Troubleshooting & Service for GL/GS Systems

50 Hz

BALBOA
water group

Balboa's Patented M7 Technology

TOPSIDE CONTROL PANEL

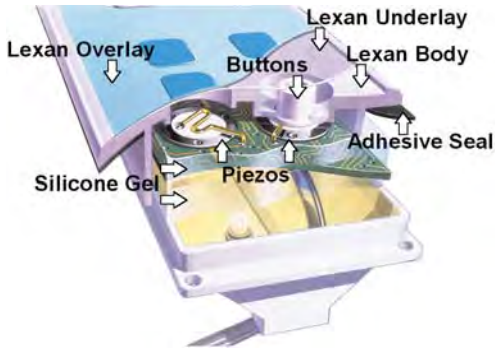
The control panel activates functions at the touch of a button. Each function will echo from the circuit board to the LCD in a corresponding manner. The panel will also display diagnostic messages that enable the service technician to easily troubleshoot the system.

ML700 Top Side Panel

M7 TECHNOLOGY

M7 is a patented Balboa technology that uses two sensors inserted at the opposite ends of the heater element to determine flow, dry fire conditions, etc. The two sensors located within the heater housing compare the inlet water temperature with the outlet water temperature. It works no matter which direction the water flows through the heater.

The sensors in combination with specific software allow the spa to be controlled without the use of external pressure switches, flow switches, or temperature sensors.



Panel Construction

GS500 with a Cut-a-way View of the Heater

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Service Tools Required

- Ammeter (50A)
- Balboa Six-in-one Screwdriver
- Digital Multi-meter
- Padlock (to lock electrical disconnect during service)
- Pliers: Slip Joint & Needle nose
- Precision Thermometer - Digital Fever Type
- Quick Check™ Test Kit
- Silicone Tube
- Small Wire Cutters
- Two 3/8" Open End Wrenches (one wrench should be ground down to 5/32" [0.1562"] thickness in order to access the nut between the heater strap and heater element connector)

Balboa Service Parts Checklist

Recommended Parts For Service Calls

- Extra Board(s)
- Extra Panel(s)
- Fuses
- Jumpers
- Heater Assembly

20618
JUMPER LOGIC

COMMON FUSES USED

30074	FUSE 1 AMP FAST BLOW GLASS
30075	FUSE 5 AMP FAST BLOW GLASS
30122	FUSE 10A BLOWER
30595	FUSE 10A POWER INPUT
30076	FUSE 15 AMP FAST BLOW CERAMIC
30596	FUSE 15A POWER INPUT
30142	FUSE 20A POWER INPUT
30123	FUSE 20A PUMP
30137	FUSE 25A POWER INPUT
21447	FUSE 25A POWER INPUT HIGH SURGE
30136	FUSE 30A POWER INPUT

GS500 Controller Board
Part No. 22844

53649 ML700

Heater Assembly

Important Information -- Product Identification

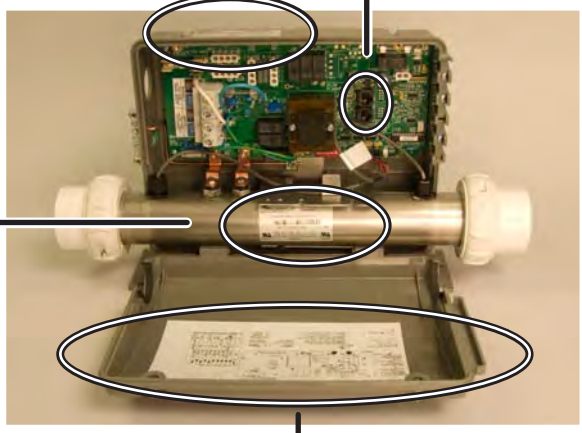
On Every System, an Identification Label Is Placed on top of the Casing

Two Types of Plug-in Connectors:

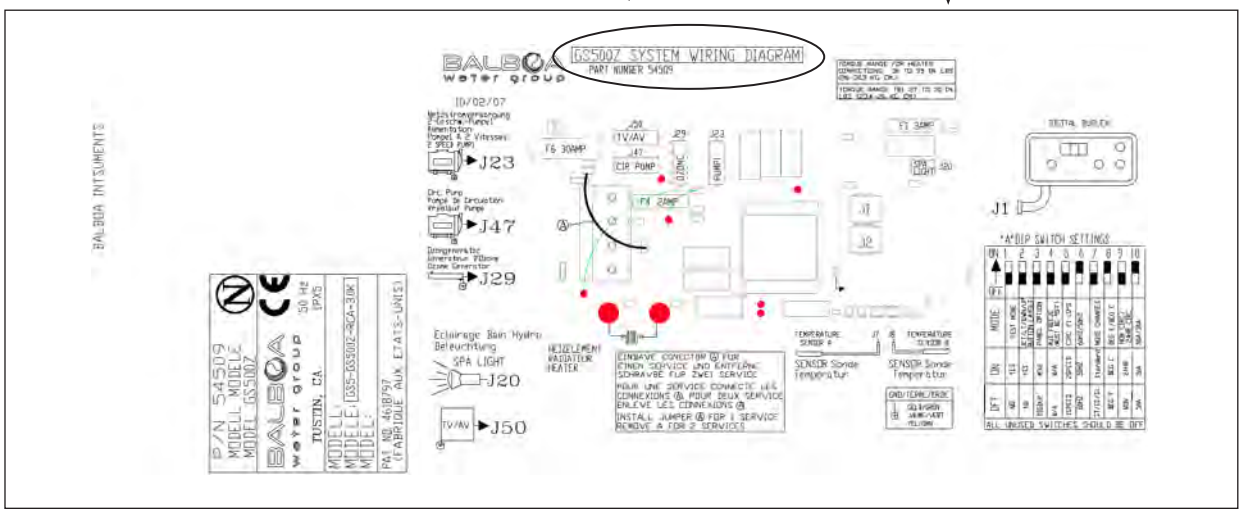
"Molex" Type, ML/GL Connector

"Phone Plug" RJ Type, VL/GS Connector

Heater Element Specifications Are Shown on the Heater Tube Label



On Every System, a Wiring Diagram Is Placed Inside the Door



Troubleshooting & Servicing Spa and Electrical Equipment

HIGH VOLTAGE CAN SERIOUSLY INJURE OR KILL!

ONLY EXPERIENCED TECHNICIANS SHOULD SERVICE THIS EQUIPMENT.

DO NOT remove the protective covers from any electrical enclosure, or attempt to service any related electrical device, unless you are a qualified electrician or service professional.

DANGER

Risk of electric shock. Before working with any electrical connections, make certain that the Main Power breaker from the house breaker box has been turned off.

