STANDARD & PLATINUM MODELS

OWNER'S REFERENCE GUIDE

Tuff Spas
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IMPORTANT! READ FIRST!

Thank you for your purchase of a Tuff Spa. When starting up any new spa there can be initial issues/questions that may arise. Please read below for possible fixes/answers that may help you to understand what is happening and if you need to call for support or if the issue can be resolved without the help of a technician.

Air Locks

If your spa is freshly filled but the pump isn't pushing water through then you probably have an air lock. Air locks are the most common occurrence when filling up a spa for the first time or refilling it for regular maintenance. This is caused by the buildup of air in the plumbing lines which will not allow water or air to flow through the jets. If left un-attended, the pump and/or heater can overheat from lack of water flow. This type of damage is not covered under the warranty. You can decrease the chances of getting an air lock by removing the filter and putting the hose down the opening. If you still get an air lock the easiest way to remedy this situation is to repeatedly cycle between low- and high-speed on the topside controls. If this does not fix the issue you will have to open the access panel that houses the pump. Once the panel is removed, locate the pump and you will see two large, white nuts attached to the pump. Take a large pair of channel locks and loosen either nut with the pump in high-speed. Continue to loosen the nut until the jets begin to work. Doing this will cause water to come out the nut you are loosening which is normal. Once the jets are functioning properly, tighten the nut back up and put the panel back on. Air locks are not considered a defect and are a normal part of a fresh fill. Therefore, if a technician comes out to remove the air lock, this is not covered under the labor portion of the warranty and any fees associated will be the responsibility of the spa owner.

Spa Is Constantly Running

While it may seem that the spa is running all the time, it almost certainly is not. When the spa is initially turned on it will run non-stop until the water has reached the set temperature. After this, the spa will run 1 hour out of every 12 hours (2 hours per day). Additionally, the pump runs once every 30 minutes to verify that the spa is at the correct temperature. If during this check, the temperature has dropped and the spa must heat, the spa will stay on as long as it takes to reach the correct temperature. So while it may seem the spa is constantly running, this is simply part of the heating and filtration process. Please reference included Balboa Quick Reference Guide for more information on filtration cycle settings.

Spa Will Not Heat Up to Temperature

If your temperature is increasing but does not reach the temperature the spa has been set to please check the following: Make sure the cover is properly closed. Make sure there are no error codes on the topside control display on the top edge of your spa and that the temperature is correctly set. Check to make sure the heat indicator light is on when the spa is in low speed. Have the technician who installed the spa make sure all wires are properly connected. If all of these things check out then there is likely a programming issue with the circuit board. Call our technical support line and we can guide you to make sure that the circuit board is properly wired for your voltage. If a technician comes out and finds the issue is not related to the spa, any fees associated will be the responsibility of the spa owner.

Breaker Trips Off & Shuts Down Shortly After Power Up

Typically this means that either the spa was incorrectly wired during setup or when rewired for 240v by an electrician. Less likely, this indicates an issue with the GFCI cord. There could also point to insufficient power to the spa. Please call the company that installed the spa and have them come back out to check the electrical current at the spa. If a technician comes out and finds the issue is not related to the spa, any fees associated will be the responsibility of the spa owner.

When the Spa Starts There Is a "Clicking" Noise

This could indicate a faulty motor or incorrect wiring at setup. Please call the company that installed the spa and have them come back out to check the electrical current at the spa. If a technician comes out and finds the issue is not related to the spa, any fees associated will be the responsibility of the spa owner.

There Is Moisture Around the Bottom of My Spa

While leaks in new spas are not impossible, because every spa is water tested at the factory for leaks, they are extremely rare. Please keep in mind that moisture around the spa can be caused from opening and closing the cover which may have moisture on it, from splash out, or overflow from bathers. If several days go by and you feel the water level in the spa is dropping quickly or that there is a large amount of water pooling outside the tub proceed as follows: First, make sure the drain cap is on and the drain is shut off. Secondly, turn off the power and take off the two access panels located directly under the digital topside and check the unions located on the pump and equipment pack to make sure they are tight and not leaking. If this does not correct the issue please contact the company you purchased the spa from. If a technician comes out and finds the issue is not related to the spa, any fees associated will be the responsibility of the spa owner.

Error Codes

If you receive any error codes on the topside controls please reference the Balboa Quick Reference Guide that came with your spa. This will explain the possible causes and solutions which will help to identify/resolve any issue before having to call for technical support. If still have questions or cannot resolve the issue, please contact your dealer or our technical support line.

Chemicals

Read and understand the spa chemistry guidelines supplied by your dealer or local chemical supplier. There are many solutions available to balance your water chemistry. If you are unfamiliar with water chemistry, your best option is to work with your dealer or your local chemical supplier. It is unhealthy to use your spa when the water is not in proper chemical balance.

Do not use Calcium Hypochlorites or Trichlors. Doing so may cause corrosion to metal components and possibly fade your spa surface. This will not be covered under the warranty.

General Startup

❖ Filling Your Spa

Confirm that the drain valve is closed. Unthread and remove the filter. Place garden hose in the void where the filter was, this will help to eliminate air locks. With the electrical breaker in the OFF position and/or the power cord un-plugged, fill to an approximate water level that will not allow water to over flow the spa when bathers are in the hot tub. Every bather's density is different and therefore water level may vary (remember to make sure that the filter is covered). Once the spa is filled, power can then be supplied to your spa.

NOTE: Please ensure that the water level does not cover or submerge any equipment for an extended period of time when people enter the spa due to water displacement. If this happens, please lower the water level to prevent this as it could cause damage to the spa components that would not be covered under warranty.

❖ Adjusting Massage Jets

To adjust for direction, rotate the "eyeball" of the jet in the desired direction. To adjust for flow, turn the outer jet face counter clockwise to increase flow and clockwise to decrease flow. At no time fully decrease flow to all the jets. This may cause your pump to malfunction and suffer catastrophic failure which will not be covered under the warranty.

❖ Air Adjustment

To introduce air into the jets, turn the air controls (located on the spa's top edge) counter clockwise. To decrease air flow, turn the air controls clockwise.

❖ Suction Fitting

Keep the suction fitting (located in the foot well area) of the spa unobstructed and free from debris at all times. Only remove the suction-fitting screen for cleaning. Never remove it while the spa is connected to electrical power.

Care and Maintenance Instructions

❖ Cleaning the Filter Cartridge

1. Disconnect power
2. Remove the filter cover
3. Unthread the Filter Cartridge counter clockwise
4. Rinse dirt and debris away thoroughly with a garden hose
5. Replace filter cartridge and cover
6. Reconnect power

❖ Replacement Filter Cartridge Part Numbers

-150, 350 Models – Unicel 4CH-20, Pleatco PSG25P4, or Filbur FC-0125
-250, 450, 650 Models – Unicel 5CH-402, Pleatco PJW40SC-F2M, or Filbur FC-2811
Please check with your dealer for any spa models not listed here.

❖ Water Chemistry

Read and understand the spa chemistry guidelines supplied by your dealer or local chemical supplier. There are many solutions available to balance your water chemistry. If you are unfamiliar with water chemistry, your best option is to work with your dealer or your local chemical supplier. It is unhealthy to use your spa when the water is not in proper chemical balance.

Warning:
Do not use Calcium Hypochlorites, Trichlors, or Bromine. Doing so may cause corrosion to your equipment and possibly fade your spa surface. This will not be covered under the warranty.

❖ Minimum Weekly Maintenance

1. Test water for chlorine and pH
2. Adjust chlorine to 1-3ppm
3. Adjust pH to 7.2-7.8

❖ Winterizing

If the Spa is to be transported or stored in temperatures 32º F (0º C) or lower, it is critical that the spa be fully winterized. For specific, regional winterization guides, please contact your local dealer. Below are general guidelines:

1. The spa must be completely free of water
2. The drain valve must remain in the open position
3. The drain valve cap must be removed and stored
4. The filter cartridge element must be removed, dried and stored
5. Remove the plug from the pump housing

❖ Hard Top Covers

1. Hot and cold weather natural causes the material to expand and contract which may allow for gaps and/or inconsistencies between the cover and spa. As long as the seal sits on the top edge of the spa any inconsistencies or small gaps around the edge of the cover will not affect the ability of the cover to retain heat and is purely aesthetic.
2. The high-grade resin from which the spas are constructed can be easily cleaned with a mild soap and water solution.
3. Any bolts/screws on the cover may need to be tightened on occasion, depending on use.

❖ Soft Top Covers

1. Soft top covers are composed of a vinyl skin and high-density foam insert. They have straps and two-part clips which are attached to the spa.
2. The vinyl surface can be cared for with any mild household cleanser or products made for the care and maintenance of vinyl products.

❖ Cleaning Your Tuff Spa

1. The filter should be cleaned every 3-6 months with your garden hose. You may also choose to use a filter cleaner. Follow the directions provided with the cleaner.
2. If the shell gets dirty, you can simply use pressurized water to clean the majority of the dirt. In some cases, you may need to use a mild soap and water solution. In this instance, you will need to thoroughly rinse the spa. If not, you will have an issue with bubbles.
3. Refill spa with fresh water to the recommended level. The water line should cover all the upper jets in the spa. If you encounter an air lock, refer to the "Relieving Air Locks" section above.

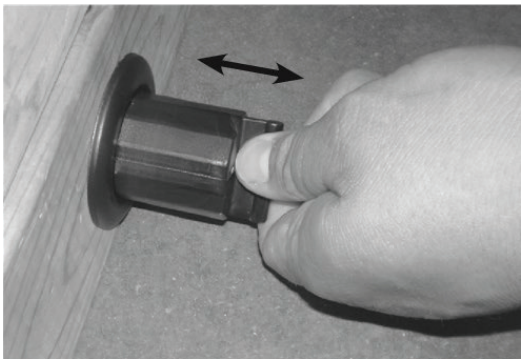
❖ Light Operating Instructions

The LED light on your Tuff Spa consists of several colors including Bright White, Aqua Blue, Soothing Violet, Ocean Blue, Majestic Gold, Shamrock Green, and Fiery Red. It also includes Chameleon Mode that rotates through the colors slowly and Party Mode which rotates through all available colors rapidly. To progress to the next lighting sequence, turn the unit off and then on again within 2-3 seconds. If the light is off for 7 or more seconds, it will remain the last color displayed.

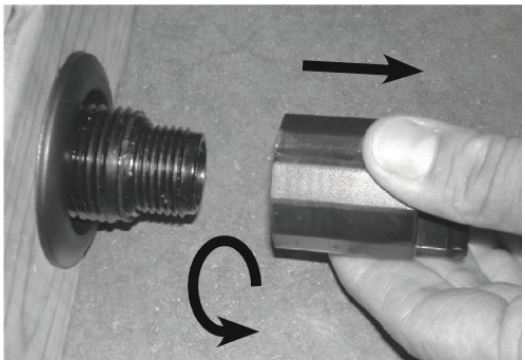
❖ Draining Your Spa

DISCONNECT THE POWER TO YOUR HOT TUB

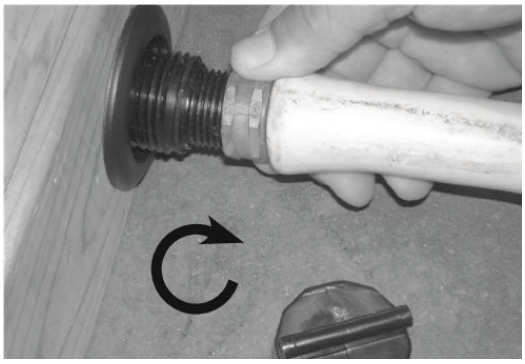
150, 250, 450, 650 Models:



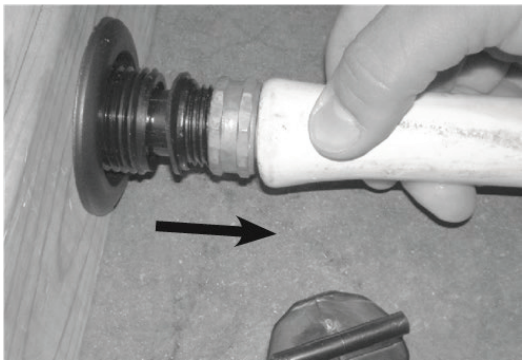
Pull knob out from the housing approximately 2" until it snaps into place.



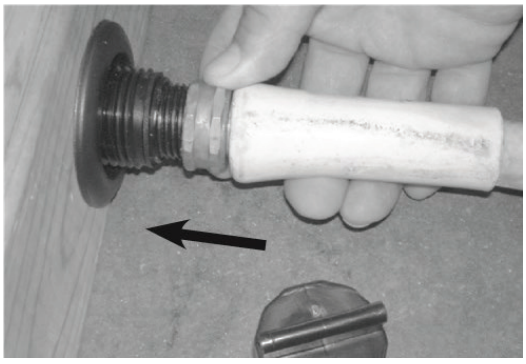
Remove cap by unthreading counter clockwise.



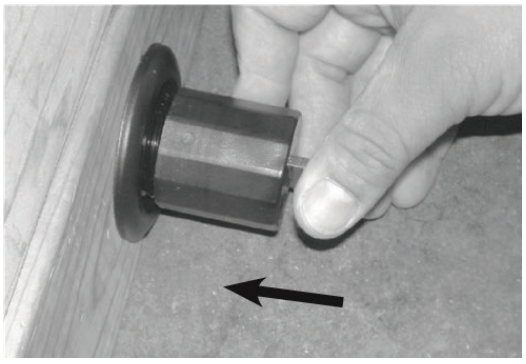
Thread hose onto the spa drain.



Pull the hose outward to allow water to flow. Push inward to shut water flow off.



To disconnect the hose, push the hose inward approximately ½" to shut the water flow off. Unthread the hose.



Thread the cap back on then push the internal back into the housing until it snaps into place

350, 550 Models:
Remove the panel below the topside controller and locate the drain hose (3/4" flex pipe with drain attachment). Remove the drain assembly cap and attach a garden hose. Twist the valve allowing water to flow out. This is a gravity drain and as such will be slow so you may not see water draining immediately. If you need to drain the spa more quickly, you may rent/buy a submersible pump.

DO NOT LEAVE SPA EMPTY FOR EXTENDED PERIODS OF TIME. LEAVING THE SPA EMPTY MAY RESULT IN THE JET HOUSING GASKETS DRYING OUT, CAUSING LEAKS AND/OR WARPING. THIS TYPE OF DAMAGE IS NOT COVERED UNDER THE WARRANTY.

Troubleshooting

❖ "LF" Error Code Fixes

1. The most common reason for this error code is a lack of water in the hot tub. The water line should be equal to the top of the highest jets (please refer to the "Filling Your Spa" section above). If it is not, add water to the spa to reach this level, then reset spa power. This will reset the memory and the error should be cleared.
2. The 2nd most common reason for this error is an air lock during a fresh fill of water into the spa. Air locks are common when filling up a spa for the first time. Please see "Relieving Air Locks" section for tips on relieving air locks. If after the air lock is remedied, you may still have a "LF" error on the topside. To reset the memory, simply reset spa power. This should clear the error code.
3. The 3rd most common reason for this error code is a dirty filter or a clog in the line. Power off the spa, remove the filter, and reset power. If the issue persists, please contact your dealer for additional assistance.

❖ "Why Is My Spa Constantly Running?"

All Tuff Spas are fitted with state-of-the-art technology that automatically filter your spa as well as check to ensure the spa is always at the desired temperature. Part of this process is that the spa pump runs twice a day for at least 1 hour each time to filter. While it does come from the factory set to run 1 hour every 12 hours, it is possible for this to be adjusted. Please reference included Balboa Quick Reference Guide for more information on filtration cycle settings. Additionally, the pump runs once every 30 minutes to verify that the spa is at the correct temperature. So, while it may seem the spa is constantly running, this is simply part of the heating and filtration process. If you still feel the spa is running constantly, please contact your dealer.

Optional Tuff Spa Safety Strap Installation

Locate all the parts necessary to complete the assembly (Fig. 1). Take the strap with clip and female piece and place them so that they are centered between the two halves of the cover (Fig. 2). Unclip the strap from the female piece but do not move the female piece (Fig. 3). Remove the small screws from the bag and use three of them to secure the female piece to spa (Fig. 4). Clip the strap back into the female piece and pull the strap so it is tight. Center the black strap mounting peice and screw on the back portion of the strap and screw it into place (Fig. 5).

