Gecko's Spa-paks

TSPA POWER SPA PACK SERVICE MANUAL

Visual step-by-step guide to easily identify & correct technical problems!

GECKO

Contents

Topics covered in this manual are as follows:

In order to be as useful as possible, this manual was written in two distinct formats. Problem solving solutions are described with trouble shooting flow charts and step-by-step procedures.

They should be used together, flow charts giving a global overview of specific problems while step-by-step procedures are more detailed.

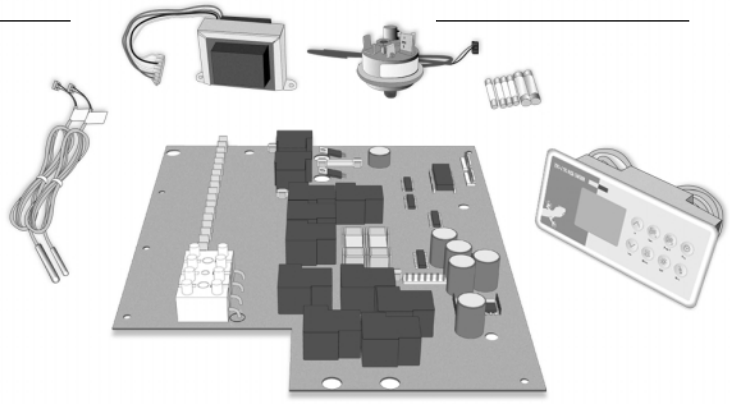
Tools & Parts

Tools, test equipment and components are necessary to perform service calls on a TSPA power spa pack.

Required tools:

Pliers
Phillips & flat screwdrivers
11/32" nut driver
1/4" open end wrench
3/8" open end wrench
Jumper cable
Multimeter
GFI tester & digital thermometer (optional)

Required pack parts:

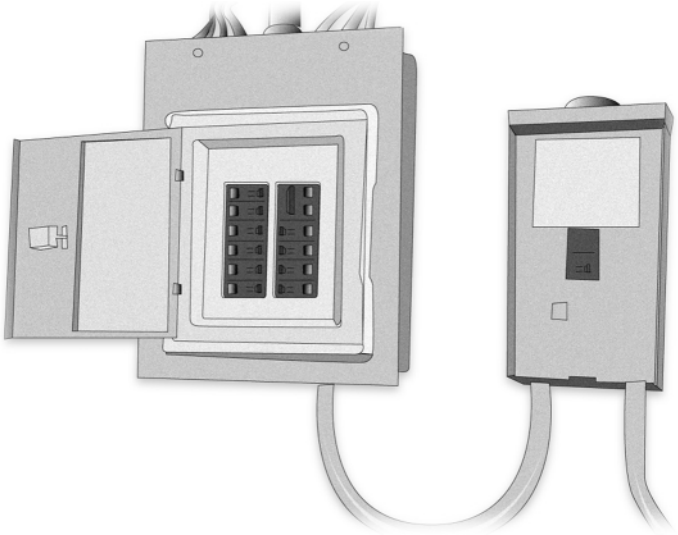


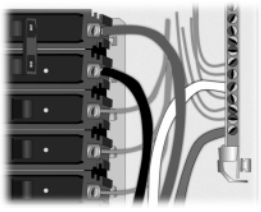
Regulation sensor
Hi-Limit sensor
TSPA system board
(or complete spa pack)
Transformer
Pressure switch
Fuses
Top side control

Gecko Electronic Inc. sells Professionnal Repair Kits that include everything needed for TSPA power spa pack servicing.
Go to last page of this manual for more information.

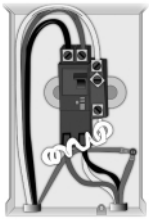
Electrical Wiring

Proper wiring of the electrical service box, GFCI box and pack terminal bloc is essential.

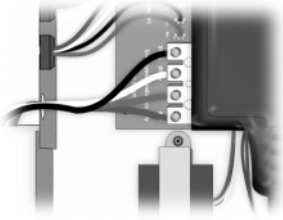




Electrical Box



GFCI

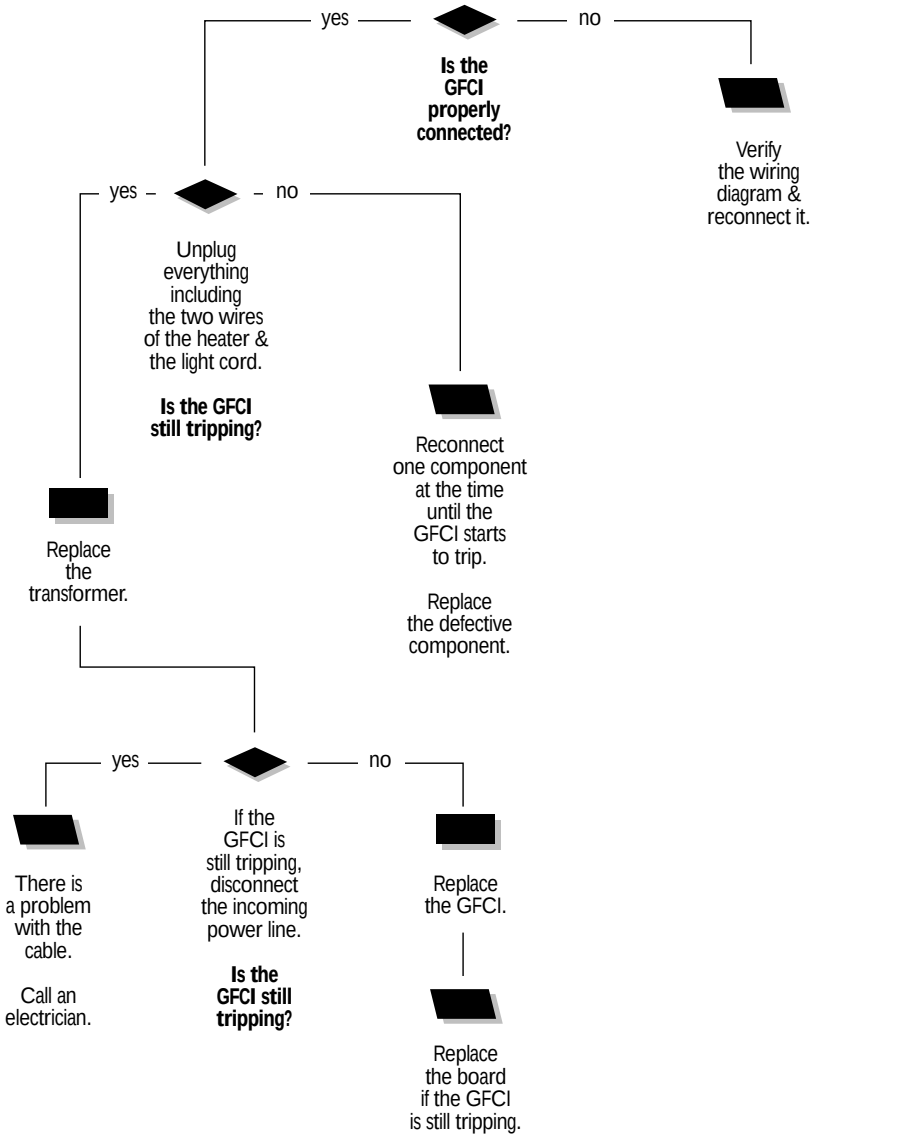


Pack Terminal Bloc

1• Make a visual inspection for signs of mis-wiring.
Refer to supplied wiring diagrams.
Call an electrician if necessary.

GFCI Flow Chart

If the GFCI trips,
follow this troubleshooting flow chart to identify the source of the problem:



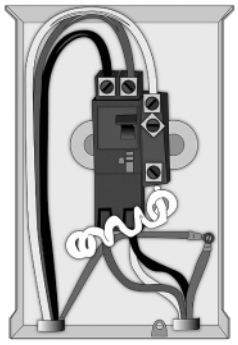
GFCI Trips!

If everything is connected and nothing seems to work, there is probably a problem with the power supply. Perform the following tests to identify and correct the problem:

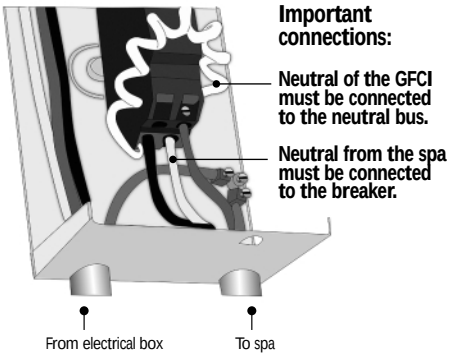
Note that in new installations, GFCI trippings due to miss-wiring are very common. If the breaker is wired properly, GFCI trippings can be caused when the total amount of current drawn by the spa exceeds the rating of the breaker. Such an occurrence is very unlikely since each output of the spa pack is individually fused and fuses will blow before the GFCI trips.

A current leak to the ground will also make the GFCI trip. If one of the components is faulty and there is a leak of more than 5mA, the GFCI will trip to prevent electrocution.

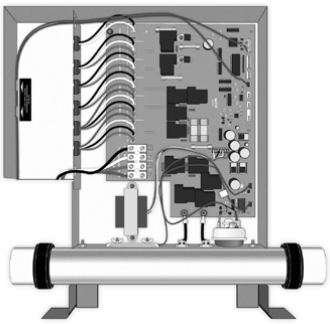
There are different models of GFCI used on the market. Note that our illustrations are generic.



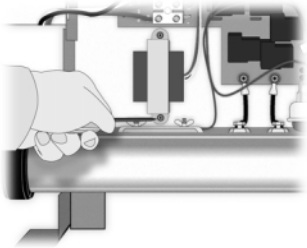
1• Verify if the GFCI is properly connected.



2• If it is not, verify the GFCI wiring diagram and reconnect it.



3• If the GFCI is properly connected but still tripping, unplug all outputs including the two wires of the heater & the light cord.

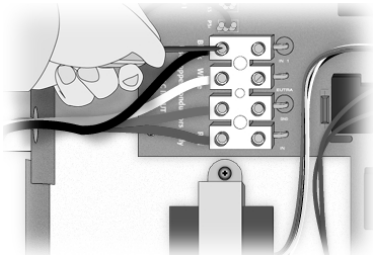


4• If the GFCI still trips, replace the transformer.

If it stops tripping, reconnect one component at the time until the GFCI starts to trip. Replace the defective component.

GFCI Trips!

If the GFCI still trips even after the replacement of the transformer, perform the following tests to correct the problem:



1• Disconnect the incoming power lines.

   If the GFCI still trips, there must be a problem with the cable. **Call an electrician.**

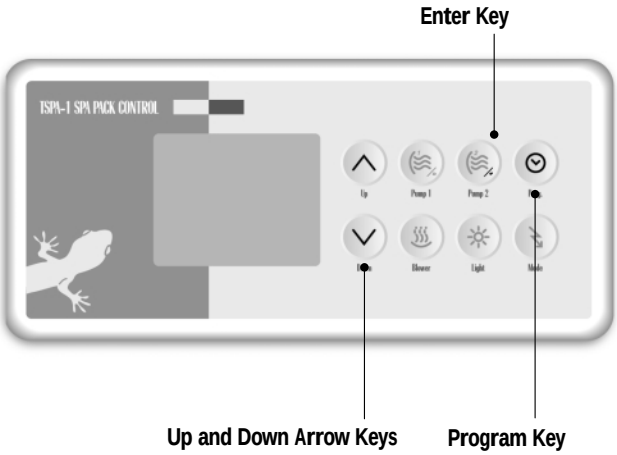
2• If the GFCI stops tripping. Replace the GFCI.

3• If the GFCI trips again, replace the board. (Refer to the "How to replace the board" section of this manual.)

Low Level Programming

Unique feature that allows the spa manufacturer to configure the spa pack to their own needs.

The configuration is programmed from the keypad and is stored into a permanent memory. Most of the time, the user does not have access to this memory. However, if the configuration has not been set properly or if the end user has accessed the configuration menu by mistake, it is possible that the system will not function normally because wrong parameters have been entered.



We suggest that you review the configuration of the low level programming every time you visit a customer.

Specific settings are supplied by the spa manufacturer.

To access low level programming, the programmer must press the program key (or the On/Off key for a TSPA-2) and hold it for 20 seconds. After this period, the display will show the parameter code (one or two digits) and a value (two or three digits).

Use the Up and Down arrows to change the parameter value and the Pump 2 key to go from one parameter to the next. You must go through all parameters to get out this mode. If you do not want to change a parameter, just press Pump 2 to go to the following one.

List of parameters.

1- Pump 1
Code: P1
Value: 1 = single speed pump, 2 = two speed pump.

2- Pump 2
Code: P2
Value: 0 = no pump, 1 = single speed pump, 2 = two speed pump.