WARNING

All electrical work must be performed by a qualified electrician and must conform to all local codes.

IMPORTANT

Due to the danger of severe electrical shock, locate all power disconnects before servicing a spa. Precautions must be taken whenever working with breaker boxes, RCD's, or service disconnects.

- Always refer to the wiring diagram which is included with each system on the inside of the system box cover. Use this diagram for voltage measurement points, and for proper reconnection of wires.

A terminal marked "GROUND" is provided within the System Control Center enclosure. To reduce the risk of electrical shock, connect this terminal to the grounding terminal of the electric supply panel with a continuous green insulated copper wire equivalent in size to the circuit conductors supplying this equipment, but no smaller than #12 AWG.

Ground in System Enclosure

Safety Tips

- Keep children and pets away.
- Be aware of your surroundings. Standing in water while repairing a spa puts you at serious risk.
- Avoid working in cramped or crowded conditions.
- Consider placing a padlock on the service panel to lock out anyone who might power up the system.

WIRING CHECK PRECAUTIONS

- When working in a system box always be aware that it may contain high voltage.
- Always keep your fingers and hand tools away from any wiring or circuit board when the power is on. Touching anything in these areas can result in serious injury.
- All service calls, no matter how minor, should include a complete wiring check, beginning with the house breaker.

CHECK FOR LOOSE CONNECTIONS OR DAMAGED WIRES

- Make sure the power is off before you touch any wiring.
- Once the power is off, carefully examine all wires for cuts or defects.

SYSTEM BOX WIRE GAUGE CHECK

When inspecting the wiring for any control system, note that connections for the incoming wires are clearly labeled at the main terminal block.

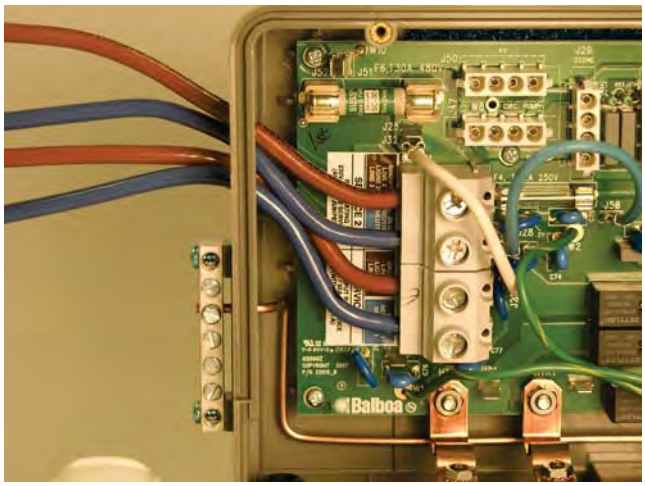
- 30A service – minimum ten gauge copper wire.

These wires must connect the house breaker box, through the local disconnect, to the main terminal block. The wiring diagram inside the system box shows the main terminal block as TB1.

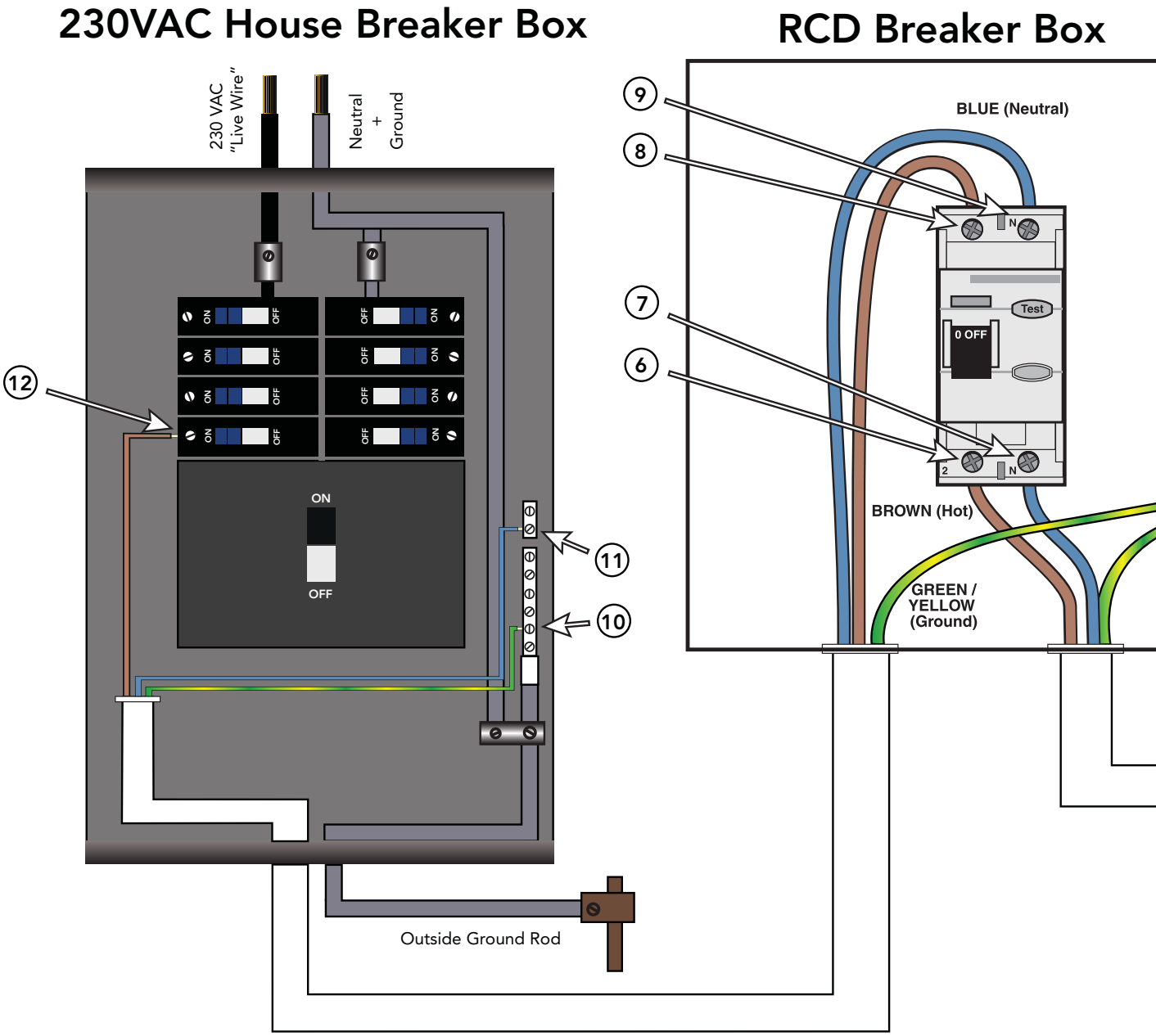
IMPORTANT -- USE OF NON-COPPER WIRE

Using non-copper wire can be dangerous, and also can be the cause of a spa's malfunction. If non-copper wire is used at any point, we do not recommend servicing the spa until an electrician replaces it with the proper gauge copper wire.