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

- **Many troubleshooting inquiries can be handled by your dealer by phone.**

- **Side panel removal allows easy access to all interior spa plumbing for easy inspection or repair, allowing for total jet accessibility in seconds rather than minutes.**

- **Most parts are readily available from the factory, if not already in stock at your local dealer.**

Quick Tip Guide

1. **For 120v (volt) hook up, use a dedicated circuit (15 Amp minimum, 20 Amp recommended) within the cord distance.**
2. **Spa cover must be closed for the spa to properly heat. Heating time depends on air temperature but generally the spa will average 24 to 48 hours to heat on 120v. The spa will automatically filter twice a day for 1 hour each time (to change this see page 3 of the ML260 User Guide attached). Jets must all be open when the spa is not used for proper heating and filtration. The pump will continue to run until reaching the set temperature. The spa cord has a GFCI protection device. If it repeatedly trips, disconnect the plug from the receptacle until the fault has been identified and corrected by a spa technician.**
3. **If an extension cord is used, it must be as short as possible and at least 10 gauge (for outdoor use). Inferior cords may cause spa controls to malfunction and void your equipment warranty.**
4. **The heating spa will cause condensation to form on the outside and bottom of the spa which may cause reason to believe the spa is leaking. For this reason, small "leaks" should be allowed a few days prior to further investigation.**
5. **The spa pump has an automatic high temperature shut off. If the motor stops, it will auto start after it cools.**
6. **All tubing, manifolds, valves, etc. can be easily accessed throughout the spa by removing the panels.**
7. **To convert the spa to 240v please contact your dealer or a licensed electrician. A 4-wire minimum 8 gauge cord on a dedicated 50-amp circuit is needed for 240v applications.**

Tuff Spa Startup

❖ Selecting Tuff Spa Site Location

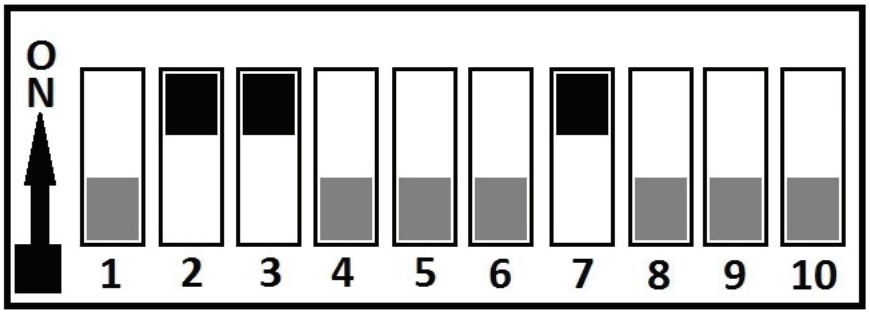
It is important your new spa be installed on a solid, flat, and level surface that is engineered to carry a load of 75 pounds per square foot. Spas should not be placed near or below electrical or telephone cables. If there is not a dedicated 120v receptacle within 10' of your spa, contact a **Licensed Electrician** to supply power near the spa. A GFCI Power Cord is supplied with all 120v applications. For 240v you will need a licensed electrician to run the necessary wiring unless proper wiring is already at site location.

❖ 120v to 240v Conversion

1. Remove the necessary panel and locate the spa control pack
2. Remove the pack cover and locate the 120v electrical wiring. Remove the 3-wire, 120v cord and connect the 4-wire, 240v hookup (50-amp breaker required)
3. Locate the jumper wire that connects J11 to J32, remove it
4. Locate the DIP Switch bank and move #10 to the OFF position (down)
5. Turn power on

120v Tuff Spa DIP Switch Settings

240v Tuff Spa DIP Switch Settings



❖ Relieving Air Locks

Occasionally, on a fresh fill or refill, an air lock may occur. This is caused by the build up of air in the plumbing lines which will not allow water or air to flow through the jets. If left un-attended, the pump and/or heater can be damaged or overheat from lack of water flow. This type of damage is not covered under the warranty. The easiest way to remedy this situation is to repeatedly cycle between low- and high-speed on the topside controls. If this does not fix the issue you will have to open the access panel that houses the pump. Once the panel is removed, locate the pump and you will see two large, white nuts attached to the pump. One is horizontal to the pump and the other is vertical. Take a large pair of channel locks and loosen the horizontal nut with the pump in high-speed. Continue to loosen the nut until the jets begin to work. Doing this will cause water to come out the nut you are loosening which is normal. Once the jets are functioning properly, tighten the nut back up and put the panel back on.

Balboa 300F-Series Operation Guide

For Systems with Software v41 Only.

Initial Start-up

Your spa will enter Priming Mode (Pr) when it is energized. **During Priming Mode, press "Jets" button repeatedly and be sure the pump is free of air.** Priming Mode lasts less than 5 minutes. Press "Temp" to exit. After Priming Mode, the spa will run in Standard Mode (see Mode section). Some panels may not have a "Temp" button. On these panels the "Set," "Warm," or "Cool" buttons are used.

Pump 1 low-speed is responsible for heating and filtration and will be referred to simply as the pump.

In multi-button sequences, if the buttons are pressed too quickly in sequence, they may not register.

Button shapes and labels may vary.

Temp Control (80°F - 104°F / 26°C - 40°C)

The last measured water temperature is constantly displayed.

The water temperature displayed is current only when the pump has been running for at least 1 minute.

On panels with a single "Temp" or "Set" button, to display the set temperature, press the button once. To change the set temperature, press the button a second time before the display stops flashing. Each press of the button will continue to either raise or lower the set temperature. If the opposite direction is desired, allow the display to revert to the current water temperature. Press the button to display the set temperature, and again to make the temperature change in the desired direction.

On panels with "Warm" and "Cool" buttons, to display the set temperature, press "Warm" or "Cool" once. To change the set temperature, press a temperature button again before the display stops flashing. Each press of "Warm" or "Cool" will adjust the set temperature.

After three seconds, the display will stop flashing and begin to display the current spa temperature.

Jets

Press "Jets" 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 preset length of time, which on some systems may be as long as 2 hours for low speed. Low speed may run automatically at times, during which it cannot be deactivated from the panel, but high speed may be operated. The ozone generator (if installed) will activate anytime low speed is running.

Light

Press "Light" to operate the spa light. Turns off after 4 hours.

Mode

Depending on system configuration, mode changing may not be available and will be locked in Standard Mode.

Mode is changed by pressing "Temp," then "Light".

Standard Mode maintains set temperature. St will be displayed momentarily when you switch into Standard Mode.

Economy Mode heats the spa to the set temperature only during filter cycles. Ec will display when water temp is not current, and will alternate with water temp when the pump is running.

Sleep Mode heats the spa to within 20°F/10°C of the set temperature only during filter cycles. SL will display when water temp is not current, and will alternate with water temp when the pump is running.

Preset Filter Cycles

The first preset filter cycle begins 6 minutes after the spa is energized. The second preset filter cycle begins 12 hours later.

Filter duration is programmable for 1, 2, 3, 4, 5, 6, 7, or 8 hours. The default filter time is 1 hour.

To program, press "Temp," then "Jets." Press "Temp" to adjust. Press "Jets" to exit programming.

Diagnostic Messages

Message	Meaning	Action Required
	No message on display. Power has been cut off to the spa.	The control panel will be disabled until power returns. Spa settings will be preserved until next power up.
`--`	Temperature unknown.	After the pump has been running for 1 minute, the current water temperature will be displayed.
`HH`	"Overheat" - The spa has shut down.* One of the sensors has detected 118°F/47.8°C at the heater.	DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. Once the heater has cooled, reset by pushing any button. If spa does not reset, shut off the power to the spa and call your dealer or service organization.
`OH`	"Overheat" - The spa has shut down.* One of the sensors has detected that the spa water is 110°F/43.5°C.	DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. At 107°F/41.7°C, the spa should automatically reset. If spa does not reset, shut off the power to the spa and call your dealer or service organization.
`SA`	Spa is shut down.* The sensor that is plugged into the Sensor "A" jack is not working.	If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat condition.)
`Sb`	Spa is shut down.* The sensor that is plugged into the Sensor "B" jack is not working.	If the problem persists, contact your dealer or service organization. (May appear temporarily in an overheat condition.)
`Sn`	Sensors are out of balance. If alternating with spa temperature, it may just be a temporary condition. If flashing by itself, spa is shut down.*	If the problem persists, contact your dealer or service organization.
`HL`	A significant difference between temperature sensors has been detected. This could indicate a flow problem.	If the water level is normal, make sure all pumps have been primed. If problem persists, contact your dealer or service organization.
`LF`	Persistent low flow problems. (Displays on the fifth occurrence of `HL` message within 24 hours.) Heater is shut down, but other spa functions continue to run normally.	Follow action required for `HL` message. Heating capability of the spa will not reset automatically; you may press any button to reset.
`dr`	Possible inadequate water, poor flow, or air bubbles in detected in the heater. Spa is shut down for 15 minutes.	If water level is normal, make sure all pumps have been primed. Press any button to reset. This message will reset within 15 minutes. If problem persists, contact your dealer or service organization.
`dY`	Inadequate water detected in heater. (Displays on third occurrence of `dr` message.) Spa is shut down.*	Follow action required for `dr` message. Spa will not automatically reset. Press any button to reset manually.
`IC`	"Ice" - Potential freeze condition detected. ** - Even when spa is shut down, some equipment will turn on if freeze protection is needed.*	No action required. All equipment will automatically activate regardless of spa status. The equipment stays on 4 minutes after the sensors detect that the spa temperature has risen to 45°F/7.2°C or higher. An optional freeze sensor may be added to protect against extraordinary freeze conditions. Auxiliary freeze sensor protection is advisable is colder climates. See your dealer for details.

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.

P/N 40887_A 11/08/2007

VS300FL4 Hot Sheet

Balboa Instruments
System PN 54626-01

System Model # VSP-VS300FL4-CCAJ
Software Version # 41
EPN # 2668

Base PCBA - PN 54604-01
PCB VS500Z - PN 22972 Rev D

Base Panels
VL401 (LCD Lite Duplex) – PN 54665
VL403 (LED Lite Duplex) – PN 54664
VL406U – PN 55350

Optional Base Panels
VL200 (Mini) – PN 55123
VL240 (MVP240) – PN 55080
VL260 (MVP260) – PN 55081

Template used: 40732_C.pdf 11/08/2007
54626-01_97_A.pdf 11/21/2007

BALBOA water group

Basic System Features and Functions

Power Requirements

- 120/240VAC, 60Hz, 16/32A, Class A GFCI-protected service (Circuit Breaker rating = 20/40A max.)
- 3 wires [hot, neutral, ground]/4 wires [hot, hot, neutral, ground]

System Outputs

Setup 1 (As Manufactured)

- 120V Pump 1, 2-Speed
- 120V Ozone *
- 12V Spa Light
- 4.0kW @ 240V Heater **
- VL401, VL403, or VL406U Panel (DIP switch A3 must be OFF)

Optional Panels

- VL200, VL240, or VL260 Panel (DIP switch A3 must be ON)

* Ozone runs with P1-low and must be same voltage as Pump 1.

** Heater wattage is rated at 240V. When running 120V to heater, output is approximately 25%.

Additional Options

- MoodEFX Lighting
  Connects to Spa Light terminal J20
- FiberEFX Lighting
  Connects to Spa Light terminal J20

Basic System Features and Functions

Any time you change a DIP Switch, other than A1, you must reset Persistent Memory for your new DIP Switch Settings changes to take effect. If you do not reset Persistent Memory, your system may function improperly.

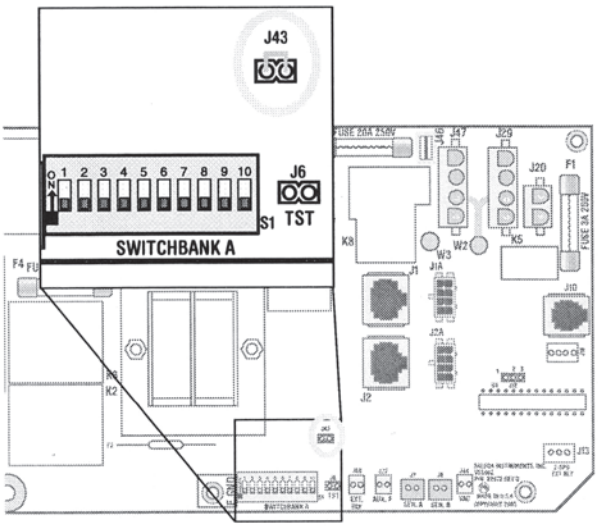
To reset Persistent Memory:

- Power down by disconnecting power source from spa.
- Put a jumper across J43, covering both pins. (See illustration below)
- Power up by connecting power source to spa.
- Wait until "Pr" is displayed on your panel.
- Power down again.
- Remove jumper from J43 (May also move to cover 1 pin only)
- Power up again.

About Persistent Memory and Time of Day Retention:

This system uses memory that doesn't require a battery to store a variety of settings. What we refer to as Persistent Memory stores the filter settings, the set temperature, and the heat mode.

Persistent Memory is not used for Time of Day. Only models with a Serial Deluxe panel installed (VS5xxDZ and GS5xxDZ) can display the time. However, during power loss to the spa, the system will lose the correct time, and reset to 12:00 PM when power is restored.



J43 on VS5xxZ and VS300 Series Main Board Shown.

Power Up Display Sequence

Upon power up, you should see the following on the display:

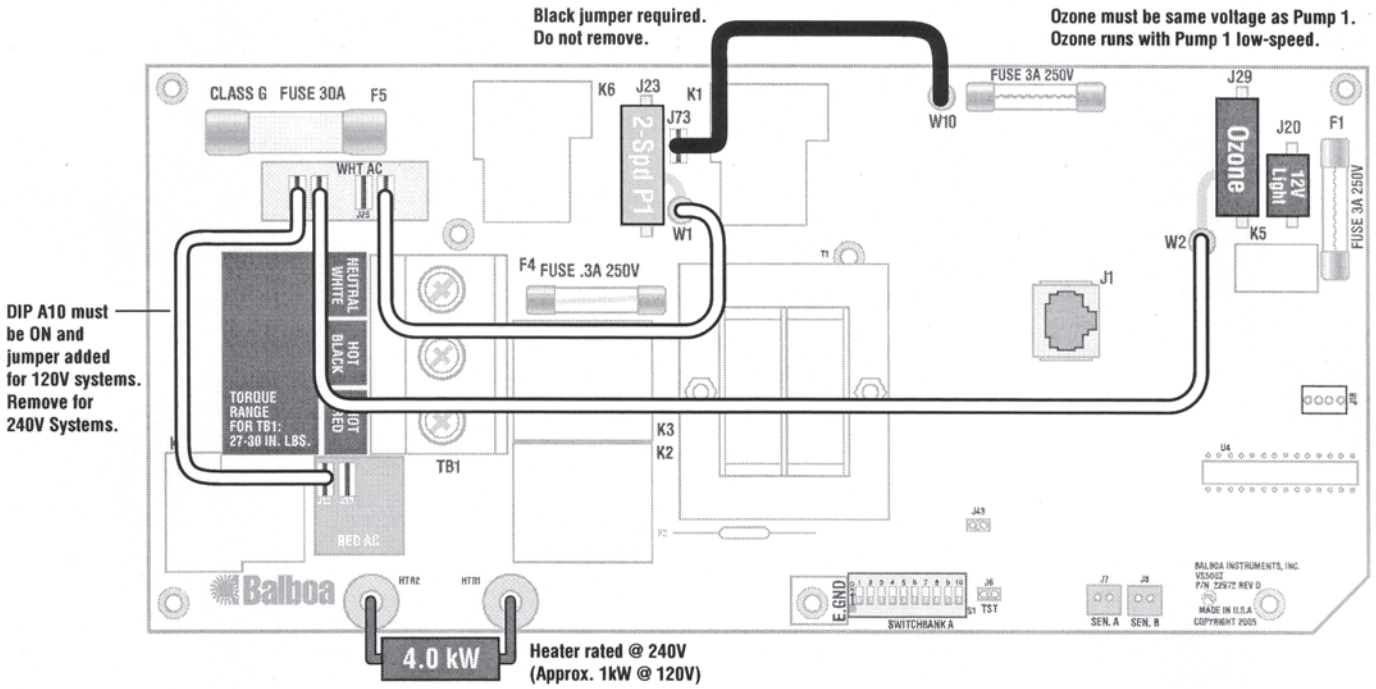
- Three numbers in a row, which are the SSID (the System Software ID). The third display of these numbers is the Software Version, which should match the version of your system. For example, if these three numbers are 100 67 38, that is a VS511SZ at version 38.
- Displayed next is: "24" (indicating the system is configured for a heater between 3 and 6 kW) or "12" (indicating the system is configured for a heater effectively* between 1 and 3 kW).
  "24" should appear for all VS models running at 240VAC.
  "12" should appear for all VS models running at 120VAC, as well as all GS models. (*A heater which is rated at 4 kW at 240VAC will function as a 1 kW heater at 120VAC.)
- "Pr" will appear to signal the start of Priming Mode.

At this point, the power up sequence is complete. Refer to the Reference Card for the VS or GS System model of your spa for information about how the spa operates from this point on, including how to adjust the Time of Day if using a Serial Deluxe style panel.

