

COAST SPAS TSPA-MP SERVICE MANUAL

• Gecko Electronics Inc. •



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



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In an attempt to make this manual as useful as possible, it has been presented in two formats. Problem-solving solutions are described with Troubleshooting Flow Charts and also with Step-by-Step Procedures.

The two formats together should provide an overall complete explanation, with flow charts providing an overview of specific problems, and step-by-step procedures giving more detailed information.

The tools, test equipment and components needed to carry out TSPA-MP metapack service calls.

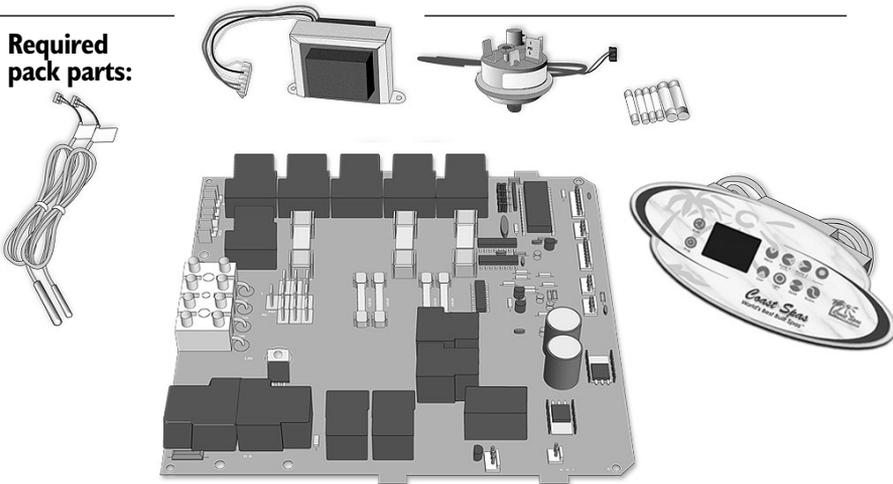
Required tools:



Pliers
Phillips & flat screwdrivers
1 1/32" nut driver
1/4" open end wrench

3/8" open end wrench
Jumper cable
Multimeter
GFCI tester & digital thermometer (optional)

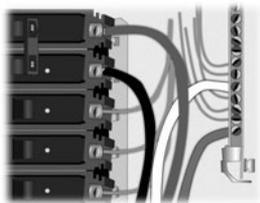
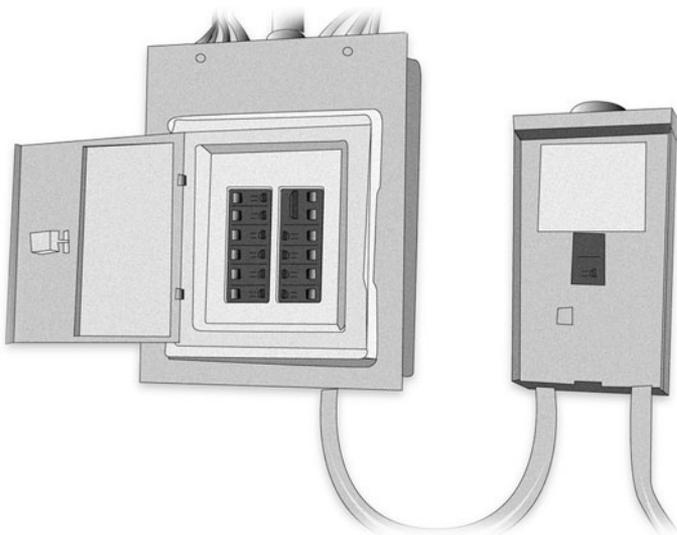
Required pack parts:



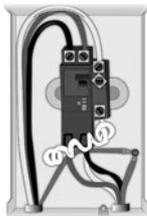
Regulation sensor
Hi-Limit sensor
TSPA-MP system board
(or complete spa pack)

Transformer
Pressure switch
Fuses
Top side control (keypad)

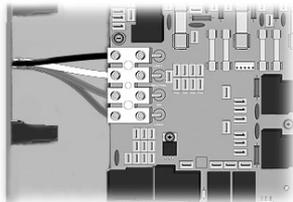
Correct wiring of the electrical service box, GFCI box and pack terminal block is essential.



Electrical Box



GFCI

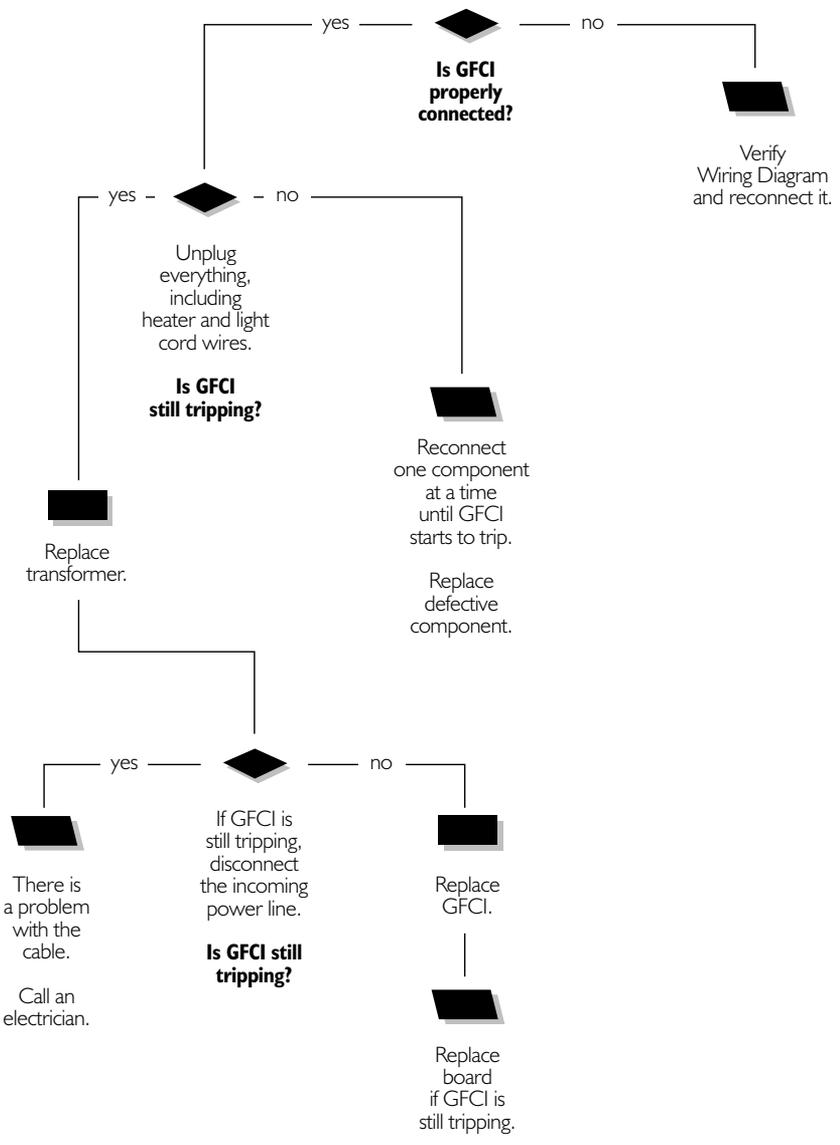


Pack Terminal Block

- 1 • Carry out a visual inspection to check for signs of miswiring.

Refer to supplied wiring diagrams.
Call an electrician if necessary.

If GFCI trips, follow this Troubleshooting Flow Chart to identify the problem:



GFCI Trips!

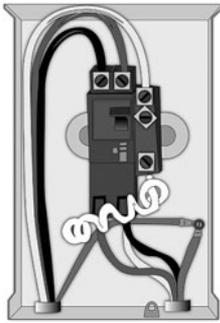
If all connections are made, but nothing seems to be working, you probably have a power supply problem. Carry out the following tests to identify and correct the problem:

Note that for new installations, GFCI trippings due to miswiring are common.

If breaker is wired properly, GFCI trippings may occur when total amount of current drawn by spa exceeds breaker rating. This is highly unlikely as each spa pack output is individually fused, and fuses will blow before GFCI trips.

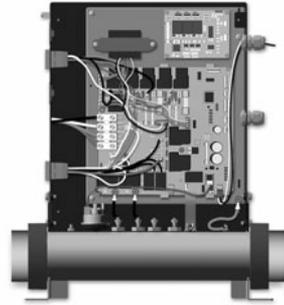
A current leak to ground will also cause GFCI to trip. If any of the components is faulty and a leak of more than 5mA occurs, the GFCI will trip to prevent electrocution.

There are different GFCI models on the market. Note that illustrations are examples only.