3- Blower
Code: bL
Value: 0 = no blower, 1 = 1 speed blower, 2 = 2 speed blower, 3 = 3 speed blower output.

4- Light
Code: LI
Value: 0 = no light, 1 = 12 volts On/Off,
2 = 12 volts 3 intensities, 3 = 120 volts (circulation pump output)
4 = Internal fiber box control (Fiber light on blower output, Fiber motor on CP output)

5- Ozone
Code: 03
Value: 0 = no ozone lamp, 1 = ozone activated during filter cycle,
2 = ozone output always on

6- AUX configuration
Display: AUx
Value: 0 = nothing installed, 1 = EXMS Fiber box controller installed
2 = DJS-1 massage controller installed

7- Time format
Code: TI
Value: 12 = 12 hours format, 24 = 24 hours format.

8- Current selection
Code: Cu
Value: 1 = no restrictions, 0 = Heater off when 2 pumps are running at high speed.

9- Circulation pump
Code: CP
Value: 0 = no circulation pump, 1 = circulation pump off when water temp. is 2°F higher than set point, 2 = circulation pump on all the time.

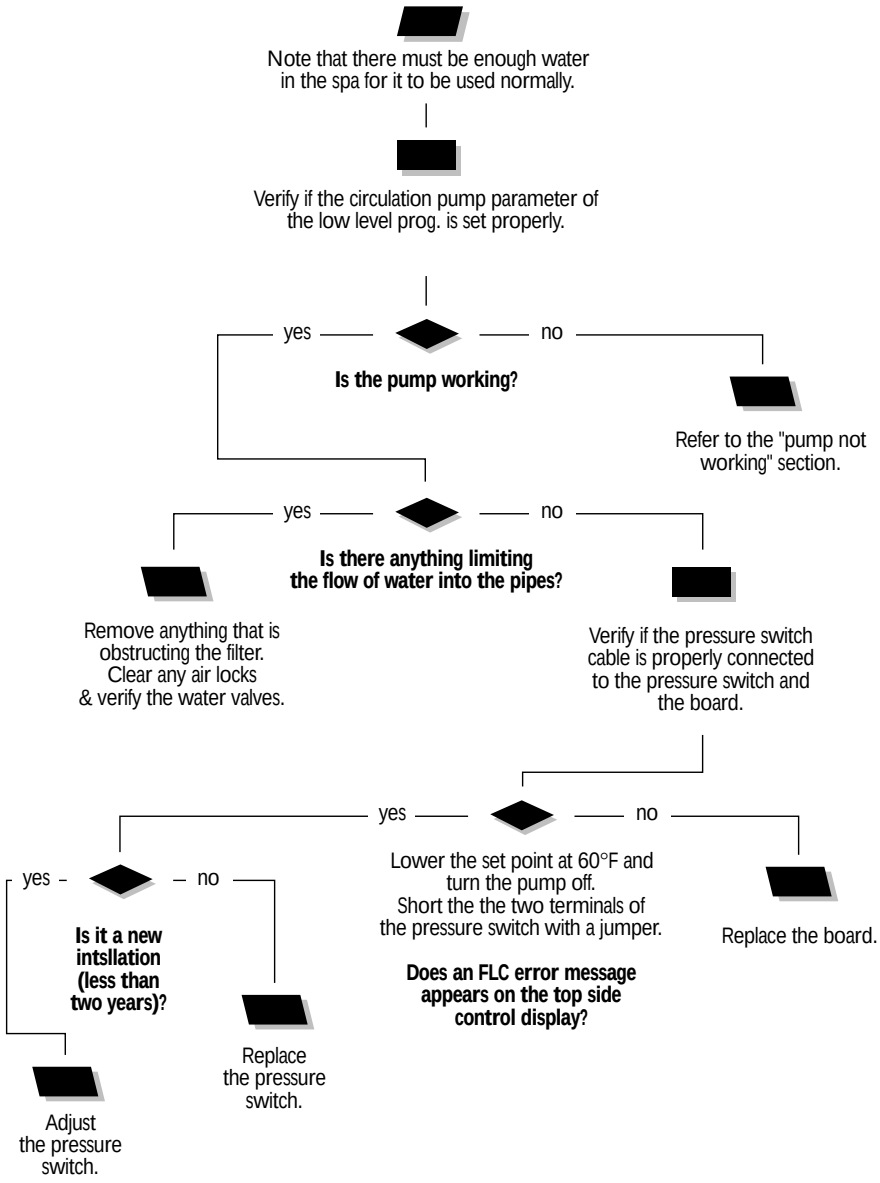
10- Temperature probe calibration
Code: r
Value: 46.0 to 55.9

On each temperature probe, there is a calibration tag with a 3 digit number, ex: .495. To insure a good calibration of the unit, you must enter the same 3 digit number into this parameter (disregard the position of the dot).

FLO Flow Chart

If an FLO message (problem with the pressure switch: pump is on but no water pressure detected) appears on the top side control display, follow this troubleshooting flow chart to identify the source of the problem:

For packs manufactured before 1/1/98, you have to press a key after each step to reset the system.



FLO Error Message

The FLO message is related to the pressure switch.
If the system does not detect any pressure when the pump is manually or automatically turned on, the message FLO will appear on the display.

For packs manufactured before 1/1/98, every time the FLO message appears on the display, the message will remain on until a key (any key) is pressed. You have to press a key between each of the following corrective steps.

Note that there must be enough water in the spa for it to be used normally. The FLO message can occur when the spa filter is dirty or when something limits the flow of water in the pipe.

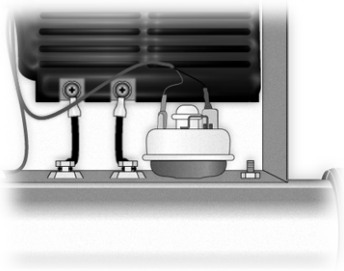
For packs manufactured after 1/1/98, the heater is shut off when an FLO message appears. For packs manufactured in 97 and before, the pump and the heater are shut off when an FLO message appears.

Power can remain On when the following steps are performed.

1• Verify the the circulation pump low level programming parameters are set properly:
Code: CP
0 = no circulation pump,
1 = circulation pump off when water temp. is 2°F higher than set point
2 = circulation pump on all the time.

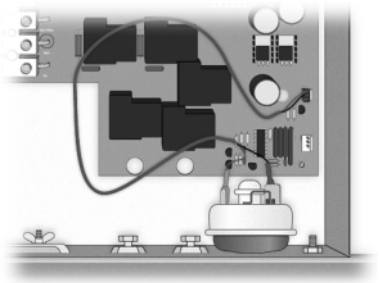
2• Verify if the pump is working. If the pump is not functioning properly, refer to the pump section of this manual.

3• Make sure to clean the filter and to look for air locks, closed trap valves or anything that could limit the flow of water.



4• Verify if the pressure switch cable is properly connected to the pressure switch and the board.

FLO Error Message



4• Turn all pumps off.
For systems with a circulation pump, the circulation pump parameter should be set to 1 (not 2) for the following test.

5• If the problem has not been solved, lower the set point to 60° by pressing on the down arrow key. Then short the two terminals of the pressure switch with the jumper cable.

6• An FLC message should appear on the display.

The FLC message identifies the pressure switch as the source of the problem.

If the installation is older than 2 years, replace the pressure switch and recalibrate it.

If the installation is recent, try to readjust the pressure switch. If it is not possible, replace the switch.

(Refer to the "How to adjust the pressure switch" section of this manual)

7• If the FLC message does not appear on the display, the problem could be either with the switch cable or the board.

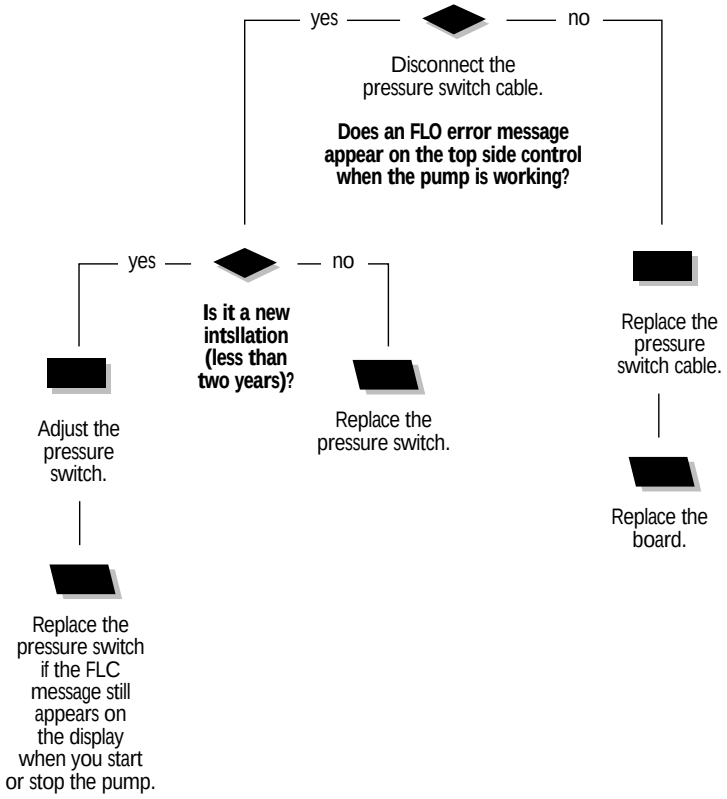
Remove the plastic cover and replace the cable.

8• Replace the board if the FLO error message is still displayed on the top side control.
(Refer to the "How to replace the board" section.)

FLC Flow Chart

If an FLC message (problem with the pressure switch: pump is off but water pressure is detected) appears on the top side control display, follow this troubleshooting flow chart to identify the source of the problem:

For packs manufactured before 1/1/98, you have to press a key after each step to reset the system.

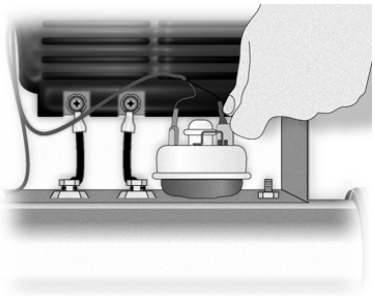


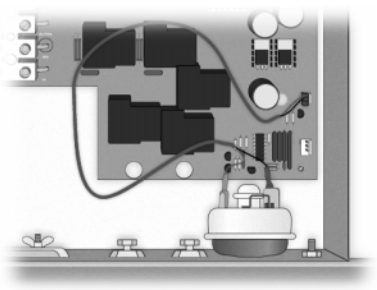
FLC Error Message

The FLC message is related to the pressure switch.
If the system detects any pressure when the pump is off, the message FLC will appear on the display.

For packs manufactured before 1/1/98, every time the FLC message appears on the display, the message will remain on until a key (any key) is pressed. You have to press a key between each of the following corrective steps.

Power can remain On when the following steps are performed.





1• Disconnect the pressure switch cable.

If an FLO message appears on the top side control display when the pump is started, adjust the pressure switch if it is a new installation (less than two years) or replace the pressure switch. (Refer to the "How to adjust the pressure switch" section of this manual)

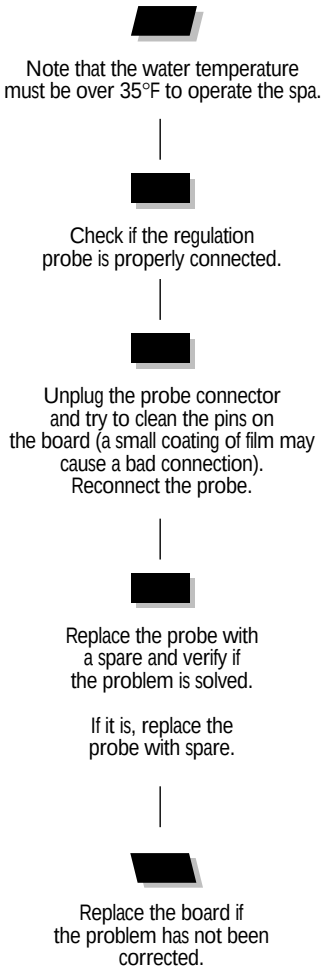
2• If the top side control does not display the FLO message, remove the plastic cover and replace the pressure switch cable.

3• Replace the board if the FLC error message is still displayed on the top side control. (Refer to the "How to replace the board" section of this manual)

Prr Flow Chart

If a Prr message (potential problem with the regulation sensor) appears on the top side control display, follow this troubleshooting flow chart to identify the source of the problem:

Press a key after each step to reset the system.



Prr Error Message

The Prr message is related to problems with the regulation sensor. The system is constantly verifying if the reading of the temperature probe is within normal limits.

Note that the temperature of the water should be over 35°F to perform the following steps. Press a key after each step to reset the system. Power can remain On.