Wiring Configuration and DIP Settings

Setup 1 (As Manufactured)

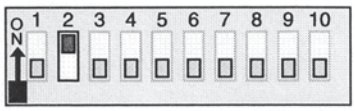
- 120V Pump 1, 2-Speed
- 12V Spa Light
- 120V Ozone
- 240V 4.0kW Heater (Approx. 1.0kW @ 120V)
- VL401, VL403, or VL406U Main Panel



WARNING: Main Power to system should be turned OFF BEFORE adjusting DIP switches.
WARNING: Persistent Memory (J43) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

SSID #
100
59
41

Switchbank A



A1, Test Mode OFF
A2, P1, LT, TD, TU
A3, Duplex Panel
A4, N/A (must be OFF)
A5, P1-high timeout, Table 1
A6, 60 Hz
A7, Mode changes allowed
A8, Degrees F
A9, P1-low timeout, Table 1
A10, High Amp mode

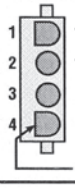
J43
Memory Reset

Panel Button Assignments
1=Pump 1
2=Light
3=Temp Down
4=Temp Up

Panel Button Positions

Wiring Color Key
- 120 Volt Connections
- 240 Volt Connections
- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

Board Connector Key



1 Typically Line voltage
2 Typically Line voltage for 2-speed pumps
3 Neutral (Common)
4 Ground
Note flat sides in connector

DIP Switches and Jumpers Definitions

SSID 100 59 41 Base Model VS300F

DIP Switch Key

A1 Test Mode (normally OFF)
A2 "ON" position: Button layout will be: Pump 1, Light, Temp Down, Temp Up *
"OFF" position: Button layout will be: Unused, Pump 1, Temp, Light
A3 "ON" position: use Mini Panel *
"OFF" position: use Lite Duplex or Digital Duplex panel
A4 N/A (must be OFF)
A5 Pump 1 high-speed timeout, see Table 1
A6 "ON" position: 50Hz operation
"OFF" position: 60Hz operation
A7 "ON" position: Standard mode only
"OFF" position: Std/Ecn/Sleep mode changes allowed
A8 "ON" position: temperature is displayed in degrees Celsius
"OFF" position: temperature is displayed in degrees Fahrenheit
A9 Pump 1 low-speed timeout, see Table 1
A10 "ON" position: heater is disabled while the high-speed pump is running (low amperage mode)
"OFF" position: heater can run while the high-speed pump is running (high amperage mode)

Table 1 Pump 1 Timeouts

A5	A9	Low-spd	Hi-spd
OFF	OFF	2 hours	15 min
ON	OFF	2 hours	30 min
OFF	ON	15 min	15 min
ON	ON	30 min	30 min

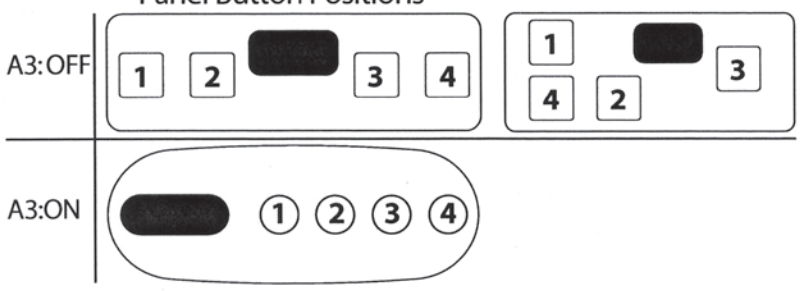
* Panels with button layout are not compatible when A2 or A3 is ON.
Note: No blower or second pump available.

Jumper Key

J43 When jumper is placed on 2 pins during power-up, system will reset persistent memory. Leave on 1 pin only to enable persistent memory feature.

WARNING:
- Setting DIP switches 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 hot sheet.

Panel Button Positions



Panel Button Assignments

A2:OFF	1=Unused 2=Pump 1	3=Temp 4=Light
A2:ON	1=Pump 1 2=Light	3=Temp Down 4=Temp Up

Quick Tip Guide

1. **Spa cover must be closed for the spa to properly heat. Heating time depends on air temperature but generally the spa will average 12 to 24 hours to heat on 240v. The spa will automatically filter twice a day for 2 hours each time (to change this see page 3 of the ML260 User Guide attached). Jets must all be open when the spa is not used for proper heating and filtration. The pump will continue to run until reaching the set temperature. If it repeatedly trips, turn the power off at the breaker box until the fault has been identified and corrected by a spa technician.**
2. **The heating spa will cause condensation to form on the outside and bottom of the spa which may cause reason to believe the spa is leaking. For this reason, small "leaks" should be allowed a few days prior to further investigation.**
3. **The spa pump has an automatic high temperature shut off. If the motor stops, it will auto start after it cools.**
4. **All tubing, manifolds, valves, etc. can be easily accessed throughout the spa by removing the panels.**
5. **A 4-wire, 8 gauge cord on a dedicated 50-amp circuit is needed for this 240v application.**

Tuff Spa Startup

❖ Selecting Tuff Spa Site Location

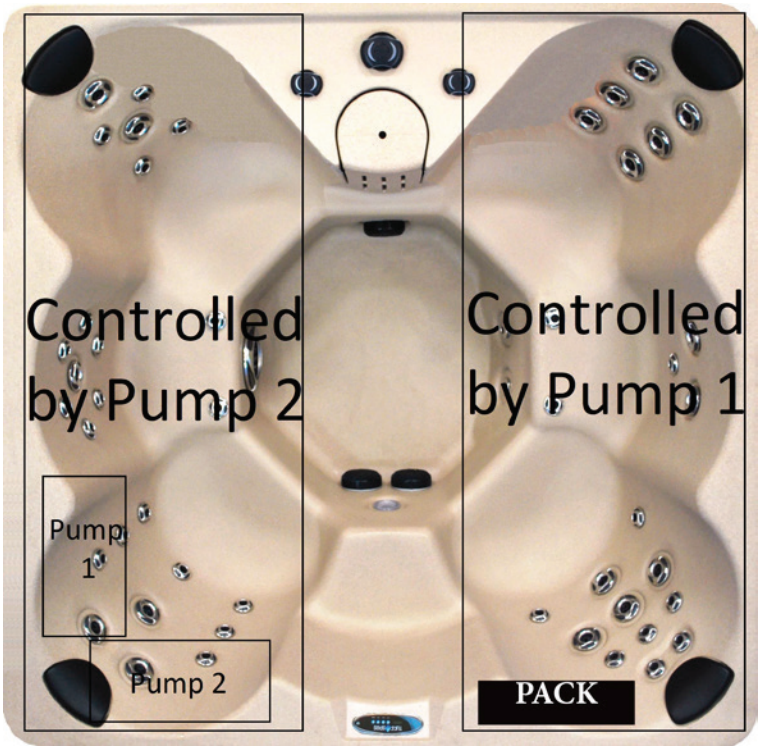
It is important your new spa be installed on a solid, flat, and level surface that is engineered to carry a load of 75 pounds per square foot. Spas should not be placed near or below electrical or telephone cables. For the 240v you will need a licensed electrician to run the necessary wiring unless proper wiring is already at site location.

❖ Relieving Air Locks

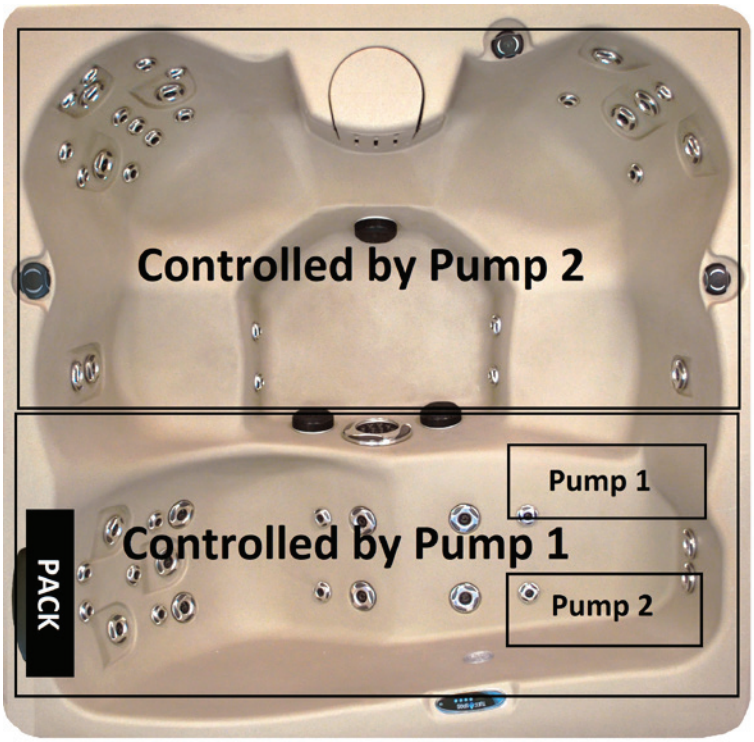
Occasionally, on a fresh fill or refill, an air lock may occur. This is caused by the build up of air in the plumbing lines which will not allow water or air to flow through the jets. If left un-attended, the pump and/or heater can be damaged or overheat from lack of water flow. This type of damage is not covered under the warranty. The easiest way to remedy this situation is to repeatedly cycle between low- and high-speed on the topside controls. If this does not fix the issue you will have to open the access panel that houses the pumps. Once the panel is removed, locate the pump and you will see two large, white nuts attached to the pump. One is horizontal to the pump and the other is vertical. Take a large pair of channel locks and loosen the horizontal nut with the pump in high-speed. Continue to loosen the nut until the jets begin to work. Doing this will cause water to come

out the nut you are loosening which is normal. Once the jets are functioning properly, tighten the nut back up and put the panel back on. Please refer to the graphics below to determine which pump needs to be relieved of an air lock based on which jets are not functioning.

TT450



TT650



TP500 and TP500S Control Panels

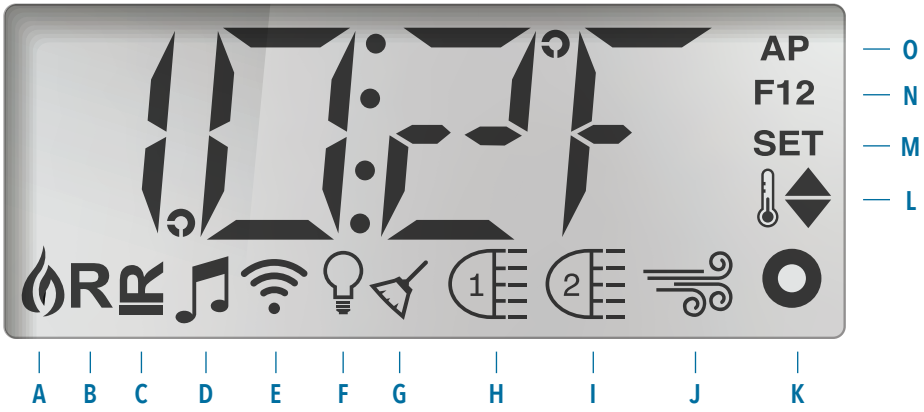
User Guide for Standard Menu

System Model: All BP series systems
Panel Model: TP500 and TP500S Series
Panel Software Version: All versions

TP500S

TP500

Display Icons



A - Heat
B - Ready Mode
C - Rest Mode
D - bba™2 On
E - WiFi (Cloud Connection)
F - Light
G - Cleanup Cycle
H - Jets 1
I - Jets 2
J - Blower
K - Auxiliary (Jets 3 or MICROSILK®)
L - Temperature Range (High / Low)
M - Set (Programming)
N - Filter Cycle (1 or 2 or Both)
O - AM or PM (Time)

MicroSilk® is a registered trademark of Jason International.

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. All material copyright of Balboa Water Group.

BALBOA water group

Main Menus

Navigation

Navigating the entire menu structure is done with 2 or 3 buttons on the control panel.

Some panels have separate **WARM** (Up) and **COOL** (Down) buttons, while others have a single **Temperature** button. In the navigation diagrams Temperature buttons are indicated by a single button icon. Panels that have two Temperature buttons (Warm and Cool) can use both of them to simplify navigation and programming where a single Temperature icon is shown.

The **MENU/SELECT** Button is used to choose the various menus and navigate each section.

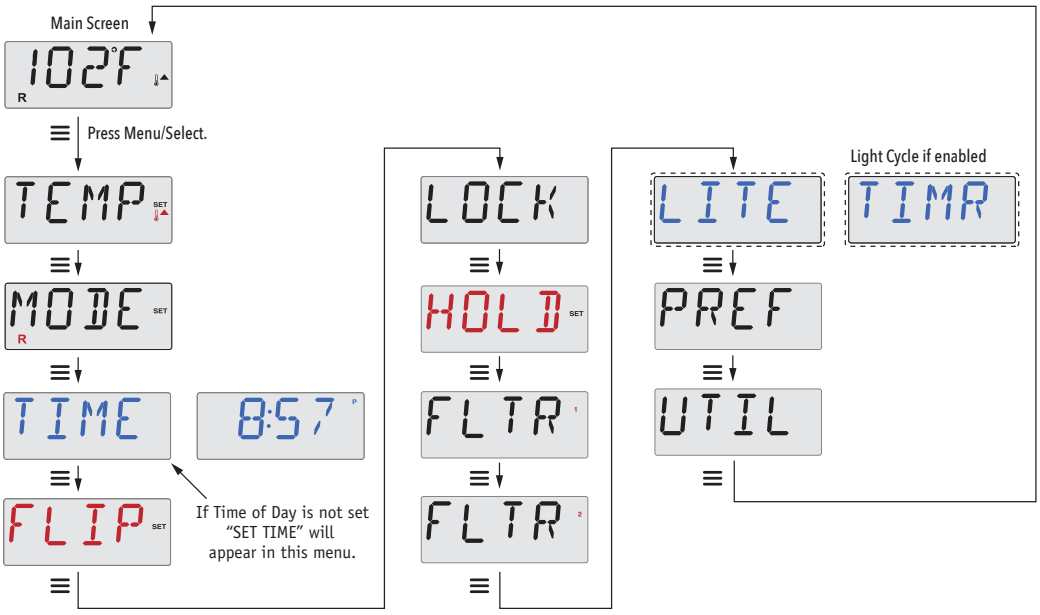
Typical use of the Temperature button(s) allows changing the Set Temperature while the numbers are flashing in the LCD. The menus can be exited with certain button presses. Simply waiting for a few seconds will return the panel operation to normal.

Power-up Screens

Each time the System powers up, a series of numbers is displayed.
After the startup sequence of numbers, the system will enter Priming Mode (See Page 3).

Key

- Indicates Flashing or Changing Segment
- Indicates Alternating or Progressive Message - every 1/2 second
- A temperature button, used for "Action"
- Menu/Select button
- ●●●●● Waiting time that keeps the last change to a menu item.
- ★★★★★ Waiting time (depends on menu item) that reverts to original setting and ignores any change to that menu item.



Main Screen

Waiting a few seconds in the Main Menu will allow the display to revert to the Main Screen. Most changes are not saved unless Menu/Select ≡ is pressed. Refer to key above.

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. All material copyright of Balboa Water Group.

BALBOA water group

Fill it up!

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 display will go through specific sequences. These sequences are normal and display a variety of information regarding the configuration of the hot tub control.

Priming Mode - M019*

This mode will last for 4-5 minutes or you can manually exit the priming mode after the pump(s) have primed.

Regardless of whether the priming mode ends automatically or you manually exit the priming mode, the system will automatically starts normal heating and filtering at the end of the priming mode. 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 pushing the “Jets” or “Aux” buttons.

If the spa has a Circ Pump, it can be activated by pressing the “Light” button during Priming Mode.

Priming the Pumps

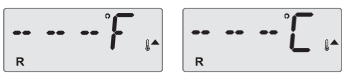
As soon as the above display appears on the panel, push the “Jets” button once to start Pump 1 in low-speed and then again to switch to high-speed. Also, push the “Jets 2” or “Aux” button, if you have a 2nd pump, to turn it on. The pumps will now be running in high-speed to facilitate priming. If the 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 pressing the “Warm” or “Cool” button. 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 momentarily display the set temperature but the display will not show the water 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.

*M019 is a Message Code. See Page 18.

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. All material copyright of Balboa Water Group.

Spa Behavior

Pumps

Press the “Jets” button once to turn pump 1 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.

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 (See page 6), Pump 1 low may also activate once in a while for at least 1 minute 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 the system is equipped with a circ pump, it will 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 or blower is on.

The specific Circulation Mode that is used has been determined by the Manufacturer and cannot be changed in the field.

Filtration and Ozone

On non-circ systems, Pump 1 low and the ozone generator will run during filtration. On circ systems, the ozone will run with the circ pump.

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. (See page 10)
A second filter cycle can be enabled as needed.

At the start of each filter cycle, all water devices (other than the primary pump) will run briefly to purge the plumbing to maintain good water quality. The term “water devices” includes the Blower.

Freeze Protection

If the temperature sensors within the heater detect a low enough temperature, then the pump(s) and the blower automatically activate to provide freeze protection. The pump(s) and blower will run either continuously or periodically depending on conditions.

In colder climates, an optional 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. 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. (See the Preferences section on page 12)

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. All material copyright of Balboa Water Group.