Total Ampere Rating of Power System	**Minimum wire size Use Copper ONLY, with 90 ° C insulation**	**Ampere Rating of RCD Circuit-breaker**
0 A to 16 A	#12 AWG	20
16 A to 20 A	#10 AWG	25
20 A to 24 A	#10 AWG	30
24 A to 28 A	#8 AWG	35
28 A to 32 A	#8 AWG	40

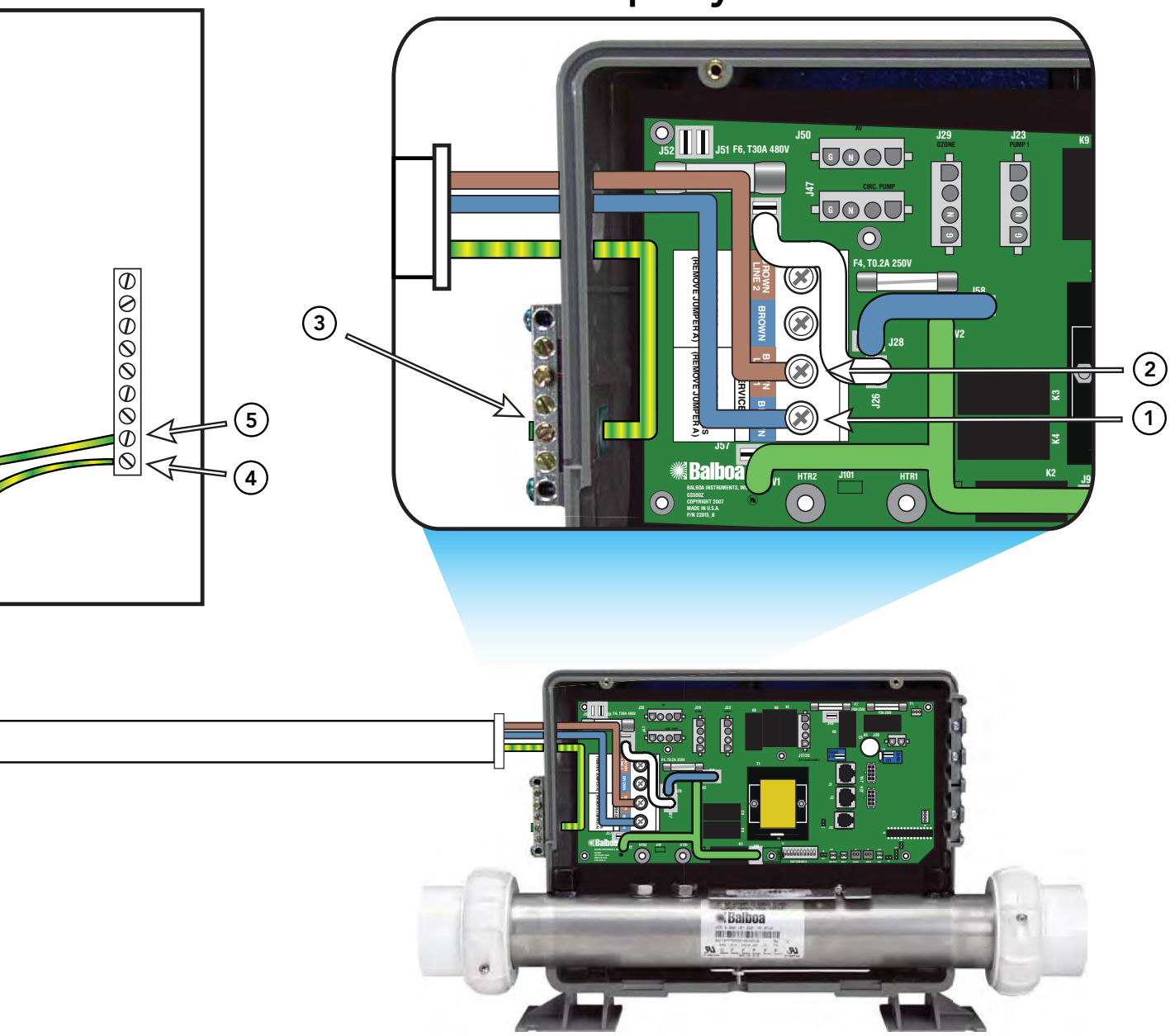


230 Volt / 50 Hz Residential Wiring Schematic with 2 Pole RCD Breaker Box

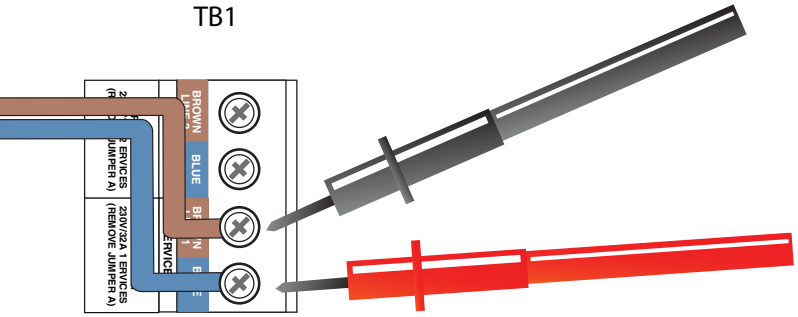


Correct Voltage	When Probes Are Placed Across
0v	[1 - 3] [4 - 7] [5 - 9] [10 - 11]
207V - 253V	[1 - 2] [2 - 3] [4 - 6] [5 - 8] [6 -7] [8 - 9] [10 - 12] [11 - 12]

