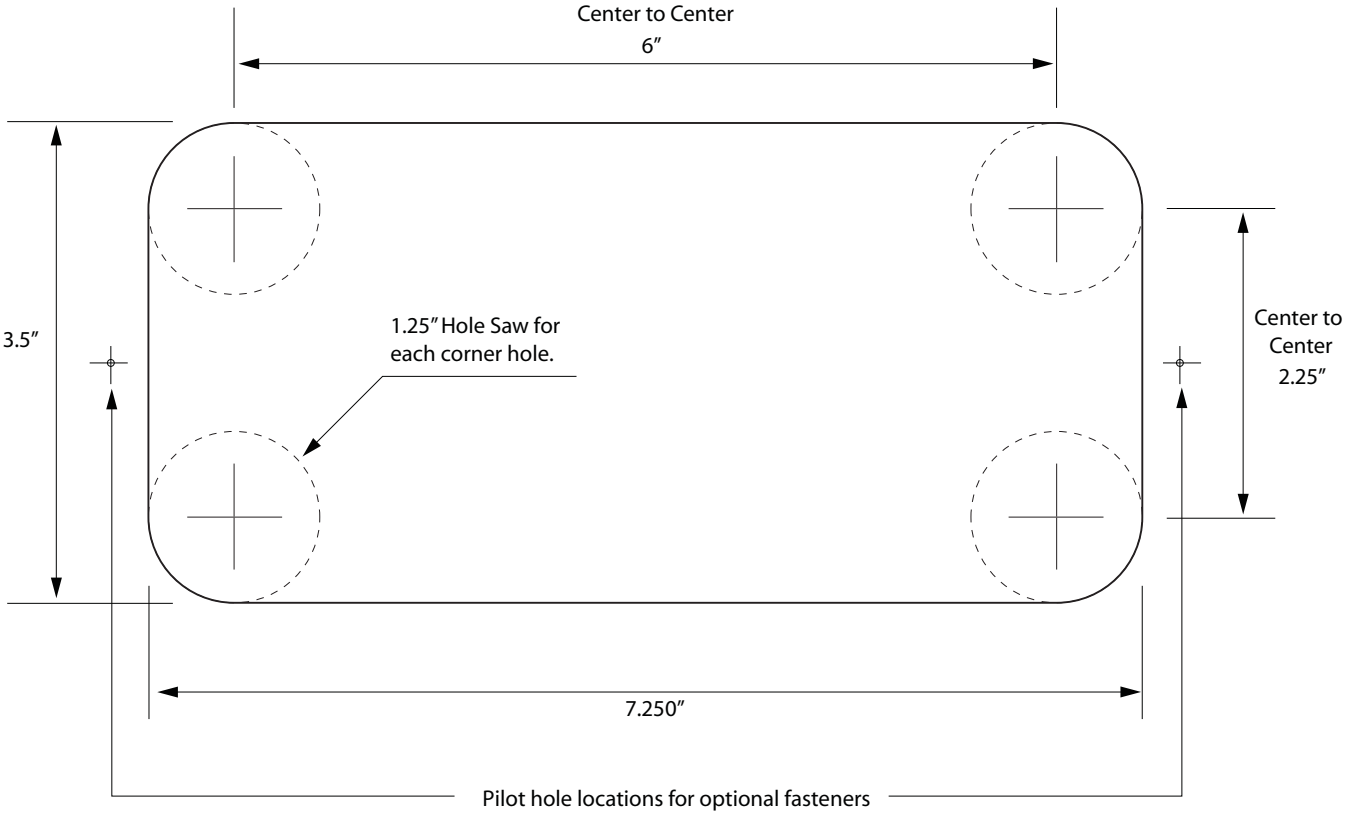
Plumbing Schematic:
Circulation Pump,
Vacuum Heater, Pressure Filter



Plumbing Schematic:
Circulation Pump,
Vacuum Filter, Vacuum Heater

BALBOA water group

TP900 Cutout Template



Enlarge the drawing above by 140% to approximate actual size.

To download a pdf of this template, at actual size, go to:

http://service.balboa-instruments.com/zzTP900cutout_download.zip

Click on the “Download the Cutout Template here” link.

Auxiliary Panels

Auxiliary Panel Features

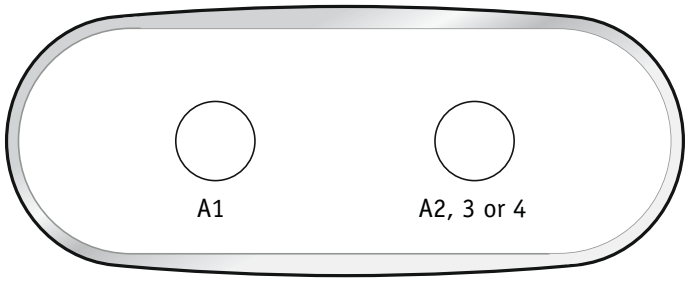
Feature	Default	Options
Aux Button A1	Jets 1	*See Aux Button Note*
Aux Button A2	Jets 2	*See Aux Button Note*
Aux Button A3	*Unused*	*See Aux Button Note*
Aux Button A4	Light	*See Aux Button Note*

Aux Buttons can be set with the following functions based on Manufacturer Specification:

