LM8 – Low Maintenance System
Installation and Operation Manual

BALBOA
water group

Important Notices

INTELLECTUAL PROPERTY ADVISEMENT

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END USER WARNING

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

GFCI COMPLIANCE

- It is required by code to install a Ground Fault Circuit Interrupter (GFCI) in the supply power for a spa. This device will trip the breaker if there is an unsafe electrical condition caused by a malfunctioning component or even the slightest short to ground.
- Note: Connect the control system only to a circuit protected by a Class A GFCI mounted at least 5' (1.52M) from the inside walls of the spa/hot tub and in line of sight from the equipment compartment.
- Refer to NEC (National Electrical Code), 2005 Edition, Article 680 for more information.

WARNINGS: DANGER! RISK OF ELECTRIC SHOCK!

- All electrical work must be performed by a qualified electrician and must conform to all national, state, and local codes.
- Before making any electrical connections, make certain that the Main Power breaker from the house breaker box has been turned off.
- Do not attempt service of this control system. Contact your dealer or service organization for assistance.
- Do not permit any electric appliance, such as a light, telephone, radio, or television within 5' (1.5m) of a pool or spa.
- Follow all owner's manual power connection instructions.
- Installation must be performed by a licensed electrician and all grounding connections must be properly installed.
- No user serviceable parts.
- Water temperature in excess of 38°C may be injurious to your health.
- Disconnect the electrical power before servicing.
- Keep access door closed.

CAUTION

- Test the ground fault circuit interrupter before each use of the spa.
- Read the instruction manual.
- Adequate drainage must be provided if the equipment is to be installed in a pit.
- To ensure continued protection against shock hazard, use only identical replacement parts when servicing.

WARNING

- Water temperature in excess of 38°C may be injurious to your health.
- Disconnect the electrical power before servicing.
- Keep the pack enclosure closed unless being serviced by a qualified serviced technician.

Table of Contents

Introduction to the LM8 System

Thank you for choosing Balboa Water Group's LM8 - Low Maintenance System. The LM8 system incorporates the following features and benefits.

ADVANCED TECHNOLOGY

- All equipment and features are controlled from topside panel
- Heater management system eliminates flow and pressure switches
- All logic and control functions for the entire spa are contained in a single module
- Artificial intelligence saves energy
- touch panel
- Self-testing diagnostics
- Self-monitoring
- Informative end user messages
- Optional modules available for:
  a) Audio FM tuner in a single chip and 100W of music power without excessive heat, and
  b) LED module with various dimming LED programs - including LEDs with music; modules available for Sloan lighting systems.
  c) The lighting system can accommodate 12VDC or 12VAC.

USER FRIENDLY

- The touch screen is the only required customer interface
- Sensors that provide real time status of current draw, timers for the Blower, Jets, Lights, Flow rate, and GPM
- Automatic control of over heating, cold plumbing, and stale water in pumps
- Special features include Economy and Auto Heat Modes, 12/24 hr time, degrees in F or C, and Lock Spa (child lockout).
- A quick Setup screen and Status screen

RELIABLE DESIGN

- Redundant connections (topside, sensors, transformer, LEDs)
- Redundant, gold plated, card edge connectors
- Higher rated part spec's (relays, capacitors, resistors, transformer)
- Extended factory testing of all control functions and special features
- UL, CSA, CE

BUILT-IN TECH SUPPORT

- Continuous self testing (motors, heater, sensors, modules)
- Green/yellow/red status on topside shows replacement needs for any spa component
- Immediate identification of miswiring or failed components

SIMPLE, INEXPENSIVE REPLACEMENTS

- Major control functions separated into modules, which can be replaced without opening pack
- Module replacement costs less than replacing fully populated main boards.

THEORY OF OPERATION

- Artificial Intelligence is used to turn the heater on just when the water temperature drops 1 degree F (not 48 times per day). The off time is constantly adjusted, based on nearness to target. Benefits are energy savings and less wearing of the pump.
- Since there is no sensor in the water, the water temperature is reported only after the pump is run for at least 30 seconds and the rate of temperature change is zero.
- A flow test is run before each heater usage. With the pump off, the heater is tested for 6 seconds. Then the rate of cooling is measured when the pump is turned back on. Gallons/minute can be calculated.
- To protect against loss of flow, the heater is turned off anytime the temperature in the heater increases by a rate of more than 2 degrees/minute. This takes only seconds, and is therefore safer than other systems.
- An overheat condition does not display an error message. Instead, the heater will be locked off (until power is reset) and the high temperature that was reached will be displayed on the Status Screen for technician review.

CONTROL SYSTEM OVERVIEW

- Fully Integrated and Self Contained
- Modular Functions
- Built-in Self Test
- Advanced Heater Management System
- High Reliability/Low Maintenance Design
- Touch Screen Top Side
- Five Issued/Pending Patents in the design

Overview

AUTOMATIC FUNCTIONS

1. The most important function of the spa control is to safely manage the heater. Normally the heater is turned on whenever the filter pump is running and the water temperature is 1 degree less than the set temperature. Once on, the heater will stay on until the water temperature is 1 degree more than the set temperature.
2. The heater will be forced to stay off if there is not an adequate flow of water through the heater. This is determined by performing a flow test prior to each heater activation. If the flow of water is too low to cool the heater 2 degrees in less than a minute, following a 6 second heater test, the heater will not be allowed on and the statues screen will appear showing a flow rate less than 6 gal./min.
3. The heater will also be forced off if too many motors are running for the size of the circuit breaker.
4. Anytime the water in the spa is 112F or more, all pumps are shut down. The pumps can be used again only when the water temperature has dropped to 104F.
5. If the water passing through the heater is 118F, or more, the temperature display is locked on the display and the heater and all pumps are held off until a manual reset (circuit breaker) is accomplished. The blower will be turned on to assist in cooling of the water.
6. Anytime the heater element (while off) falls to a temperature of 48F, it is presumed that the spa's plumbing may be in danger of freezing. All pumps and the blower are turned on for 1 minute. If the heater element sensor is still 48F or less after 1 minute, the blower and pumps are turned off and the heater is turned on to raise the water to 60F. If for some reason (flow) the heater can't be turned on, the pumps will continue to run until the temperature of the water reaches 49F.
7. Once a day, at 10 am, any pump or blower that hasn't been running in the last 24 hours is turned on for 15 seconds to purge stale water.
8. All components are automatically timed out, as follows:
   Pumps – 30 minutes
   Blower – 30 minutes
   LEDs – 4 hours
   Audio – 1.5 Hours

INITIAL INSTALLATION

1. Verify that circuit breaker is in off position.
2. Remove lower pack cover.
3. Connect 120VAC or 240VAC to pack, per wiring diagram.
4. Connect all motors, ozonator, touchscreen spaside, LEDs, speakers, and antenna, per legends on relay board.
5. Turn circuit breaker back on.
6. Observe transformer LED. If LED is green, power is connected and the transformer is working.
7. Return circuit breaker to off position.
8. Replace pack cover.

PREFERENCES

1. Close the circuit breaker again.
2. Use the setup button to set time, temperature, filter hours, mode, circuit breaker size, my spa information, pump configuration, or to lock the spaside buttons. The individual displays are self-explanatory.

TEST

1. Turn the circuit breaker off and back on to start the automatic self-test sequence.
2. Observe the spaside buttons as each spa component is tested. The button associated with each component will change from yellow to green; proper operation is verified. If a button turns white, the associated component is defective and must be replaced.
3. Observe the display for messages which may indicate other failed components, such as:
   F1 (Fuse 1)
   F2 (Fuse 2)
   F3 (Fuse 3)
   Bad sensor
   Rel (Relay board)
   COMM (Communications problem)
4. As soon as all buttons are yellow or green, and there are no error messages on the display, the spa is ready to operate without concern.

Overview (cont.)