1• Verify if the regulation probe (the sensor located in the spa) is properly connected.

2• Disconnect the probe connector and try to clean the probe connector pins. A small coating of film may cause a bad connection.

3• Reconnect the probe.

If the Prr message is still displayed on the top side control, replace the probe with a spare and place its head directly in the spa water.

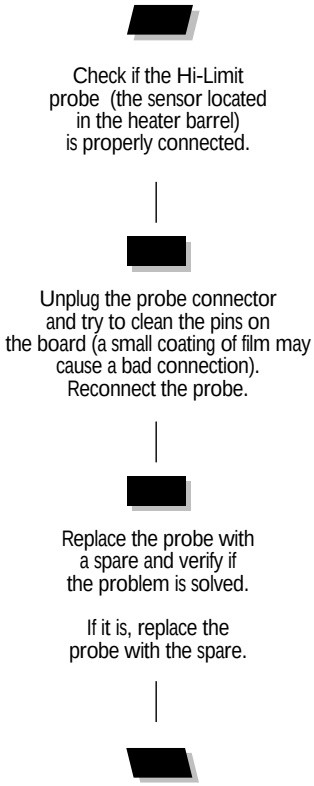
If the problem is solved, replace the probe.

4• Replace the board if the problem has not been corrected.

PrH Flow Chart

If a PrH message (potential problem with the Hi-Limit sensor) appears on the top side control display, follow this troubleshooting flow chart to identify the source of the problem:

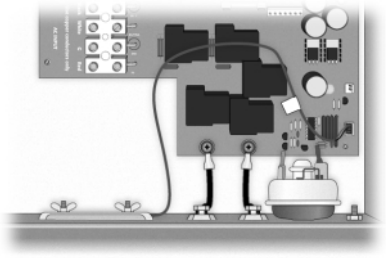
Press a key after each step to reset the system.



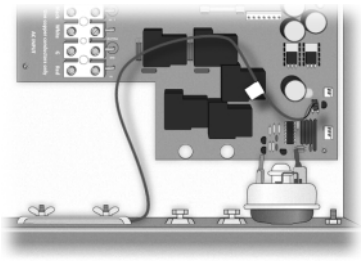
Prh Error Message

The Prh message is related to problems with the Hi-Limit sensor. The system is constantly verifying if the reading of the Hi-Limit sensor is within normal limits.

Press a key after each step to reset the system.
Power can remain On.



1• Remove the plastic cover and verify if the hi-limit probe (the sensor located in the heater barrel) is properly connected.



2• Disconnect the probe connector and try to clean the probe connector pins. A small coating of film may cause a bad connection.

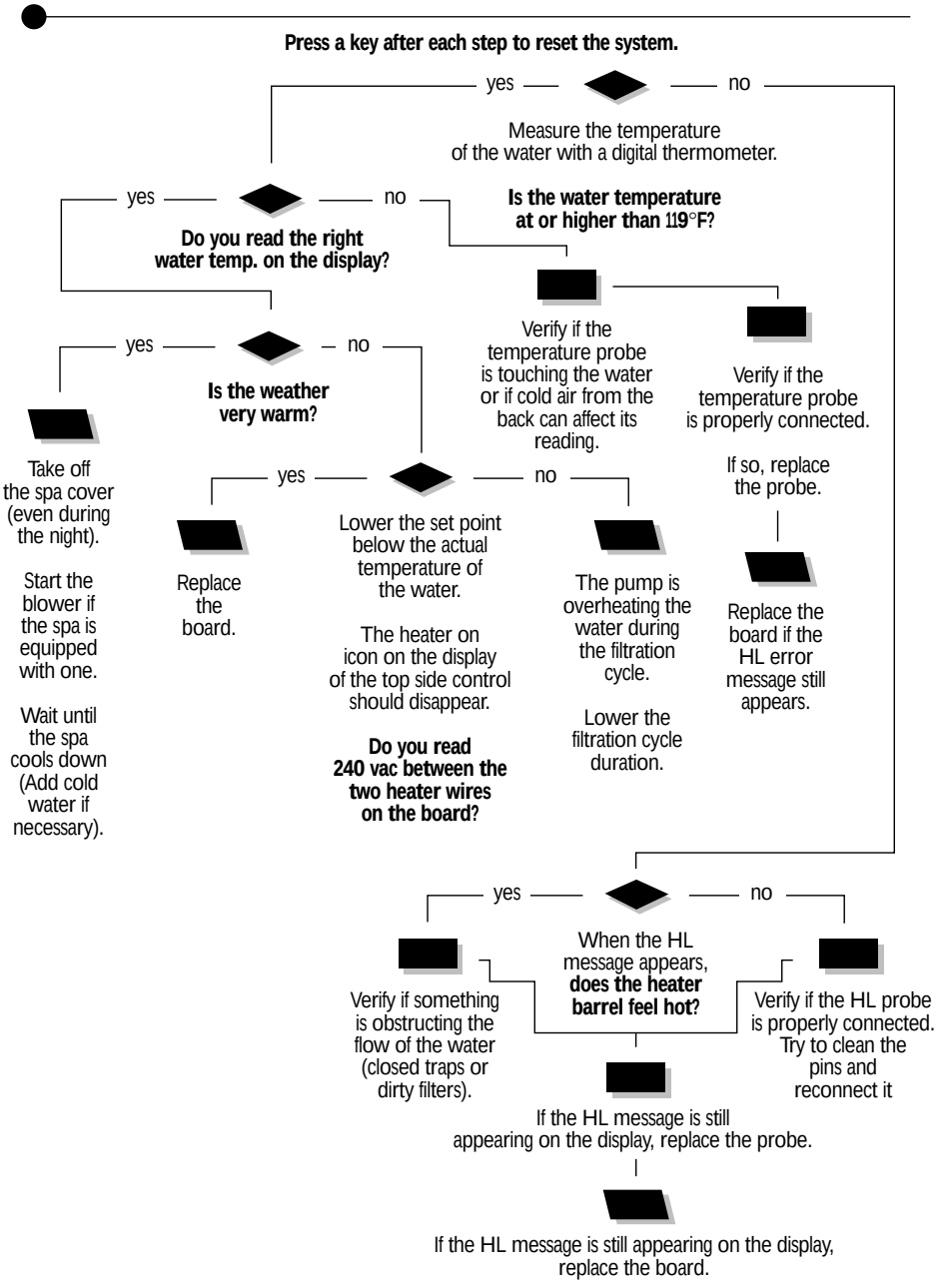
3• Reconnect the probe.

If the Prh message is still displayed on the top side control, replace the probe with a spare and verify if the problem is solved.

4• Replace the board if the problem has not been corrected.

HL Flow Chart

If an HL message (potential problem with the Hi-Limit sensor) appears on the top side control display, follow this troubleshooting flow chart to identify the source of the problem:



HL Error Message

The HL message is related to the Hi-Limit sensor. It will appear on the display whenever water temperature at the hi-limit sensor exceeds 119°F.

Press a key between each step to reset the system.
Power can remain On.

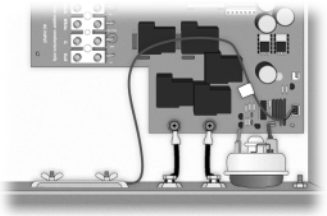
1• Measure the temperature of the water with a digital thermometer.

2• **If the reading is below 119°F:**

a- Check if the heater barrel feels hot

If it is hot, verify if something is obstructing the flow of water (closed valves or dirty filter).

b- If it is not, verify if the Hi-Limit probe is properly connected.



Try to clean the probe connector pins. A small coating of film may cause a bad connection.

Reconnect the probe.

c- If the HL message is still appearing on the display, replace the probe.

d- If the problem is not solved, replace the board. (Refer to the "How to replace the board" section of this manual)

3• **If the reading is at or higher than 119°F**

Go to next page if the top side display shows the right temperature.

Go to page 24 if the display does not show the right temperature.

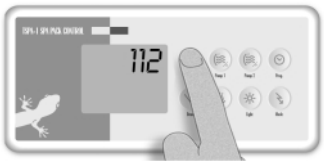
HL Error Message

If a digital thermometer reading of the water temperature is at or higher than 119°F and the display of the top side control shows the right temperature, perform the following tests.

If the weather is very warm:

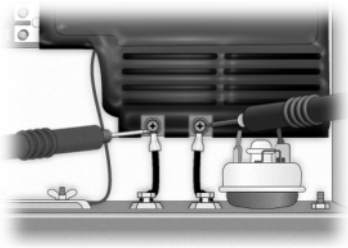
1• Take off the spa cover (even during the night). Start the blower if the spa is equipped with one. Wait until the spa cools down (Add cold water if necessary).

If the weather is not a factor:



2• Lower the set point below the actual temperature of the water.

The heater on icon on the top side control display should disappear.



3• Remove the spa cover. With a voltmeter, read the voltage between the two heater wires on the board.

4• **If you do not read 240 vac**, the pump may be overheating the water during the filtration cycle.

Enter the programming mode and lower the filtration cycle duration.

5• **If you do read 240 vac,** replace the board. (Refer to the "How to replace the board" section of this manual.)

HL Error Message

If a digital thermometer reading of the water temperature is at or higher than 119°F and the display of the top side control does not show the right temperature, perform the following tests.

1• Verify if the temperature probe is in contact with water and if cold air coming from the back can affect its readings.

Use foam to isolate the probe from cold air if it is the source of the problem.

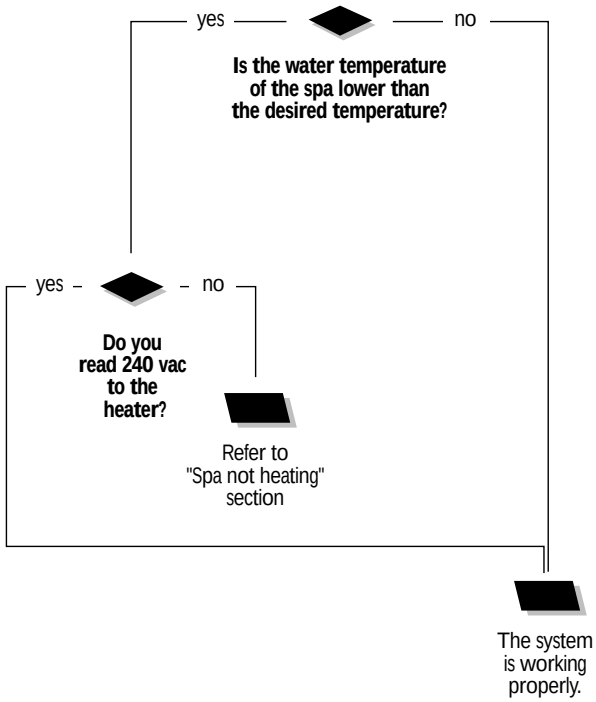
2• Verify if the temperature probe is properly connected.

If it is, replace the probe.

3• Replace the board if the HL error message still appears on the display. (Refer to the "How to replace the board" section of this manual.).

Freeze Flow Chart

If a FrEE message appears on the top side control display, follow this troubleshooting flow chart to identify the source of the problem:

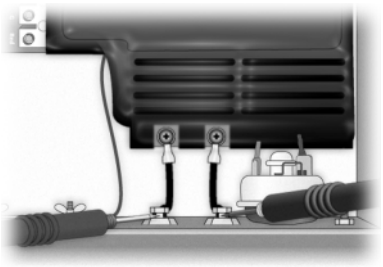


FrEE Error Message

The FrEE message is related to the freeze protection of the system. The system will enter a protective mode if it detects water cold enough to freeze the pipes.

Power can remain On.

1• With a digital thermometer, verify the temperature of the water.