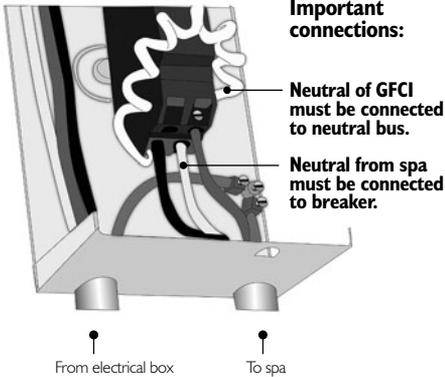


From electrical box To spa

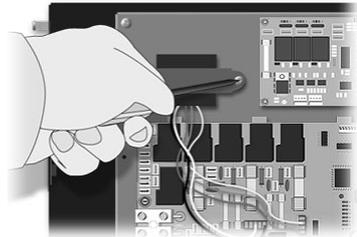
- 1 • Verify if GFCI is properly connected.



- 3 • If GFCI is properly connected, but still tripping, unplug all outputs including heater and light cord wires.

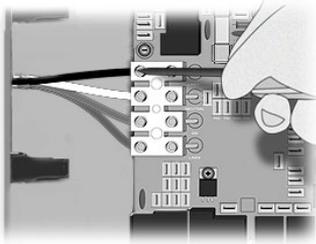


- 2 • If it is not, verify GFCI wiring diagram and reconnect it.



- 4 • If GFCI still trips, replace transformer. If it stops tripping, reconnect one component at a time until GFCI starts to trip. Replace defective component.

If GFCI continues to trip even after having replaced the transformer, carry out the following tests to correct the problem:



- 1 • Disconnect incoming power lines.

If GFCI still trips, there must be a cable problem.

Call an electrician!

- 2 • If GFCI stops tripping.
Replace GFCI.
- 3 • If GFCI trips again, replace board. (Refer to "How to Replace the Board" section of this manual.)

Low Level Programming

Certain system operating parameters can be configured from the keypad. This is normally done by Gecko or the spa installer, but may be done any time.

Low level programming:

To access low level programming, press and hold **Program** key for 20 seconds, after which the first parameter code should appear on the display.

Use **Up/Down** keys to modify parameter values and **Program** key to change from one parameter to the next. You must go through all parameters to exit this mode. If you do not wish to change a parameter, simply press **Program** key to advance to the next parameter.

List of parameter configurations

1- Pump 1

Display: P1 x

Value of x: 1 = single-speed
2 = two-speed

2- Pump 2

Display: P2 x

Value of x: 0 = not installed
1 = single-speed
2 = two-speed

3- Blower

Display: bL x

Value of x: 0 = not installed
1 = single-speed
2 = two-speed
3 = three-speed

4- Light

Display: LI x

Value of x: 0 = not installed
1 = 12 VAC (single-intensity)
2 = 12 VAC (triple-intensity)
3 = 120 VAC (auxiliary 1 relay)
4 = Internal fiber box control mode (aux. 1 & 2 relays)

5- Ozone

Display: O3 x

Value of x: 0 = not installed
1 = on only in filter cycle
2 = always on

6- Circulation pump

Display: CP x

Value of x: 0 = not installed
1 = regulated (with spa temperature)
2 = always on

7- Service message

Display: SEr x

Value of x: 0 = message not displayed
1 = message displayed every 8000 hours

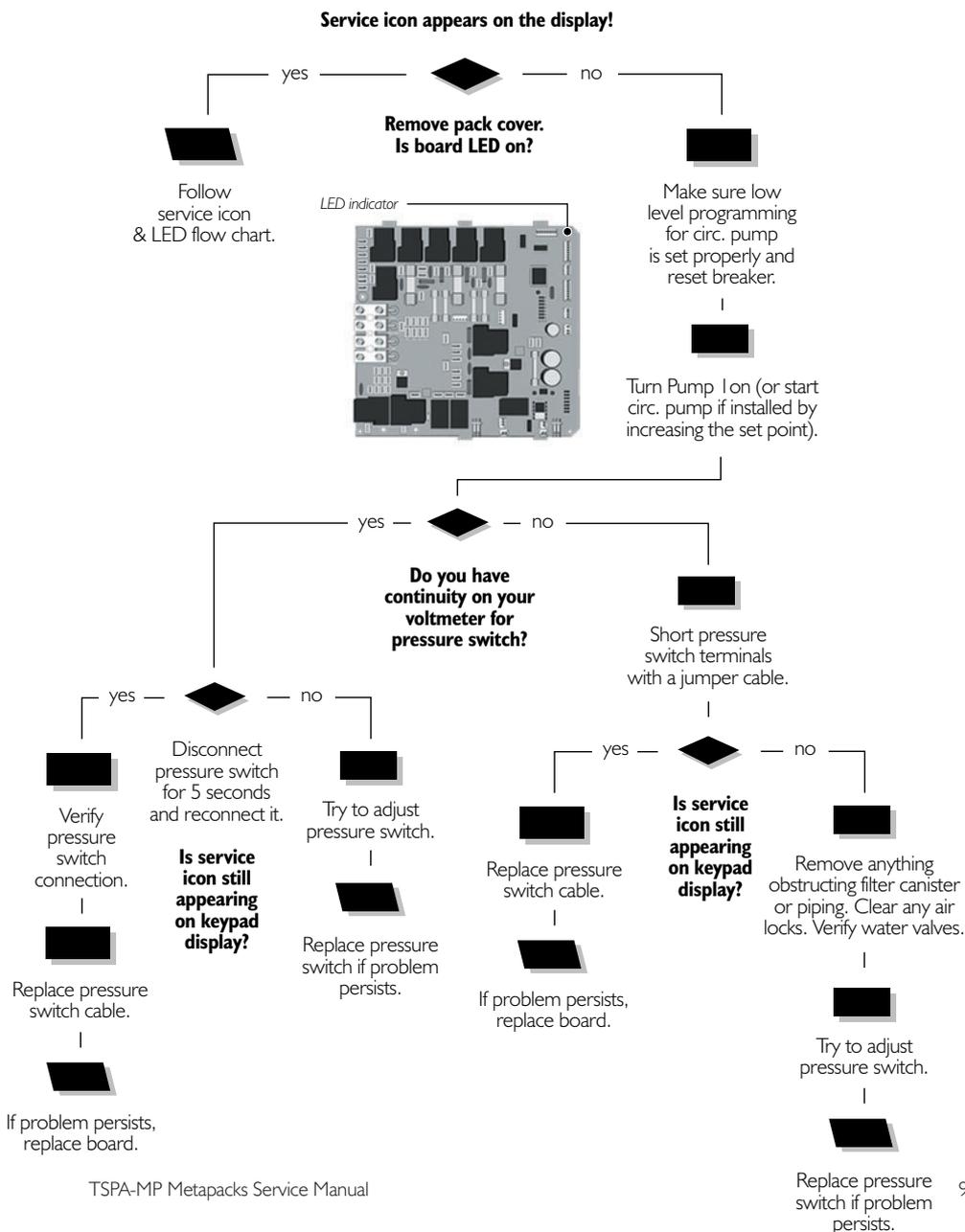
8- Current limiting option

Display: Cu x

Value of x: 0 = low current (heater off if more than one pump is on at high speed)
1 = high current (no restrictions)

Service Icon Flow Chart

If service icon appears on keypad display, follow Troubleshooting Flow Chart below to identify the problem:



Service Icon is Displayed!

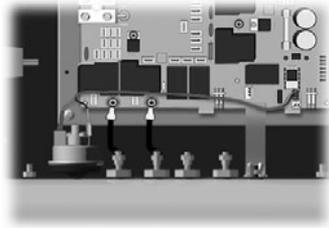
The service icon indicates a pressure switch problem.

There must be enough water in the spa for normal operations. System may detect error condition if spa filter is dirty or if something restricts flow of water in piping.

The heater will automatically shut down when error condition occurs.

Power may remain On when the following steps are carried out.

- 1 • Verify if pump is working. If pump is not working right, refer to pump section of this manual.
- 2 • Make sure low level setting for pressure switch is set correctly:
CP 0: circ. pump not installed
CP 1: circ. pump installed
- 3 • If Pump 1 is working properly, turn it on by pressing **Pump 1** key (or start circ. pump by increasing set point) and test continuity on pressure switch.
- 4 • If you detect continuity, go to step # 10.



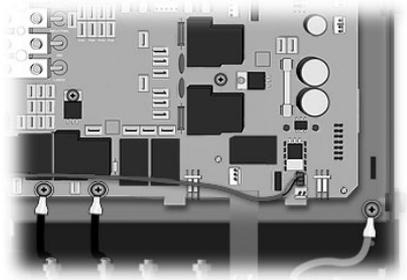
- 5 • If you do not detect continuity, verify if pressure switch cable is properly connected to pressure switch and board.