OPERATION

Turn on Jet1, Jet2, and the blower by pressing the appropriate button. Note that Jet1 and Jet2 will activate a low speed winding with the first press of the button and a high speed winding with the second press.

Observe that as each component is successfully activated, the associated button will turn green. If, however, a certain component appears to be inoperative, a quick series of automatic tests will be performed to isolate the failure to that component or some other problem area, like a blown fuse. If the tests determine that the component is actually failed, the button will turn white, indicating the likely need for replacement of that component.

Turn on the LED lighting by pressing the LEDs button. Note that each time the LEDs are turned on, the display will show the current color program, which can be changed as desired. The last selection is a music reflections program that follows the beat of the music. If selected, the brightness can be changed with the up and down buttons.

Turn on the audio by pressing the audio button. Follow the display messages to adjust volume, bass, music source, and FM tuning.

HOME SCREEN

The main screen is the "home" screen:
- Use the "pump 1", "pump 2", or "blower" buttons to activate the desired component.
  a) If the button is red, it means the component is off.
  b) If the button is yellow, it means the low speed is activated.
  c) If the button is green, the high speed is activated.
  d) The blower is simply green when it is on, and red when it is off.
  e) If the button turns white, that means there is some sort of a problem associated with that component (low current, blown fuse, disconnected, etc.)
- If a profile is selected, the name of the profile will be displayed below the "welcome" banner.
- In the lower left-hand corner, the current time is displayed.
- In the lower right-hand corner, the current water temperature is displayed.
- A "sun" icon is displayed directly to the left of the water temperature whenever the heater is energized.
- Note: If the spa does not have a blower, a "My Spa" button will be shown. Selecting "My Spa" acts the same as selecting "My Spa" from the "Setup" screen. "My Spa" is described in detail below.
- From any other screen, the "Back" button will take you to the previous screen. On any screen that has a "help" button present, it will take you to a brief description of the screen's purpose and use.

SETUP SCREEN

To set the temperature, time, filter hours, filter mode, user profiles, or physical configuration of the spa, select "Setup" on the "Home" screen. More detailed explanations are within the text.

LM8 Modules

CONTROL MODULES

The **Red Control Module** manages all Logic Functions:

1. Keeps time of day
2. Reports water temperature
3. Saves settings in flash memory
4. Translates messages from Touchscreen and activates Relay Board
5. Times out Pumps, Lights, and Audio
6. Safely maintains Heater Function
7. Monitors Sensor Health
8. Backup Processor also watches for Heater or Sensor problems

The **Yellow / Green LED Module** provides colors and intensity selected at Topside.

The **Green Audio Module** tunes FM from Topside Commands and delivers 100W of Music.

Blank green modules are placeholders. However, these modules can be replaced by different colored modules for LED functions or stereo.

NOTE ON CHANGING COMPONENTS

When changing modules or panels, be sure that the system is powered down completely before removing or inserting any modules or panels into the system. If the system is still powered up while removing or inserting any module or panel, irreparable damage may occur to the module, the mother board, or the panel.

12 VAC Module
Yellow / Dark Green
Part No. 57118

12 VDC LED Sloan Module
Yellow / Lime Green
Part No. 57119

Balboa Control Module
Red / Red
Part No. 57130

Blank Module
Dark Green / Dark Green
Part No. 35006-G

Audio Module
Lime Green / Lime Green
Part No. 57116

Configuration and Operation

CONFIGURATION - FILTER SOURCE & BREAKER

The LM8 spa pack contains a set-up to accommodate several sizes of household breakers. It will also regulate which components on the spa can come on together to stay within the breaker setting range. The heater is turned off whenever the current rules are required for any particular breaker setting.

Pump 1	WELCOME	Temp
Pump 2		Setup
Blower		Status
12:00PM	HOME	☀ 100F

Home Screen

Select	Temperature	
⬆	Time	
	Filter Hours	Help
	Lock Spa	
⬇	Mode	Back
	Configuration	
12:00PM	SETUP	100F

Setup Screen

Select	FILTER SOURCE ○ Circ pump ● Low Speed 1	
⬆	BREAKER	Help
⬇	○ 30 Amps ● 60 Amps	Back
12:00PM	CONFIG	100F
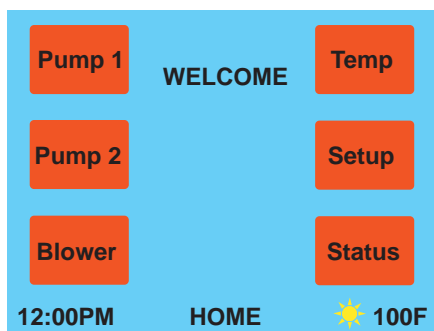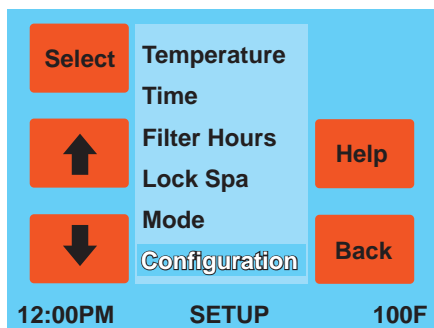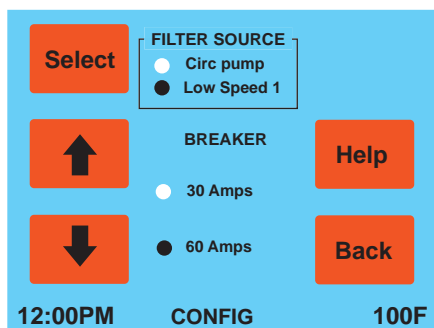
Config Screen

FILTER SOURCE (INSTALLATION)

Home > Setup > Configuration > [Filter Source]

During setup, the Configuration screen also allows the installer to choose the type of filter pump that will be used. If a circ pump is selected, the pump will run continuously.

Setting the Filter Source will affect how filtration times are set. Also, the Pump 1 button on the Home screen will act differently than if a two speed Pump 1 were used.

BREAKER SETTING (INSTALLATION)

Home > Setup > Configuration > [Breaker]

From the Home screen, use the Up and Down Arrows to scroll through menus. 60A is the factory default.

- Press the Select button to choose the desired setting.
- Press the Save button to save any breaker setting changes.
- Press the Back button to go back to the Home Screen.

Note: Consider using the 60A breaker setting, and then wire the spa accordingly.

WIRING INSTALLATION

1. The LM8 Spa requires a dedicated 50A circuit with a GFCI. The service cable must be 4-wire, 6 AWG.
2. **Turn off the circuit breaker before proceeding.**
3. Remove the lower lid after removing the 4 lid screws.
4. Connect one 220v service wire (**usually** black) to L1, the neutral wire (**usually** white) to neutral, and the other 220v service wire (**usually** red) to L2. If there is any doubt, verify lines with a voltmeter.
5. The green wire (safety ground) is brought into the enclosure with the other wires, but it must then be routed back through the hole provided in the enclosure and connected securely to the grounding bar.
6. Verify that the transformer connectors are plugged in and everything else is in place inside the pack, then turn on the circuit breaker and verify that the green LED (D22) on the top edge of the board is on. (This verifies the power connections.) Turn the breaker back off and replace the lower pack lid.
7. Turn on the circuit breaker. Observe that a self-test procedure will immediately verify the condition of all motors, heaters, sensors, and all modules. If any button on the topside is white, it means that component is defective or unplugged. Other possible issues will result in a pop-up status screen, which can be analyzed to determine any other problems. *Do not press* any buttons on the topside control while the system is in self-test mode. This test usually takes only a few seconds.
8. Be aware that each time before the heater is allowed to operate, the pump and heater will be turned on and off to verify that the spa has flowing water. This process may take up to 2 minutes. During this time, the pump cannot be operated manually.
9. If a "COMM ERROR" is seen, power down, then recheck the seating of the red module and the topside panel connector.