Temperature and Temp Range

Adjusting the Set Temperature

When using a panel with Up and Down buttons (Temperature buttons), pressing Up or Down will cause the temperature to flash. Pressing a temperature button again will adjust the set temperature in the direction indicated on the button. When the LCD stops flashing, the spa will heat to the new set temperature when required.

If the panel has a single temperature button, pressing the button will cause the temperature to flash. Pressing the button again will cause the temperature to change in one direction (e.g. UP). After allowing the display to stop flashing, pressing the Temperature Button will cause the temperature to flash and the next press will change the temperature in the opposite direction (e.g. DOWN).

Press-and-Hold

If a Temperature button is pressed and held when the temperature is flashing, the temperature will continue to change until the button is released. If only one temperature button is available and the limit of the Temperature Range is reached when the button is being held, the progression will reverse direction.

Dual Temperature Ranges

This system incorporates two temperature range settings with independent set temperatures. The High Range designated in the display by a thermometer and an “up” arrow, and the Low Range designated in the display by a thermometer and “down” arrow.

These ranges can be used for various reasons, with a common use being a “ready to use” setting vs. a “vacation” setting. The Ranges are chosen using the menu structure below. Each range maintains its own set temperature as programmed by the user. This way, when a range is chosen, the spa will heat to the set temperature associated with that range.

For example:

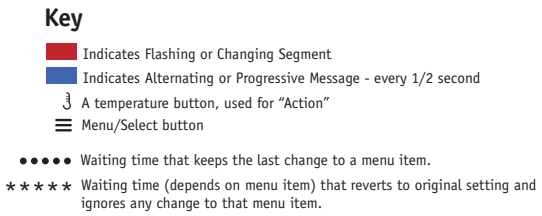
High Range might be set between 80°F and 104°F.

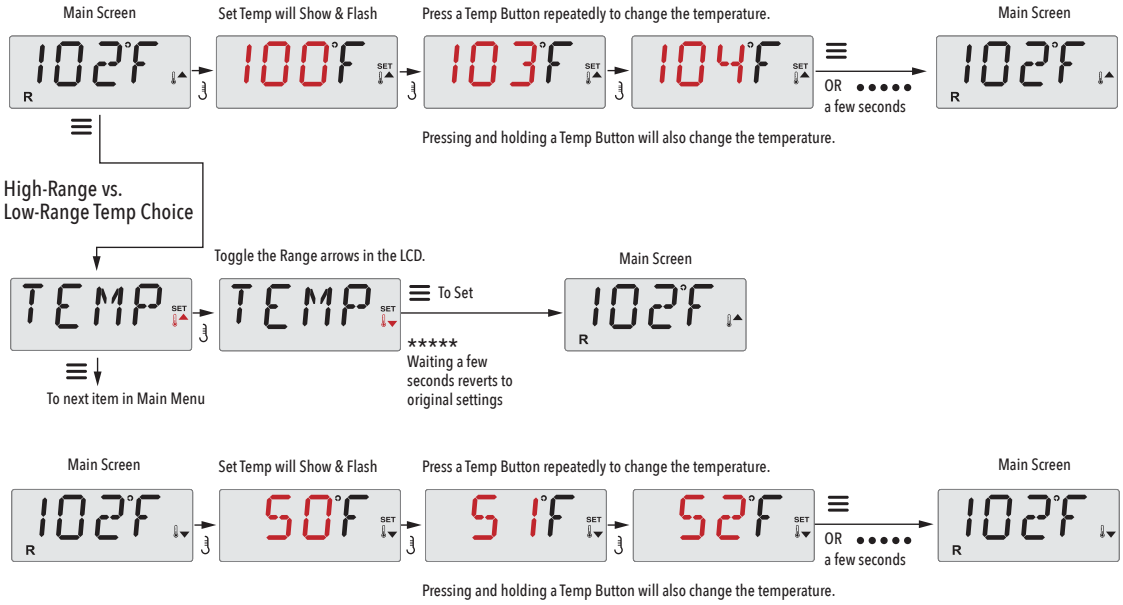
Low Range might be set between 50°F and 99°F.

More specific Temp Ranges may be determined by the Manufacturer.

Freeze Protection is active in either range.

See Ready and Rest on Page 6
for additional heating control information.





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Mode – Ready and Rest

In order for the spa to heat, a pump needs to circulate water through the heater. The pump that performs this function is known as the "primary pump."

The primary pump can be either a 2-Speed Pump 1 or a circulation pump.

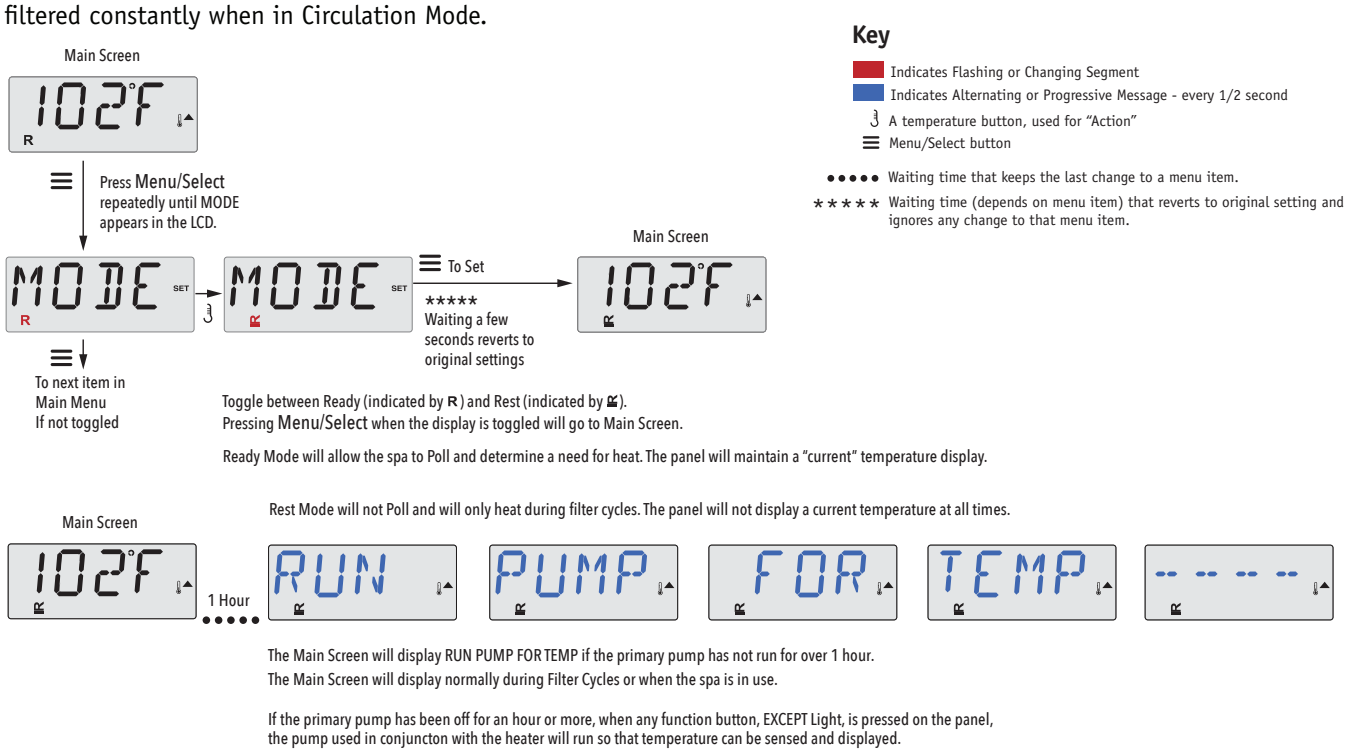
If the primary pump is a 2-Speed Pump 1, Ready Mode (indicated by **R**) will circulate water periodically, using Pump 1 Low, in order to maintain a constant water temperature, heat as needed, and refresh the temperature display. This is known as "polling."

Rest Mode (indicated by) will only allow heating during programmed filter cycles. Since polling does not occur, the temperature display may not show a current temperature until the primary pump has been running for a minute or two.

Circulation Mode (See Page 4, under Pumps, for other circulation modes)

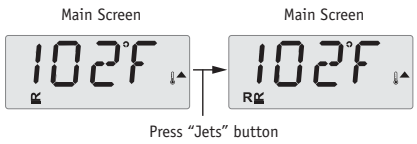
If the spa is configured for 24HR circulation, the primary pump generally runs continuously. Since the primary pump is always running, the spa will maintain set temperature and heat as needed in Ready Mode, without polling.

In Rest Mode, the spa will only heat to set temperature during programmed filter times, even though the water is being filtered constantly when in Circulation Mode.



Ready-in-Rest Mode

R appears in the display if the spa is in Rest Mode and "Jets" is pressed. It is assumed that the spa is being used and will heat to set temperature. The primary pump will run until set temperature is reached, or 1 hour has passed. After 1 hour, the System will revert to Rest Mode. This mode can also be reset by entering the Mode Menu and changing the Mode.



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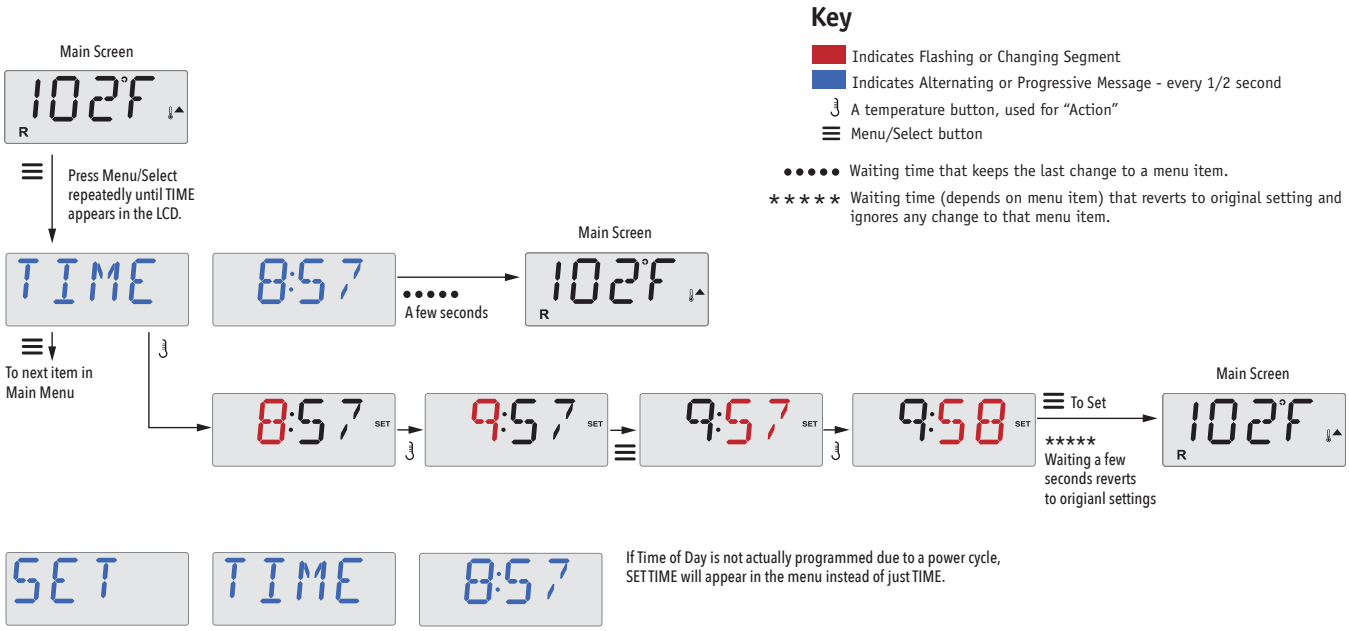
Show and Set Time-of-Day

Be sure to set the Time-of-Day

Setting the time-of-day can be important for determining filtration times and other background features.

When in the TIME menu, SET TIME will flash on the display if no time-of-day is set in the memory.

24-hour time display can be set under the PREF menu. (See Page 12)



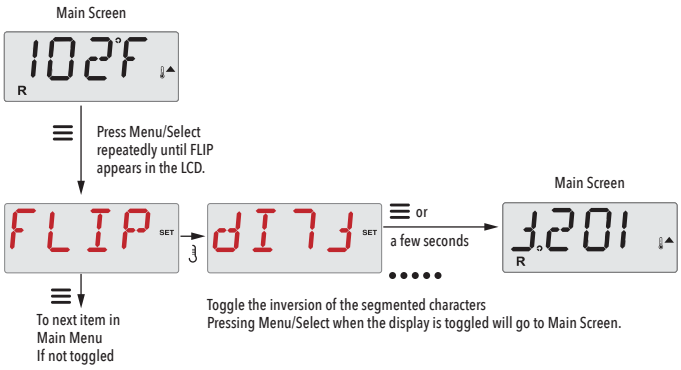
Note:

This note refers to systems that do not keep track of Time-of-Day when powered down.

If power is interrupted to such a system, Time-of-Day is not stored. The system will still operate and all other user settings will be stored. If filter cycles are required to run at a particular time of day, resetting the clock will return the filter times to the actual programmed periods.

When such a system starts up, it defaults to 12:00 Noon, so another way to get filter times back to normal is to start up the spa at noon on any given day. SET TIME will still flash in the TIME Menu until the time is actually set, but since the spa started at noon, the filter cycles will run as programmed.

Flip (Invert Display)



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. All material copyright of Balboa Water Group.

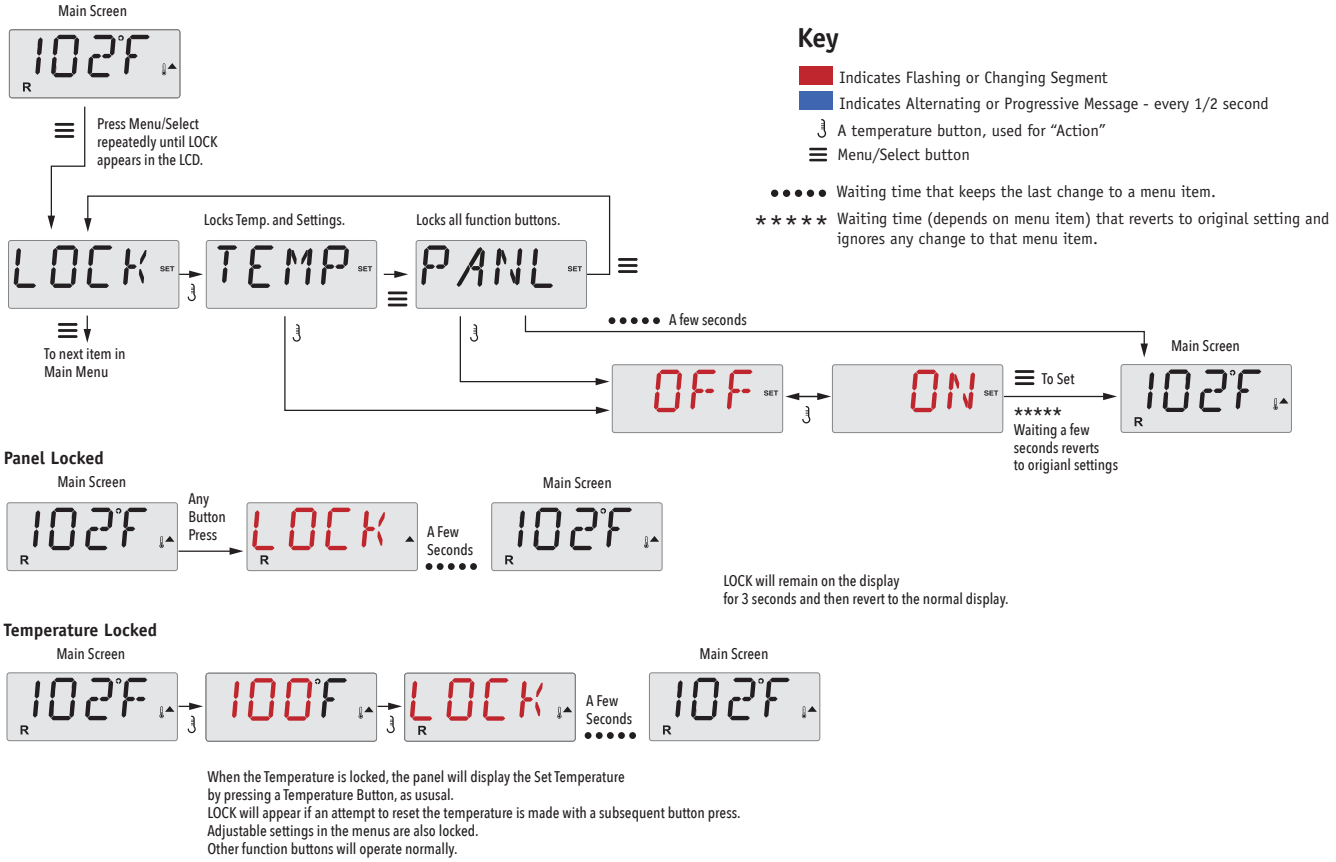
Restricting Operation

The control can be restricted to prevent unwanted use or temperature adjustments.