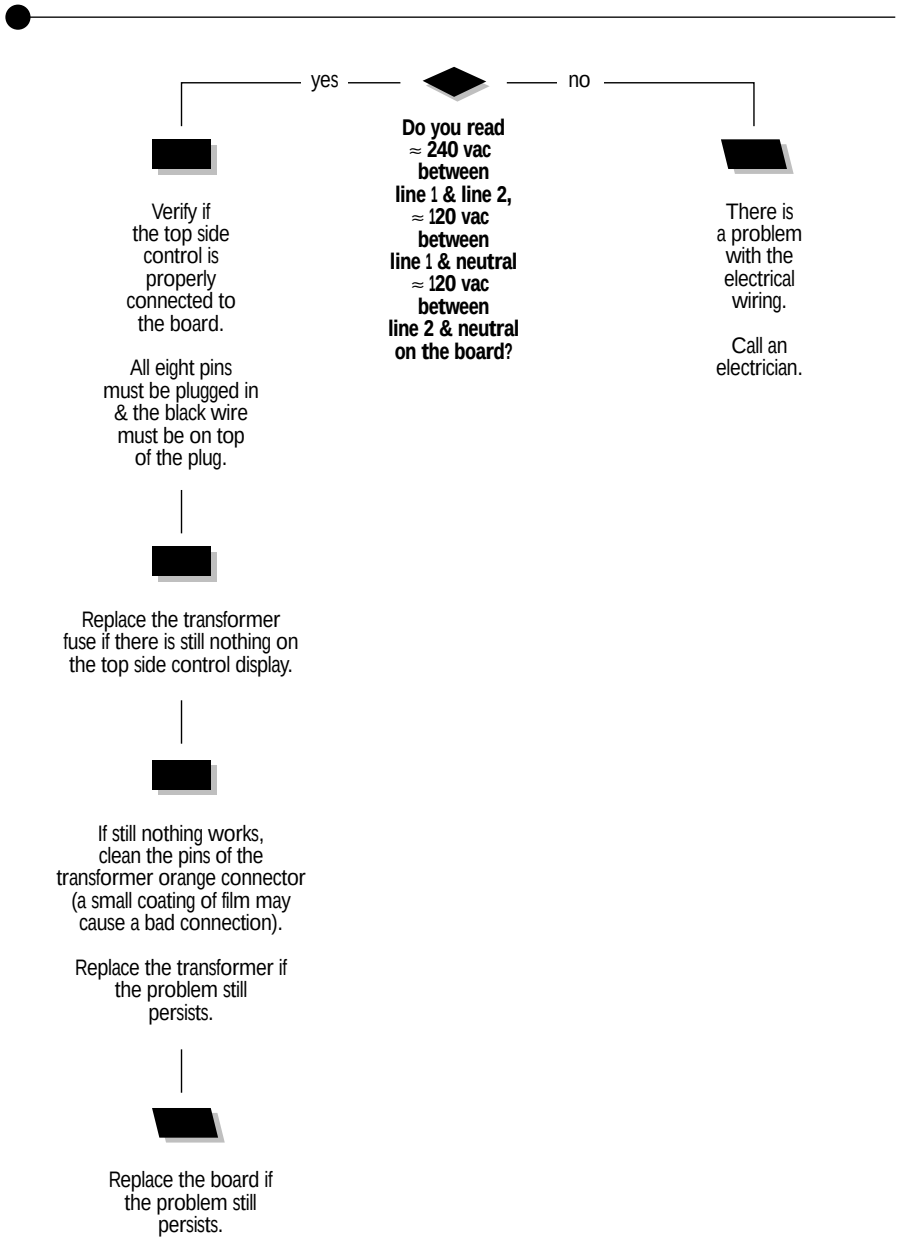
2• If the water temperature is lower than the desired temperature, measure the voltage to the heater.

If you read around ≈240 vac, the freeze protection system is working properly.

If you do not read ≈240 vac, refer to the "Spa not heating" section of this manual.

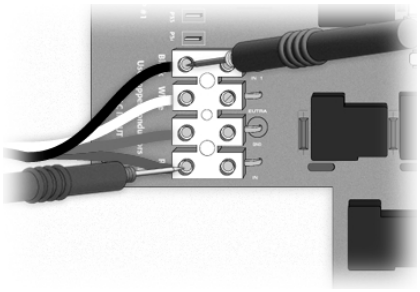
"Nothing Works!" Flow Chart

If nothing seems to work,
follow this troubleshooting flow chart to identify the source of the problem:

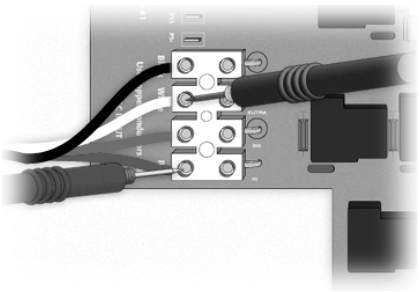


Nothing Works!

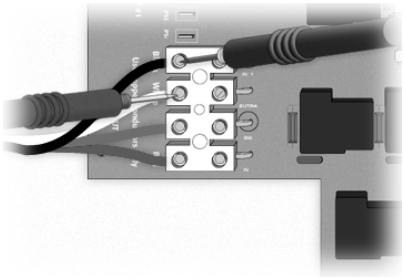
If everything is connected and nothing seems to work, there is probably a problem with power supply. Perform the following tests to identify and correct the problem:



1• On the terminal block, measure the voltage between line 1 (black) and line 2 (red).
You should get ≈240 vac.



3• Measure the voltage between line 2 (red) and neutral (white).
You should get ≈120 vac.



2• Measure the voltage between line 1 (black) and neutral (white)
You should get ≈120 vac.

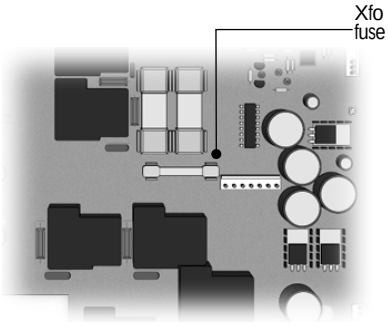
4• If you do not get good readings, there must be a problem with the electrical wiring.

Call an electrician.

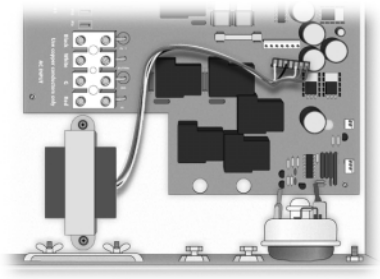
Nothing Works!

If you are getting good voltage readings but nothing seems to work, perform the following tests to correct the problem:

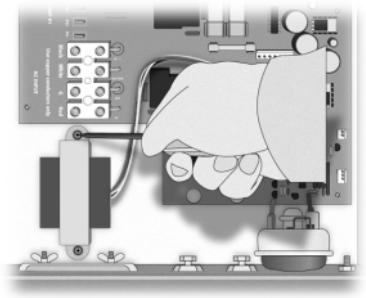
1• Verify if the top side control is properly connected to the board.



2• Replace the transformer fuse if there is still nothing working.



3• If nothing works, clean the pins of the transformer orange connector. A small coating of film may cause a bad connection.

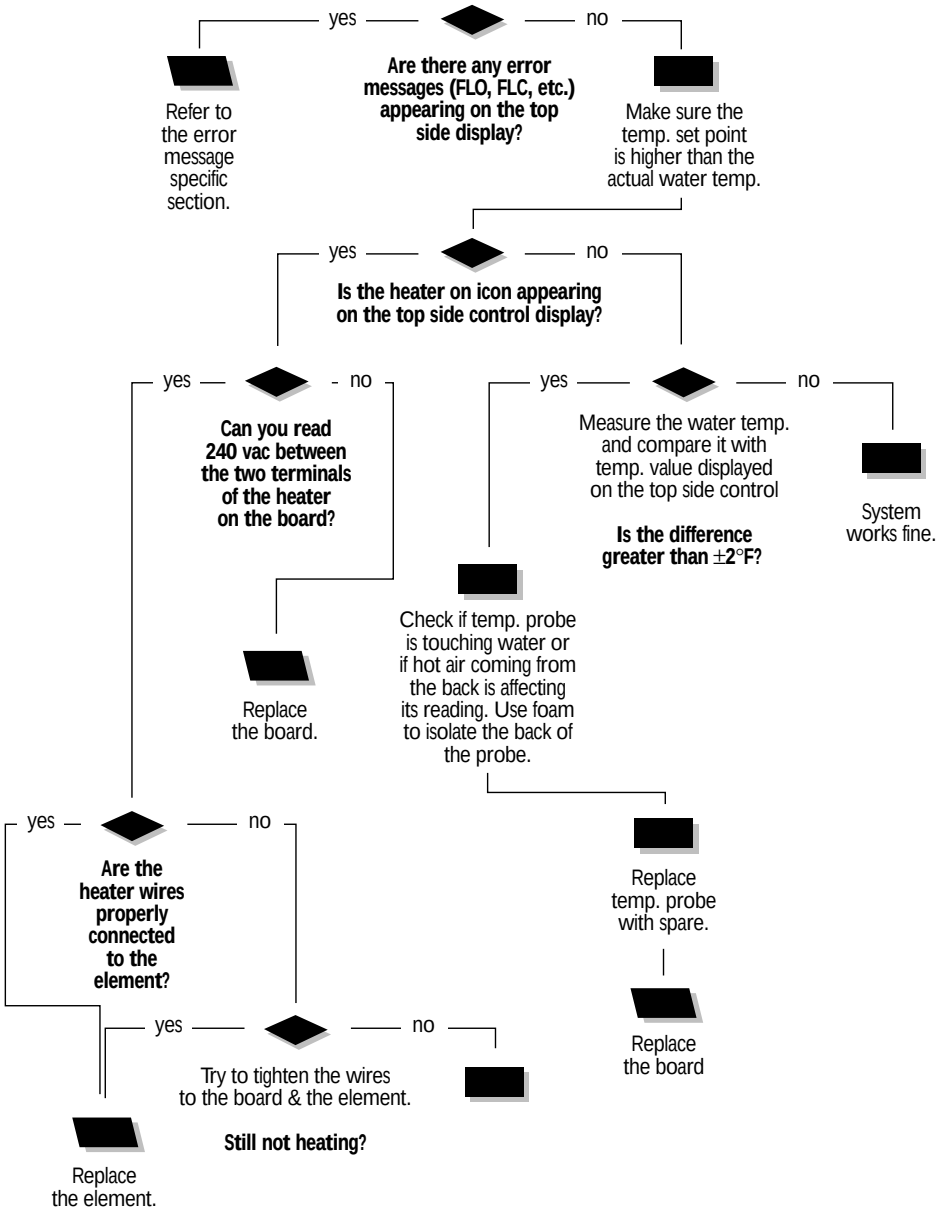


4• Replace the transformer if the problem persists.

5• If the problem is still not solved, replace the board. (Refer to the "How to replace the board" section.)

"Spa Not Heating" Flow Chart

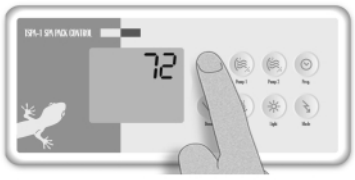
If the spa seems to not be heating the water,
follow this troubleshooting flow chart to identify the source of the problem:



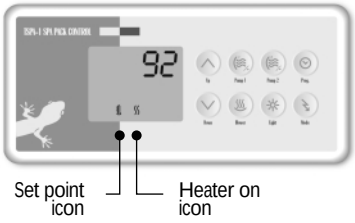
Spa Is Not Heating!

If the spa seems to not be heating the water, perform the following tests to correct the problem:

1• Verify if there is an error message displayed on the top side control. If it is the case, refer to the specific section of the error message.



2• If it is not, verify if you can call for heat by increasing the temperature set point. Press on the Up Arrow key to increase the temperature set point.



3• Verify if the heater on icon appears on the top side control display.

The icon will be on when the heater is working. It will flash if there is a call for heat but the heater has not started yet.

4• If the icon is not appearing on the display, with a digital thermometer, measure the water temperature and compare your reading with the temperature value displayed on the top side control.

If the values are different (±2°F), check if the sensor is touching the water or if hot air from the back is affecting its readings.

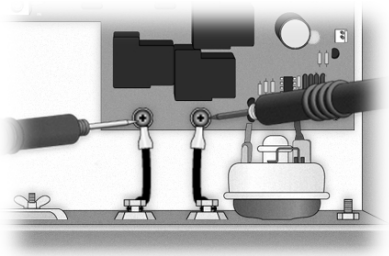
5• If so, use foam to isolate the back of the probe.

6• If not, replace the temperature sensor with a spare one.

7• If the spa is still not heating, replace the board.

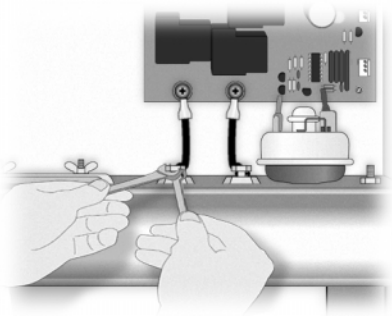
Spa Is Not Heating!

If the heater on icon appears and the spa is still not heating, perform the following tests to correct the problem:



1• Remove the plastic cover and measure the voltage between the two heater screws on the board.

Replace the board if you are not getting a reading of ≈240 vac.