- 6• Ensure adequate water flow in the heater and short two pressure switch terminals with jumper cable.
- 7• **If service icon disappears**, first make sure there is no blockage of water or air lock and check water valve.

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

If installation is recent, try readjusting the pressure switch. If this is not possible, replace switch.

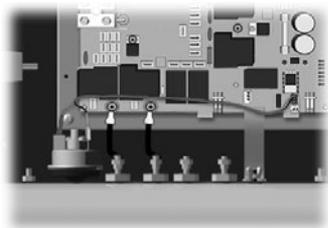
(Refer to "How to Adjust the Pressure Switch" section of this manual.)



- 8• **If service icon still appears**, the problem may be either with switch cable or board.

Remove plastic cover and replace cable.
- 9• Replace board if error condition still persists. (Refer to "How to Replace the Board" section.)

Power may remain On while the following steps are carried out.

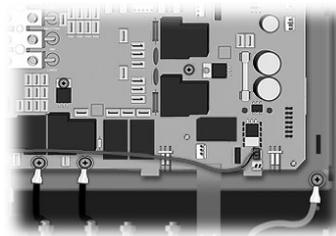


- 10 • If you have continuity on pressure switch, follow these steps:

Disconnect pressure switch cable for 5 seconds and reconnect it.

If error condition disappears, adjust pressure switch, if it is a new installation (less than two years) or replace it.

(Refer to "How to Adjust the Pressure Switch" section of this manual.)

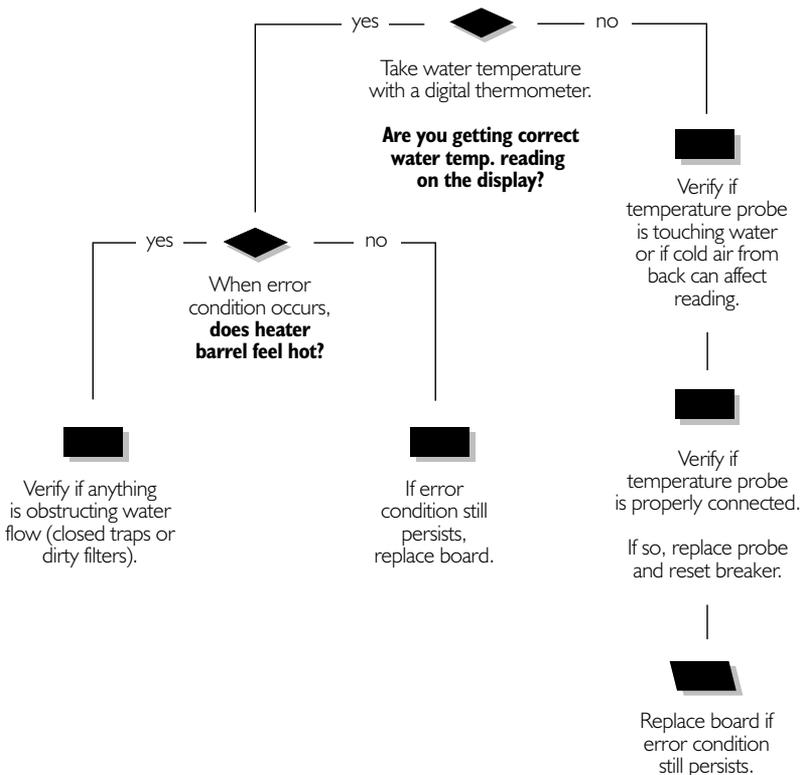
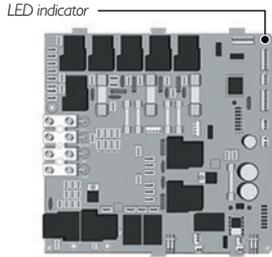


- 11 • If error condition persists, remove plastic cover and replace pressure switch cable.
- 12 • Replace board if error condition still persists. (Refer to "How to Replace the Board" section of this manual.)

Service Icon & LED Flow Chart

If error condition occurs (potential Hi-Limit sensor or temperature probe problem), follow Troubleshooting Flow Chart below to identify the problem:

Turn breaker off then on again to reset the system.
If Hi-Limit condition no longer persists,
check for blockage of water in the piping.



Service Icon & LED Displayed

The service icon and LED error condition is related to the Hi-Limit sensor or temperature probe.

Turn breaker off then on again to reset the system.

If service icon and LED disappear, wait until they are displayed again on keypad.

Power may remain On.

- 1 • Take water temperature with digital thermometer.

- 2 • **If keypad display shows correct temperature:**
 - a- Check if heater barrel feels hot.

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

 - b- If heater barrel feels cold, replace board. (Refer to "How to Replace Board" section of present manual.)

- 3 • Proceed to following page if keypad display shows incorrect temperature.

If keypad display isn't showing correct temperature, carry out the following tests:

- 1 • Verify if temperature probe is in contact with water and if cold air from the back could be affecting readings.

Use foam to isolate probe from cold air if that is the problem.

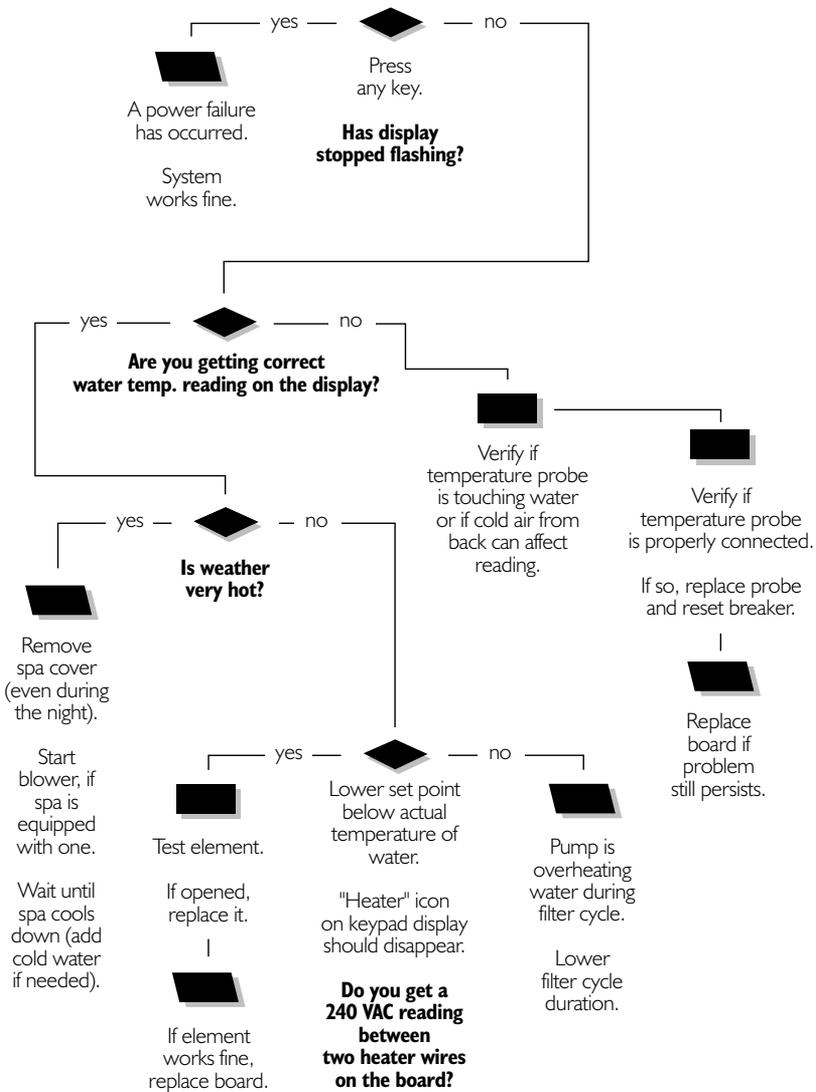


- 2 • Make sure temperature probe is properly connected.

If it is, replace probe and reset breaker.
- 3 • Replace board if HL error condition still persists. (Refer to "How to Replace the Board" section of this manual.)

Display Flashing Flow Chart

On certain packs, if system detects temperature at 112°F or higher, the display will start flashing. Follow Troubleshooting Flow Chart below to identify the problem:



Display Is Flashing

If digital thermometer water temperature reading is 112°F or higher and keypad display indicates correct temperature, carry out the following tests:

If display stops flashing after pressing a key, this means that a power failure has occurred. System works fine.

If weather is very hot:

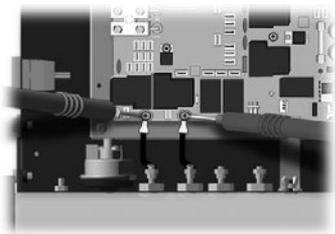
- 1 • Remove spa cover (even during the night). Start blower if spa is equipped with one. Wait until spa cools down (add cold water if necessary).