Locking the panel prevents the controller from being used, but all automatic functions are still active.

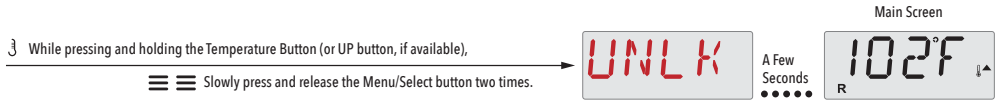
Locking the Temperature allows Jets and other features to be used, but the Set Temperature and other programmed settings cannot be adjusted.

Temperature Lock allows access to a reduced selection of menu items.
These include Set Temperature, FLIP, LOCK, UTIL, INFO and FALT LOG.



Unlocking

This Unlock sequence may be used from any screen that may be displayed on a restricted panel.



NOTE: If the panel has both an UP and a Down button, the ONLY button that will work in the Unlock Sequence is the UP button.

The temperature will not Unlock if the Unlock sequence is done while the panel is displaying "LOCK".

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. All material copyright of Balboa Water Group.

Hold (Standby)

Hold Mode –M037*

Hold Mode is used to disable the pumps during service functions like cleaning or replacing the filter. Hold Mode will last for 1 hour unless the mode is exited manually.

Drain Mode

Some spas have a special feature that allows a pump to be employed when draining the water.
When available, this feature is a component of Hold Mode.
Drain Mode will time out with Hold Mode.

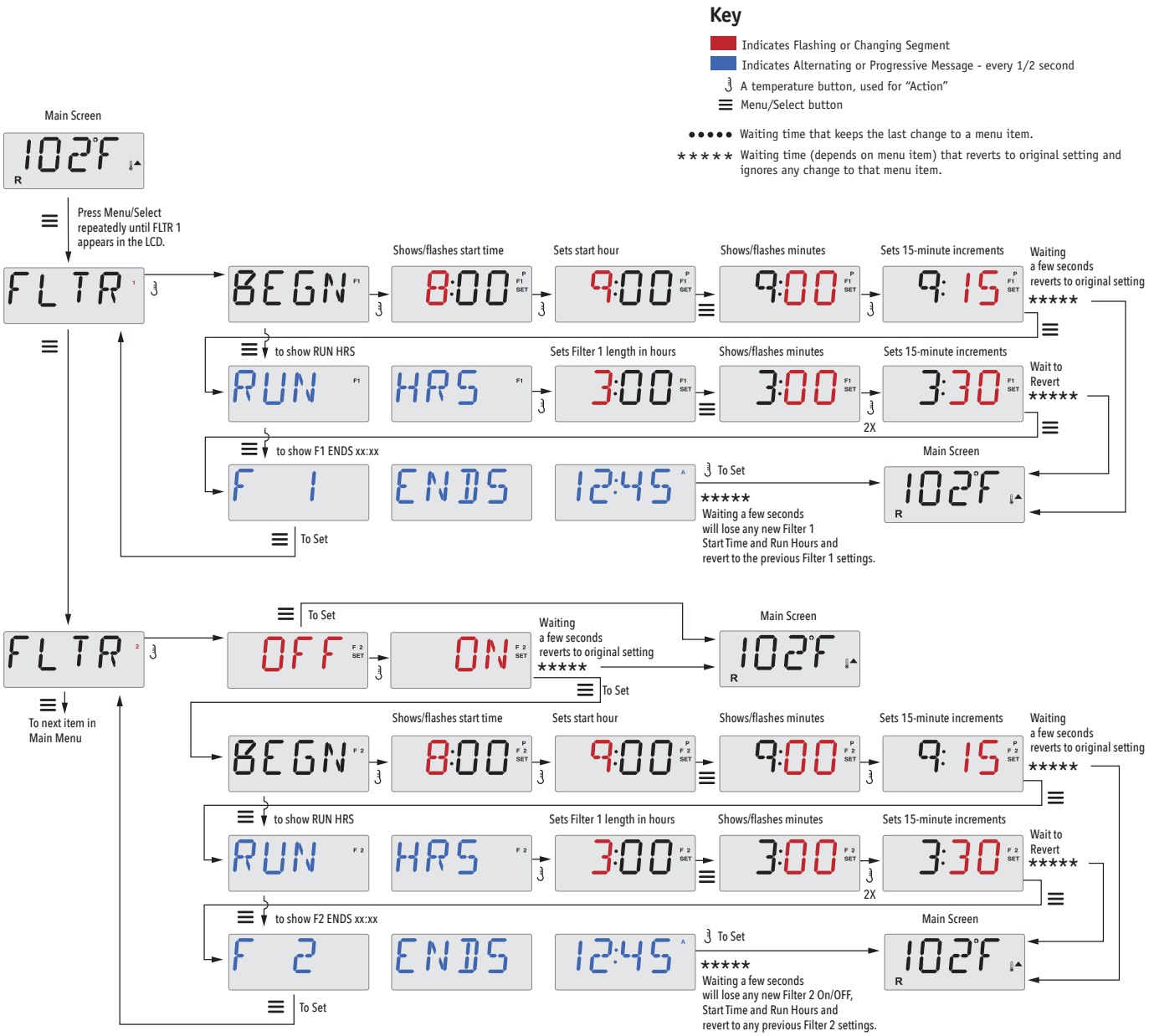
M037 is a Message Code. See Page 18.

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. All material copyright of Balboa Water Group.

Adjusting Filtration

Main Filtration

Filter cycles are set using a start time and a duration. Start time is indicated by an “A” or “P” in the bottom right corner of the display. Duration has no “A” or “P” indication. Each setting can be adjusted in 15-minute increments. The panel calculates the end time and displays it automatically.



Filter Cycle 2 - Optional Filtration

Filter Cycle 2 is OFF by default.

It is possible to overlap Filter Cycle 1 and Filter Cycle 2, which will shorten overall filtration by the overlap amount.

Purge Cycles

In order to maintain sanitary conditions, secondary Pumps and/or a Blower will purge water from their respective plumbing by running briefly at the beginning of each filter cycle.

If Filter Cycle 1 is set for 24 hours, enabling Filter Cycle 2 will initiate a purge when Filter Cycle 2 is programmed to begin.

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. All material copyright of Balboa Water Group.

Light Timer Programming

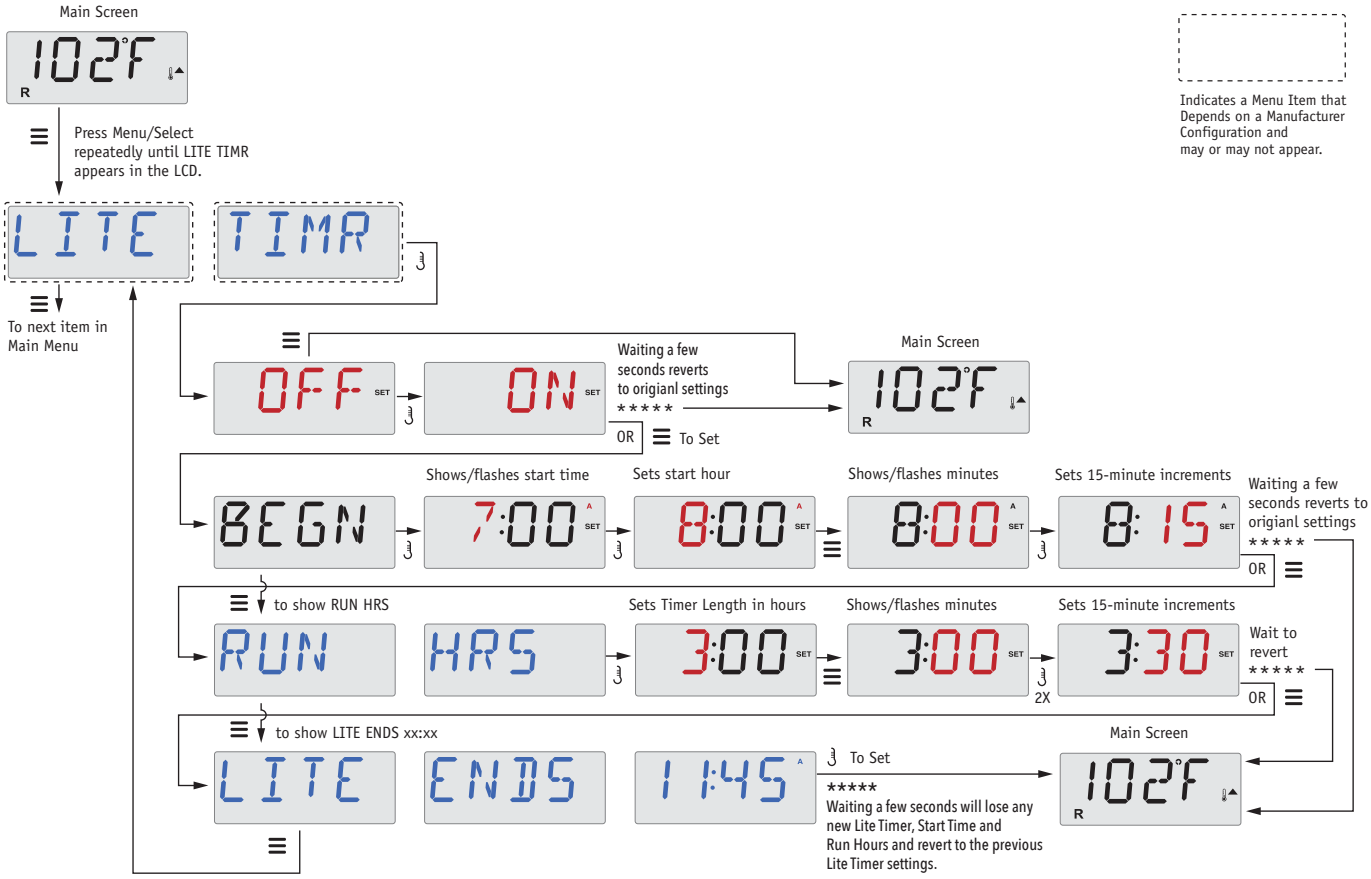
Light Timer Option

If LITE TIMR does not appear in the Main Menu, the Light Timer feature is not enabled by the manufacturer.

When available, the Light Timer is OFF by default.

Key

- Indicates Flashing or Changing Segment
- Indicates Alternating or Progressive Message - every 1/2 second
- A temperature button, used for "Action"
- Menu/Select button
- ●●●●● Waiting time that keeps the last change to a menu item.
- ★★★★★ Waiting time (depends on menu item) that reverts to original setting and ignores any change to that menu item.



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. All material copyright of Balboa Water Group.

Preferences

F / C **(Temp Display)**

Change the temperature between Fahrenheit and Celsius.

12 / 24 **(Time Display)**

Change the clock between 12 hr and 24 hr display.

RE-MIN-DERS **(Reminders)**

Turn the display of reminder messages (like “Clean Filter”) On or Off.

Note: Reminders continue to run in the background even when not displayed. So turning the display of Reminders On or Off does not reset any Reminder counts.

CLN-UP **(Cleanup)**

Cleanup Cycle Duration is not always enabled, so it may not appear. When it is available, set the length of time Pump 1 will run after each use. 0-4 hours are available.

M8

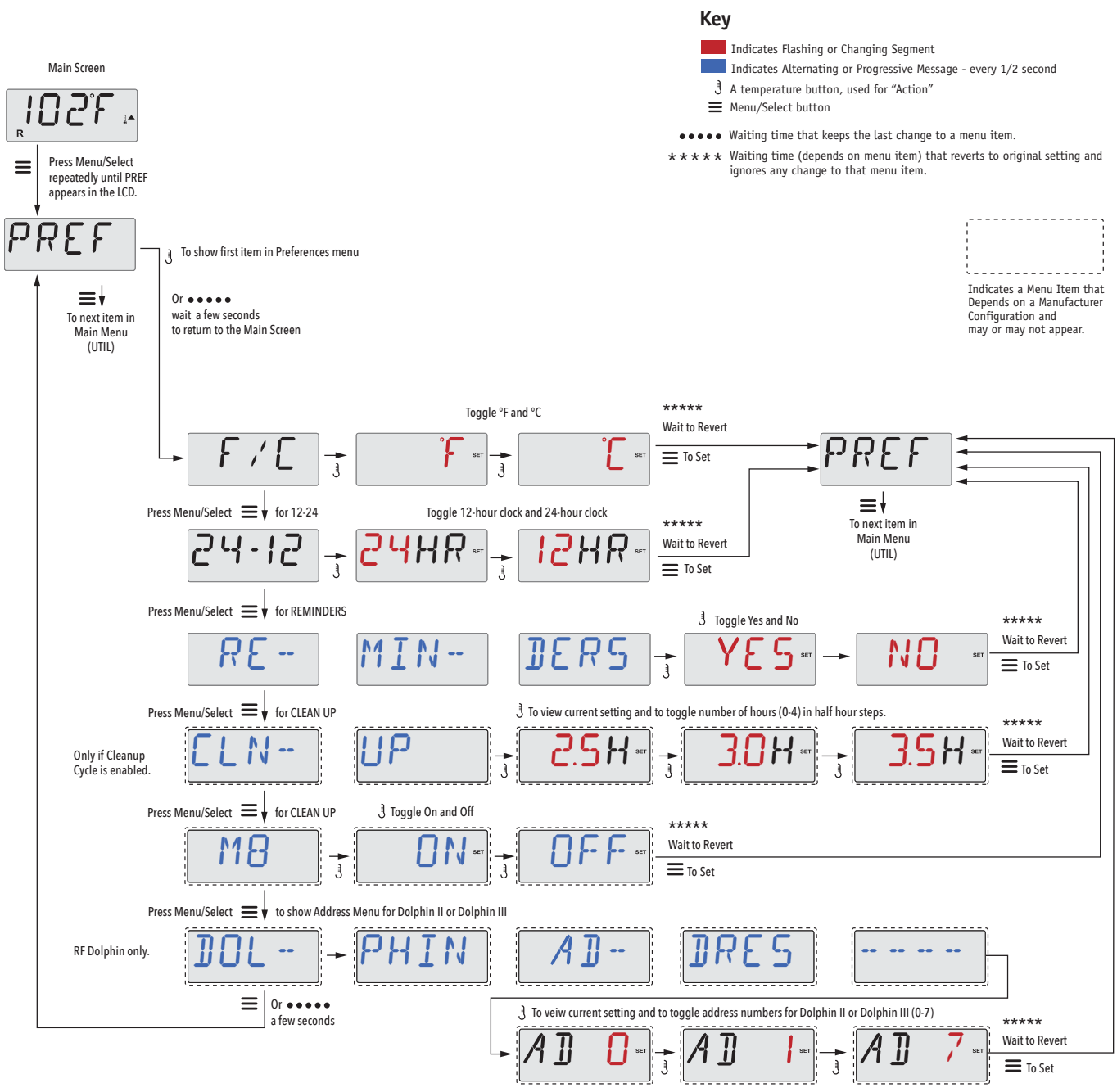
(This message may not appear on all systems.) On systems that have M8, it is enabled by default. It can be disabled (or re-enabled) here. M8 reduces polling intervals when the water temperature in the spa is steady.

DOL-PHIN-AD-DRES **(Dolphin II and Dolphin III) Applies to RF Dolphin only. (This message may not appear depending on the configuration)**

When set to 0, no addressing is used. Use this setting for a Dolphin Remote which is factory set for no address by default. When set between 1 and 7, the number is the address. (See the Dolphin manual for details.)

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. All material copyright of Balboa Water Group.

Preferences



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. All material copyright of Balboa Water Group.

Utilities and Information

INFO (System Information sub-menu)

The System Information Menu displays various settings and identification of the particular system.

SSID (Software ID)

Displays the software ID number for the System.

MODL (System Model)

Displays the Model Number of the System.

SETP (Current Setup)

Displays the currently selected Configuration Setup Number.

Heater Voltage (Feature not used on CE rated systems.)

Displays the operating voltage configured for the heater.

Heater Wattage as Configured in Software (CE Systems Only.)

Displays a heater kilowatt rating as programmed into the control system software (1-3 or 3-6).

*H_* (Heater Type)

Displays a heater type ID number.

*SW_* (Dip Switch Settings)

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

PANL (Panel Version)

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

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. All material copyright of Balboa Water Group.

Additional Utilities

Utilities

In addition to INFO, The Utilities Menu contains the following:

GFCI (GFCI Test)
(Feature not available on CE rated systems.)

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 test feature. If the GFCI Test Feature is reset, the device will trip within 7 days. (See Page 17)

A / B (A/B Sensor Temperatures)

When this is set to On, the temperature display will alternate to display temperature from Sensor A and Sensor B in the heater.