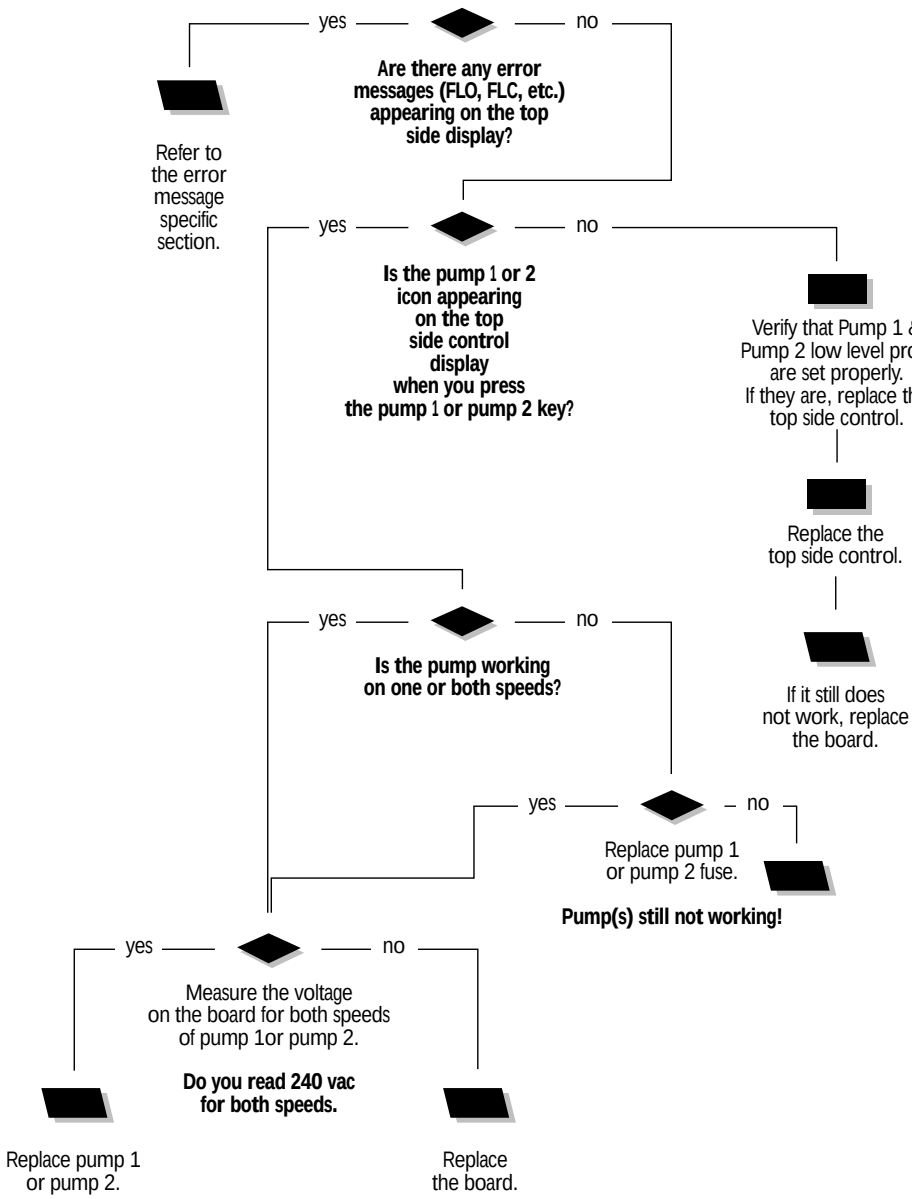
2• If voltage reading is good, verify if the heater wires are properly connected to the element.

If not, tighten the wires to the board and the element.

3• If the problem has not been solved, replace the element.

Pump Flow Chart

If Pump 1 or Pump 2 does not work,
follow this troubleshooting flow chart to identify the source of the problem:



Pump 1 Does Not Work!

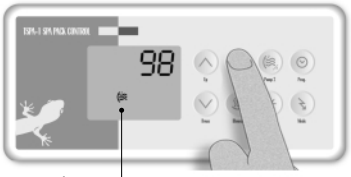
If Pump 1 does not work,
perform the following tests to correct the problem:

To increase the life of the relay, we are using a circuit called snubber on the pump relay. With this type of circuit, if no pump is connected to an output and the relays are open, the voltmeter will still read voltage of around 60 volts. This is normal.

It is important to measure voltage when Pump 1 is connected to the pack. Power must remain On.

1• Verify if there is an error message displayed on the top side control. If it is the case, refer to the specific section of the error message.

2• Verify if Pump 1 low level programming parameters are set properly:
Code: P1
1 = single speed pump,
2 = two speed pump.



Pump 1 on icon

3• Verify if Pump 1 on icon appears on the top side control display when you press on the pump key.

4• If it does not appear, use your spare top side control to verify if the keypad is defective.

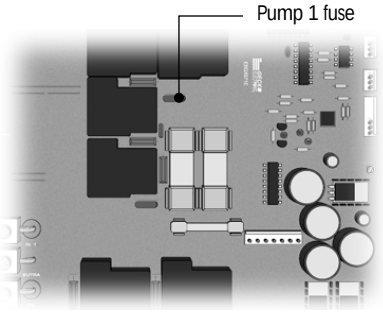
If it is, replace the keypad.

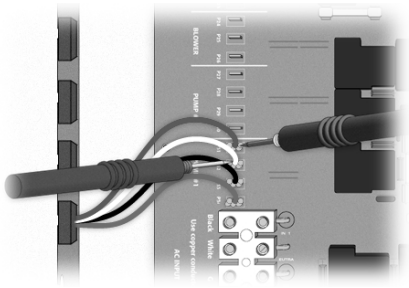
If not, replace the board.

5• If Pump 1 icon appears on the top side control display when the pump 1 key is pressed, verify if Pump 1 works in one of the speeds.

Pump 1 Does Not Work!

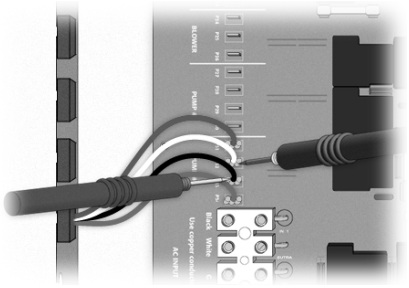
If Pump 1 does not work in any speed, perform the following tests to correct the problem:





1• If Pump 1 does not work in either speeds, replace the pump 1 fuse.

2• If replacing the fuse is not effective or if Pump 1 works in one of two speeds, read the voltage on the board for both speeds.



Turn Pump 1 to high speed and measure the voltage between the white and the black wire connectors (P32 & P33 connectors on the board).

The reading shoud be ≈240 vac. (≈120 vac for a 120 vac pump)

3• Turn Pump 1 to low speed and measure the voltage between the white and the red wire connectors (P31 & P32 connectors on the board).

The reading should be ≈240 vac. (≈120 vac for a 120 vac pump)

4• If the voltage is as it should be, replace pump 1.

5• If not, replace the board.

Pump 2 Does Not Work!

If Pump 2 does not work,
perform the following tests to correct the problem:

To increase the life of the relay, we are using a circuit called snubber on the pump relay. With this type of circuit, if no pump is connected to an output and the relays are open, the voltmeter will still read voltage of around 60 volts. This is normal.

It is important to measure voltage when Pump 2 is connected to the pack. Power must remain On.

1• Verify if there is an error message displayed on the top side control. If it is the case, refer to the specific section of the error message.

2• Verify the pump 2 low level programming parameters are set properly:
Code: P2
1 = single speed pump,
2 = two speed pump.

Pump 2 on icon

3• Verify if Pump 2 on icon appears on the top side control display when you press on the pump key.

4• If it does not appear, use your spare top side control to verify if the keypad is defective.

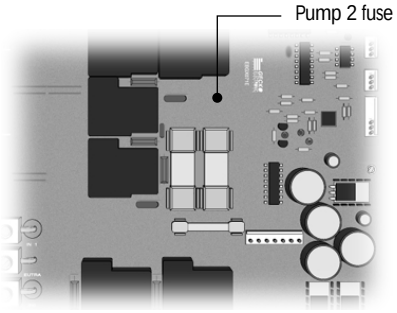
If it is, replace the keypad.

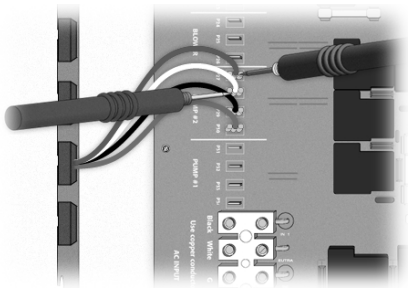
If not, replace the board.

5• If Pump 2 icon appears on the top side control display when the pump 2 key is pressed, verify if Pump 2 works in one of the speeds.

Pump 2 Does Not Work!

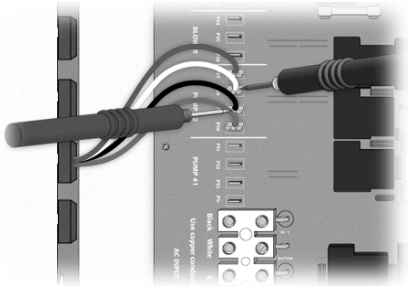
If Pump 2 does not work in both speeds, perform the following tests to correct the problem:





1• If Pump 2 still does not work in both speeds, replace the pump 2 fuse.

2• If replacing the fuse is not effective or if Pump 2 works in only one of two speeds, read the voltage on the board for both speeds.



Turn Pump 2 to high speed and measure the voltage between the white and the black wires connector (P28 & P29 connectors on the board).

The reading shoud be ≈240 vac.

3• Turn Pump 2 to low speed and measure the voltage between the white and the red wires connector (P27 & P28 connectors on the board).

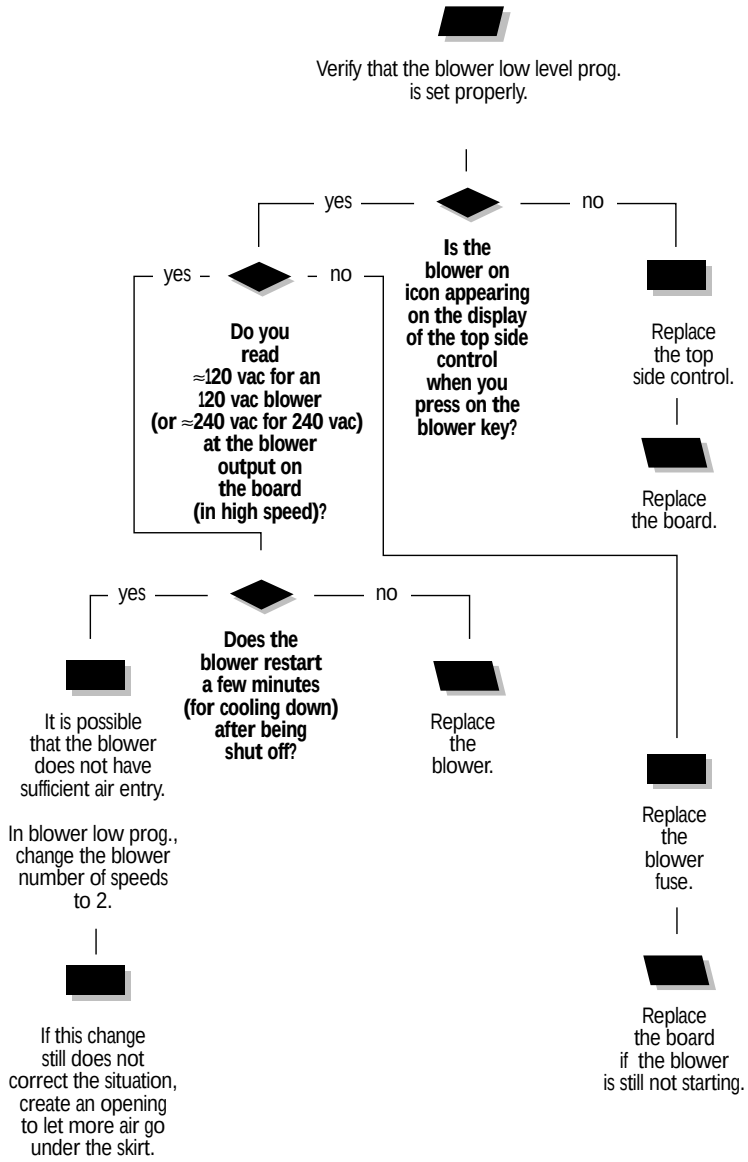
The reading should be ≈240 vac.

4• If the voltage is as it should be, replace Pump 2.

5• If not, replace the board.

Blower Flow Chart

If the blower does not work,
follow this troubleshooting flow chart to identify the source of the problem:



Blower Does Not Work!

If the blower does not work,
perform the following tests to correct the problem:

To increase the life of the relay, we are using a circuit called snubber on the blower relay. With this type of circuit, if no blower is connected to an output and the relays are open, the voltmeter will still read voltage of around 60 volts. This is normal.

It is important to measure voltage when the blower is connected to the pack. Power must remain On.

1• Verify the blower low level programming parameters are set properly:
Code: BL
0= no blower,
1= 1 speed blower,
2= 2 speed blower,
3= 3 speed blower output.