Spa System Box



TB1

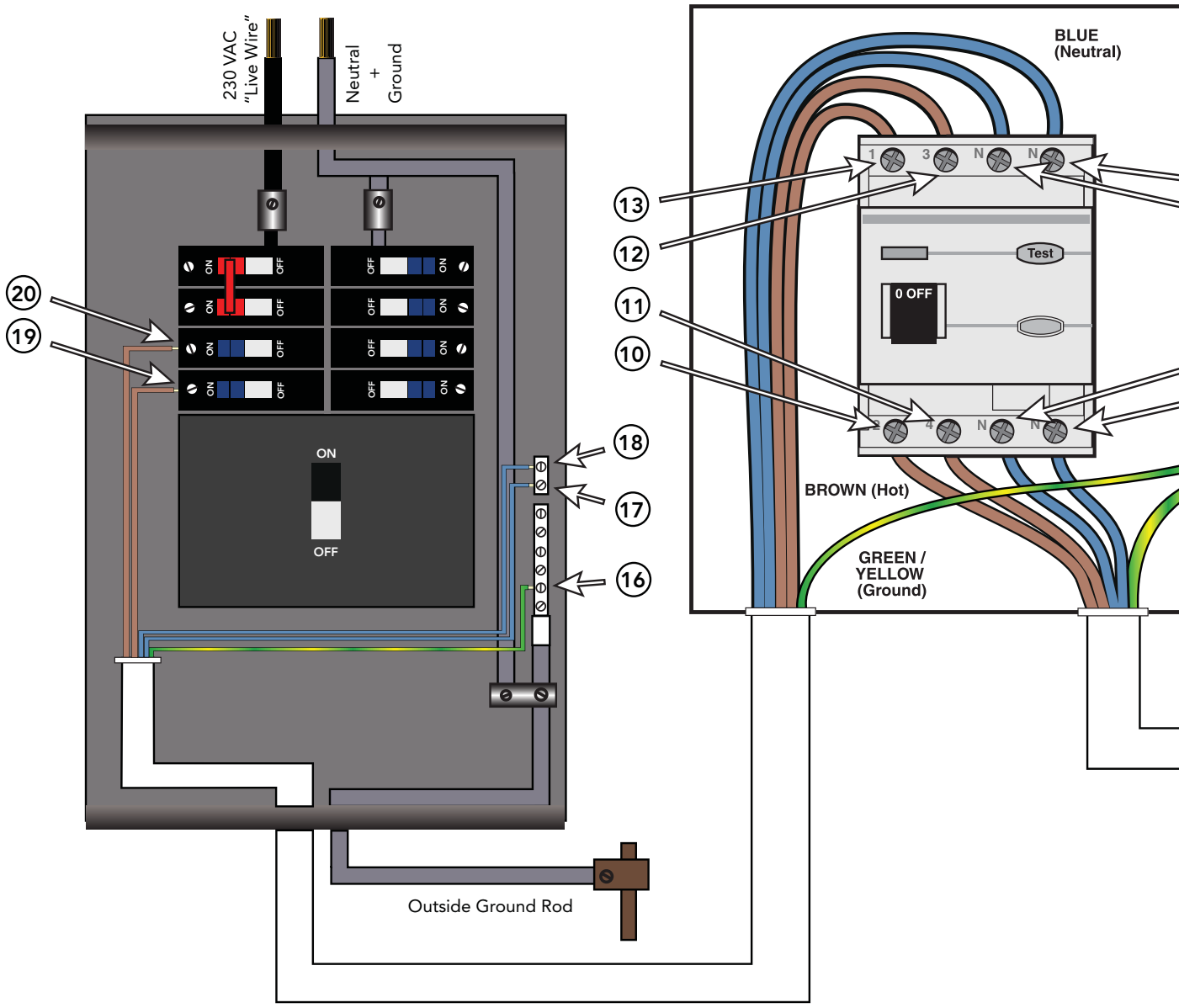


Test for Voltages by placing probes on these locations

230 Volt / 50 Hz Residential Wiring Schematic with 4 Pole RCD Breaker Box

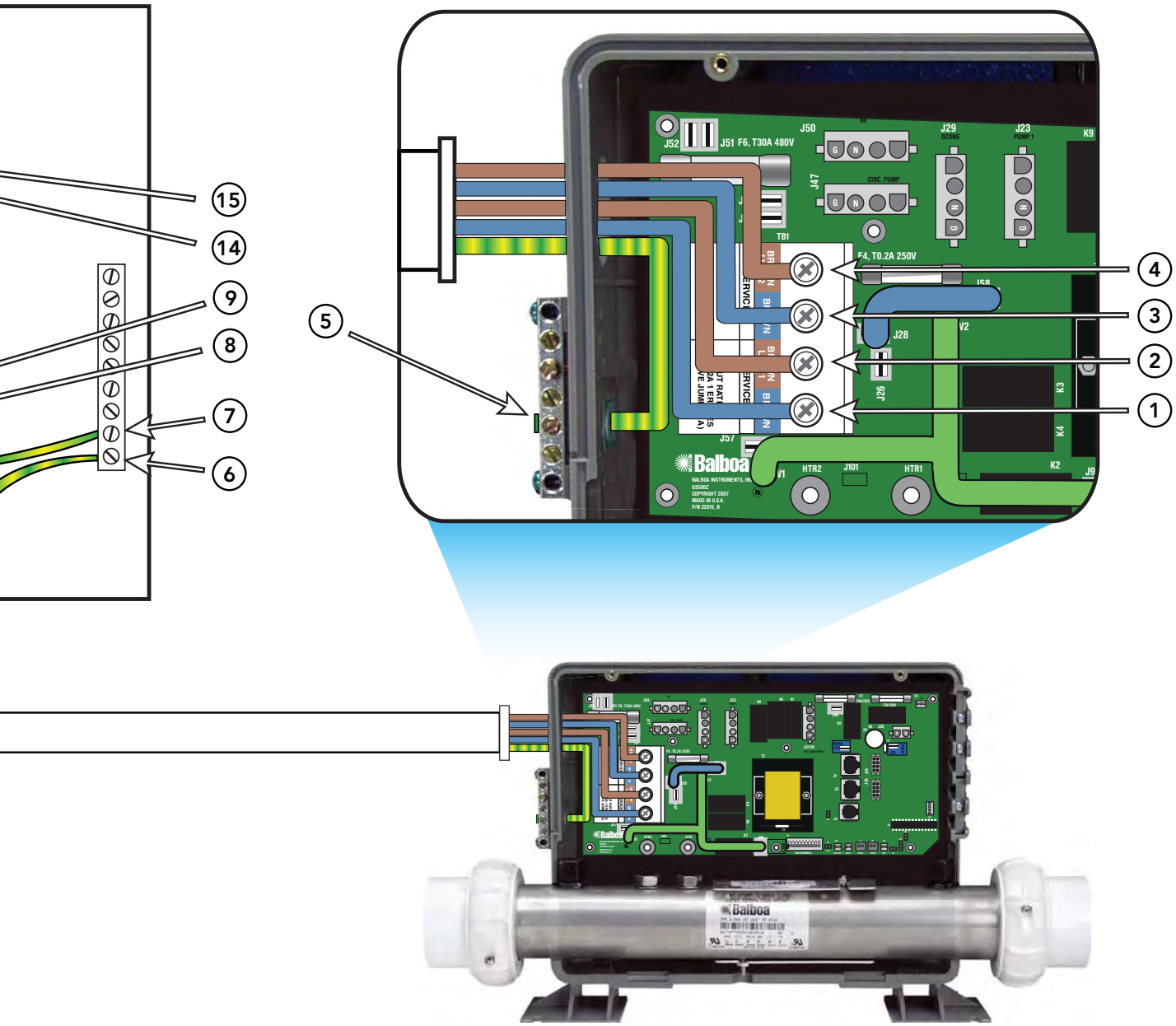
230VAC House Breaker Box

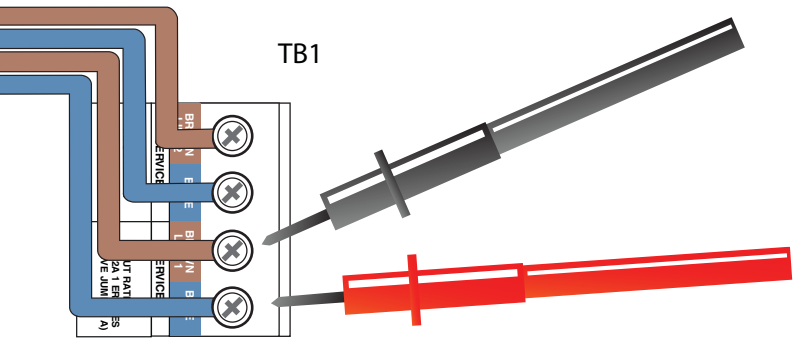
RCD Breaker Box



Correct Voltage	When Probes Are Placed Across				
0v	[1 - 5]	[6 - 8]	[7 - 14]	[7 - 17]	[16 - 17]
	[3 - 5]	[6 - 9]	[7 - 15]	[7 - 18]	[16 - 18]
207V - 253V	[2 - 5]	[6 - 10]	[7 - 12]	[16 - 19]	[17 - 19]
	[4 - 5]	[6 - 11]	[7 - 13]	[16 - 20]	[17 - 20]

Spa System Box





Test for Voltages by placing probes on these locations

230 Volt 50 Hz - Residual Current Devices (RCD's)

A residual current device (RCD, or R.C.D. henceforth) is the generic term for a device that monitors the current in the line conductor and the neutral conductor of a circuit in an earthed system.

In a circuit that's operating properly, the vector sum of the live and neutral current values added together will be zero. Current flowing to earth, due to a line earth fault, will return via the earth conductor, and regardless of load conditions, will be registered as a fault. This current flow will give rise to a residual current that will be detected by the device. If the residual current exceeds the rated sensitivity of the RCD, it will automatically activate a tripping of the faulty circuit.

Two Pole RCD

Four Pole RCD

Typical specifications are as follows:

Residual Current Devices (RCD's) range
Sensitivity - from 10 to 500mA
Voltage - 2 poles : 230V; 3/4 poles: 230/400V
Connection capacity
- 25A: 6/10 mm² (flexible/ rigid cable)
- 40,60A: 16/25 mm²
- 80,100A: 35/50 mm²

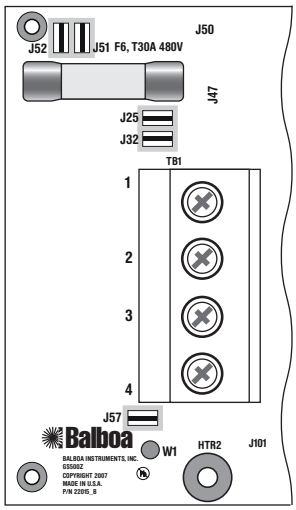
IMPORTANT!

Remember, high voltage is still accessible in the house breaker box even though you have turned off the spa breaker.

Keep in mind that a majority of R.C.D. tripping problems can be attributed to incorrect wiring. R.C.D. troubleshooting usually finds the problem.

RCD LINE-IN WIRING CHECK

- Locate the proper circuit breaker and turn it off.
- Remove the cover from the house breaker box. Check the main service amperage rating to the breaker box.
- From the circuit breaker, locate the brown load wire and the blue neutral wire.
- From the R.C.D. neutral bar, locate the blue load neutral, and the green ground wire.
- Be sure there are no other appliances on the spa circuit. If there are, service must be re-wired to supply the spa only.
- Make sure all three wires exit the house breaker box via conduit, routed to the R.C.D. breaker box. The brown should be connected to the R.C.D. line-in. The blue load neutral connects to the neutral in.



RCD LINE-OUT WIRING CHECK FOR 230 V DEDICATED SYSTEM

The brown wire should connect to load out, the blue wire from neutral out. All wires will exit the box via conduit routed to the spa control system.