If hot weather is not a factor:



- 2 • Lower set point below current water temperature.

"Heater" icon should disappear from keypad display.



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

- 4 • **If you do not read 240 VAC**, pump may be overheating water during filter cycle.



Enter Programming mode and shorten filter cycle duration.

- 5 • **If you do read 240 VAC**, test the element. If it is opened, replace it. If element works fine, replace board. (Refer to "How to Replace the Board" section of this manual.)

If digital thermometer water temperature reading is 112°F or higher and keypad display isn't showing correct temperature, carry out the following tests:

- 1 • Verify if temperature probe is in contact with water and if cold air from the back could be affecting readings.

Use foam to isolate probe from cold air if that is the problem.



- 2 • Make sure temperature probe is properly connected.

If it is, replace probe and reset breaker.

- 3 • Replace board if display is still flashing. (Refer to "How to Replace the Board" section of this manual.)

Wrong Temperature Flow Chart

On certain packs, if system detects that temperature is not within normal limits, a highly incorrect temperature will be displayed. Follow Troubleshooting Flow Chart below to identify the problem:



Check if regulation probe is properly connected.



Unplug probe connector and clean pins on the board (even a small coating of film may cause a bad connection).
Reconnect the probe.



Replace probe with a spare and verify if problem is solved.

If it is, replace probe with spare.



Replace board if problem persists.

Wrong Temperature Displayed

Wrong temperature on keypad display indicates a problem with regulation sensor. The system is constantly verifying if temperature probe reading is within normal limits.



Note that water temperature must be over 35°F in order to carry out the following steps. Power may remain On.



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



- 2 • Disconnect probe connector and clean probe connector pins. Even a small coating of film may cause a bad connection.

- 3 • Reconnect probe.

If wrong temperature is still displayed on keypad, replace probe with a spare and place probe head directly in spa water.

If problem is solved, replace probe.

- 4 • Replace board if problem persists.

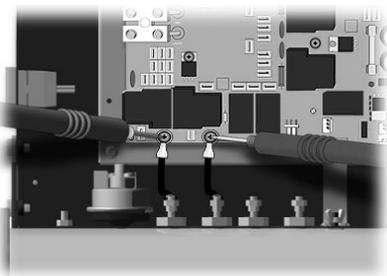
Smart Winter Mode

If pumps have started up several times and "Filter Cycle" icon is flashing, the system has detected water cold enough to freeze the pipes and has gone into the protective Smart Winter Mode.



An irregularly flashing "Filter Cycle" icon means that the system has stopped filtering after 3 hours because water temperature exceeds Set Point by more than 2°F. If the temperature cools down before the scheduled end of the cycle, filtering will resume for the remainder of the programmed cycle duration.

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



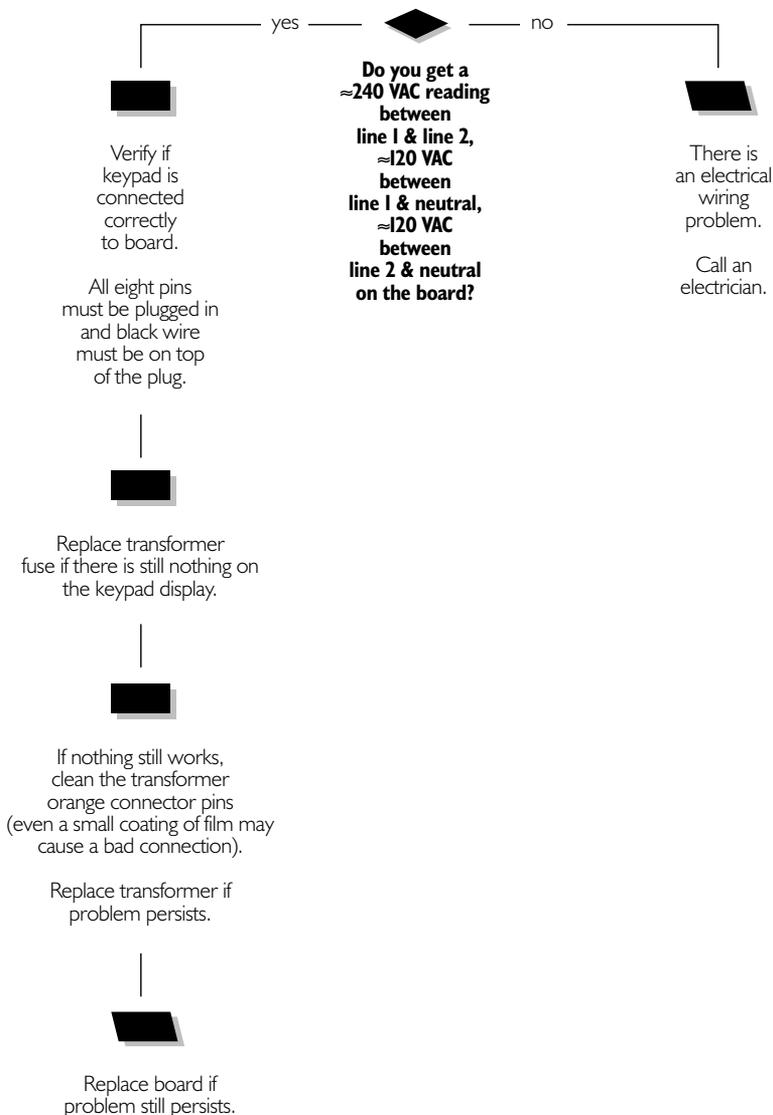
- 2 • If the water temperature is lower than the desired temperature, measure the voltage to the heater.

If your reading is approx. ≈ 240 VAC, Smart Winter Mode is working properly.

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

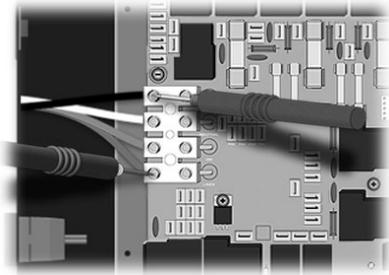
"Nothing Seems to Work" Flow Chart

If nothing seems to work, follow the Troubleshooting Flow Chart below to identify the problem:



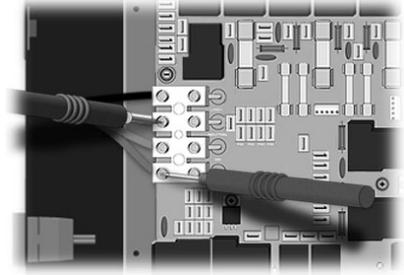
Nothing Seems to Work!

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



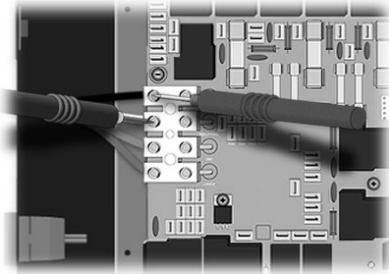
- 1 • On the terminal block, measure voltage between line 1 and line 2.

You should get ≈ 240 VAC.



- 3 • Measure voltage between line 2 and neutral.

You should get ≈ 120 VAC.



- 2 • Measure voltage between line 1 and neutral.

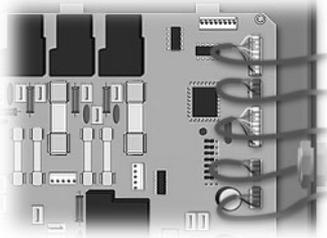
You should get ≈ 120 VAC.

- 4 • If you do not get good readings, this indicates an electrical wiring problem.

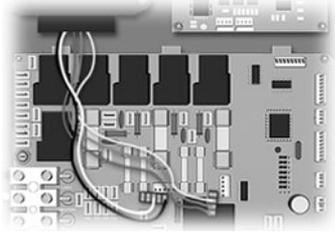
Call an electrician!

Nothing Seems to Work!

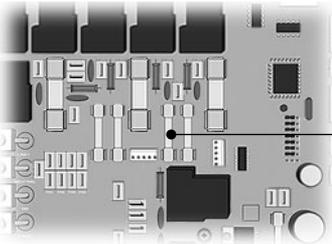
If you are getting good voltage readings, but nothing seems to work, carry out the following tests to correct the problem:



- 1 • Verify if keypad is correctly connected to the board.

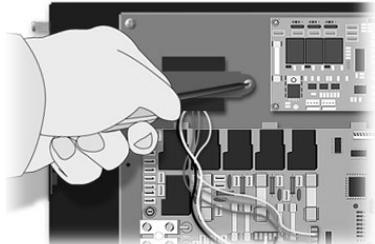


- 3 • If nothing works, clean transformer orange connector pins. Even a small coating of film may cause a bad connection.