FALT LOG (Fault Log)

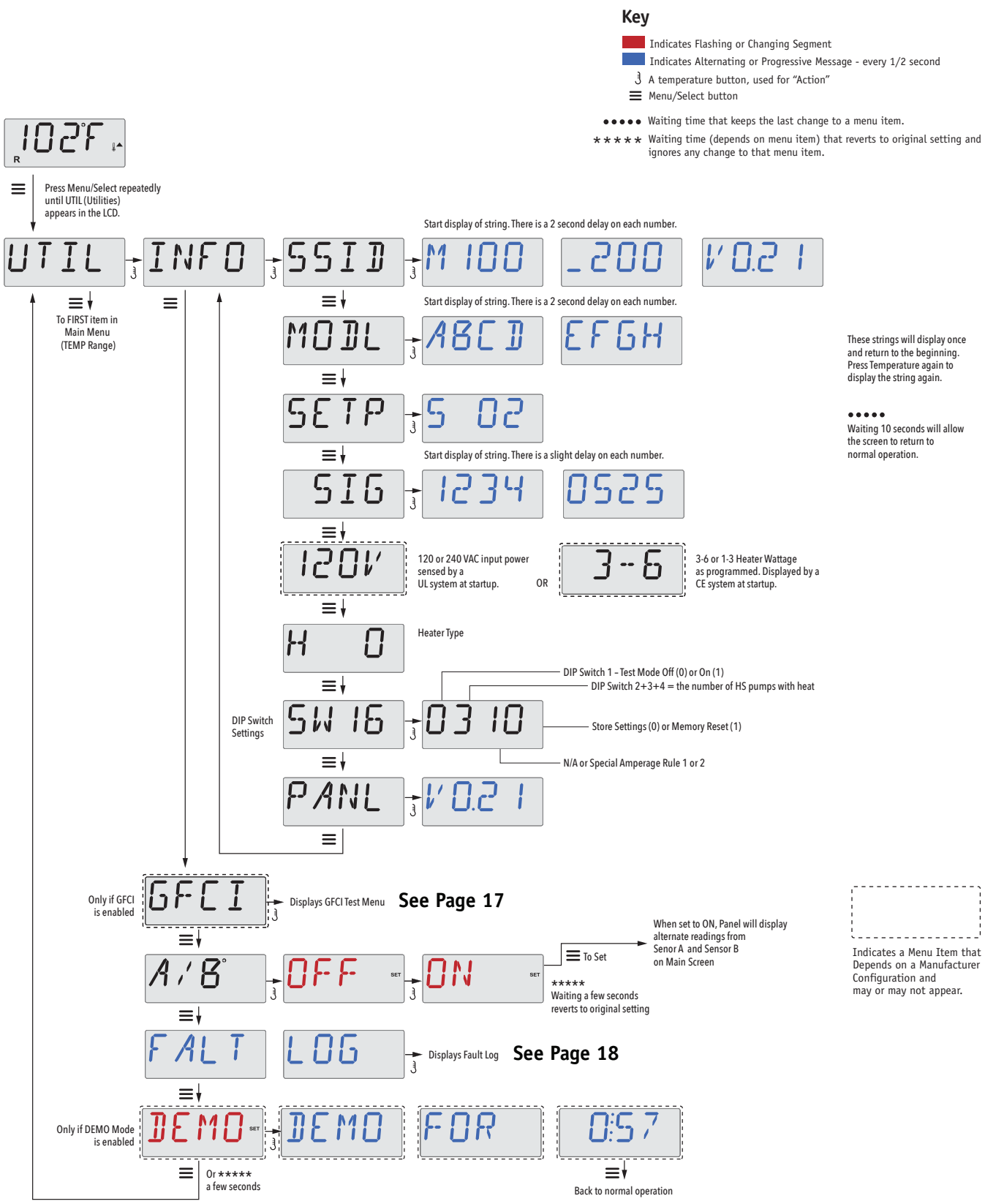
The Fault Log is a record of the last 24 faults that can be reviewed by a service tech.

DEMO (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.

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. All material copyright of Balboa Water Group.

Utilities



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. All material copyright of Balboa Water Group.

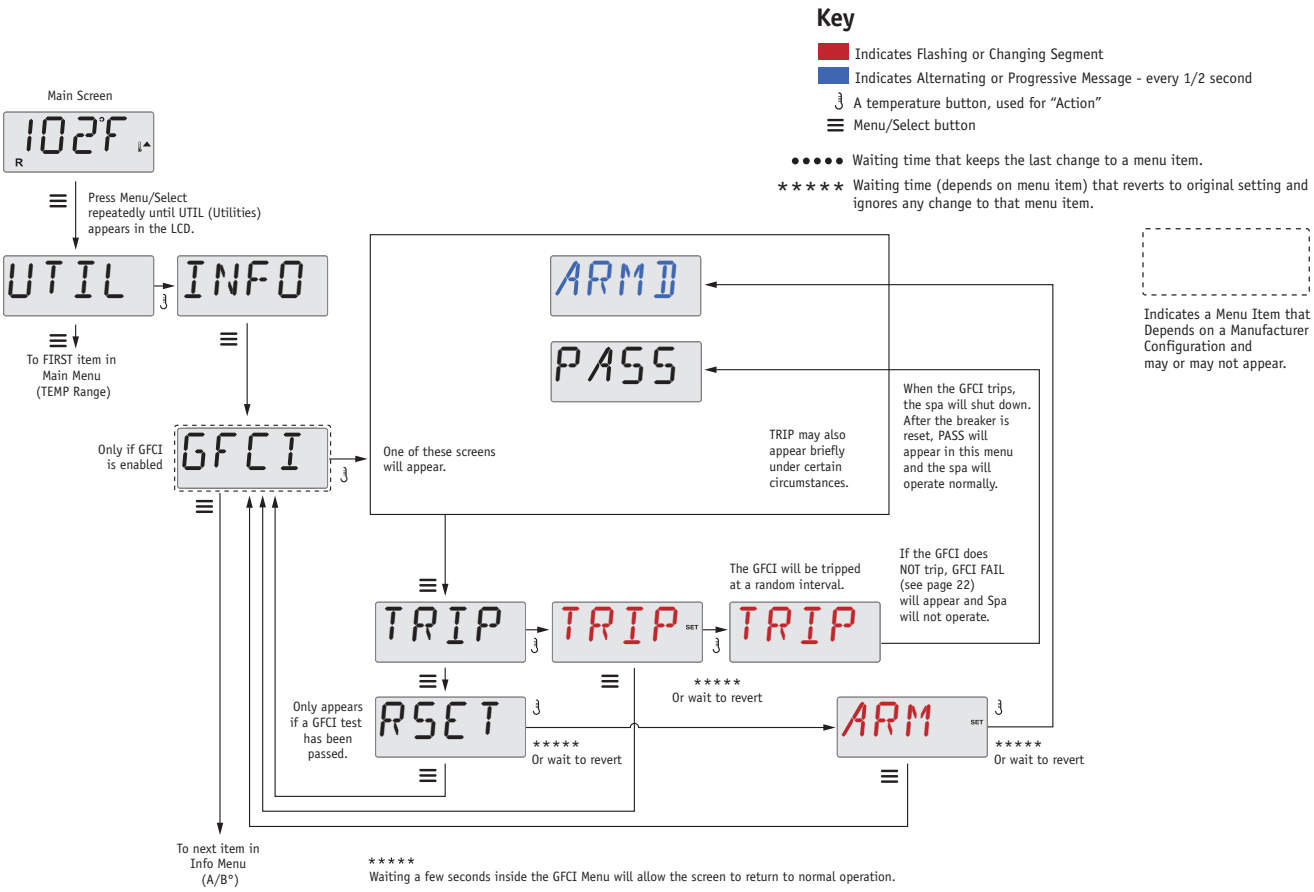
Utilities – GFCI Test Feature

Not Available on CE Rated Systems.

A 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. (UL rated systems only.) 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 a few 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. 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.

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

Warning:

If freezing conditions exist, a GFCI should be reset immediately or spa damage could result. The end user should always be trained to test and reset the GFCI on a regular basis.

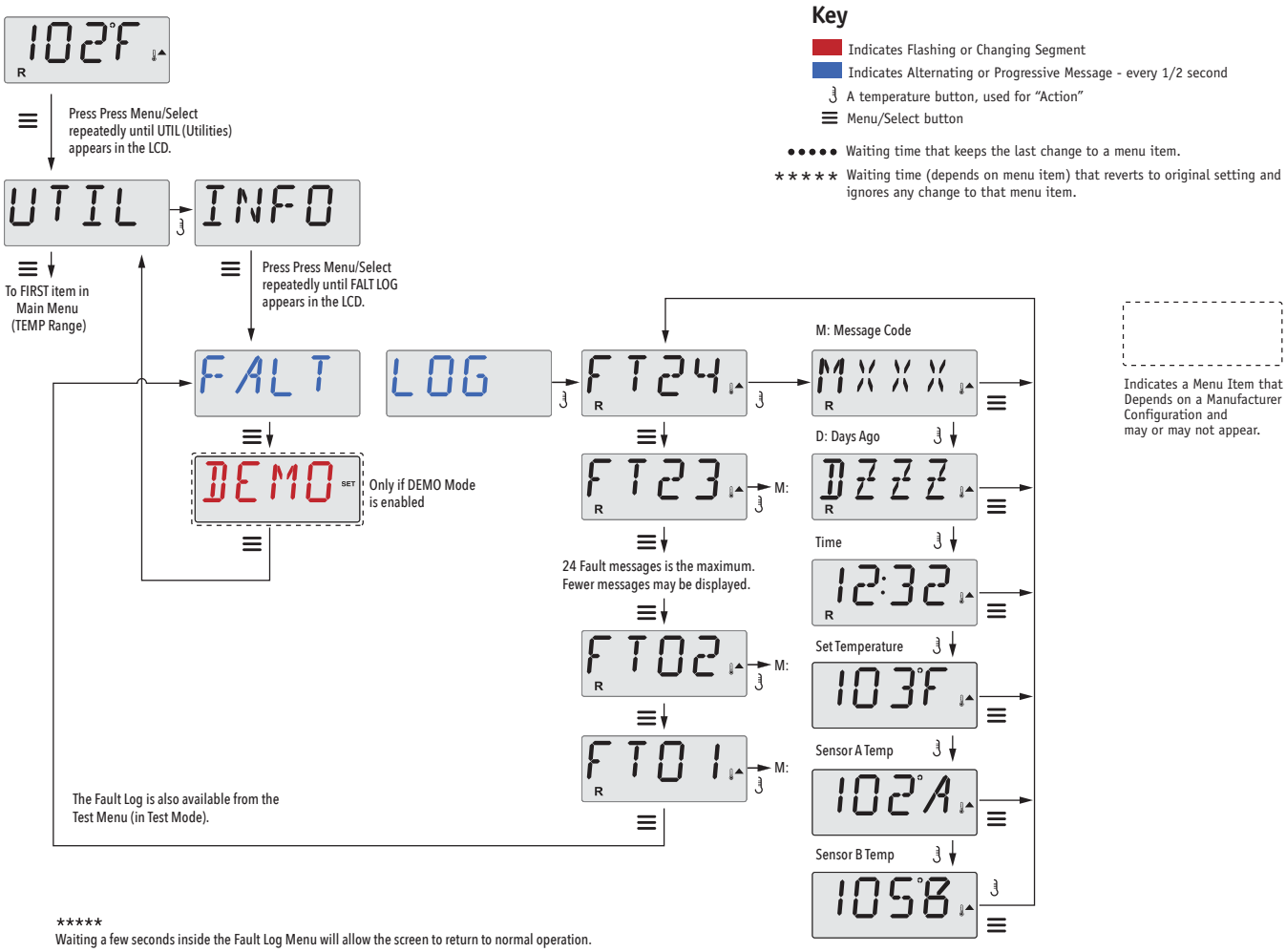
Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. All material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

Utilities – Fault Log

A Little History can tell a lot

The Fault Log stores up to 24 events in memory and they can be reviewed under the Fault Log Menu.

Each event captures a Fault Message Code, how many days have passed since the fault, Time of the fault, Set Temperature during the fault, and Sensor A and B temperatures during the fault.



See following pages for various Message Codes and definitions.

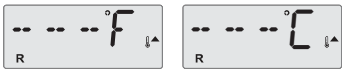
Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. All material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

General Messages

Priming Mode – M019

Each time the spa is powered up, it will enter Priming Mode. The purpose of Priming Mode is to allow the user to run each pump and manually verify that the pumps are primed (air is purged) and water is flowing. This typically requires observing the output of each pump separately, and is generally not possible in normal operation. Priming Mode lasts 4 minutes, but you can exit it earlier by pressing any Temp button. The heater is not allowed to run during Priming Mode.

NOTE: If your spa has a Circ Pump, it will turn on with "Light" in Priming Mode. The Circ Pump will run by itself when Priming Mode is exited.



Water Temperature is Unknown

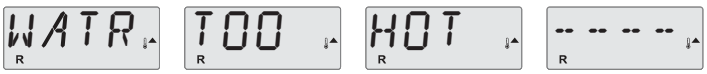
After the pump has been running for 1 minute, the temperature will be displayed.

Too Cold - Freeze Protection

A potential freeze condition has been detected, or the Aux Freeze Switch has closed, and all pumps and blower are activated, either one at a time, or all at once, depending on how your system was built. All pumps and blower are ON for at least 4 minutes after the potential freeze condition has ended, or when the aux freeze switch opens.

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.



Water is too Hot (OHS) – M029

One of the water temp sensors has detected spa water temp 110°F (43.3°C) 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.

J29 Warning – M044

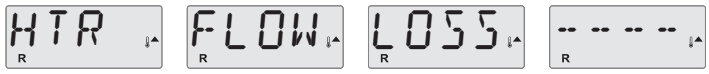
J29 is typically used as a Heater Disable input. As such, it should not typically be shorted at power-up. This message appears if J29 is shorted at power-up.

MOXX numbers are Message Codes. See Page 18.

* This message can be reset from the topside panel with any button press.

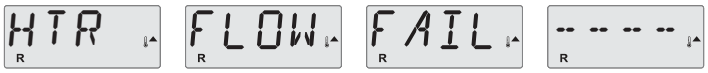
Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. All material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

Heater-Related Messages



Heater Flow is Reduced (HFL) – M016

There may not be enough water flow through the heater to carry the heat away from the heating element. Heater start up will begin again after about 1 min. See “Flow Related Checks” below.



Heater Flow is Reduced (LF)* – M017

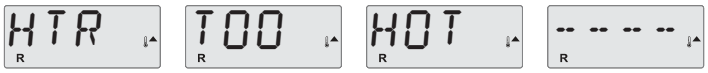
There is not enough water flow through the heater to carry the heat away from the heating element and the heater has been disabled. See “Flow Related Checks” below. After the problem has been resolved, you must press any button to reset and begin heater start up.

Heater may be Dry (dr)* – M028

Possible dry heater, or not enough water in the heater to start it. The spa is shut down for 15 min. Press any button to reset the heater start-up. See “Flow Related Checks” below.

Heater is Dry* – M027

There is not enough water in the heater to start it. The spa is shut down. After the problem has been resolved, you must press any button to reset and restart heater start up. See “Flow Related Checks” below.



Heater is too Hot (OHH)* – M030

One of the water temp sensors has detected 118°f (47.8°C) in the heater and the spa is shut down. You must press any button to reset when water is below 108°f (42.2°C). See “Flow Related Checks” below.

A Reset Message may Appear with other Messages.

Some errors may require power to be removed and restored.

Flow-Related Checks

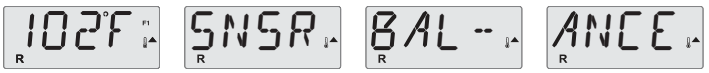
Check for low water level, suction flow restrictions, closed valves, trapped air, too many closed jets and pump prime.

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.

* This message can be reset from the topside panel with any button press.

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. All material copyright of Balboa Water Group.

Sensor-Related Messages



Sensor Balance is Poor – M015

The temperature sensors MAY be out of sync by or 3°F. Call for Service.

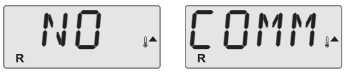
Sensor Balance is Poor* – M026

The temperature sensors ARE out of sync. The Sensor Balance is Poor fault has been established for at least 1 hour. Call for Service.

Sensor Failure – Sensor A: M031, Sensor B: M032

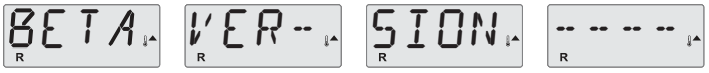
A temperature sensor or sensor circuit has failed. Call for Service.

Miscellaneous Messages



No Communications

The control panel is not receiving communication from the System. Call for Service.



Pre-Production Software

The Control System is operating with test software. Call for Service.

°F or °C is replaced by °T

The Control System is in Test Mode. Call for Service.

* This message can be reset from the topside panel with any button press.

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. All material copyright of Balboa Water Group.

System-Related Messages

Memory Failure - Checksum Error* – M022

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.