Once you have found all wiring correctly installed, begin to check for proper voltage. If Correct Wiring is Verified, check to see if the proper RCD is installed.

- Check the label in the system box near TB1 to determine the maximum amperage draw for the system.
- Be sure the R.C.D. is rated for more amperage than the system will draw.
- For a 230 V dedicated system, a 2-pole or 4-pole R.C.D. with no load neutral is acceptable.
- For a detailed wiring checklist, please review the previous segment of this manual on proper R.C.D. wiring or the R.C.D. manufacturer's instructions.
- If the wiring is correct and the R.C.D. will not reset, then unplug the pump and try to reset the R.C.D.
- If the R.C.D. trips again, then unplug the blower and push the reset button. If the R.C.D. continues to trip, then do the same procedure for the ozone generator.
- If the R.C.D. stops tripping after you unplugged one of the spa's components, turn off the power to the spa then plug in each component except the one that tripped the R.C.D.
- Power up the system. If the R.C.D. no longer trips, then you have correctly identified the problem.
- Repair or replace the component as instructed by the spa manufacturer.
- If you have unplugged all of the spa's components and the R.C.D. still doesn't reset, then the problem is most likely a ground fault in the heater.
- Disconnect the heater, and test.

Diagnosing M7 Topside Control Panels

Panel messages are a quick clue toward solving a variety of problems. Here are the most common messages and what they mean.

PRELIMINARY PANEL CHECK

- If the problem is not obvious, look on the topside control panel for diagnostic messages.
  If no messages are seen, run through all spa functions and note any inconsistent operation.
- Most error messages are stored in the fault log. To view the fault log, the spa must be in test mode and the spa light must be turned on.

Once you have determined that proper voltage is running through the circuit board and transformer, continue to the topside control panel. A panel that is not functioning properly may include the following symptoms: low voltage such as missing or scrambled segments, missing icons on the LCD, non-functional LED's, or nonfunctional buttons. If any of these symptoms are present, perform the following:

- Turn the power off and unplug the panel from the circuit board.
- Then, plug in your test panel and restore power. If everything functions normally, replace the topside panel.
- Disconnect ozone generator (if applicable).
- If you still see symptoms of low voltage, such as a sluggish, blank or partially blank panel, or if the display or the LED's do not function at all, turn the power off; unplug the ozone generator (if equipped); then restore power to the system. If the problem persists, turn off the power and replace the circuit board.