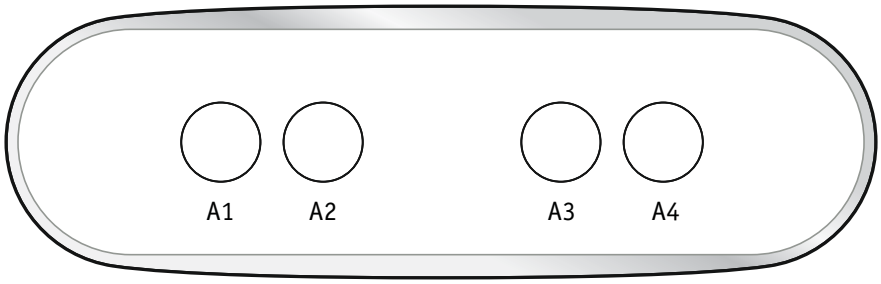
These functions can vary by Setup Number as well.
Unused – Up – Down – Temp – Jets 1 – Jets 2 – Jets 3 – Jets 4 – Jets 5 – Jets 6 – Jets 7 – Jets 8 – Blower 1 – Blower 2 – Mister 1 – Mister 2 – Mister 3 – Light 1 – Light 2 – Light 3 – Light 4 –
Fiber Optic – Option 1 – Option 2 – Option 3 – Option 4 – EitherLight

AX10 A1	No O/L	52803
AX10 A2	AUX O/L	55919 ▶
AX10 A3	No O/L	52805
AX10 A4	No O/L	52806

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



AX40	No O/L	52799



BALBOA water group

Applicable Plumbing Fittings

2" Tailpiece kit PN 55911.

Standard 2" sockets to glue up to 2" PVC pipe.

Not Immediately Available.

1.5" Tailpiece kit PN 55914.

1.5" sockets to glue up to 1.5" PVC pipe with the I.D.
Be sure to orient the fittings so that the insert is at the 12:00 position to prevent trapped air.

1" Circ Pump Insert kit PN 55912.

1" barb fittings for use with 1" tubing.
Be sure to orient the fittings so that the insert is at the 12:00 position to prevent trapped air.

Not Immediately Available.

1" Circ Pump Insert kit PN 55913.

One fitting for direct coupling to the threaded suction of an appropriately-sized circ pump. A 1" barb fitting for use with 1" tubing is used on the other end of the heater.
Be sure to orient the fittings so that the insert is at the 12:00 position to prevent trapped air.

WARNING!

Qualified Technician Required for Service and Installation

Basic Installation and Configuration Guidelines

Use minimum 6AWG copper conductors only.

Torque field connections between 21 and 23 in lbs.

Readily accessible disconnecting means to be provided at time of installation.

Permanently connected.

Connect only to a circuit protected by a Class A Ground Fault Circuit Interrupter (GFCI) mounted at least 5' (1.52M) from the inside walls of the spa/hot tub and in line of sight from the equipment compartment.

CSA enclosure: Type 2

Refer to Wiring Diagram inside the cover of the control enclosure.

Refer to Installation and Safety Instructions provided by the spa manufacturer.

Warning: People with infectious diseases should not use a spa or hot tub.

Warning: To avoid injury, exercise care when entering or exiting the spa or hot tub.

Warning: Do not use a spa or hot tub immediately following strenuous exercise

Warning: Prolonged immersion in a spa or hot tub may be injurious to your health

Warning: Maintain water chemistry in accordance with the Manufacturers instructions.

Warning: The equipment and controls shall be located not less than 1.5 meters horizontally from the spa or hot tub.

Warning! GFCI Protection.

The Owner should test and reset the GFCI on a regular basis to verify its function.

Warning! Shock Hazard! No User Serviceable Parts.

Do not attempt service of this control system. Contact your dealer or service organization for assistance. Follow all owner's manual power connection instructions. Installation must be performed by a licensed electrician and all grounding connections must be properly installed.

CSA Compliance/Conformité

Caution:

- Test the ground fault circuit interrupter before each use of the spa.
- Read the instruction manual.
- Adequate drainage must be provided if the equipment is to be installed in a pit.
- For use only within an enclosure rated CSA Enclosure 3.
- Connect only to a circuit protected by a Class A ground fault circuit interrupter.
- To ensure continued protection against shock hazard, use only identical replacement parts when servicing.
- Install a suitably rated suction guard to match the maximum flow rate marked.

Warning:

- Water temperature in excess of 38°C may be injurious to your health.
- Disconnect the electrical power before servicing.

Attention:

- Toujours verifier l'efficacite du disjoncteur differentiel avant d'utiliser differentiel avant d'utiliser le bain.
- Lire la notice technique.
- Lorsque l'appareillage est installe dans une fosse, on doit assurer un drainage adequat.
- Employer uniquement a l'interieur d'une cloture CSA Enclosure 3.
- Connecter uniquement a un circuit protege par un disjoncteur differentiel de Class A.
- Afin d'assurer une protection permanente contre le danger de shock electrique, lors de l'entretien employer seulement des pieces de rechange identiques.
- Les prises d'aspiration doivent etre equipees de grilles convenant au debit maximal indique.

Avertissement:

- Des temperatures de l'eau superieures a 38°C peuvent presenter un danger pour la sante.
- Deconnecter du circuit d'alimentation electrique avante l'entretien.

Warning/Advertissement:

- Disconnect the electric power before servicing. Keep access door closed.
- Deconnecter du circuit d'alimentation electrique avant l'entretien. Garder la porte fermer.

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www.balboawatergroup.com