Memory Warning - Persistent Memory Reset* – M021

Appears after any system setup change. Contact your dealer or service organization if this message appears on more than one power-up, or if it appears after the system has been running normally for a period of time.

Memory Failure - Clock Error* – M020 - Not Applicable on the BP1500

Contact your dealer or service organization.

Configuration Error – Spa will not Start Up

Contact your dealer or service organization.

GFCI Failure - System Could Not Test/Trip the GFCI – M036

NORTH AMERICA ONLY. May indicate an unsafe installation. Contact your dealer or service organization.

* This message can be reset from the topside panel with any button press.

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. All material copyright of Balboa Water Group.

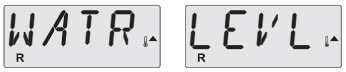
System-Related Messages

A Pump Appears to be Stuck ON – M034

Water may be overheated. POWER DOWN THE SPA. DO NOT ENTER THE WATER. Contact your dealer or service organization.

A Pump Appears to have been Stuck ON when spa was last powered - M035

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



The water level is too low

Some systems have a water level detect, and this message appears if it detects that the water level is too low.

* This message can be reset from the topside panel with any button press.

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. All material copyright of Balboa Water Group.

Reminder Messages

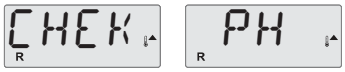
General maintenance helps.

The display of Reminder Messages can be suppressed by using the PREF Menu. See Page 12.

Reminder Messages can be chosen individually by the Manufacturer. They may be disabled entirely, or there may be a limited number of reminders on a specific model.

The frequency of each reminder (e.g. 7 days) can be specified by the Manufacturer.

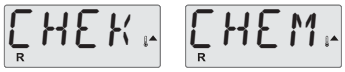
Press a Temperature button to reset a displayed reminder message.



Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 7 days.

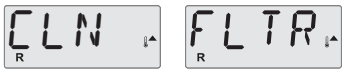
Check pH with a test kit and adjust pH with the appropriate chemicals.



Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 7 days.

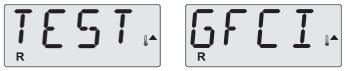
Check sanitizer level and other water chemistry with a test kit and adjust with the appropriate chemicals.



Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 30 days.

Clean the filter media as instructed by the manufacturer. See HOLD on page 9.



Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 30 days.

The Ground Fault Circuit Interrupter (GFCI) or Residual Current Device (RCD) is an important safety device and must be tested on a regular basis to verify its reliability.

Every user should be trained to safely test the GFCI or RCD associated with the hot tub installation.

A GFCI or RCD will have a TEST and RESET button on it that allows a user to verify proper function.

Warning:

If freezing conditions exist, a GFCI or RCD should be reset immediately or spa damage could result.
The end user should always trained to test and reset the GFCI or RCD on a regular basis.

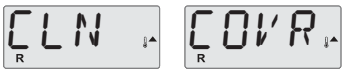
Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. All material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

Reminder Messages Continued

Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 90 days.

Change the water in the spa on regular basis to maintain proper chemical balance and sanitary conditions.



Alternates with temperature or normal display.

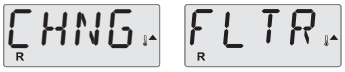
Appears on a regular schedule, e.g. every 180 days.

Vinyl covers should be cleaned and conditioned for maximum life.

Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 180 days.

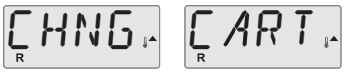
Wood skirting and furniture should be cleaned and conditioned per the manufacturers instructions for maximum life.



Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 365 days.

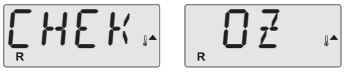
Filters should be replaced occasionally to maintain proper spa function and sanitary conditions.



Alternates with temperature or normal display.

As needed.

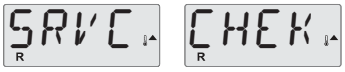
Install new mineral cartridge.



Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 365 days.

Check your ozone and/or UV generator per your spa manufacture's instructions.



Alternates with temperature or normal display.

Appears on a regular schedule, e.g. every 365 days.

Have a service technician do a check-up on your spa per your spa manufacturer's instructions.

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. All material copyright of Balboa Water Group.

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) or Residual Current Device (RCD) 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 or RCD Protection.

The Owner should test and reset the GFCI or RCD 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 or residual current device 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 or residual current device.
- 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.

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. All material copyright of Balboa Water Group.

BP100G2 Tech Sheet

Customer: **Balboa Water Group**

Part Number:

59267-01	5.5kW 800 Incoloy
59268-01	4.0kW 800 Incoloy
59270	Remote Heater System -- Heater is sold separately

Custom Box Overlay ☐

Box Overlay Part Number N/A

UL System Model For 5.5kW:	BP1-BP100G2-BU
UL System Model For 4.0kW:	BP1-BP100G2-BS
UL System Model For Remote:	BP1-BP100G2-B
Software Version ID:	M100_230 V52.0
Software Version:	52.0
File Name:	BP100_52.0_BP100G2.hex
Configuration Signature:	F402B0EF

Eng. Project Number: 5270

Control Panels (See later pages for more information):

spaTouch™2	Any version (version 2.0 or later required for bba™2 fully integrated functionality)
Icon spaTouch™	Any version (version 3.36 or later required for bba™2 fully integrated functionality)
Menued spaTouch™	Any version (version 2.8 or later required for bba™2 integrated functionality)
TP900	Version 3.1 and later (Version 3.13 or later required for bba™)
TP800	Version 3.1 and later (Version 3.13 or later required for bba™; version 4.11 or later required for bba™2 integrated functionality)
TP600	Version 2.7 and later (Version 2.12 or later required for bba™/bba™2 On/Off control via menu)
TP500	Any version
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)
TP400W US	Version 2.7 and later (TP400W 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
59267 59268	5205	05-01-19	BWG	Generic BP100G2 system, supporting most of the Setups the BP100 board can do with a pump expander board.
59267-01 59268-01	5270	09-04-19	BWG	Update software for full TP500 compatibility.
59270	5270	09-04-19	BWG	Added PN for version with remote heater support. Remote heater is sold separately.

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

bba™ is integrated into graphic display panels (TP800, TP900 and spaTouch™). With TP600/TP500/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/TP500/TP400, use the “BT” entry on the menu to toggle bba™2 power On/Off.

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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Basic Functions Setup 1 - 4

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 3 & 4 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.

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.

*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.

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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Basic Functions Setup 1 - 4

System Ouputs:

Pump 1	240VAC*	2-Speed	12A max	15-minute timer (30-minute timer for P1 Low in non-circ Setupa 2 & 4 only) This is the heater pump in Setups 2 & 4. Must deliver 20 GPM through heater
		1-Speed in Setups 1 & 3		
Pump 2	240VAC	1-Speed	12A max	15-minute timer Unused in Setups 3 & 4
Circ Pump	240VAC*	1-Speed	2A max	Programmable Filtration Cycles + Polling This is the heater pump in Setups 1 & 3. Must deliver 20 GPM through heater
Ozone	240VAC*		.5A max	Slaved to Circ Pump in Circ Setups and to Pump 1 Low in Non-Circ Setups
Spa Light	10VAC	On/Off	1A max	240-minute timer.
A/V (Stereo)	120VAC	Hot	3A max	Always on
Heater	5.5kW @ 240VAC (approx 1.4kW @ 120VAC) 4.0kW @ 240VAC (1.0kW @ 120VAC)			

*Pump 1, Circ Pump and Ozone must be the same voltage.

With 120VAC power input (for Setups 3 & 4 only), Pump 1, Circ pump and Ozone must all be 120V. See wiring diagram for rewiring instructions.

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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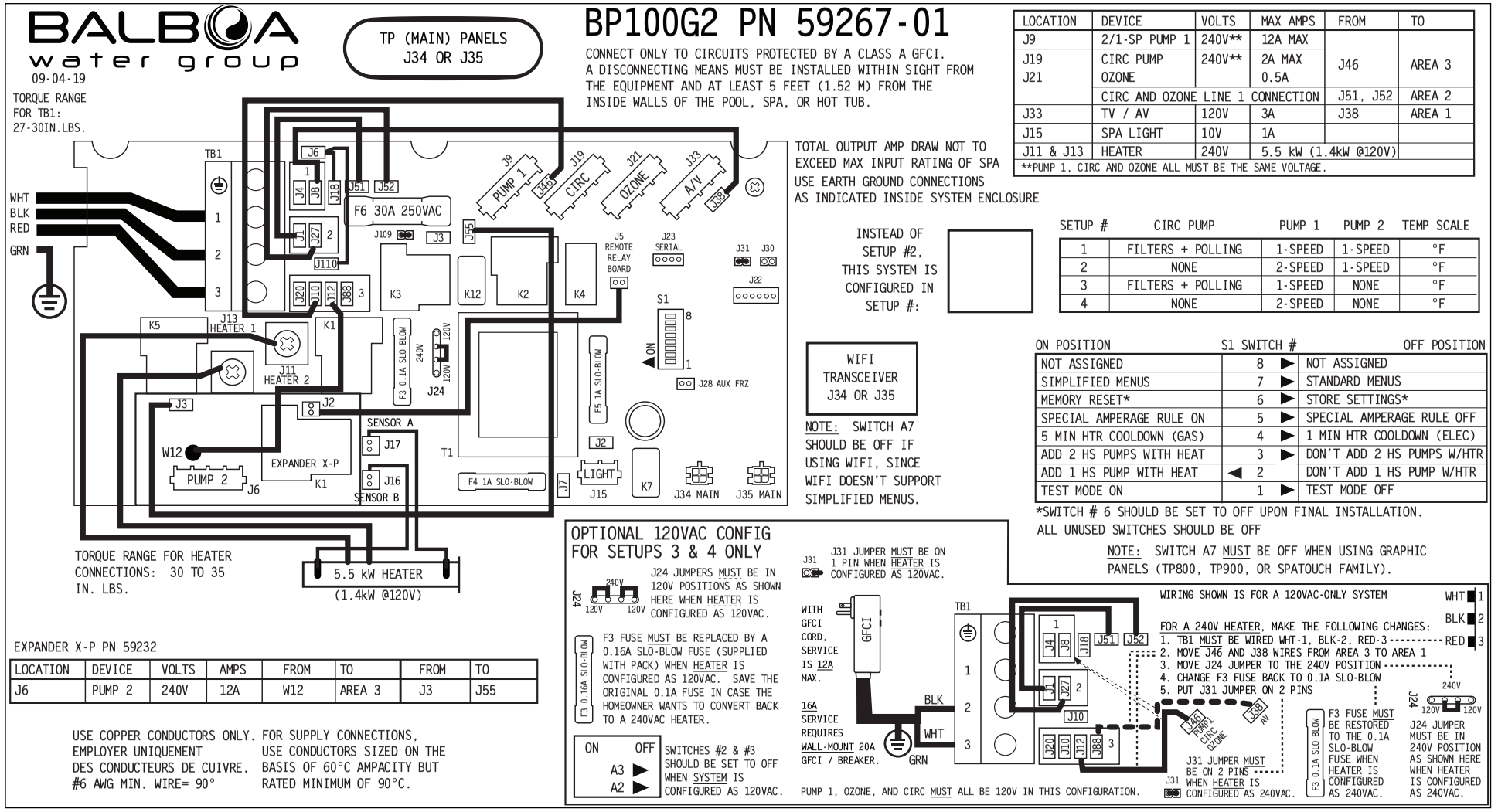
Hardware Setup

Wiring Diagram



LOCATION	DEVICE	VOLTS	MAX AMPS	FROM	TO
J9	2/1-SP PUMP 1	240V**	12A MAX	J46	AREA 3
J19 J21	CIRC PUMP OZONE	240V**	2A MAX 0.5A		
	CIRC AND OZONE LINE 1 CONNECTION			J51, J52	AREA 2
J33	TV / AV	120V	3A	J38	AREA 1
J15	SPA LIGHT	10V	1A		
J11 & J13	HEATER	240V	5.5 kW (1.4kW @120V)		
**PUMP 1, CIRC AND OZONE ALL MUST BE THE SAME VOLTAGE.					

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

ON POSITION	S1 SWITCH #	OFF POSITION
NOT ASSIGNED	8 ▶	NOT ASSIGNED
SIMPLIFIED MENUS	7 ▶	STANDARD MENUS
MEMORY RESET*	6 ▶	STORE SETTINGS*
SPECIAL AMPERAGE RULE ON	5 ▶	SPECIAL AMPERAGE RULE OFF
5 MIN HTR COOLDOWN (GAS)	4 ▶	1 MIN HTR COOLDOWN (ELEC)
ADD 2 HS PUMPS WITH HEAT	3 ▶	DON'T ADD 2 HS PUMPS W/HTR
ADD 1 HS PUMP WITH HEAT	◀ 2	DON'T ADD 1 HS PUMP W/HTR
TEST MODE ON	1 ▶	TEST MODE OFF

EXPANDER X-P PN 59232

LOCATION	DEVICE	VOLTS	AMPS	FROM	TO	FROM	TO
J6	PUMP 2	240V	12A	W12	AREA 3	J3	J55

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 2009 Balboa Water Group.

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Setup Reference Table

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

System (and any replacement board) **is shipped in Setup 2**

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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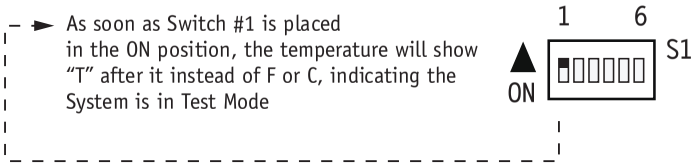
Changing Software Setups with TP600 / TP500 / TP400

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.

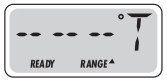


Software Setups

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.

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 TP600 / TP500 / TP400 Continued

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

NOTE: WHerever the below says Warm or Temp folowed by Light, on the TP500 press Menu instead of Warm or Temp followed by lighrt. And whenever the chart below says Light, on the TP500 press Menu insead of Light.

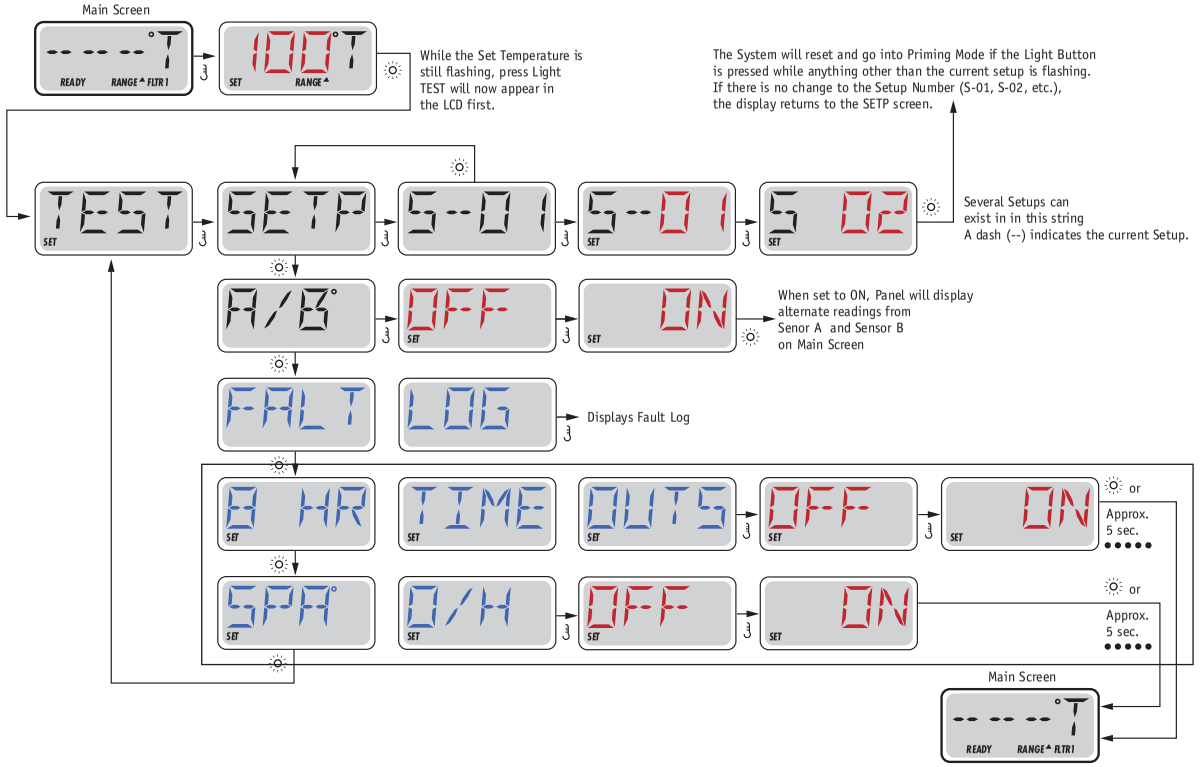
Immediately after exiting Priming Mode, press this sequence of buttons: Warm*, Light, Warm, Warm, Warm, Warm. Continue to press Warm until the diplay shows the Setup Number (S-01, S-02, etc.) you want to switch to. When the correct setup number is showing, press Light once, and the system will reset,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



Key

- Indicates Flashing or Changing Segment
- Indicates Alternating or Progressive Message - every 1/2 second
- A temperature button, used for "Action"
- Light or dedicated "Choose" button, depending on control panel configuration
- ●●●●● Waiting time - varies depending on function

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.)