Blower on Icon

2• Verify if the blower on icon appears on the top side control display when you press on the blower key. (The icon will flash if the blower is in low speed).

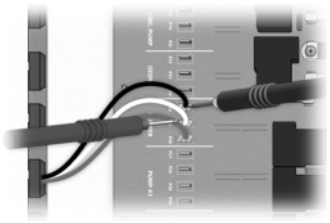
3• If the blower on icon does not appears on the top side control display, replace the top side control.

4• If it still does not work, replace the board.

.

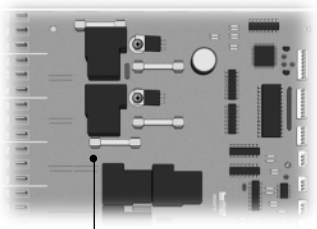
Blower Does Not Work!

If the blower on icon appears on the top side control display but the blower still does not work, perform the following tests to correct the problem:



1• If the icon appears on the top side display:
measure the voltage at the blower outputs (P24 & P25 connectors on the board.) in high speed.

You should read:
≈120 vac for an 120 vac blower
≈240 vac for an 240 vac blower



2• Replace the blower fuse if you do not measure sufficient voltage.

3• Replace the board if you still have not any voltage. (Refer to the "How to replace the board" section.)

4• If you do not get a good voltage reading, check if you can restart the blower a few minutes after it had been shut off.

Replace the blower if does not start after cooling down.

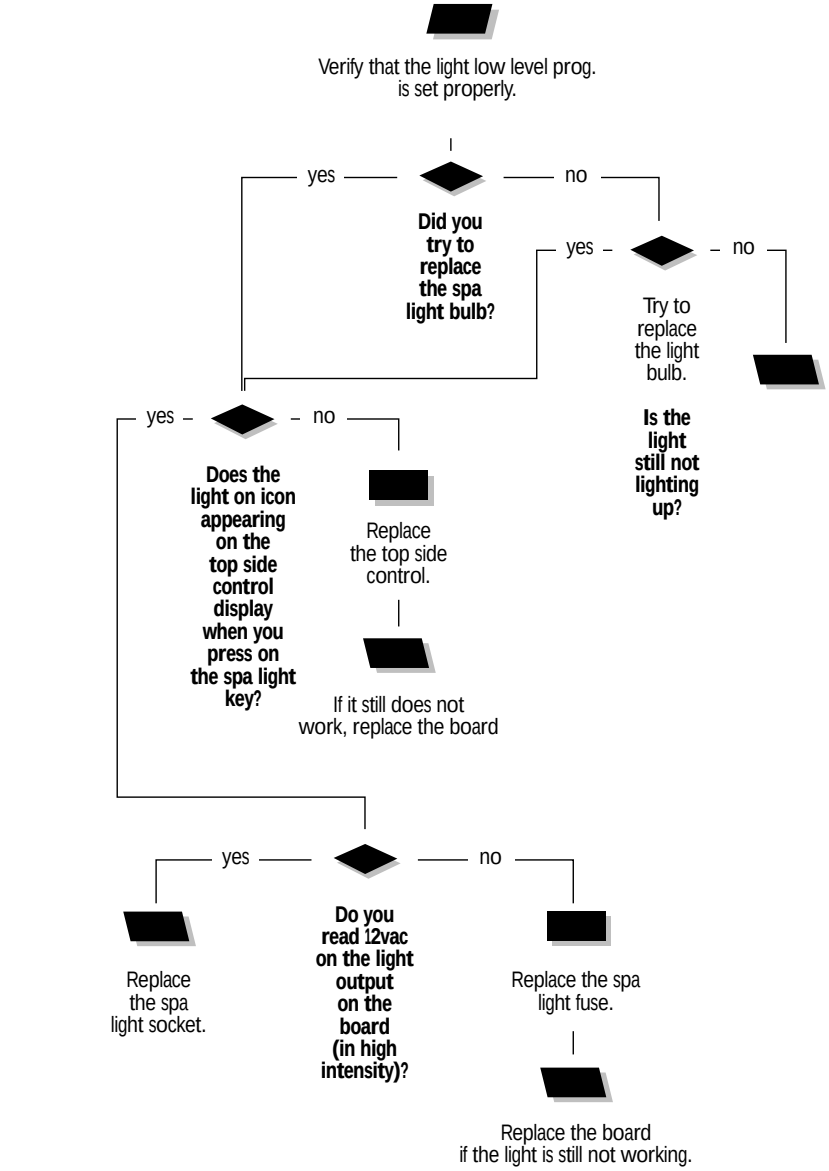
5• If the blower does restart after cooling down, it is possible that the blower does not draw sufficient air.

6• In low level programming, change the blower of speed to 2.

7• If the problem persists, create a bigger opening to let more air go to the blower.

Spa Light Flow Chart

If the spa light does not work,
follow this troubleshooting flow chart to identify the source of the problem:



Spa Light Does Not Work!

If the spa light does not work,
perform the following tests to correct the problem:

To increase the life of the relay, we are using a circuit called snubber on the light relay. With this type of circuit, if no light is connected to an output and the relays are open, the voltmeter will still read voltage of around 12 volts. This is normal.

It is important to measure voltage when the light is connected to the pack. Power must remain On.

1• Verify if the light low level programming parameters are set properly:
Code: LI
0 = no light,
1 = 12 volts On/Off,
2 = 12 volts 3 intensities,
3 = 120 volts (circulation pump output)
4 = Internal fiber box control

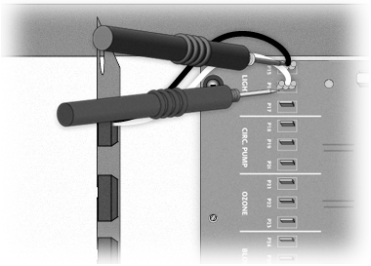
2• First replace the bulb of the spa light.

3• If the light is still not working, verify if the light on icon appears on the top side control display when you press on the light key.

4• If the light on icon is not turned on, use a spare top side control to verify if the keypad is defective.

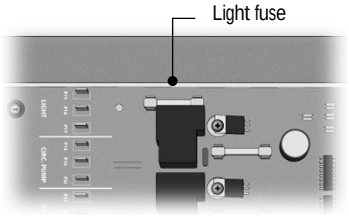
If it is, replace the keypad.

If not, replace the board.



5• If the light on icon is displayed but the light still does not work, remove the plastic cover and measure the voltage between the two wires of the light at high intensity (P15 & P16 connectors on the board.).

If you have ≈12 vac, replace the light socket

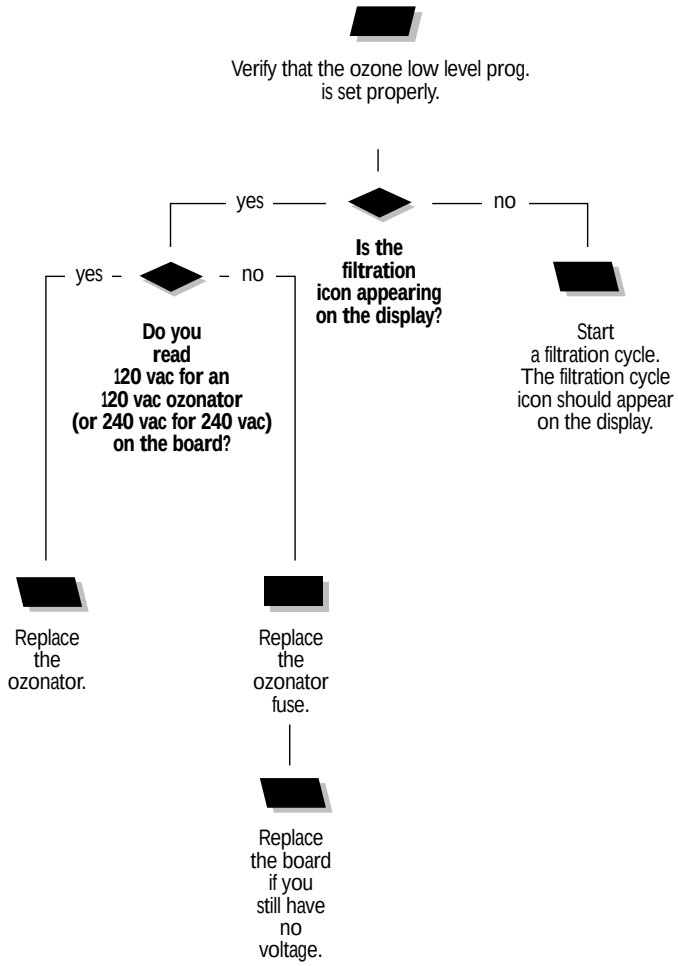


6• If you do not read any voltage, replace the light fuse on the board.

7• If the problem persists, replace the board. (Refer to the "How to replace the board" section.)

Ozonatator Flow Chart

If the ozonator does not work,
follow this troubleshooting flow chart to identify the source of the problem:



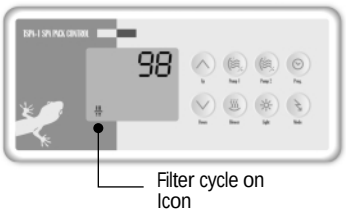
Ozonator Does Not Work!

If the ozonator does not work,
perform the following tests to correct the problem:

To increase the life of the relay, we are using a circuit called snubber on the ozonator relay. With this type of circuit, if no ozonator is connected to an output and the relays are open, the voltmeter will still read voltage of around 60 volts. This is normal.

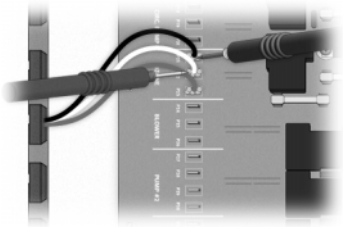
It is important to measure voltage when the ozonator is connected to the pack. Power must remain On.

1• Verify if the ozone low level programming parameters are set properly:
Code: 03
0 = no ozone lamp,
1 = ozone activated during filter cycle,
2 = ozone output always on



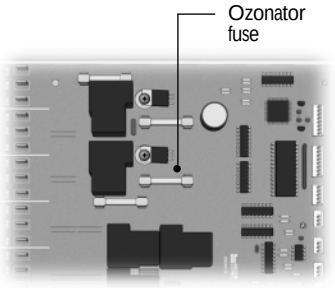
2• Verify if the filter cycle on icon appears on the top side control display. If not, start a filtration cycle.

Refer to the user manual for information on how to start a filter cycle



3• Measure the voltage at the ozonator outputs. (P21 & P22 connectors on the board.)
You should read:
≈120 vac for an 120 vac ozonator
≈240 vac for an 240 vac ozonator.

4• Replace the ozonator if you have good voltage.

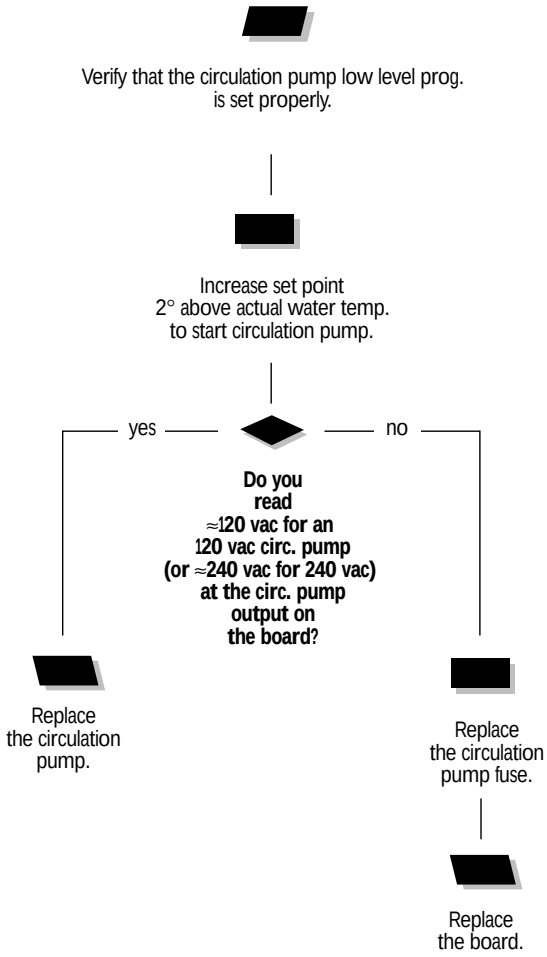


5• Replace the ozonator fuse if you do not measure sufficient voltage.

6• Replace the board if you still have not any voltage. (Refer to the "How to replace the board" section.)

Circulation Pump Flow Chart

If the circulation pump seems to not be working, follow this troubleshooting flow chart to identify the source of the problem:



Circ. Pump Does Not Work!