Xfo
fuse

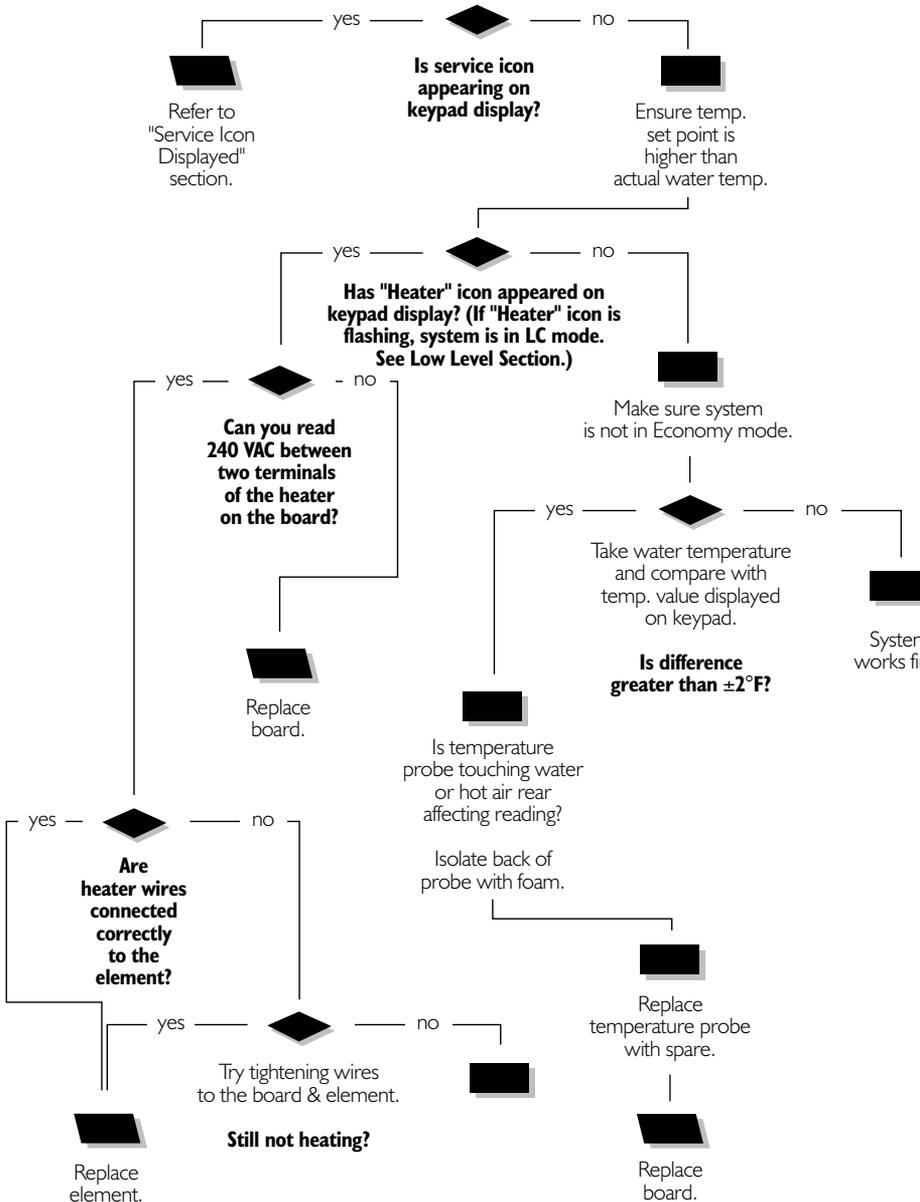
- 2 • Replace transformer fuse if nothing still seems to work.



- 4 • Replace transformer if problem persists.
- 5 • If problem is still not solved, replace board. (Refer to "How to Replace the Board" section.)

"Spa Not Heating" Flow Chart

If the spa does not seem to be heating the water, follow the Troubleshooting Flow Chart below to identify the problem:



Spa Not Heating!

If the spa does not appear to be heating the water, carry out the following tests to correct the problem:

- 1 • Check if service icon is appearing on keypad display. If it is, refer to "Service Icon Appearing on Keypad Display" section of this manual.



- 2 • If service icon is not on keypad display, try to increase temperature by raising temperature set point. Press **Up** key to increase set point.



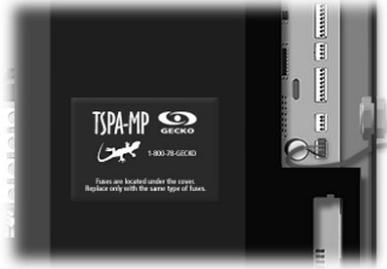
- 3 • Verify if "Heater" icon appears on the display.

"Heater" icon will be on when heater is on. It will flash if more heat has been requested, but heater has not yet started or if system is in LC mode (see Low Level Section).

If **"Heater" icon does not light up**, make sure system is not in an Economy mode cycle.

- 4 • Use a digital thermometer to take water temperature and compare your reading with the temperature value on the keypad display.

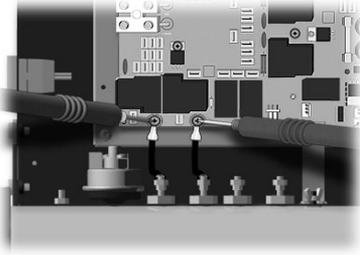
If values are different ($\pm 2^{\circ}\text{F}$), verify if sensor is touching water or if hot air from rear could be affecting readings.



- 5 • If yes, use foam to isolate behind the probe.
- 6 • If no, replace temperature sensor with a spare one.
- 7 • If spa is still not heating, replace the board.

If "Heater" icon appears on the display, but spa is still not heating, carry out the following tests to correct the problem:

If "Heater" icon lights up on the display:

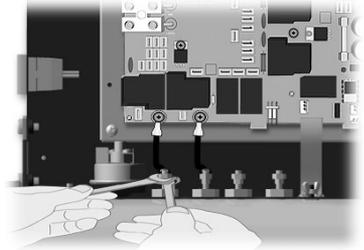


- 1 • Remove plastic cover and measure voltage between two heater screws on the board.

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

1-Kw heater: P21 & P56

4-Kw heater: P63 & P44



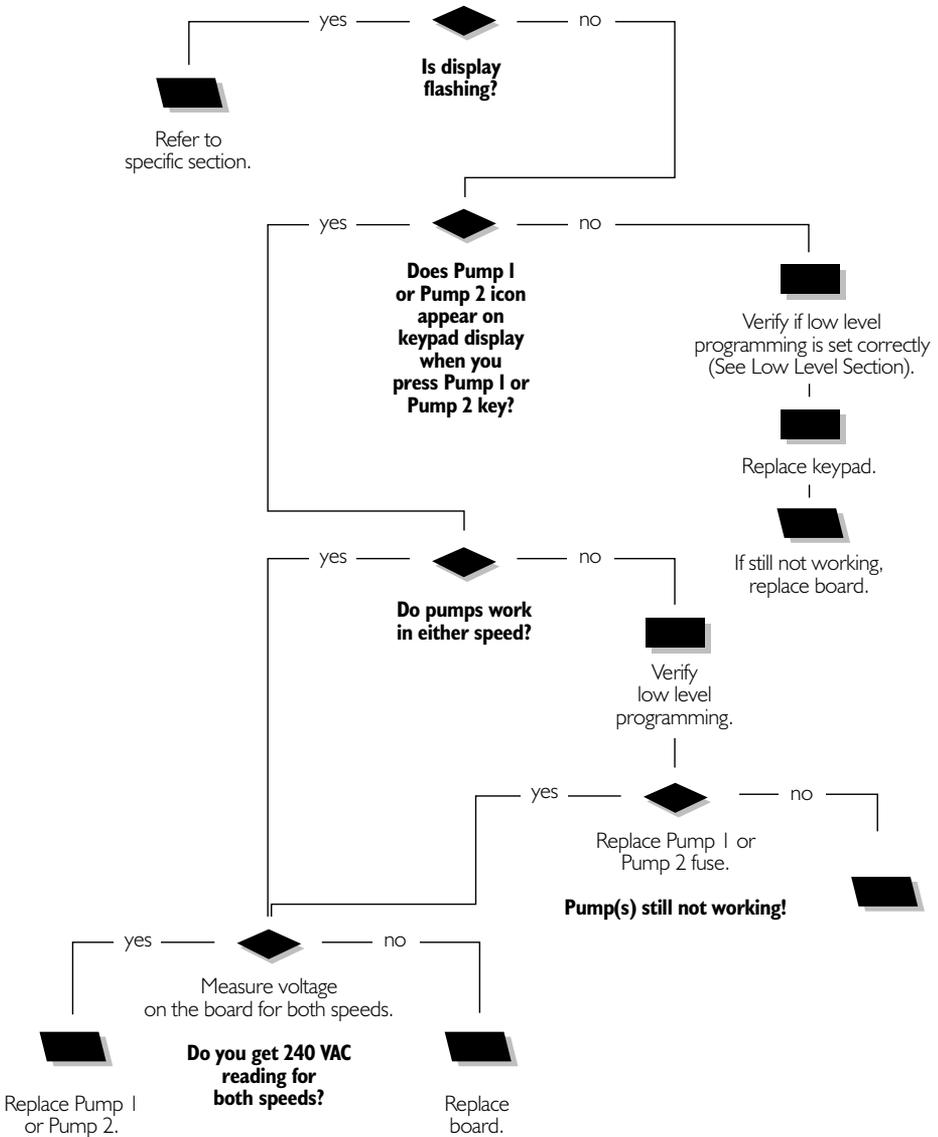
- 2 • If voltage reading is correct, verify if heater wires are properly connected to the element.