PANEL DISPLAY MESSAGES

THE PANEL DISPLAYS:

HH, OHH, or HTR TEMP LMT

At least one of the sensors has detected water temperatures of 48ºC inside the heater. Or,

THE PANEL DISPLAYS:

OH, OH5, **or** SPA TEMP LMT

One of the sensors has detected the temperature of the water coming into the heater to be 43.5ºC, and so the water in the spa is likely to be that hot. These indicate that the spa has shut down due to an overheat situation.

NOTE: Overheating may occur if the low-speed pump is set to operate for extended periods of time, or if the incorrect pump is installed. In rare cases (usually warmer climates), the circulation pump may also cause overheating.

MOST PROBABLE OVERHEATING CAUSES. INSPECT THESE FIRST

- Check slice or ball valves. Make sure that they are open.
- Make sure the correct pump is installed.
- Clean the filter/skimmer if there is any blockage.
- Check heater element alignment.
- Check for debris on the heater element.
- In extremely hot weather, check for proper cabinet ventilation.
- Make sure the temperature sensor is fully inserted into the sensor fitting on the heater.
- Check for excessive filter duration.

NOTE: A common programming mistake is overlapping filter times that may cause the spa to filter continuously.

- Check the water level.
- Check the water temperature with an accurate thermometer. Remove the spa cover and allow the water to cool to below 42°C. Adding cool water may be necessary. Touch any button to reset the system. If the water is still hotter than the set temperature, press the blower button (if applicable) to cool the spa.

THE PANEL DISPLAYS:

5A, SnA, SnH, or
SENSOR A
or SERVICE RQD

THE PANEL DISPLAYS:

Sb, Snb, Snt, or
SENSOR B
or SERVICE RQD

This indicates that the spa has shut down due to an open or faulty sensor. If the problem recurs, test the sensor set. (See Testing the Sensor Set.)

NOTE: In rare cases, rapid system overheat causes sensor error messages. Be sure to rule out possible situations like no flow or no water.

THE PANEL DISPLAYS:

Sn, SnS, or SENSOR SYNC

This indicates that the sensors are out of balance.

If alternating with temperature, it may just be a temporary condition. If flashing by itself, spa is shut down.
If the panel also displays "Service Req", spa is shut down.
If the spa shuts down due to this error, one (or both) of the sensors are probably reading several degrees off. If the problem recurs, test the sensor set.

NOTE: **All spa models are different in shape and size and have different thermal characteristics; therefore, Balboa Water Group cannot be held responsible for freeze damage to the spa's plumbing. Testing is the responsibility of the spa manufacturer and must be done to determine the best location for the freeze sensor.**

THE PANEL DISPLAYS:

IC, ICE, or FREEZE COND

This indicates that the auxiliary sensor detects a possible freeze condition. This is a normal spa function; no further action is necessary.

When the auxiliary sensor reads around 4.4°C (40°F, actual temperature dependent on specific auxiliary sensor used), the system provides freeze protection. It automatically activates all of the pumps and the blower to circulate water and warm the plumbing.

NOTE: This auxiliary freeze protection functions at all times, even when another fault condition has occurred and has otherwise shut the spa down.

Any time the lower of the two temperature sensors goes below 7°C (45°F), all pumps/blowers turn on. They continue to run for 4 minutes after the temperature reaches 7°C or above. As soon as the temperature falls below 7°C again, this process restarts. This "simplified" sensor freeze protection functions at all times, even when another fault condition (other than total sensor failure) has occurred and has otherwise shut the spa down.

THE PANEL DISPLAYS:

HL, HFL, or HTR FLOW LOW

This indicates that a substantial difference in temperature between sensors has been detected during heating.

This could indicate a flow problem. Check water level in spa. Refill, if necessary. If the water level is okay, make sure the pumps have been primed. *On the **fifth occurrence** of the above message the panel will display:*

Diagnosing M7 Topside Control Panels (cont.)

LF, or LOW FLOW

This indicates a persistent flow problem. The heater is shut down while all other spa functions continue to run normally. Power on the spa must be cycled before the heater will function again.

THE PANEL DISPLAYS:

dr, dr4, or HEATER MAY BE DRY-- WILL RETEST SHORTLY

This indicates that there is not enough water in the heater. Spa shuts down for 15 minutes.

This could indicate poor flow or air bubbles in the heater. On the third consecutive occurrence of the above message (without a successful heating cycle in between) the panel will display:

dY, dr4, or HEATER DRY SERVICE ROD

Spa is shut down and will not reset in 15 minutes. Press any button to reset manually.

THE PANEL DISPLAYS:

--F, --C, -.-C or --

This indicates that the temperature is completely unknown because the pump has not yet run for 2 minutes after Priming Mode was exited. This is only displayed for 2 minutes at power-up.

SOME TROUBLESHOOTING SCENARIOS

You find out the system is in "OHH". This alone doesn't explain a lot. What led up to the "OHH" is much more important. See if the user has any additional information (for example, how long before the "OHH" was the spa panel last checked, and how hot was the water then). If the spa has cooled, see whether the problem can happen again, this time watching carefully to see if there are additional clues leading to the "OHH" (for example, other messages that appear shortly before the "OHH" happens).

You find out the system keeps showing "HFL", or is now in "LF", or is shut down due to a "dry" fault. Put the spa in test mode with the light on, so that you see the two sensor temperatures. Are they normal (within .5°C/1°F) when not heating? How far apart are they when heating? "HFL" happens when they are 3°C/6°F apart (2°C/4°F on 120V and other low-heater-wattage systems), see how quickly that happens after heating starts. If it's getting close to that right away, it's probably a consistent flow problem, but if it's nowhere close to the "HFL"-causing temperature difference, the flow problem may be intermittent or only occur in certain specific situations.

LOW VOLTAGE

At Balboa, it's been our experience that the majority of the problems associated with electronic control systems are due to low voltage.

BROWN OUTS

"Brown outs" can have an effect on the spa's operation in a variety of ways. The control panel may go blank, have scrambled messages on the LCD, or only a few features will function.

If the system is getting the proper voltage at TB1, but still doesn't operate, then test for a blown power input fuse.