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Equipment Expansion

Expansion Features

Control Connection	Default	Fuse
Relay 1 (J5)	1-Speed Pump 2	None (uses main board 30A fuse)

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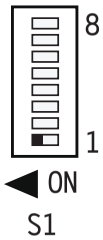
DIP Switch Functions

Fixed-fuction DIP Switches



A1	Test Mode (normally Off).
A2	In “ON” position, add one high-speed pump (or blower) with Heater.
A3	In “ON” position, add two high-speed pumps (or 1 HS Pump and Blower) with Heater.
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 and A3 work in combination to determine the number of high-speed devices and blowers that can run before the heater is disabled. i.e. A2 and A3 in the ON 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 all off = No heat with any high-speed pump or blower.*

Assignable DIP Switches

A4	In “ON” position, enables a 5-minute cooldown for some gas heaters (Cooling Time B). In “OFF” position, enables a 1-minute cooldown for electric heaters (Cooling Time A).
A7	In “ON” position, Simplified Menus on TP400/TP500/TP600. Do not use graphic panels (TP800, TP900, or spaTouch™ family) with Simplified Menus. In “OFF” position, Regular Menus on TP400/TP500/TP600. This setting is compatible with all panels.

Undesignated switches are not assigned a function.

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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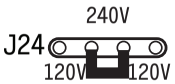
Jumper Definitions

J109	GFCI Test/Trip Enable/Disable ***Note:*** *This feature must be enabled in software as well.*	J109
J30	Do Not Use	
J31	Jumper on 1 pin when heater voltage is 120V Jumper on 2 pins when heater voltage is 240V	J31
J24	Jumper on center two pins (240V) when heater voltage is 240V. Two Jumpers installed; one on left 2 pins and one on right 2 pins (120V) when heater voltage is 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.

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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Replacement Parts

PCBA:

Main PCBA:	59269-01
Expander PCBA:	59232

HEATER(s):

Heater:	58421 5.5kW 800Inc -- for integral heater only
	58426 4.0kW 800Inc -- for integral heater only
Temp Sensor Kit:	30344KIT 12-inch sensor -- for integral heater only
	30382KIT 24-inch sensor -- for integral heater only

FUSES:

Part Number	Amperage	Location
30136	30A	F6
26983	1A	F4, F5
24514	0.1A SLO	F3 when using 240V heater
26982	0.16A SLO	F3 when using 120V heater

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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BP100 Configuration Options

General Features

Feature	Default	
Pump 1 in Filter Cycle (Circ Only)	No	
Pump 1 Low Timer	30 Minutes	Applies in non-circ Setups (configurations) only
General Pump Timer	15 Minutes	
Blower Timer	15 Minutes	
Mister Timer	15 Minutes	
Light Timer	240 Minutes	
Circ (when enabled)	Programmable + Polling	
Cleanup Cycle	*30 Minutes*	
Cleaup as Preference setting	*Yes*	
Ozone	With Heater Pump*	
Ozone Suppression	OFF	
Pump Purge	60 Seconds	
Blower Purge	30 Seconds	
Mister Purge	5 Seconds	
Purge Type	Serial - Pumps at lowest speed	

* The heater Pump can be either a Circ Pump or Pump 1 Low.

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BP100 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

**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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BP100 Configuration Options

Time Features

Feature	Default
Time Format*	12 Hour
Filter 1 Start Hour*	20:00 (8:00 PM)
Filter 1 Duration*	2 Hours
Filter Cycle 2 Default*	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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BP100 Configuration Options

Reminder Features

Feature	Default
Reminders Shown*	*Yes*
Check pH	*OFF*
Check Sanitizer	*OFF*
Clean Filter	30 Days
Test GFCI	OFF
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)*

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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BP100 Configuration Options

Special Features

Feature	Default
Special Amperage Rule A	No Limitation
Special Amperage Rule B	No Limitation
Drain Mode	Disabled
Demo Mode	Disabled
GFCI Trip	Enabled
Automatic GFCI Test	Disabled
Ozone Slaved to Heater Pump	*Yes*
Dual Voltage Heater	Always Input Voltage
Safety Suction	Disabled
Menu Style	Standard Menus when DIP switch A7 is OFF. Simplified Menus when DIP switch A7 is ON..

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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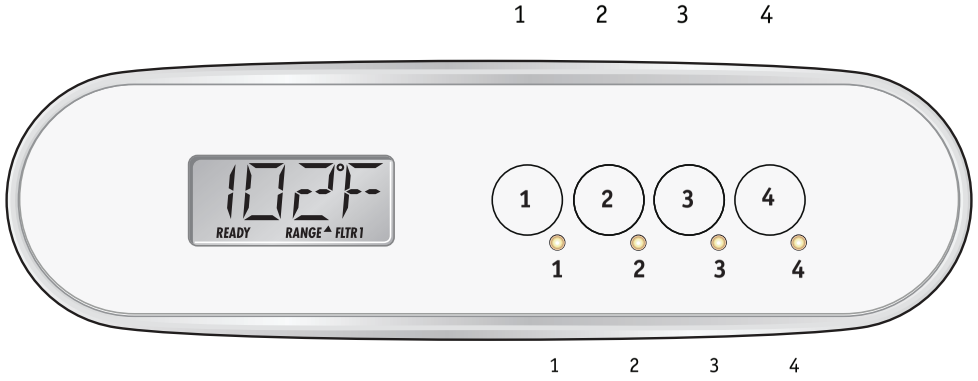
TP400 Panel Configuration

Button Layout Table for TP400T

Button #	Setups 1 & 2	Setups 3 & 4
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	Undefined



TP400T US

50380-XX

Includes overlay PN 12511.

Button Layout Table for TP400W

Button #	All Setups
1	Up
2	Down
3	Light 1
4	Jets 1
LED 1	Heater ON
LED 2	Undefined
LED 3	Light ON
LED 4	Jets 1 ON

TP400W is supported in Setups 3 & 4 only.

TP400W US

50384-XX

Includes overlay PN 12510.

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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IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

TO REDUCE THE RISK OF INJURY:

- Spa water should never exceed 40° C (104° F). Water temperatures between 38° C (100° F) and 40° C (104° F) are considered safe for a healthy adult. Lower water temperatures are recommended for extended use (exceeding 15-20 minutes) and for younger children.
- Excessive water temperature has a high potential for causing fetal damage, during the early months of pregnancy, pregnant or possibly pregnant women should limit spa temperatures to 30° C (100° F).
- Before entering a spa, the user should measure the water temperature with an accurate thermometer since the tolerance of temperature regulating devises may vary as much as plus or minus 3° C (5° F).
- The use of alcohol, drugs or medication before or during spa use may lead to unconsciousness with the possibility of drowning.
- Persons suffering from obesity or with a medical history of heart disease low or high blood pressure, circulatory system problems, or diabetes should consult a physician before using a spa.
- Persons using medication should consult a physician before using a spa. Some medication may induce drowsiness while other medication may affect heart rate, blood pressure, and circulation.
- Do not sit or stand on the edge of the spa or cover.

Hyperthermia occurs when the internal temperature of the body reaches a level several degrees above the normal body temp plus or minus temperature of 98.8° F. The symptoms of hyperthermia include dizziness, fainting, drowsiness, lethargy and an increase in the internal body temperature. The affects of hyperthermia include (1) unawareness of impending hazard, (2) Failure to perceive heat, (3) Failure for the need to exit the Spa, (4) Physical inability to exit Spa, (5) Fetal damage to pregnant women, and (6) Unconsciousness resulting in a danger of drowning.

WARNING The use of Alcohol, Drugs or medication can greatly increase the risk of fatal hyperthermia.

DANGER: RISK OF ELECTRIC SHOCK

Do not permit any electric appliance such as a light, telephone, radio, or television within 5 feet of a spa or hot tub.

IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

WARNING: CHILDREN SHOULD NOT USE SPA OR HOT TUBS WITHOUT ADULT SUPERVISION
AVERTISSEMENT: NE PAS LAISSER LES ENFANTS UTILISER UNE CUVE DE RELAXATION SANS SURVEILLANCE

WARNING: DO NOT USE SPAS OR HOT TUBS UNLESS ALL SUCTION GUARDS ARE INSTALLED TO PREVENT BODY AND HAIR ENTRAPMENT
AVERTISSEMENT: POUR EVITER QUE LES CHEVEUX OU UNE PARTE DU CORPS PUISSENT ETRE ASPIRES, NE PAS UTILISER UNE CUVE DE RELAXATION SI LES GRILLES DE PRISE D'ASPIRATION NE SONT PAS TOUTES EN PLACE

WARNING: PEOPLE USING MEDICATIONS AND/OR HAVING ADVERSE MEDICAL HISTORY SHOULD CONSULT A PHYSICIAN BEFORE USING A SPA OR HOT TUB.
AVERTISSEMENT: LES PERSONNES QUI PRENNENT DES MEDICAMENTS OU ONT DES PROBLEMES DE SANTE DEVRAIENT CONSULTER UN MEDECIN AVANT D'UTILISER UNE CUVE DE RELAXATION

WARNING: PEOPLE WITH INFECTIOUS DESEASES SHOULD NOT USE A SPA OR HOT TUB
AVERTISSEMENT: LES PERSONNES ATTEINES DE MALADIES INFECTIEUSES NE DEVRAIENT PAS UTILISER UNE CUVE DE RELAXATION

WARNING: TO AVOID INJURY EXERCISE CARE WHEN ENTERING OR EXITING THE SPA OR HOT TUB
AVERTISSEMENT: POUR EVITER DES BLESSURES, USER DE PRUDENCE EN ENTRANT DANS ONE CUVE DE RELAXATION ET E SORANT

WARNING: DO NOT USE DRUGS OR ALCOHOL BEFORE OR DURING THE USE OF A SPA OR HOT TUB TO AVOID UNCONSCIOUSNESS AND POSSIBLE DROWNING
AVERTISSEMENT: POUR EVITER L'EVANOUISSEMENT ET LA NOYADE EVENTUELLE, NE PRENDE NI DROGUE NI ALCOOL AVANT D'UTILISER UNE CUVE DE RELAXATION NI QUAND ON S'Y TROUVE

WARNING: PREGNANT OR POSSIBLY PREGNANT WOMEN SHOULD CONSULT A PHYSICIAN BEFORE USING A SPA OR HOT TUB
AVERTISSEMENT: LES FEMMES ENCEINTES, QUE LEUR GROSSESSE SOIT CONFIRMEE OU NON, DEVRAIENT CONSULTER UN MEDECIN AVANT D'UTILISER UNE CUVE DE RELAXATION
WARNING: WATER TEMPERATURE IN EXCESS OF 38° C MAY BE INJURIOUS TO YOUR HEALTH
AVERTISSEMENT: IL PEUT ETRE DANGEREUX POUR LA SANTE DE SE PLONGER DANS DE L'EAU A PLUS 38° C

IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

WARNING: BEFORE ENTERING THE SPA OR HOT TUB MEASURE THE WATER TEMPERATURE WITH AN ACCURATE THERMOMETER
AVERTISSEMENT: AVANT D'UTILISER ONE CUVE DE RELAXATION MESURE LA TEMPERATURE DE L'EAU A L'AIDE D'UN THERMOMETRE PRECIS

WARNING: DO NOT USE A SPA OR HOT TUB IMMIDIATELY FOLLOWING STRENUOUS EXERCISE
AVERTISSMENT: NE PAS UTILISER ONE CUVE DE RELAXATION IMMDIATEMENT APRES UN EXERCISE FATIGANT

WARNING: PROLONGED IMMERSION IN A SPA OR HOT TUB MAY BE INJURIOUS TO YOUR HEALTH
AVERTISSMENT: L'UTILISATION PROLONGEE D'UNE CUVE DE RELAXATION PEUT ETRE DENGEREUSE POUR LA SANTE

WARNING: DO NOT PERMIT ELECTRIC APPLIANCES (SUCH AS A LIGHT, TELEPHONE, RADIO OR TELEVISION WITHIN 1.5 M OF THIS SPA OR HOT TUB
AVERTISSMENT: NE PAS PLACER D'APPAREIL ELECTRIQUE (LUMINARE, TELPHONE, RADIO, TELEVISEUR ETC) A MOINS DE M DE CETTE COVE DE RELAXATION

CAUTION: MAINTAIN WATER CHEMISTRY IN ACCORDANCE WITH THE MANUFACTURE'S INSTRUCTIONS
ATTENTION: LA TENEUR DE LEAU EN MATIERS DISSOUTES DOIT ETRE CONFORME AUX DIRECTIVES DU FABRICANT

WARNING

Connect to a grounded, Grounding Type Receptacle Only
To reduce the risk of electric shock, replace damaged cord immediately
DO NOT BURY THE CORD

DANGER

To reduce the risk of injury to persons, DO NOT REMOVE Suction Fittings

TO ALL ORIGINAL PURCHASERS OF THIS PRODUCT

LIFETIME WARRANTY

Tuff Spas™ warrants the entire Spa Shell and Hard Cover surface against water loss and structural integrity due to defects in the spa for Lifetime. The shell has a prorated lifetime warranty, the customer will be responsible for a portion of the proration as follows: **Years 1-5=0% Years 6-lifetime=50%**. The cover has a non-prorated lifetime warranty. For original purchaser only, warranty is non-transferable.

3- YEAR EQUIPMENT WARRANTY

The Original Manufacturers provide limited warranties on the "Topside" Controls, Heater, Master Control center, and Pump for 3 years from date of manufacturing. See terms and conditions in separate manufacture documents.

1- YEAR PARTS WARRANTY

The Original Manufacturers provide limited warranties on all Plumbing and Fittings, Wiring, Cords, GFCI, Jets, Hard Cover Arm Bars, Vinyl Spa Covers, Pillows, Hard Cover Gaskets & Straps, and other non-electrical mechanical parts for 1 year. The ozone is also covered for 1 year. See terms and conditions in separate manufacture documents.

1- YEAR LABOR WARRANTY

Tuff Spas™ warrants all the labor involved with manufacturing defects for 1 year from date of purchase. This does not include electrical issues, ozone systems, issues with air locks or other issues that do not arise from defects in manufacturing. In some cases, the servicing dealer may charge you a reasonable repairperson travel/service charge that is not covered by this warranty. Please contact the dealer for information regarding any such charges.

PERFORMANCE OF WARRANTY

Tuff Spas™ shall repair or replace (at our option) warranted product if it fails or becomes defective during the warranty period. To obtain service in the event of a defect covered by this Warranty, contact your Tuff Spas™ dealer or Tuff Spas™ as soon as possible and take appropriate precautions to prevent further damage to your spa. Tuff Spas™ or a designated service technician will correct the defect subject to the terms in this warranty. In the event that a replacement or repair is necessary, costs for the removal of the defective spa, shipping costs for the replacement or repaired spa, and delivery and installation of the replacement or repaired spa will be the responsibility of the spa owner.

EXCEPTIONS TO WARRANTY

1. Any damage caused by negligent misuse, improper installation, improper water chemistry, and/or failure to follow instructions in the Owners Manual.
2. Cartridge filter elements, light bulbs, stereos and all stereo components, foam, insulation, and cover straps.

This warranty is void if the spa has been subject to any alteration, misuse, or abuse. Alteration shall include any component or plumbing change, electrical conversion, or the addition of any sanitation or water purification device or heating system, which contributes to a component or unit failure or unsafe operating system. Misuse and abuse shall include use of the spa in an application for which it is not designed. **Specifically: Damage caused by clogged or dirty cartridges, damage/discoloration to the spa surface caused by harsh chemicals or chemical misuse, and damage/discoloration to the spa surface caused by improper pH balance or other improper water chemistry maintenance. Damage to the spa surface caused by leaving the spa uncovered or without water, for long periods of time.**

Tuff Spas™ shall not be liable for injury to any person or any claim for damage however it shall arise. All consequential expenses including loss of use, transportation charges arising out of alleged deficiency of spa are specifically excluded. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. Some states do not allow the exclusion of consequential damages, so the above limitation may not apply to you.

Tuff Spas™ 121 S. 39th Ave. STE 2, Phoenix, AZ 85009

TO ALL ORIGINAL PURCHASERS OF ITS PRODUCT

Tuff Spas™
121 S. 39th Ave. STE 2
Phoenix, AZ 85009

Warranty Registration: Mail this in with a copy of your invoice or contract.

Name:_____ Dealer Name:_____

Address: _____City: _____

State: _____ Zip: _____ Phone: _____

Spa Model & Serial #: _____ Date of Purchase ___/___/___

NOTES

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