Note: LM8 wiring diagrams are towards the back of this manual.

STARTUP PROCEDURE

1. Go to the topside control panel and look at the display. The spa will go through a startup self-test sequence and a flow test, which together will last for a couple of minutes. During this time, refrain from pushing any buttons on the touch screen. During this period the temperature will be displayed as "0" and the time will be 12:00pm. Once the self-test is complete, the current water temperature will be displayed and heating will begin based on the default set point of 100F (38C).
Note: Pump 1 will be running at low speed continuously until the filter time and/or the time is set.
Caution: If any errors appear during the start up period, refer to the troubleshooting section of the manual.

2. You should hear the 2-speed pump turn on at low speed, see water moving through the jets, and see the Pump 1 button illuminated yellow on the control panel. Press the Pump 1 button again. You should hear the 2-speed pump turn on high speed, and see the Pump 1 button illuminated green.

3. If the water is running smoothly through the lines, open the seat(s) manifold air control valve and you should see an increase in jet pressure. Check and adjust the water and airflow of every jet if necessary.
4. Press the Pump 1 button a third time to turn off the 2-speed pump.
Note: This pump remains on if filtration or heat is needed on spas without a circ pump.
5. For a two pump spa, press the Pump 2 button. You should hear the pump turn on and see water flowing through the jets. Also, the Pump 2 button will illuminate green. Press the Pump 2 button again to turn off the pump.
6. For the blower (if applicable), press the Blower button. You should hear the blower turn on and see bubbles in the jets. Also, the Blower button will illuminate green. Press the Blower button again to turn off the blower.

PUMP AND BLOWER SETTINGS

The pump and blower settings on the spa can be adjusted on the home menu screen by pressing either "PUMP 1", "PUMP 2", or the "BLOWER" button, depending on which you desire to be adjusted. (Certain buttons will not show depending on spa model.)
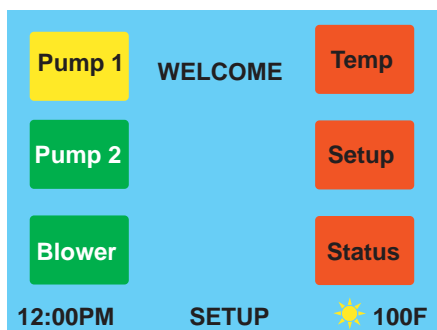
Home Screen

The settings for Pump 1 are: LOW, HIGH, and OFF. To adjust the settings, select the "PUMP 1" button. For LOW, press the button once. For HIGH, press the button a second time. For OFF, press the button a third time. During the LOW setting, the button will glow yellow. During the HIGH setting, the button will glow green. When the pump is OFF, the button will glow red. If there is an issue with the pump, the button will glow white. (Please refer to troubleshooting.)

Note: If the system is in a period of filtration, the pump will run at LOW speed and will not be able to be changed until filtration is complete.

The settings for Pump 2 are: ON and OFF. To turn pump 2 on or off, select the "PUMP 2" button. For ON, the button will glow green. For OFF, the button will glow red. If there is a problem with the pump, the button will glow white. (Please refer to troubleshooting.)

The settings for the Blower are: ON and OFF. To turn the blower on or off, select the "BLOWER" button. For ON, the button will glow green. For OFF, the button will glow red.

SETTING THE TIME

To set the local time on your spa, select "SETUP" from the home menu screen to access the setup menu screen.

Home > Setup > Time
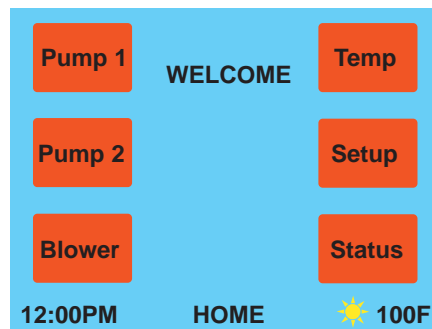
Home Screen
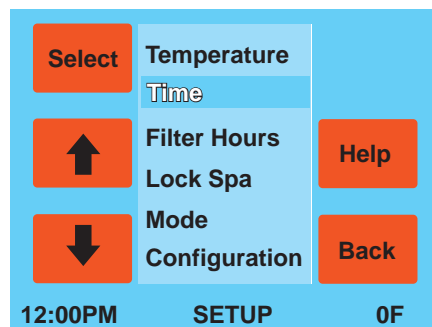
Setup - Time
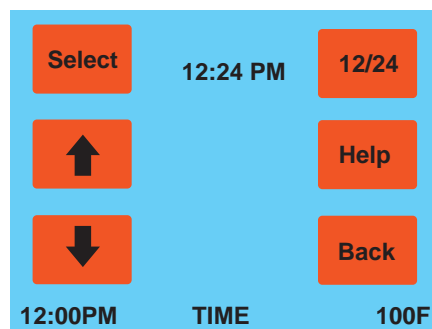
Time Selection Screen

To set the hour and minutes, use the Up and Down buttons as the numerals flash. To toggle and select your preference, use Select. To choose either standard time or military time, use the 12/24 button. To return to the Setup menu and save the time setting, select the Back button. Note: In the case of a power failure, the time will return to the 12PM default.

TEMPERATURE SELECTION

Home > Setup > Temperature > Select [Set Temp]

To adjust the water temperature of your spa, access the temperature setting screen. Select the Temp button on the home menu screen. Select Temperature, and then Set Temp.
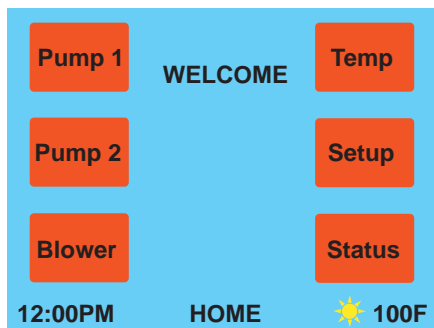
Home Screen
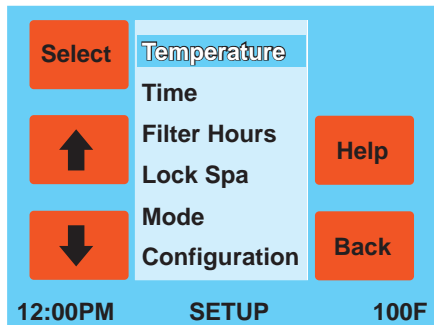
Setup - Temperature
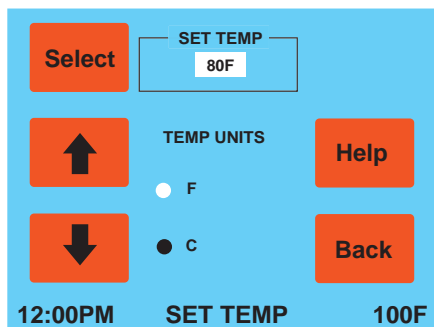
Temperature Selection Screen

To select the desired water temperature of your spa, press the Up or Down arrows. To return to the home menu, select the Back button.

Water temperature is maintained to +/- 1 degree of the set point. When the water reaches the set point plus one degree, the heater will shut off. When the water drops to 1 degree below the set point, the heater will turn back on. Whenever there is a need for heat, the system will conduct a FLOW TEST prior to turning the heater on. **This test runs approximately 1 minute, during which this time no pumps can be controlled from the touch screen menu.** If the test is successful, the heating pump will turn on, if it has not been running already, and the Sunburst logo will be displayed beside the temperature readout on the home menu screen indicating the heater is on.

TEMPERATURE UNITS SETTING

Home > Setup > Temperature > Select [Temp Units]

To have your temperature display in Celsius or Fahrenheit, activate Temp Units by using the Select button. Then use the arrows to toggle between F or C. Once the preference is made, use Select to switch to Set Temp, or Back to revert to the Setup screen.