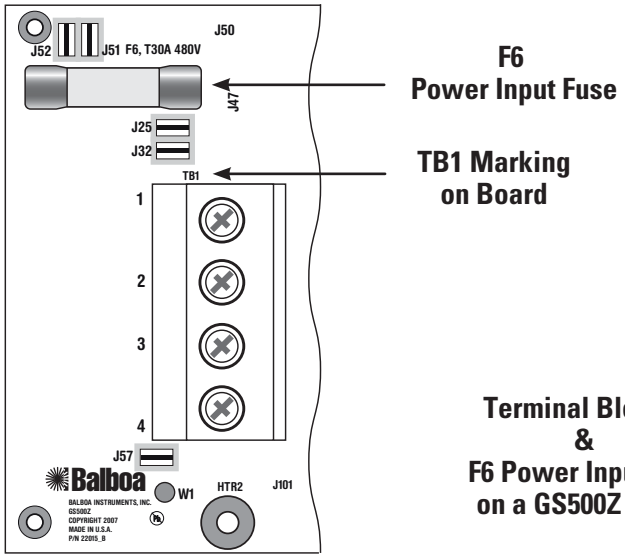
CHECKING THE SYSTEM POWER INPUT FUSE

Warning

These procedures are performed while the system is powered up and running under peak loads. Be careful.

Systems that use 230V peripheral devices (below):

- Measure between the brown TB1 terminal and F6 power input fuse on the side farthest away from the circuit board edge (opposite the F6 silk screen). You should see 230 volts.
- If the system is equipped with the additional F6 power input fuse, measure F6 in the same manner. You should also see 230 volts.
- If you determine that there is no voltage at one or both locations, then the system power input fuse(s) need to be replaced. Only use a fuse of the same type and amp rating when you replace any of these fuses.
- ***NOTE FOR ALL SYSTEMS*** In each situation, the most likely reason for the system power input fuse to blow is a pump problem. However, on occasion, a blower problem may also cause this fuse to blow if a 10A blower fuse is not built in.
(cont. next page)



Basic Control System Troubleshooting (cont.)

Once the power input fuse has been changed

- Check the voltage between the black and red wires again. Acceptable voltage range is between 216V and 264V.

These readings should be taken under peak load conditions.

Important

If the voltage is not in the acceptable range, call an electrician or the local electric company to diagnose the problem.

TO DETERMINE THE CAUSE OF A BLOWN POWER INPUT FUSE

Perform the following ***sequence of tests***.

Test the System

- Turn the power off.
- Be sure to replace the system power input fuse with the same type.
- Unplug the blower and all pumps.
- Restore the power and verify system operation.
- If the fuse blows, then re-check the internal system wires and connector for burns, cracks or cuts in insulation.
- If the fuse does not blow, turn the power off and plug in the pump.

NOTE: Be sure to test each device individually.

Test the Pump

- Restore the power and activate the pump.
- If the fuse blows, there is a pump problem.
- If the fuse does not blow, turn off the power.

Test the Blower

- Plug in the blower.
- Power up the system and activate the blower.
- If the fuse blows, then there is a blower problem.
- If the fuse does not blow, the combined pump and blower amperage may be excessive. To verify this, first check with your spa manufacturer for amperage draw limits on each device.
- Since the blower should now be running, you can check the amperage draw with an ammeter by measuring around the black blower wire and compare with manufacturer's specifications.

TEST THE AMPERAGE DRAW

- Turn off the power, disconnect the blower, make sure the pump is plugged in, and restore power.
- Start the pump and switch to high speed (if available), this should draw the most current.
- Make sure all jets and valves are open.
- Check the amperage at the red pump wire. Compare your reading with manufacturer specifications. (If the other plug-in devices exist, they should be tested in the same way.)
- If the amperage draw for each device is within manufacturer's specifications, the problem could be a nuisance spike in the pump, or water in the blower.

NOTE: These slow-blow fuses are not always discolored when blown. Always test continuity of a fuse with an ohmmeter.

NOTE: Miswiring of the spa is the most common reason for this fuse to blow. However, a lightning strike in the area is a possible, though less likely, cause of the failure.

Spa Behavior -- Start-up Information

See manufacturer's owners manual or reference card for general information on operating the spa, including programming filters and other settings that are changed from the topside control panel.

PRIMING MODE

In Priming Mode, the "Mode" button toggles the ozone on/off (with a 15-second time-out). This can be useful if you want to verify ozone generator operation without waiting for a filter cycle. This feature is not available on smaller panels where Mode is a multi-button sequence, since such a sequence exits Priming Mode.

GENERAL INFORMATION ON FILTER TIMES

- *On time capable panels,* the filter times and durations are completely programmable from the topside control panel, and the first filter may not run for many hours after power-up. If you want the filter to run sooner, you have to either reprogram the filter or advance the time to just before the filter start.
- *On all other systems,* the first filter starts 6 minutes after power-up and the duration can be chosen (either using button sequences on the topside control panel or via a DIP switch) between several preset choices. Note that if you let Priming Mode exit automatically after 4 minutes, you have 2 more minutes before the first filter runs after power-up. *Exiting Priming Mode by pressing the "Temp", Warm", or "Cool" buttons, allows up to 6 minutes available before the first filter runs.*

IMPORTANT INFORMATION: If the filter settings have just been changed, it may take up to 24 hours for the filter cycle to reflect the changes. This is especially likely when changing from a very long filter duration (such as Continuous), to a short one, or vice versa.

- The low-speed pump (on non-circ) and ozone generator (if installed) will run during the filter cycles.
- The blower runs for 30 seconds at the start of each filter cycle. This will maintain water quality in the air channel.
- The pumps (other than pump 1 in non-circ, including pump 1 in circ) will run for 5 minutes at the start of each filter cycle.

HEATER START UP INFORMATION

On M-7 systems, the heater goes through a testing phase every time it starts up to assure that there is adequate water flow. This provides sophisticated dry fire and low flow protection. It can be confusing if you don't know what to expect. Step by step, here is what happens. (Note that the timing/temperature details may be slightly different on some older M7 systems.)

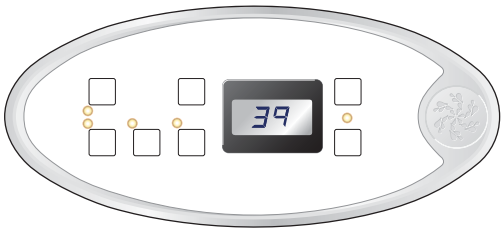
- Prior to heating, the pump is run for at least two minutes, and then the temperature difference between the sensors is assessed. It must be 1.0°C/ 2°F or less for heating to proceed, otherwise an error is issued.
- The heater turns on for 6.5 to 18 seconds (depending on heater voltage and wattage). At this point, the heat indicator on the panel is "solid". During this time the panel is not immediately responsive.
- The heater turns off for 90 seconds, making sure that the water flow keeps the temperature rise small and short. (Abnormal water flows, or lack of water, will produce a large and/or long temperature rise, and the system faults in that situation.) At this point, the heat indicator on the panel may appear to "shimmer" or "dim" (on some panels this may be less obvious from certain angles and more obvious from other angles, or in different lighting).
- If the dry fire test has passed, heating turns back on to heat the spa. The heat indicator on the panel returns to "solid".
- During spa heating, a difference between the sensors of 1.0°C /2°F, or perhaps 1.5°C/3°F, is considered normal. A significantly higher difference, however, is usually indicative of a flow problem, and will cause a fault which disables the heating for at least a minute (and then restarts the whole above process).