If the circulation pump does not work, perform the following tests to correct the problem:

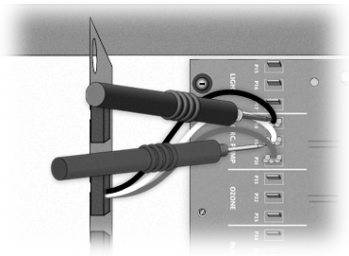
To increase the life of the relay, we are using a circuit called snubber on the circ. pump relay. With this type of circuit, if no circ. pump is connected to an output and the relays are open, the voltmeter will still read voltage of around 60 volts. This is normal.

It is important to measure voltage when the circ. pump is connected to the pack. Power must remain On.

1• Verify the circ. pump low level programming parameters are set properly:
Code: CP
0 = no circulation pump,
1 = circulation pump off when water temp. is 2°F higher than set point,
2 = circulation pump on all the time.

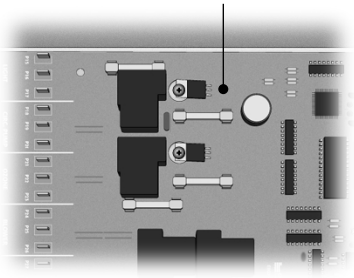
Set point icon

2• Start the circulation pump by increasing temp. set point to 2° higher than the actual water temp.



3• Remove the plastic cover and measure the voltage between the black and white wires of the circulation pump (P18 & P19 connectors on the board.). The reading should be ≈240 vac. (≈120 vac for a 120 vac pump)

Circ. pump fuse

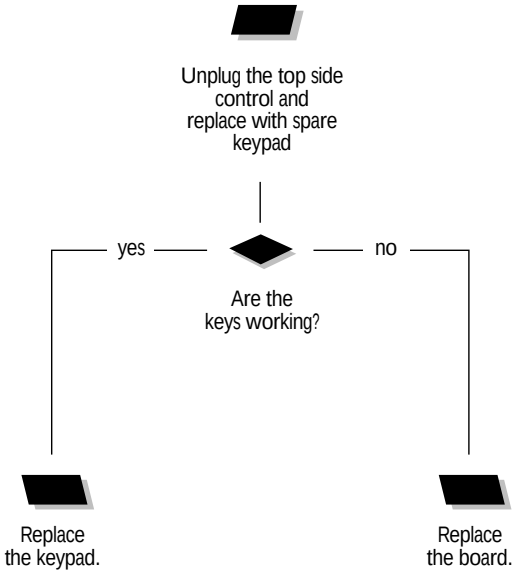


4• If you do not read any voltage, replace the circ. pump fuse on the board.

5• If the problem persists, replace the board. (Refer to the "How to replace the board" section.)

Keys Flow Chart

If one of the keys of the top side control display seems to not be working, follow this troubleshooting flow chart to identify the source of the problem:



Keys Don't Work !

If the one of the keys seems to not be working, perform the following tests to correct the problem:

1• Replace the top side control with a spare keypad.

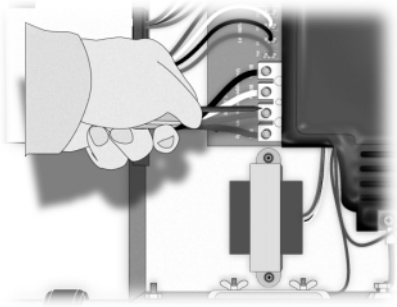
2• Check if the keys are responding.

3• If they are, replace the keypad.

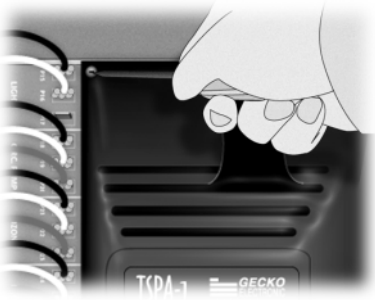
4• If they are not responding, replace the board.

How To Replace The Board

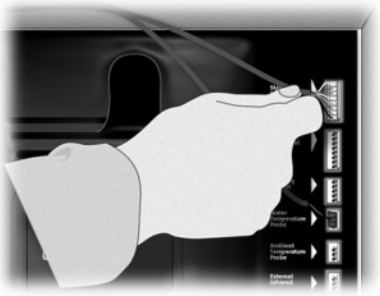
If the board of a TSPA pack has to be replaced, make sure to turn the power off.



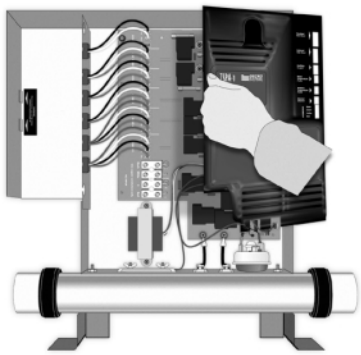
1• Remove the pack cover and disconnect the power input cables.



3• Unscrew the plastic cover.



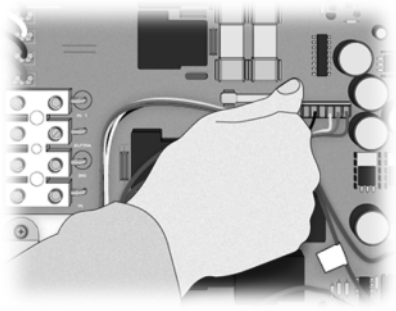
2• Unplug all connectors located at the upper right corner of the power box.



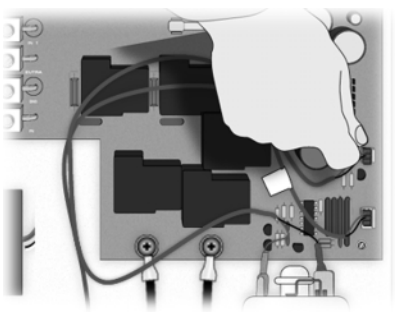
4• Lift the cover.

How To Replace The Board

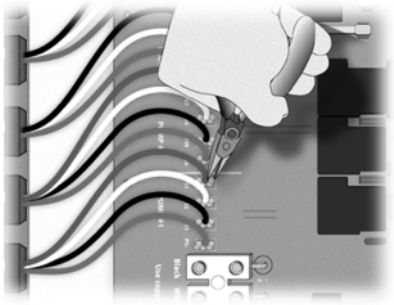
If the board of a TSPA pack has to be replaced, make sure to turn the power off.



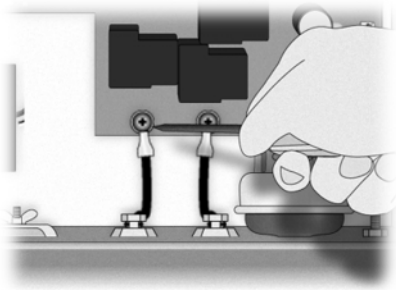
5• Disconnect the transformer connector.



7• Disconnect the high limit sensor and the pressure switch cable.

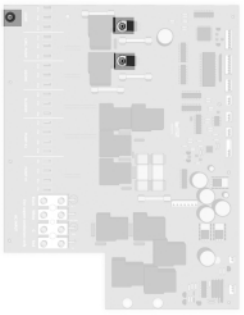


6• Disconnect all wires of the pump, light and ozone outputs with the pliers.

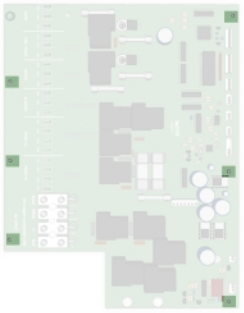


8 • Disconnect the heater output by removing the two screws at the bottom of the board.

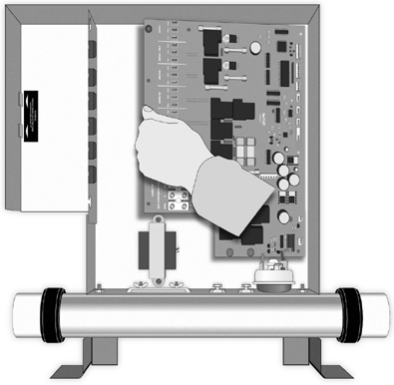
How To Replace The Board



9• Remove the ground and the triac screws.



10 • The board is held in place by six plastic standoffs.



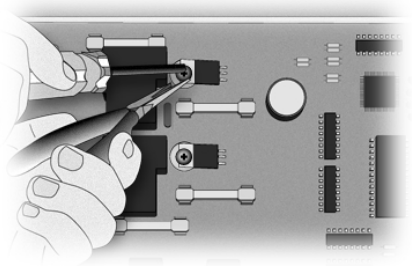
11 • Beginning on the left side, gently lift the board until it is released from the snap*.

* Note that most recent models of TSPA (made in 98) come with new releasable standoffs. Use pliers to release standoff heads

How To Replace The Board

13 • Verify if the plastic mounting studs are damaged. If so, replace the damaged ones.

14 • Align the new board with the standoffs and snap into place.



15 • Reinstall the triac screw. It is important to hold the triac in place with pliers while screwing to avoid bending the pins.

Do not over tighten.

16 • Put the ground screw in place.

17 • Connect all connector wires to the board. A wiring diagram is printed on the back of the power box cover and indicates where the wires must be connected.

18 • Connect the heater cable.

19 • Reinstall the transformer and connect it to the board.

20 • Connect the pressure switch and the high temperature sensor cables.

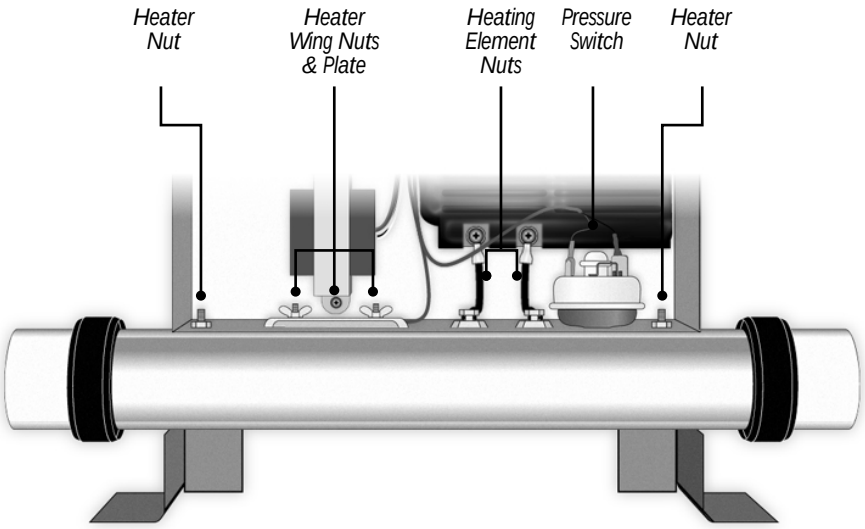
21 • Verify all the connections. Reinstall the plastic cover. Place its bottom part first.

22 • Connect the keypad and the temperature sensor.

23 • Connect the power cable and turn the power on.

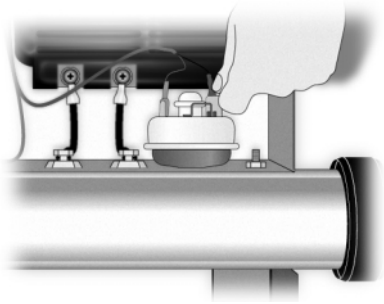
How To Replace The Heater

Follow this procedure if the heater of a TSPA pack has to be replaced. Make sure that the power to the pack has been turned off.

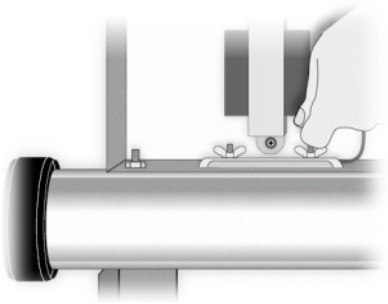


Before starting the removal procedure:

- Disconnect the power input cables of the pack.
- Make sure that the water valves of the spa are closed

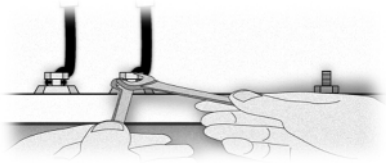


1• Disconnect the two connectors on the top of the pressure switch and unscrew and remove the pressure switch.

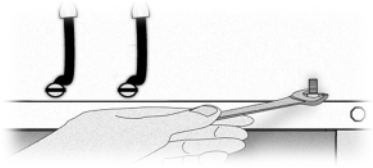


2• Unscrew the two wing-nuts that hold the plate of the heater and remove the Hi-Limit temperature sensor from under the plate.

How To Replace The Heater



3• With the wrenches, disconnect the heater by removing the two nuts on the top of the element.



4• Unscrew the two nuts that hold the heater to the enclosure and slide the heater from under the pack.

5• Loosen the two screws that hold the mounting feet on each side of the pack.