FILTRATION SETTINGS

Home > Setup > Filter Hours

To adjust the filtration settings, select the "SETUP" button on the home menu screen, and then select the "FILTER" button on the setup menu screen.

The filtration cycles, duration, and start time are adjusted within the Filter Hrs screen. The "START TIME" button allows you to adjust what time your spa will begin the filtration cycles.

To adjust the number of filtration cycles, select start and stop times from the screen.

Once within the Filter Hrs screen, scroll to choose the start time. Press Select to turn the cycle On. Scroll to the desired stop time, then press Select again.

To review your filtration settings, scroll through the Filter Hrs screen suing the Up and Down arrows and observe at what times the filtration times are scheduled to come on and off.

Home Screen

Setup - Filter Hours

Filtration Settings Screen

STATUS SCREEN

Home > Status

The Status screen provides a quick way to view information on the spa water temperature, flow rate, frequency, current, and voltage. It also displays the components configuration installed in the spa. Touch the screen to exit.
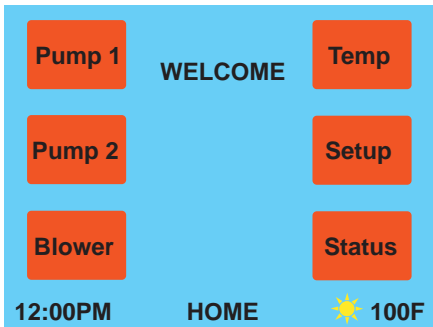
Home Screen
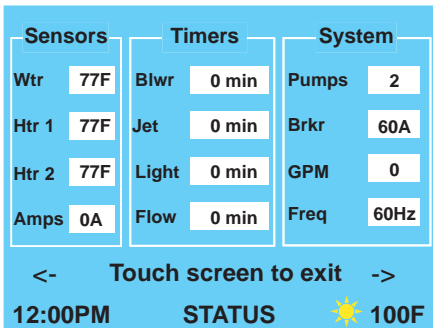
Status Screen

LOCKING THE DISPLAY SCREEN

Home > Setup > Lock Spa

Locking the display screen deactivates all of the buttons on the display, so that nothing is unintentionally hit. Once locked, the screen will instantly go to a screen saver.

To unlock the display screen, press on the screen (if screen saver is active), scroll to Unlock Spa from the Setup menu screen, and then press Select. To go back to the home menu, press the Back button.
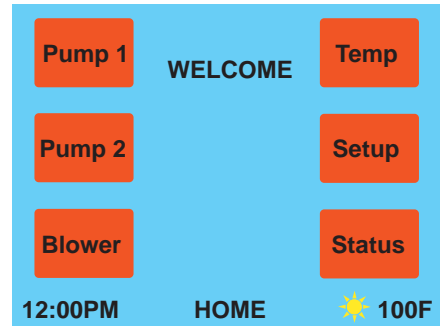
Home Screen
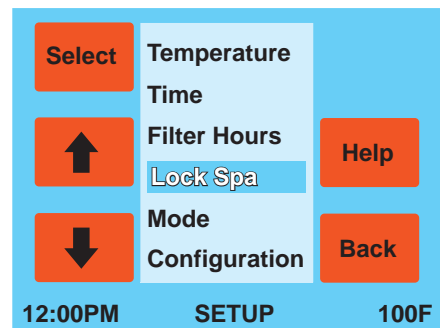
Setup - Lock Spa
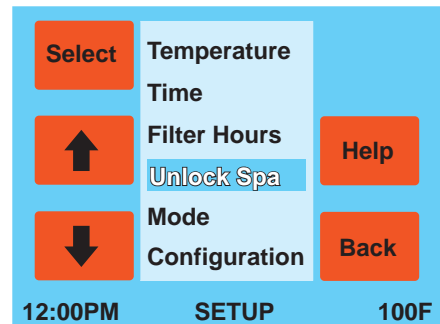
Setup - Unlock Spa

MODE

Home > Setup > Mode

If Economy Mode is selected, the spa will only start heating during these the chosen hours. If a non-filter hour is reached while in Economy Mode and the set temperature has not been reached, it will continue heating until the desired temperature is achieved, then turn off.

Auto Heat Mode allows the heat to come on whenever it detects the water temp to be at least 1 degree below the set temperature and continue to heat to 1 degree above set temperature.
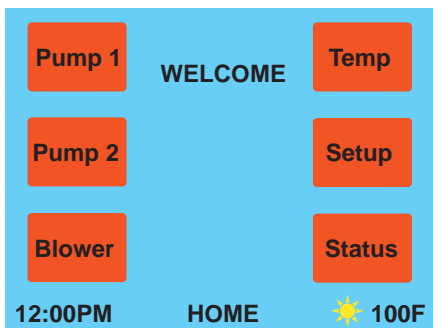
Home Screen
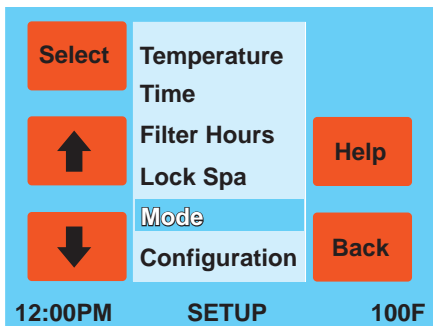
Setup - Mode
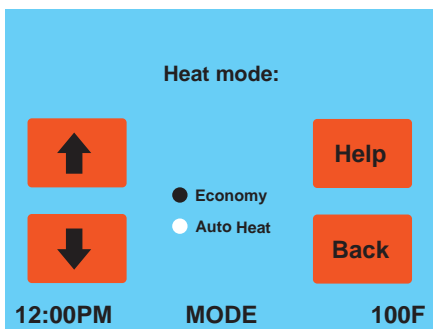
Mode - Filtration Settings

PUMPS

Home > Setup [Scroll Down] > Pumps

Selecting "Pumps" reveals the "Pumps" screen.

1. **Warning: These settings should generally be set once during installation and should not have to be modified again. Incorrect settings could lead to unpredictable spa operation**.
2. Use the "Select" button to toggle between "Blower" and "Low Speed 2". Use the up/down arrows to change the selected parameter.
3. For "Blower", if the spa has a blower, "Yes" should be selected, otherwise "No" should be selected. The default is "No".
4. For "Low Speed 2", if pump 2 has two speeds (high and low), "Yes" should be selected, otherwise "No" should be selected. The default is "Yes".
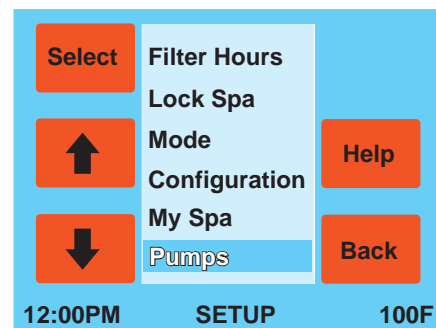

Setup - Pumps
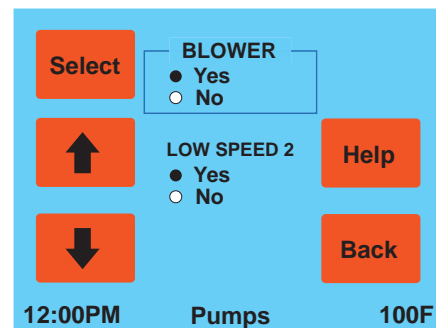
Pumps

MY SPA

Home > Setup [Scroll Down] > My Spa

Selecting "My Spa" reveals the "My Spa" screen. This is where you can edit or select 1 of 9 possible unique user profiles.