ML Series Panels -- For Use with EL and GL Systems

ML900

ML700

ML554



ML553

ML551

ML550

ML400

ML260

ML240

ML200

"Molex" type ML/GL Connector

ML900 Panel Operation

Diagnostic Messages section for the ML900 is unique. Refer to the User Guide for additional information.
User Guide for panel ML900 is 40568-99.

Initial Start-up

When your spa is first actuated, it will go into Priming mode (after displaying some configuration information). Please see "Spa Behavior -- Start-up Information" for additional information.

The Priming mode will last for up to 4 minutes and then the spa will begin to heat and maintain the water temperature in the Standard mode. You can exit Priming mode early by pressing "Warm" or "Cool".

Mode/Prog

This button is used to switch between standard, economy, and sleep modes. Press "Mode/Prog" to enter mode programming, press "Cool" to cycle through to desired mode (LCD flashes until confirmed), then press "Mode/Prog" to confirm selection

Standard mode maintains the desired temperature. Note that the last measured spa temperature displayed is current only when the pump has been running for at least 1 minute. The "***STANDARD***" icon will display until the mode is changed.

Economy mode heats the spa to set temperature only during filter cycles. The "***ECONOMY***" icon will display until mode is changed. Pressing "Jets 1" while in Economy mode puts the spa in Standard-In-Economy mode, which operates the same as Standard Mode, then reverts to Economy Mode automatically after 1 hour. Both the "***STANDARD***" and "***ECONOMY***" icons display in this mode. During this time, a press of the "Mode/Prog" button will revert to Economy Mode immediately.

Sleep mode heats the spa to within 11°C (20°F) of the set temperature only during filter cycles. The "***SLEEP***" icon will display until mode is changed.

Standby Mode

Pressing "Warm" or "Cool" then "Jets 2" will turn off all spa functions temporarily. This is helpful when changing a filter. Pressing any button resets the spa. On some systems the "Jets 1" button will control the pump in Standby Mode ("Drain Mode"). In this case, press any other button to exit.

Locking the Panel

Press "Time" "Jets 1" then "Warm" within 3 seconds. When locked, the PL "PL ○" light will light. All buttons are frozen except the "Time" button. To unlock the panel, press "Time" "Jets 1" then "Cool".

Locking the Set Temperature

Press "Warm" or "Cool" then "Time", "Jets 1", and "Warm" within 3 seconds to activate the lock. The TL "TL ○" light will light when the set temperature is locked.
To unlock the set temperature, press "Warm" or "Cool" then "Time", "Jets 1" and "Cool".

Time

When time hasn't been programmed, the "***TIME***" icon flashes. (Time settings on EL1000 and some EL2000 systems are not preserved in the event of power loss; time will have to be reprogrammed upon each power up.)

Setting the Time

Once the spa has been properly connected the first time (every power up on the EL1000 and some EL2000 systems), notice the "***TIME***" icon appearing on the screen.

Press Time then Mode/Prog

Select the hour by pressing Warm ***Or*** Cool *(Each press changes the time by 1 minute)*

Press Mode/Prog to enter.

Select minutes by pressing Warm ***Or*** Cool *(Each press changes the time by 1 minute)*

Press Mode/Prog to exit the time setting procedure and enter the optional filter cycle programming. (Exits programming on some EL1000 and some EL2000 systems.)

Press Time to exit programming.

ML700 Panel Operation

Diagnostic Messages section for the ML700 is unique. Refer to the User Guide for additional information.
User Guide for panel ML700 is 40520-99.

Initial Start-up

When your spa is first actuated, it will go into Priming mode (after displaying some configuration information). Please see "Spa Behavior -- Start-up Information" for additional information.

The Priming mode will last for up to 4 minutes and then the spa will begin to heat and maintain the water temperature in the Standard mode. You can exit Priming mode early by pressing "Warm" or "Cool".

Mode/Prog

This button is used to switch between standard, economy, and sleep modes. Press "Mode/Prog" to enter mode programming, press "Cool" to cycle through to desired mode (LCD flashes until confirmed), then press "Mode/Prog" to confirm selection.

Standard mode maintains the desired temperature. Note that the last measured spa temperature displayed is current only when the pump has been running for at least 1 minute. The "***STANDARD***" icon will display until the mode is changed.

Economy mode heats the spa to set temperature only during filter cycles. The "***ECONOMY***" icon will display until mode is changed. Pressing "Jets 1" while in Economy mode puts the spa in Standard-In-Economy mode, which operates the same as Standard Mode, then reverts to Economy Mode automatically after 1 hour. Both the "***STANDARD***" and "***ECONOMY***" icons display in this mode. During this time, a press of the "Mode/Prog" button will revert to Economy Mode immediately.

Sleep mode heats the spa to within 11°C (20°F) of the set temperature only during filter cycles. The "***SLEEP***" icon will display until mode is changed.

Standby Mode

Pressing "Warm" or "Cool" then "Jets 2" will turn off all spa functions temporarily. This is helpful when changing a filter. Pressing any button resets the spa. On some systems the "Jets 1" button will control the pump in Standby Mode ("Drain Mode"). In this case, press any other button to exit.

Locking the Panel

Press "Time" "Jets 1" then "Warm" within 3 seconds. When locked, the PL "PL" light will light. All buttons are frozen except the "Time" button. To unlock the panel, press "Time" "Jets 1" then "Cool".

Locking the Set Temperature

Press "Warm" or "Cool" then "Time", "Jets 1", and "Warm" within 3 seconds to activate the lock. The TL "TL" light will light when the set temperature is locked.
To unlock the set temperature, press "Warm" or "Cool" then "Time", "Jets 1" and "Cool".

Time

When time hasn't been programmed, the "***TIME***" icon flashes. (Time settings on EL1000 and some EL2000 systems are not preserved in the event of power loss; time will have to be reprogrammed upon each power up.)

Setting the Time

Once the spa has been properly connected the first time (every power up on the EL1000 and some EL2000 systems), notice the "***TIME***" icon appearing on the screen.

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Select minutes by pressing Warm ***Or*** Cool *(Each press changes the time by 1 minute)*

Press Mode/Prog to exit the time setting procedure and enter the optional filter cycle programming. (Exits programming on some EL1000 and some EL2000 systems.)

Press Time to exit programming.