If not, tighten wires to board and element.

- 3 • If problem persists, replace the element.

Pump Flow Chart

If Pump 1 or Pump 2 is not working, follow Troubleshooting Flow Chart below to identify the problem:



Pump 1 Does Not Work!

If Pump 1 is not working, carry out the following tests to correct the problem:

To increase the life of the relay, we use a "snubber" circuit on the pump relay. With this type of circuit, if no pump is connected to an output and relays are open, the voltmeter will continue reading around 60 volts. This is normal.

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



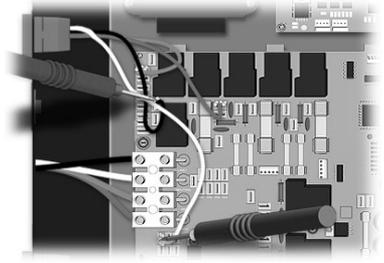
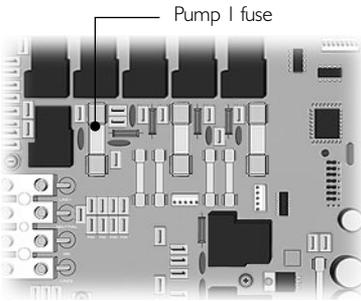
- 1 • Check if the display is flashing. If yes, refer to specific section.
- 2 • Verify if "Pump 1" icon appears on keypad display when you press **Pump 1** key.

If "Pump 1" icon does not appear, check low level programming first (see Low Level Section).

- 3 • If "Pump 1" icon does not appear, use a spare keypad to verify if keypad is defective.
If it is, replace keypad.
If not, replace board.
- 4 • If "Pump 1" icon appears on keypad display when **Pump 1** key is pressed, verify if Pump 1 works in any of the speeds.

Pump 1 Does Not Work!

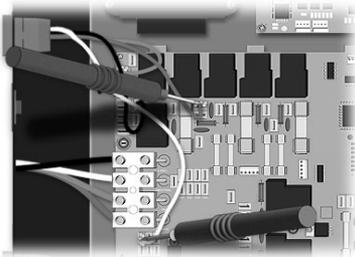
If Pump 1 does not work in any speed, perform the following tests to correct the problem:



- 1 • If Pump 1 does not work in either speed, replace Pump 1 fuse.
- 2 • If replacing the fuse does not work, or if Pump 1 works in one of two speeds, take voltage reading on the board for both speeds.

- 3 • Turn Pump 1 to high speed and measure voltage between white and black wire connectors:
240 VAC pump: P64 & P57
120 VAC pump: P64 & P48

The reading should be:
≈240 VAC for a 240 VAC pump
≈120 VAC for a 120 VAC pump



- 4 • If voltage is correct, replace Pump 1.
- 5 • If not, replace board.

Turn Pump 1 to low speed and measure voltage between white and red wire connectors:
240 VAC pump: P37 & P57
120 VAC pump: P37 & P48

The reading should be:
≈240 VAC for a 240 VAC pump
≈120 VAC for a 120 VAC pump

Pump 2 Does Not Work!

If Pump 2 is not working, carry out the following tests to correct the problem:

To increase the life of the relay, we use a "snubber" circuit on the pump relay. With this type of circuit, if no pump is connected to an output and relays are open, the voltmeter will get a reading of around 60 volts. This is normal.

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



- 1 • Check if display is flashing. If it is, refer to specific section.
- 2 • Verify if "Pump 2" icon appears on keypad display when you press **Pump 2** key.

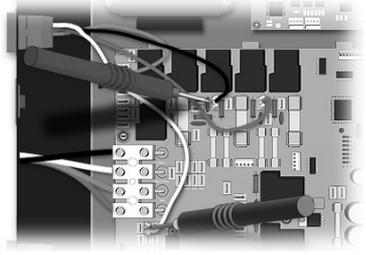
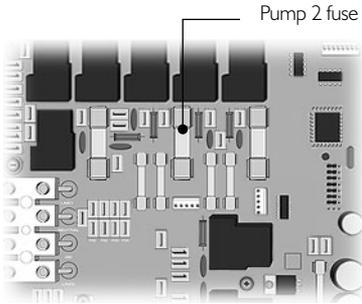
If "Pump 2" icon does not appear, check low level programming first (see Low Level Section).
- 3 • If "Pump 2" indicator does not appear, use a spare keypad to verify if spa keypad is defective.

If it is, replace keypad.

If not, replace board.
- 4 • If "Pump 2" icon appears on the display when you press **Pump 2** key, verify if Pump 2 works in any speed.

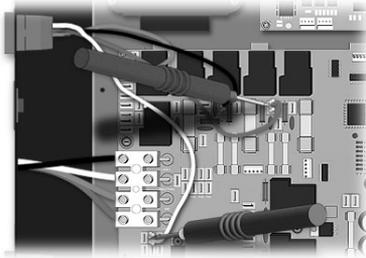
Pump 2 Does Not Work!

If Pump 2 is not working in any speed, carry out the following tests to correct the problem:



- 1 • If Pump 2 does not work in either speed, replace Pump 2 fuse.
- 2 • If replacing fuse does not correct problem, or if Pump 2 works in one of two speeds, read voltage on the board for both speeds.
 - 3 • Turn Pump 2 to high speed and measure voltage between white and black wire connectors:
240 VAC pump: P35 & P58
120 VAC pump: P35 & P45

The reading should be:
 ≈ 240 VAC for a 240 VAC pump
 ≈ 120 VAC for a 120 VAC pump
 - 4 • If voltage is correct, replace Pump 2.
 - 5 • If not, replace board.

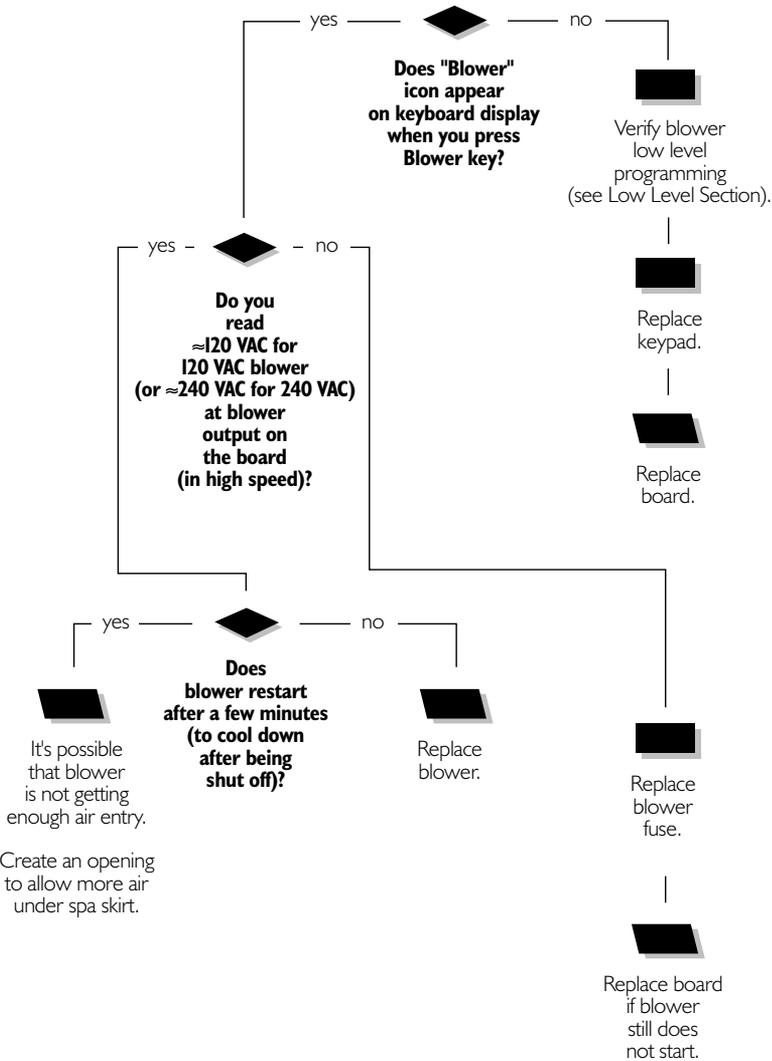


Turn pump 2 to low speed and measure voltage between white and red wire connectors:
240 VAC pump: P22 & P58
120 VAC pump: P22 & P45

The reading should be:
 ≈ 240 VAC for a 240 VAC pump
 ≈ 120 VAC for a 120 VAC pump

Blower Flow Chart

If blower isn't working, follow this Troubleshooting Flow Chart to identify the source of the problem:



Blower Does Not Work!