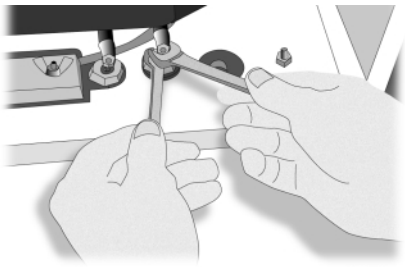
Slide the heater out,

6• Slide the new heater into place and attach it to the enclosure using the two nuts.

The two nuts must be well tightened because they are also used as a current collector in case of heater failure.

7• Unscrew the two wing-nuts that hold the plate to the heater and slide the Hi-Limit temp. sensor under the plate and into the heater.

Screw the two wing-nuts just enough to hold the sensor in place.



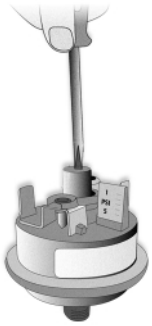
8• Connect the two wires from the board to the heater.

It is important to hold both nuts of the element when tightening. If you bend or twist the end of the element, you may damage it.

9• Check if the two wires for the element are well connected to the board.

10• Reinstall the pressure switch and reconnect its cables (in no particular order).

How To Adjust a Pressure Switch



For systems manufactured since 1/1/98.

1• Turn the pump (or the circulation pump) in low speed.

2• Increase the setting of the pressure switch to 4 P.S.I. or until you have an FLO message on the display.

3• Start decreasing the pressure switch setting by turning the adjustment screw counter clock wise very slowly until the FLO message disappears. Then, decrease another 1/4 of turn more.

4• Run the pump in high speed for 30 seconds, you should not see an FLO message.

5• Turn the pump off and wait 30 seconds. You should not see an FLC message.

6• Run the pump in low speed for 30 seconds. You should not see an FLO message.

7• If you see an FLO or an FLC message, restart the adjustment procedure.

If you are not able to adjust the pressure switch, change it.

For systems manufactured prior to 1/1/98.

These systems are programmed with software that shuts the pump off every time an FLO message occurs.

In this case, you have to press a key (any key) to reset the system.

The process to adjust the pressure switch remains the same except that you have to decrease the setting half a turn at the time.

1• Decrease the setting by half a turn.

2• Press any key and wait for 5 seconds.

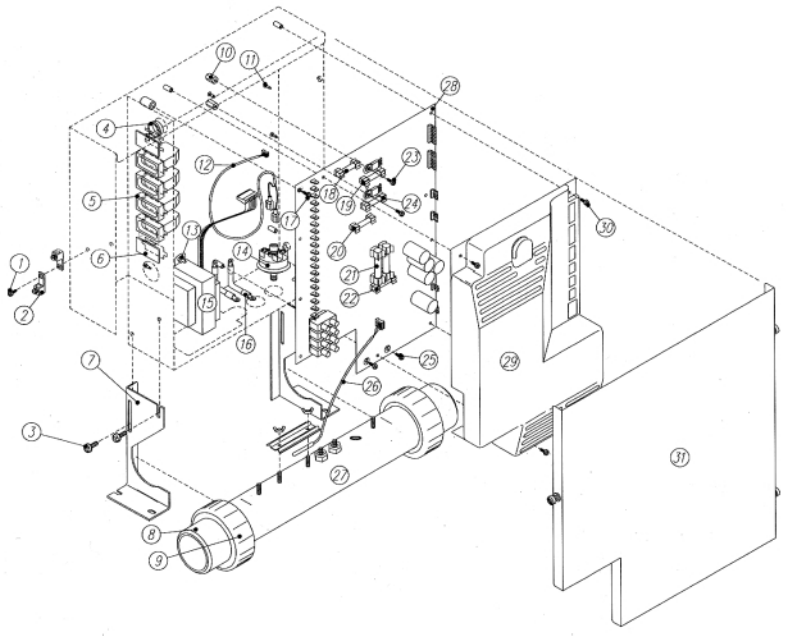
If the setting is too high, an FLO message will appear and the pump will be turned off.

3• Continue the operation until the FLO message does not reappear.

Parts List

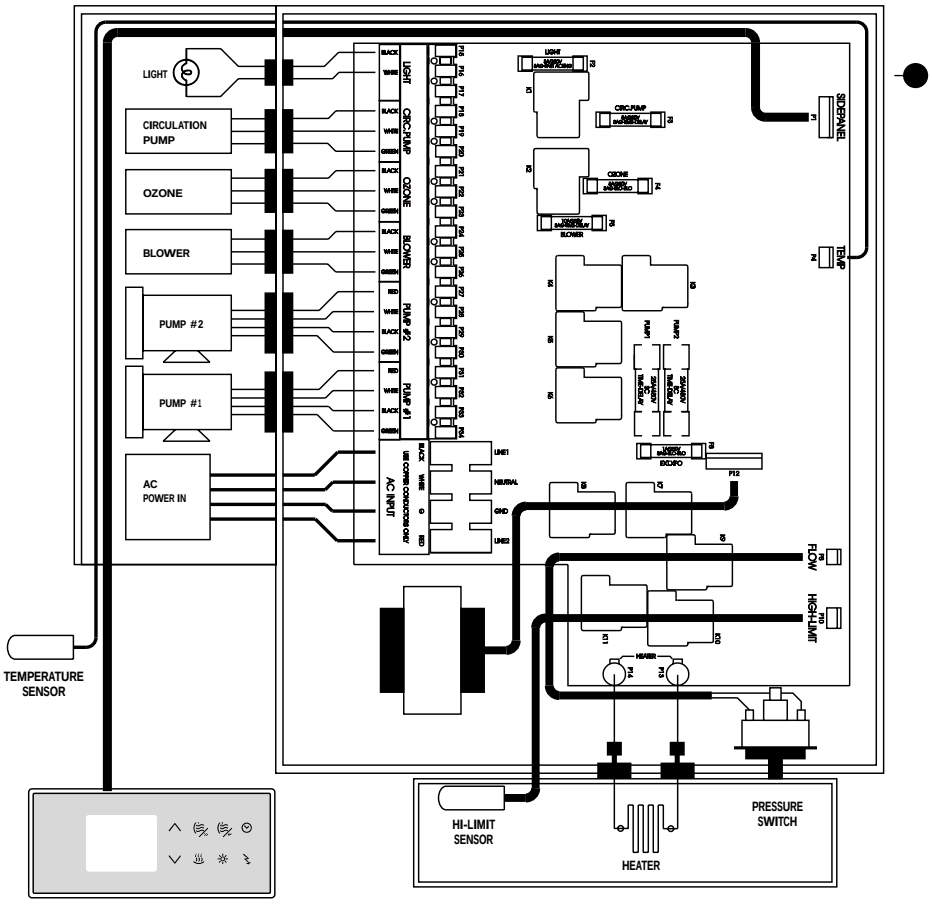
Ref.:	Part Number	Description	Retail US	Cdn
1	282AD0064-P25	Screws for bonding lug (package of 25)	5.57	7.59
2	210EA0183-P10	Bonding lugs (package of 10)	8.02	10.91
3	282AE0022-P10	Screws for mounting feet (package of 10)	8.47	11.51
4	250AB0036-P25	Grommets for cable opening (package of 10)	5.46	7.42
5	9920-400150	J&J mini-connector for pump 1	7.26	9.88
5	9920-400152	J&J mini-connector for pump 2, single speed	6.68	9.09
5	9920-400150	J&J mini-connector for pump 2, two speeds	7.26	9.88
5	9920-400148	J&J mini-connector for ozone	5.93	8.06
5	9920-400147	J&J mini-connector for blower	5.93	8.06
5	9920-400154	AMP connector for pump 1	7.26	9.88
5	9920-400169	AMP connector for pump 2, single speed	6.68	9.09
5	9920-400154	AMP connector for pump 2, two speeds	7.26	9.88
5	9920-400153	AMP connector for ozone	5.93	8.06
5	9920-400153	AMP connector for blower	5.93	8.06
5	9920-400169	AMP connector for circulation pump	6.68	9.09
5	9920-400165	J&J regular connector for pump 1	7.26	9.88
5	9920-400163	J&J regular connector for pump 2, single speed	6.68	9.09
5	9920-400165	J&J regular connector for pump 2, two speeds	7.26	9.88
5	9920-400162	J&J regular connector for ozone	5.93	8.06
5	9920-400161	J&J regular connector for blower	5.93	8.06
5	9920-400164	J&J regular connector for circulation pump	5.93	8.06
5	9920-400155	AMP connector for light (option LA)	3.35	4.45
5	9920-400178	Light cord (option LS)	7.57	10.30
6	140AA0125-P10	Blank plate for J&J mini and AMP (package of 10)	10.90	14.82
6	140AA0133-P10	Blank plate for J&J regular (package of 10)	15.15	20.60
7	9917-100125	Left foot for 2" heater	13.37	18.18
7	9917-100126	Right foot for 2" heater	13.37	18.18
7	9917-100189	Left foot for 3" heater	13.37	18.18
7	9917-100188	Right foot for 3" heater	13.37	18.18
8	530AB0061	Tail pieces for 2" heater	5.39	7.33
8	530AB0039	Tail pieces for 3" heater	6.24	8.48
8	530AB0042-P5	Gaskets for 2" heater (package of 5)	8.00	10.88
8	530AB0020-P5	Gaskets for 3" heater (package of 5)	10.03	13.64
9	530AB0055	Nut for 2" heater	4.90	6.67
9	530AB0013	Nut for 3" heater	5.39	7.33
10	282FB0104-P10	Metal standoffs for triac (package of 10)	22.77	30.97
11	282FB0167-P25	Plastic standoffs for the board (package of 25)	12.65	17.21
12	9920-400124-P5	Pressure switch cables (package of 5)	11.81	16.06
13	282CA0092-P25	Nuts for transformer (package of 25)	7.57	10.30
14	510AD0064	Pressure switch	28.43	38.67
15	9920-100020	120 volts transformer	45.59	62.00
15	9920-100050	240 volts transformer	59.59	81.58
16	9920-400123-P5	Heater cables for in-line heater (package of 5)	10.47	14.24
17	282AD0038-P25	Ground screws (package of 25)	9.87	13.42
18	430AC0117-P10	Fuses for light (package of 10)	11.14	15.15
19	430AC0054-P10	Fuses for circulation pump (package of 10)	10.70	14.55
20	430AC0069-P10	Fuses for blower (package of 10)	17.82	24.24
21	430AE0033-P10	Fuses for pump 1 and pump 2 (package of 10)	54.36	73.93

Ref.:	Part Number	Description	Retail US	Cdn
22	430AC0092-P10	Fuses for transformer (package of 10)	11.14	15.15
23	282AB0128-P25	Screws for the triac (package of 25)	7.68	10.45
24	430AC0054-P10	Fuses for ozone (package of 10)	10.70	14.55
25	282AD0072-P25	Screws for the heater cable (package of 25)	8.80	11.97
26	9920-400122	High-limit sensor for in-line heater	13.99	19.03
27	530AA0012	2" 5.5Kw in-line heater	143.23	194.79
27	530AA0035	3" 5.5Kw in-line heater	176.14	239.55
27	530AA0025	3" 4.5Kw in-line heater	176.14	239.55
27	530AB0087	5.5Kw element for in-line heater	88.23	119.99
27	530AB0074	4.5Kw element for in-line heater	88.23	119.99
28	9917-100187	TSPA-1 plastic cover	30.48	41.45
29	282AB0136-P25	Screws to hold the plastic cover (package of 25)	4.46	6.06
30	9917-100124	White metal cover	33.37	45.39
30	9917-100172	Black metal cover	33.37	45.39
31	EQGX165	Board for TSPA-1-P122-P222-01-LS-H34.5-JJM-CC	329.78	448.50
31	EQGX214	Board for TSPA-1-P122-P222-B1-O1-LS-LW-H5.5-AMP-OM	358.96	488.19
31	EQGX219	Board for TSPA-1-P122-P222-B1-O1-L2S-LW-H35.5-JJM-BF	359.01	488.25
	9920-400125	10 foot temperature probe	19.21	26.12
	9920-400245	25 foot temperature probe	23.88	32.48



Prices subject to change without prior notice.

Wiring Diagram



Pump 1	
Red	P31
White	P32
Black	P33
Green	P34

Pump 2	
Red	P27
White	P28
Black	P29
Green	P30

Blower	
Black	P24
White	P25
Green	P26

Ozone	
Black	P21
White	P22
Green	P23

Circulation Pump	
Black	P18
White	P19
Green	P20

Light Connector	
Black	P15
White	P16

Heater	
Black 1	P13
Black 2	P14
Green / Ground	Ground

Connectors	
Keypad	P1
Temp. sensor	P4
Transfo.	P12
Pressure switch	P8
Hi-Limit sensor	P10

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