1. Use the up/down arrows to highlight the profile you would like to activate and press the "Select" button to select it.
2. Pressing "Save" while a profile is highlighted will store the current saveable settings into that profile.
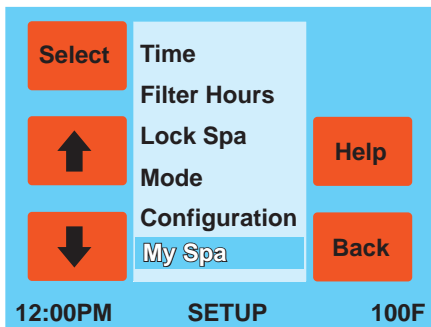
Setup - My Spa
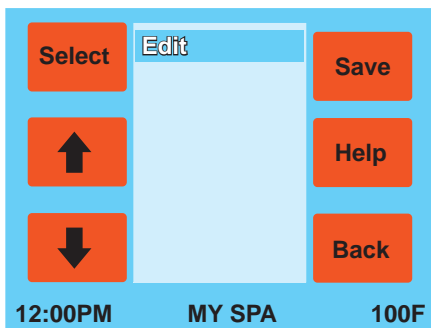
My Spa - Edit

3. If you highlight "Edit" and press "Select", the "Edit" screen will be displayed.
4. On the "Edit" screen:
   • Use the up/down arrows to highlight a profile.
   • Press "Delete" to erase the highlighted profile permanently from memory.
   • Pressing "New" will take you to the "New" screen where you can create a new profile.

5. On the "New" screen:
   • Use the up/down arrows to activate the next letter in the new profile's name.
   • Press "Select" to choose the letter. Each profile name can have up to 6 letters.
   • Press "Clear" to erase the entire profile name.
   • Press "Save" to save the name that you entered. The name box will be cleared out and you can enter another name until you have reached 9 profiles.
   • Press the "Back" button to return to the "My Spa" screen. Pressing the "Back" button without pressing "Save" will clear out any entered letters and not create a profile.
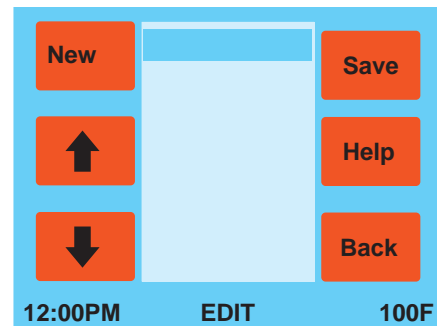
Edit Screen

New Screen

6. After creating a profile name, you should set up the spa how you want it, then save those settings to the profile by using the "My Spa" screen.
7. Parameters that can be saved in a profile are: volume, bass, stereo source (FM/line), and the current state of pump 1, pump 2, and the blower.

SCREENSAVER

The screensaver activates after approximately 10 minutes of no user interaction. A blank white screen will appear. Under conditions where normal spa operation is prohibited, the universal symbol for "No" will be displayed.

The conditions for a "No" symbol are:
1. Topside has been locked out by the user using the "lock" function. Topside can be unlocked by returning to the setup screen and selecting "unlock spa".
2. Heater temp is below 48F. The spa will attempt to raise the temperature with the heater or with the pumps if there is a flow problem. Normal operation is prohibited when in this mode.
3. Overheat condition. If the spa water is greater than 117F, the spa is locked down and all heating and pump functions are forbidden until the spa is powered down, then up again.
4. Bad heater sensor.
5. Flow problem (clogged, dirty filter, etc.). Another "flow test" can be initiated by raising the set temperature or pressing a pump button. Otherwise, another "flow test" will be run at a calculated time.
6. No communication with the control module (COMM error).
7. In certain instances when the "relay board" message is present and it is better to prevent most major spa operations (heating, pump operation, etc.)

PANEL MESSAGES -- ERROR & INFO MESSAGES

Troubleshooting, error, or informative messages that may appear and flash on the bottom of the screen in place of the screen name are:

1. "Install error" - problem with the power in the pack.
2. "COMM error" - topside can't communicate with the control module.
3. "Ctrl module" - control module needs to be replaced.
4. "Purge" - occurs every morning at 10am. All pumps are run for 15 seconds if they haven't been run in the last 24 hours.
5. "Circ pump" - same as seeing a white pump button. There is a problem with the circ pump (low current, blown fuse, disconnected, etc.).
6. "Heater" - same as seeing a white pump button. There is a problem with the heater (low current, blown fuse, disconnected, etc.)
7. "Relay board" - there is a problem with the relay board and might need to be replaced. All jumpers, electrical connections, pump connections, and configuration settings should also be checked.
8. "Fuse 1", "Fuse 2", or "Fuse 3" - the specified fuse should be replaced.

   Note:
   F1: Pump 1
   F2: Pump 2
   F3: Blower, Circ, Ozone

Accessories and Optional Modules

Attention: Audio and LED Lighting require modules for operation. Be sure that the system is powered down completely before removing or inserting any modules into the system. If the system is still powered up while removing or inserting any module, irreparable damage may occur to the module, the mother board, or the panel.

AUDIO

Home > Mood > Stereo > Source > Line [MP3] / FM

Inside the Media Screen, press the On button to activate the audio system. The button is green when the audio system is On. The button is red when the audio system is Off.

To choose your audio source (FM radio or MP3 player), the TUNE menu box must be highlighted. Select allows highlighting between TUNE, VOLUME, and BASS.

Within the TUNE menu box, you choose your source of sound. Toggle between FM or MP3 with the Source button. Note: An antenna is required for reception of radio stations.

To adjust the station or bass, press the "TUNE/BASS" button until the desired component is selected, and then cycle through the "UP" and "DOWN" arrow buttons to adjust the selected component. The arrows will revert to volume adjust if no buttons are pressed for 10 seconds, which at that point the title for the arrows will be displayed as "Volume".

To connect an MP3 player, make sure the volume on the MP3 player is set at 30%. If the MP3 volume is set too high, the speakers may not function properly due to acoustic overdrive. If overdrive occurs, the sound coming through the speaker will sound distorted and the speaker will shut down. The speakers will need to cool down and will function properly thereafter.

Adjust the MP3 volume prior to turning on the speakers again. Connect the MP3 player to the spa by plugging the cord attached to the spa into the MP3 player's headphone connection.

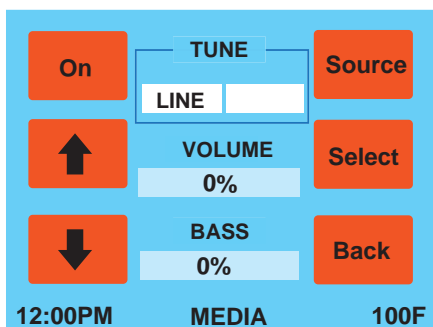To return to the home menu screen, select the "BACK" button.