If blower is not working, carry out the following tests to correct problem:

To increase the life of the relay, a "snubber" circuit is used on the blower relay. With this type of circuit, if no blower is connected to an output and relays are open, the voltmeter will continue to get a voltage reading 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.

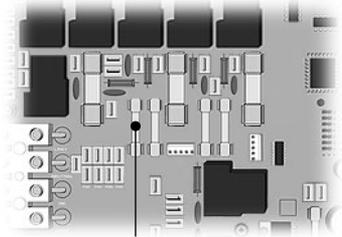
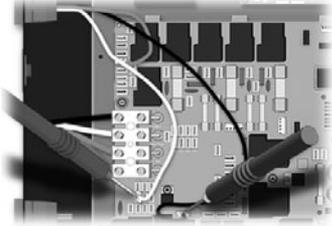
- 1 • Verify if "Blower" icon lights up on keypad display when you press **Blower** key (icon will flash when blower is in low speed).
- 2 • Verify if blower low level programming is set correctly.



- 3 • If "Blower" icon does not appear on keypad display, then replace keypad.
- 4 • If "Blower" icon still does not appear on keypad display, then replace the board.

Blower Does Not Work!

If "Blower" icon lights up on control display, but blower still isn't working, carry out the following tests to correct the problem:



Blower fuse

- 1 • If icon lights up on keypad while blower is in high speed, take voltage reading between white and black wire connectors:
120 VAC blower: P49 & P43
240 VAC blower: P59 & P43

Your reading should be:

≈120 VAC for a 120 VAC blower
≈240 VAC for a 240 VAC blower

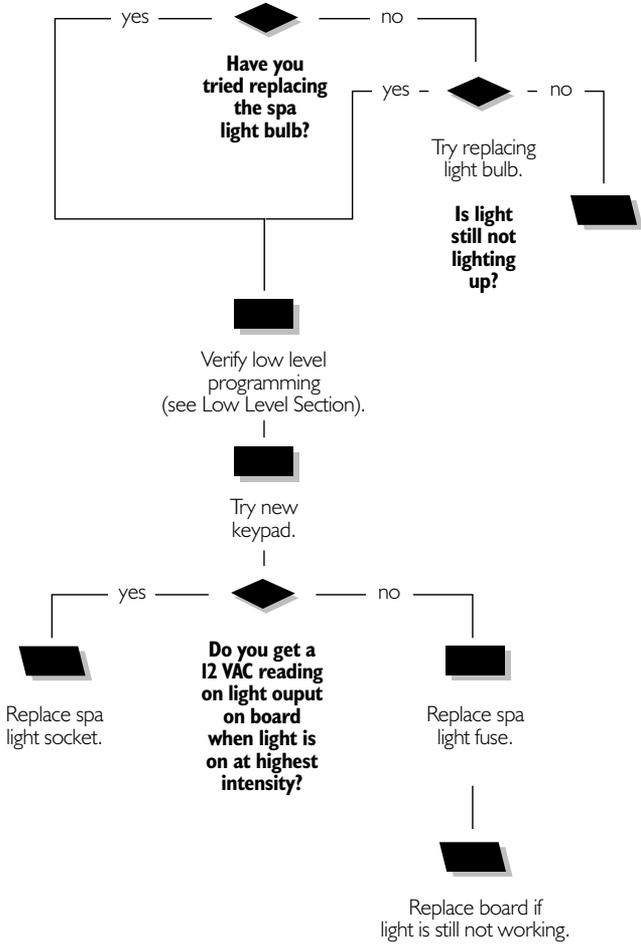
- 2 • Replace blower fuse if you do not get a high enough voltage reading.
- 3 • Replace board if you still aren't getting a voltage reading. (Refer to "How to Replace the Board" section.)
- 4 • If you don't get a good voltage reading, check if you can restart blower a few minutes after being turned off.

Replace blower if it does not start after cool down period.

- 5 • If blower does start up after cool down, it's possible that it is not drawing in enough air.
- 6 • Enlarge the opening to allow more air into blower.

Spa Light Flow Chart

If spa light does not appear to be working, follow the Troubleshooting Flow Chart below to identify the problem:

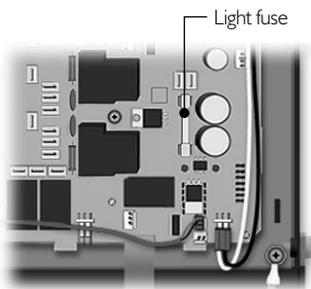


Spa Light Does Not Work!

If spa light is not working, carry out the following tests to correct the problem:

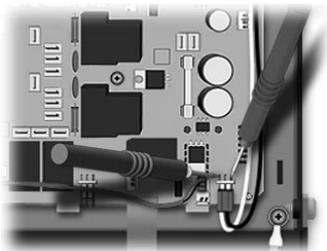
**It is important to measure voltage when light is connected to the pack.
Power must remain On.**

- 1 • The first step is to try replacing the spa's light bulb.



- 2 • If light still isn't working, verify low level programming first (see Low Level Section). Use a spare keypad to verify if spa keypad is defective.

- 4 • If you aren't getting a voltage reading, replace light fuse on the board.
- 5 • If the problem persists, replace board. (Refer to "How to Replace the Board" section.)

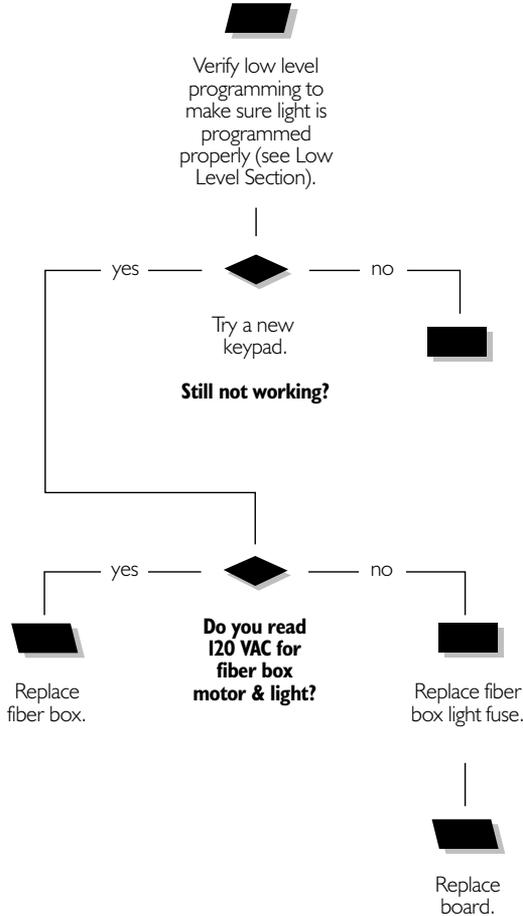


- 3 • Remove plastic cover and measure voltage between opposite prongs of connector P14 on the board.

If you get ≈ 12 VAC, replace light socket.

Fiber Box Light Flow Chart

If fiber box light does not appear to be working, follow Troubleshooting Flow Chart below to identify the problem:



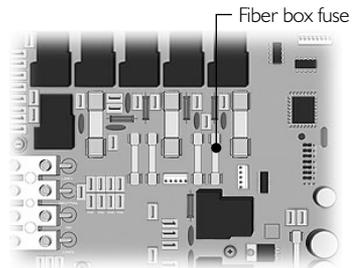
Fiber Box Light Does Not Work!

If fiber box light is not working, carry out the following tests to correct the problem:

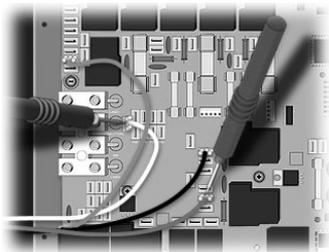
To increase the life of the relay, a "snubber" circuit is used on the fiber box relay. With this type of circuit, if no fiber box is connected to an output and relays are open, the voltmeter will still get a reading of around 60 volts. This is normal.