Note: As the TEMP button isn't available with the light or audio modules installed, temperature is set using the Setup button.
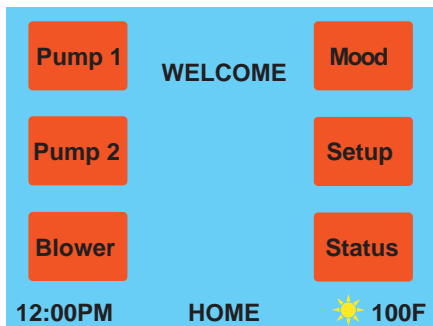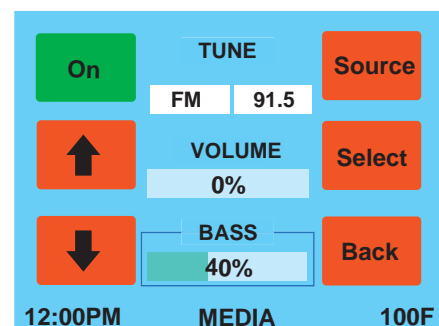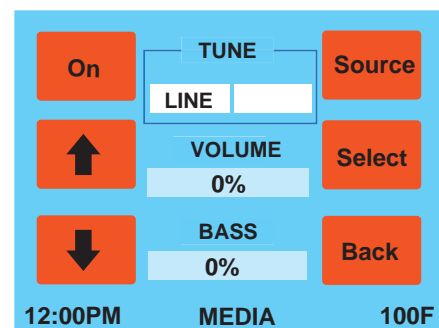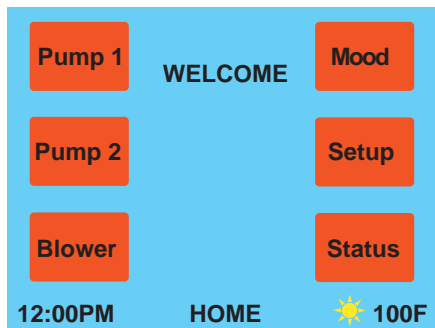

Home Screen

Mood Screen

Media Screen

LED LIGHTING

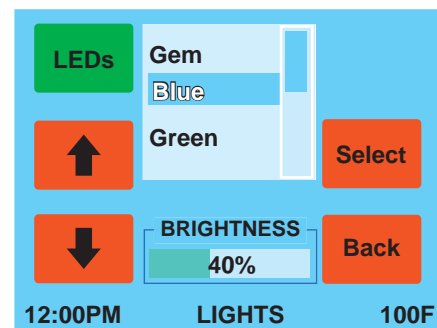### Home > Mood > LEDs > Select [Color] / [Brightness]

If your spa is equipped with perimeter lighting, the LEDs button will be activated. Inside the LIGHTS menu, press the LEDs button to activate the lighting system. The button is green when the lighting system is On. The button is red when the lighting system is Off.

To activate the color or tempo of the light (light synchronizes with music under in Music mode under COLOR), Select COLOR to highlight it. Using the arrow key(s), scroll to the desired effect. To adjust the intensity of the lighting, Select BRIGHTNESS. When highlighted, the brightness is adjusted by using the arrow keys.

To return to the home menu screen, select the "BACK" button.

Pump 1	WELCOME	Mood
Pump 2		Setup
Blower		Status
12:00PM	HOME ☀	100F

Home Screen

LEDs	Gem	
	Blue	
↑	Green	Select
↓	BRIGHTNESS 40%	Back
12:00PM	LIGHTS	100F

LEDs		
Stereo		Help
		Back
12:00PM	MOOD	100F

Mood Screen

GFCI Wiring Installation Diagram

House Breaker Box

Bottom view of G.F.C.I
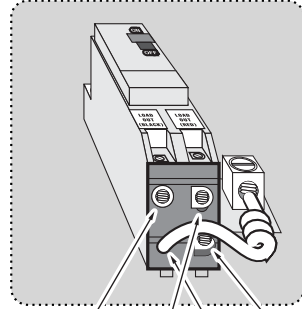
Black (Hot)   White   White

Red (Hot)

Outside Ground Rod

G.F.C.I Breaker Box

ON

OFF

LOAD OUT (BLACK)   LOAD OUT (RED)

For internal wiring of the LM8, see the Wiring Configurations on the following pages.

# Balboa Domestic Wiring Configuration – Board No. 57129

LM8000 – PN 57129
03/29/11

CONNECT ONLY TO CIRCUITS PROTECTED BY A CLASS A GFCI.

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

USE COPPER CONDUCTORS ONLY.
EMPLOYER UNIQUEMENT
DES CONDUCTEURS DE CUIVRE.
#6 AWG MIN. WIRE= 90°

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

TORQUE RANGE FOR
MAIN TERMINAL BLOCK (J11):
21-23 IN. LBS.
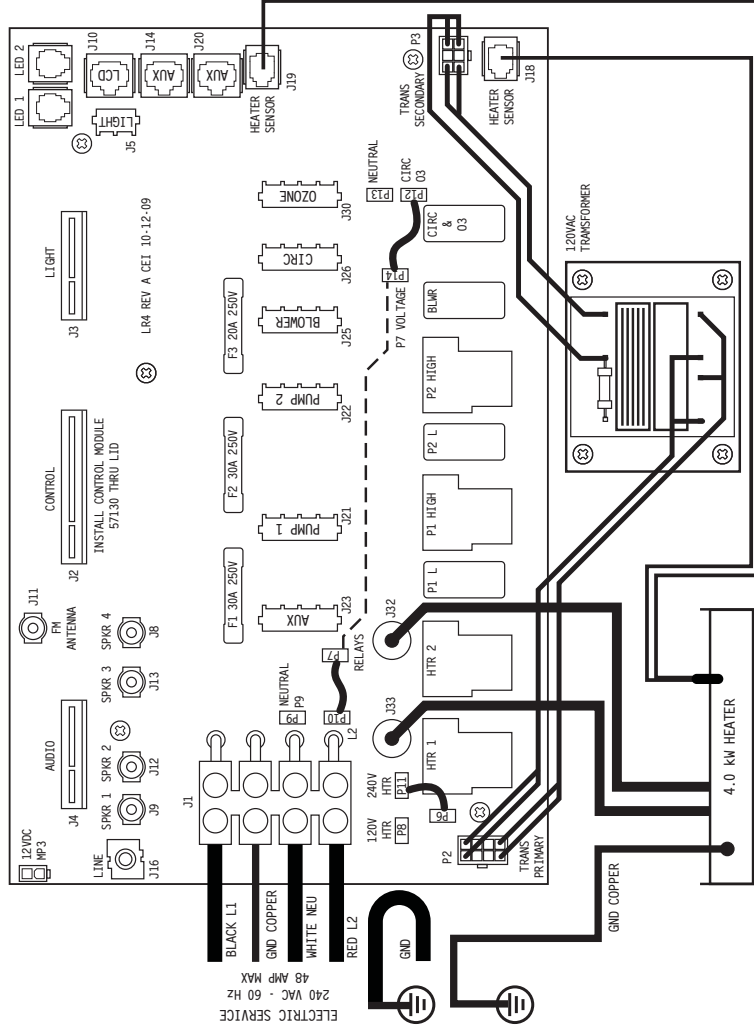
DEVICE	VOLTS	FROM	TO	OTHER
HEATER	120V	P6	P8	1.0 KW
HEATER	240V	P6	P11	4.0 KW
AUX, P1, P2, BL	120V	P7	P9	
AUX, P1, P2, BL	240V	P7	P10	
CIRC, OZONE	120V	P12	P13	
CIRC, OZONE	240V*	P12	P14*	

*P14 VOLTAGE IS DETERMINED BY P7.
P7 MUST BE CONNECTED TO P10 FOR 240V

LOCATION	DEVICE	VOLTS	AMPS	FROM	TO
J5	LIGHT	12V	1A		
J21	PUMP 1	240V	12A MAX	P7	P10
J22	PUMP 2	240V	12A MAX	P7	P10
J23	AUX**	240V	4A		
J25	BLOWER	240V	4A	P7	P10
J26	CIRC	240V	1A	P12	P14
J30	OZONE	240V	1A	P12	P14
HTR	HEATER	240V	4.0 kW	HTR TERM	J32 & J33

**ANY DEVICE POWERED BY J23 MUST CARRY ITS OWN FUSING

TOTAL OUTPUT AMP DRAW NOT TO EXCEED MAX INPUT RATING OF SPA
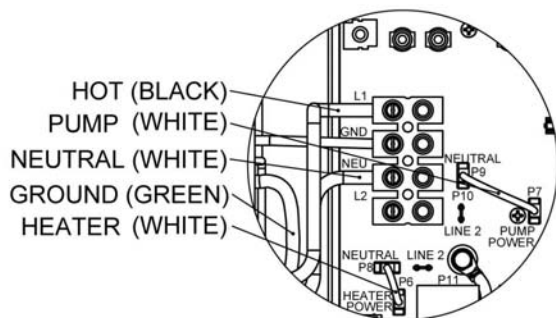USE EARTH GROUND CONNECTIONS AS INDICATED INSIDE THE SYSTEM ENCLOSURE

SPA-SIDE CONTROL PANEL J10

LR4 REV A CEI 10-12-09

INSTALL CONTROL MODULE 57130 THRU LID

ELECTRIC SERVICE
240 VAC · 60 Hz
48 AMP MAX

BLACK L1
GND COPPER
WHITE NEU
RED L2

GND COPPER

4.0 KW HEATER

GROUND
FUSED LINE 1
SWITCHED LINE 2 OR NEUTRAL - LOW SPEED
SWITCHED LINE 2 OR NEUTRAL - HIGH SPEED
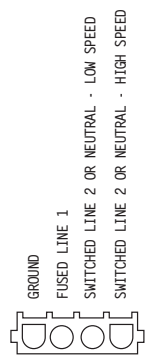
120V & 240V Wiring with Heater Options

WARNING: DISCONNECT THE ELECTRIC POWER BEFORE SERVICING

AVERTISSEMENT : DÉBRANCHEZ L'ÉNERGIE ÉLECTRIQUE AVANT L'ENTRETIEN

L1 (BLACK)
PUMP (WHITE)
NEUTRAL (WHITE)
GROUND (GREEN)
L2 (RED)
HEATER (WHITE)

240VAC WIRING FOR DETAIL A

HOT (BLACK)
PUMP (WHITE)
NEUTRAL (WHITE)
GROUND (GREEN)
HEATER (WHITE)

120VAC WIRING FOR DETAIL A

L1 (BLACK)
PUMP (WHITE)
NEUTRAL (WHITE)
GROUND (GREEN)
L2 (RED)
HEATER (WHITE)
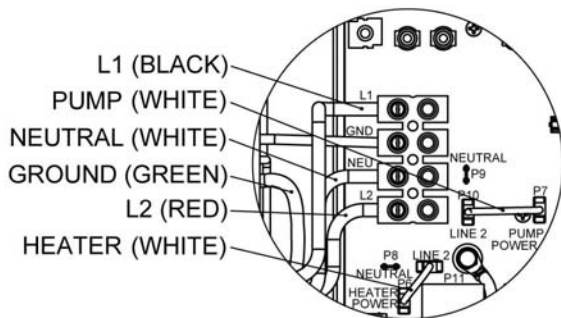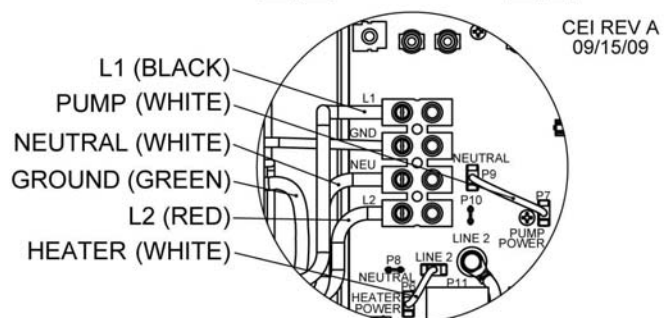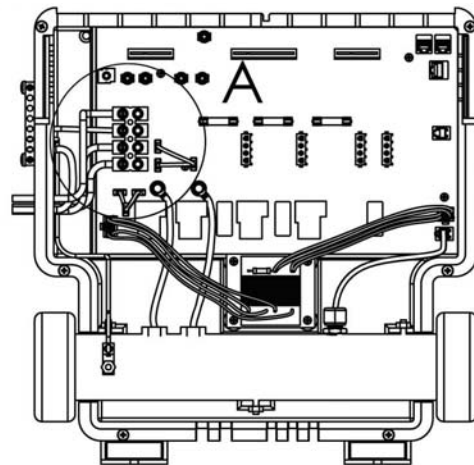
**120VAC WIRING FOR DETAIL A
WITH 240VAC HEATER OPTION**

CEI REV A
09/15/09

FOR SUPPLY CONNECTION, SELECT WIRE BASED ON 90°C.

POUR le RACCORDEMENT, d'APPROVISIONNEMENT, FIL CHOISI BASÉ SUR 90°C.

USE COPPER CONNECTORS ONLY.

UTILISEZ LES CONNECTEURS DE CUIVRE SEULEMENT.

USE CLASS A GROUND FAULT CIRCUIT INTERRUPTER.

UTILISEZ LA CLASSE UN CIRCUIT DE AUTE DE TERRE INTERRUPTEUR.

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Specifications

Environmental	
Operating Temperature	–20°C (-4°F) to 60°C (140°F)
Storage Temperature	-25°C (-13°F) to 85°C (185°F)
Humidity	Humidity: up to 85% RH, non-condensing
Mechanical	
Weight (with modules & tailends, w/o cord)	10.80 lbs. (4.898 kg)
Dimensions (w/o tail pieces, modules)	15.25"H x 15.0"W x 4.25"D
Dimensions (with tail pieces, modules)	15.25"H x 19.125"W x 4.25"D
Dimensions (mounting holes)	8.25" x 3.125"
Enclosure Material	
ABS, Chimei PA757 or equivalent	Metal Heater (Incoloy Element)
Resin Color: 350C Green	
Certifications	
Standard/Files	UL 1563 5th Edition – Intertek File No. 3168167ATL-001A CAN/CSA C22.2#281.1 1st Edition – Intertek File No. 3168167ATL-001A
Electrical Connections, Output	
Pump 1	1 or 2 Speed - 240V/12A or 120V/12 A
Pump 2	1 or 2 Speed - 240V/12A or 120V/12A
Pump 3	1 or 2 Speed - 240V/12A or 120V/12A (Optional w/ expansion board)
Circ Pump and Ozone (combined total)	240V/2.0A or 120V/2.0A
Blower	240V/8A or 120V/8A
Lights	12 VAC (Incandescent or LED dependant on module)
AV (Stereo)	25W @ 4 Channels, Class D Amplifiers
Heater	240 VAC (Integrated with Module), 4.0 Kw
Heater	
Heater Flow	6 GPM Minimum water flow required for 2" LM8
Sensors	2 self test sensors must read the same reading or the LM8 will shut off
" "	No Polling reacts to differences of +/- 1 degree difference from set point
" "	112° cuts off system until cool down to 104°; 118° creates a manual reset
Purge	Purge is 15 seconds once a day
Electrical Specifications	
Transformer	50 Watt transformer (P-P), 5 Amp fuse (UL approved); Class 2 transformer
Relay Board	15 volt relays; Optical coupler to diodes

Troubleshooting

Troubleshooting of the spa control system is made easy by the built-in self-testing feature. As soon as power is available, and everything is properly connected, the self-test routine can isolate most spa problems immediately.

Regardless of the problem, the following routine should always be followed, step-by step, for quickest results.

Note: Due to revision changes, some panel and module combinations may show a White button error display instead of Red.

1. If the spa has already been in operation skip to step 2, otherwise verify that electrical service is properly connected to the spa. Refer to the wiring diagram inside the enclosure cover and to the Installation Instruction for proper connections.
2. If the Top Side has a visible display, skip to step 10. If the display is dark, there may be a power problem. Verify that the circuit breaker is in the "on" position. If it is already on, place it in the "off" position and prepare to open the spa.
3. Remove the spa paneling that covers the pack area. Next, remove the four screws that hold the lower pack cover in place and put the cover aside.
4. Turn the breaker back on. Return to the spa and look for a green LED marked "D22". If the LED is on, skip to step 9.
5. Using a voltmeter, measure the incoming power between L1 and NEUTRAL. If the voltage is between 100V and 130V, the problem is in the pack, go to step 6. If the required voltage is not present, an electrician should be called to correct the service problem.
6. Loss of power in the pack can be due to only two things, (1) a disconnected or defective transformer, or (2) a defective relay board. If a spare transformer is available, it can be temporarily plugged into the relay board to verify the condition of the original transformer. (Turn off the circuit breaker before attempting this substitution.)
7. If substitution of the transformer didn't solve the problem, turn off the circuit breaker and replace the relay board, or entire pack.
8. Turn the breaker back on and observe the LED again. It should now be on, since all possible problems have been eliminated.
9. The easiest thing to verify next is the Top Side. If the Top Side display is normal, proceed to step 13. "Normal" means that different screens can be selected and

adjustments can be made.
10. If the topside is not normal, substitute topside should be tried. Turn off the breaker again, remove the Control Module, remove the both covers, remove the original topside, plug in new topside, re-attach the cover with at least two screws, and, finally, re-install the Control Module.
11. Turn the circuit breaker back on and look for a normal display on the Top Side. If successful, go to step 12. If the display is still not normal, turn off the circuit breaker again and substitute a new Control Module. In the rare case that the display is still not normal, with the green transformer LED on and with a new Control Module, turn off the breaker and replace the relay board (or pack). The Top Side should now show a good display, since everything that could cause the problem has been replaced.
12. If a new topside is required, it must be configured to match the equipment in the spa. Start by holding the invert button down for 15 seconds, until a new display appears. Select "yes" when "re-set configuration setting?" appears. Follow the screens and then simply select the installed components in the spa and press the save button. Next you will see a Logo choice screen. Pick any Logo and press save again.
13. With a good display on the Top Side, it is time to let the self-test function do its job. Turn the breaker off, replace the cover and all three modules, and then turn the breaker back on. Observe that the Control Module will exercise all of the various motors and the heater, looking for defective motors, fuses, relay board, heater element, or connections. The display may have a message indicating a required action (like a bad fuse). Go to step 14. The display may also have a button that has turned white. That means the equipment controlled by that button is not drawing current and is, therefore, defective or unplugged. Actions are as follows:

White Pump Button – The pump controlled by that button is not drawing current. Check for proper pump connections on the relay board. Pump 1 uses a heavy cable with 4 wires. Pump 2 uses a heavy cable with 3 wires. The ozonator uses a smaller cable. Another reason for the pump to not draw current is because it has overheated. Turn off the circuit breaker for 30 minutes and see if the pump will run after it cools. If it does, look for insulation issues around the pump.

Pump 1		**Temp**
Pump 2		**Setup**
Blower		**Status**
12:00PM	**SETUP**	☀ **100F**
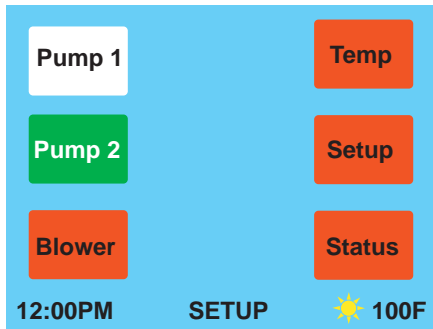
White Audio Button – The Audio Module has a plug and play feature, so if the button is white, it is not in place or somehow not communicating with the Control Module. Turn off the circuit breaker and replace the Audio Module.

White LEDS Button – The LED Module has a plug and play feature, so if the button is white, it is not in place or somehow not communicating with the Control Module. Turn off the circuit breaker and replace the LED Module.

14. Possible Messages are:
    "Replace Fuse" (Excessive current has been drawn by a motor or the ozonator.) Go to step 17.
    "Replace Control Module" (Internal problems found.) The red module must be replaced.
    "COMM Error" (The Topside is unable to communicate with Control Module.) Go to step 18.
    "Replace Relay Board" (A bad relay, current sensor, or jumper has been found.) Go to step 22.

15. If no messages are showing and no buttons are white, allow approximately 2 minutes for a flow test to be performed, and then proceed to test each function for normal operation from the topside. Note that anytime a button is pressed and a defect is seen by the self-test function, instead of green, the button will turn white. If a white button appears, the associated equipment may need to be replaced.

16. If the self-test function does not indicate any actions to take, the balance of the troubleshooting must be performed by careful observations and possible substitution as follows:
    A. TOP SIDE – If the touch screen does not change screens, or the display is not normal, the Top Side must be replaced. (First verify that the screen is not locked, by going to "setup" and then "unlock".)
    B. CONTROL MODULE – The Control Module is the

brain for the entire spa. If it has been damaged, certain functions may not be performed correctly. A quick substitution will verify the need to replace it.
C. LED MODULE - All of the LED function is in this module. Replacement will solve most LED problems, other than individual LED outage.
D. AUDIO MODULE – Replacement of this module should resolve any audio problem, other than individual speaker problems (which can be isolated by swapping speaker wires).
E. TEMPERATURE SENSOR – The sensor in the heater measures both water flow and water temperature. It has dual elements that monitor each other. The only time it would need replacement is if one of the elements becomes defective. This will be obvious because the temperature readings for Heater 1 and Heater 2 on the status screen will be different by more than 20F, which is a sign of trouble, since they are exposed to the same temperature in the heater.

17. Fuses can best be checked by hooking a voltmeter between L2 on the incoming power connector and the right hand side of each fuse. Any fuse that doesn't have around 230V on that side must be replaced. Replace with 30A to avoid incidental blowing. If the fuse blows again, look for a problem with the pump or the motor.

18. A message of "COMM Error" may be caused by improper seating of the red module. Before replacing the red module, turn off the circuit breaker and then remove the red module. Examine the circuit card inside the module for proper position. The edge of the card with the gold fingers should be about ¼ inch inside the edge of the module. Note that it is free to move slightly inside the module. If the card appears to be jammed out of position, due to excessive insertion force, an attempt to correct the problem may be attempted. If it looks undamaged, go to step 20.

19. Remove the black o-ring around the module. Observe the position of the white nylon guide hardware relative to the card's bottom side (no components). Insert a medium screwdriver into one of the small slots between the two halves of the module and twist the screwdriver to pop open the module. Reposition the card, snap the module back together, and replace the o-ring.

20. With the circuit breaker still off, replace the cover with 2 screws and re-install the red module. Note that a gentle up and down movement will help the card inside the

module find its mating connector on the relay board. Now have an assistant turn on the circuit breaker while you watch for three flashes of red light from the card inside the module, near the back left side. If you don't see this light on power up, and the message is still present, the red module must be replaced.

21. If the flashing red light is seen, but the "COMM Error" message is still present, another topside should be tried. Do not remove the old topside yet. Just turn off the breaker, remove all modules, plug in another topside, replace the cover with 2 screws, install just the red module, and turn the breaker back on. If the message is still there, turn off the breaker and install a new relay board. (This should rarely be necessary.)

22. A message of "Replace Relay Board" will occur when there appears to be a failed component on the Relay Board. Before replacing the board, however, verify the incoming ac power. Use a voltmeter to measure 120V between Neutral and L1 and between Neutral and L2. Then look for 240V between L1 and L2. If these voltages are not present, within 10%, call a qualified electrician for wiring corrections.

23. If voltages are within range, verify that the 3 red jumpers are correctly installed on the board. All three should be connected to L2, or 240V. Verify that all crimps are tight.

24. If no other issues can be seen, the relay board must be replaced. Turn off the circuit breaker and proceed to unplug all pumps, transformer, heater sensor, topside, LEDs, speakers, mp3, and antenna. It might be helpful to make a sketch of actual connections before you start. The relay board is held by 4 screws, which can now be removed.

Re-connect all components according to your sketch. Be careful not to connect anything to the "AUX" connector, which has constant power on its pins. Turn the breaker back on and observe the self-test routine. The spa should now be ready to use, since there is nothing else that could have caused the "Replace Relay Board" message.

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BALBOA
water group