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

- 1 • Verify low level programming to make sure that it is programmed for a fiber box (LI 4).



- 2 • Try a new keypad.



- 4 • If you aren't getting a voltage reading, replace fiber box light fuse (F3).
- 5 • If problem persists, replace board. (Refer to "How to Replace the Board" section.)

- 3 • Verify if you can get a reading of 120 VAC for fiber box motor and light output.

Motor: P28 & P50

Light: P24 & P50

If you get \approx 120 VAC, replace fiber box module.

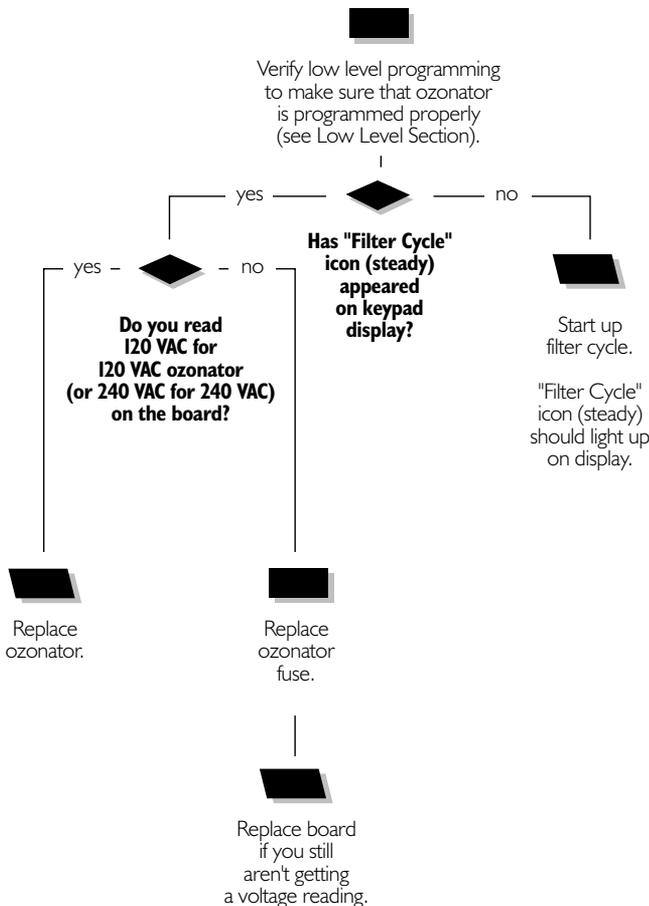
Ozonator Flow Chart

If the ozonator is not working, follow Troubleshooting Flow Chart below to identify the problem:

If the user turns on a pump, blower or light during a filter cycle, the cycle will be interrupted and will only resume 40 minutes after last active output has been turned off (automatically or manually). This delay is to prevent excessive ozonator activation.

During this interval, "Filter cycle" icon will flash in a different sequence (On: 1/2 sec., Off: 1/2 sec., On: 1/2 sec., Off: 1 1/2 sec.).

Also, to prevent excessive water temperature caused by overly long filter cycles, the system will cancel a filter cycle after 3 hours if water temperature rises more than 2°F above set point. In this case, "Filter Cycle" icon flashes on display.



Ozonator Does Not Work!

If ozonator isn't working, carry out the following tests to correct the problem:

To increase the life of the relay, a "snubber" circuit is used on the ozonator relay. With this type of circuit, if no ozonator is connected to an output and relays are open, the voltmeter will still get a reading of around 60 volts. This is normal.

It is important to take voltage reading with ozonator connected to the pack. Power must remain On.

N.B.: On new systems, if a pump, blower or light is turned on during filter cycle, the cycle will be interrupted and will resume only 40 minutes after the last active output has been turned off. This delay is to prevent excessive ozonator activation.

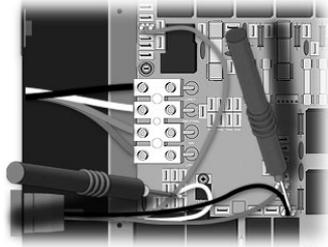
During this time, "Filter Cycle" icon will flash in a different sequence (3 short, 1 long, 3 short, 1 long, etc.).

To prevent excessive water temperature due to overly long filter cycles, the system will automatically cancel a filter cycle after 3 hours if water temperature climbs more than 2°F above set point. In this case, "Filter Cycle" icon flashes on the display.



- 1 • Verify low level programming to make sure that ozonator is programmed properly (see Low Level Section).
- 2 • Verify if "Filter Cycle" icon (steady icon) appears on keypad.

If not, start up a filter cycle (refer to TSPA-MP User's Manual).

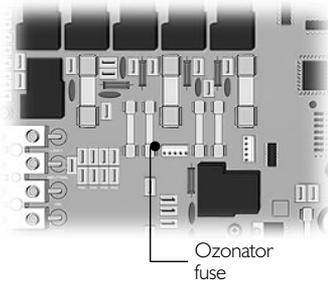


- 3 • Measure voltage between ozonator white and black wire connectors:
240 VAC ozonator: P30 & P60
120 VAC ozonator: P30 & P46

You should read:

≈240 VAC for a 240 VAC ozonator
≈120 VAC for a 120 VAC ozonator

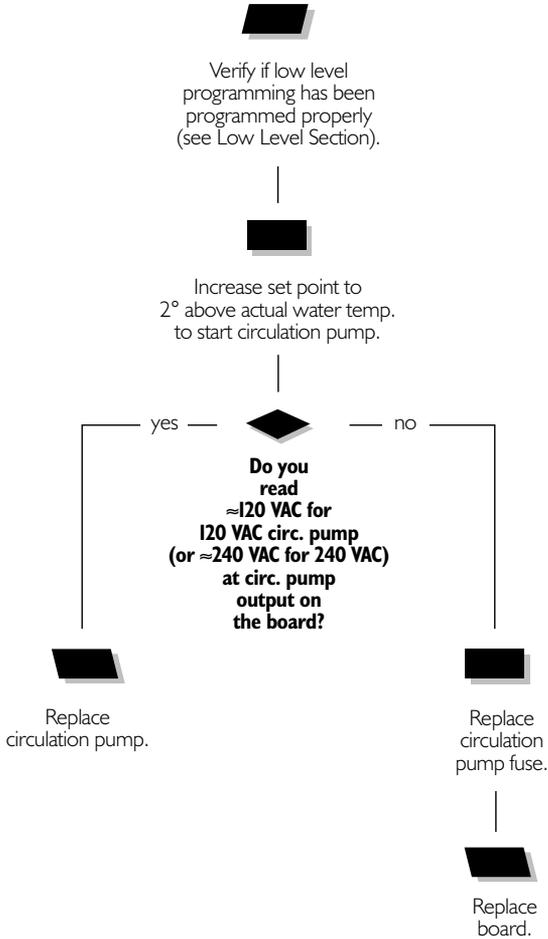
- 4 • Replace ozonator if you get a good voltage reading.



- 5 • Replace ozonator fuse if voltage reading isn't high enough.
- 6 • Replace board if you still don't get a voltage reading. (Refer to "How to Replace the Board" section.)

Circulation Pump Flow Chart

If the circulation pump does not appear to be working, follow this Troubleshooting Flow Chart to identify the problem:



Circulation Pump Not Working!

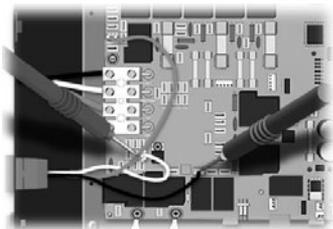
If your TSPA-MP has a defective circulation pump, carry out the following tests to correct the problem:

To increase the life of the relay, a "snubber" circuit is used on the circulation pump relay. With this type of circuit, even if no circulation pump is connected to an output and relays are open, the voltmeter will continue to get a volt reading around 60. This is normal.

It is important to take voltage reading when circulation pump is connected to the pack. Power must remain On.

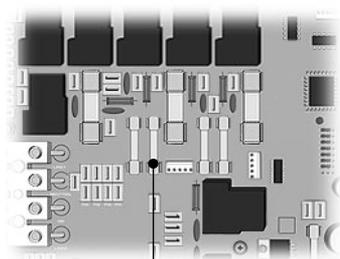


- 1 • Verify if low level programming has been programmed properly (see Low Level Section).
- 2 • Start circulation pump by setting temperature set point 2° higher than actual water temperature.



- 3 • Remove plastic cover and take voltage reading between circulation pump's black and white wire connectors.
240 VAC pump: P36 & P54
120 VAC pump: P36 & P41

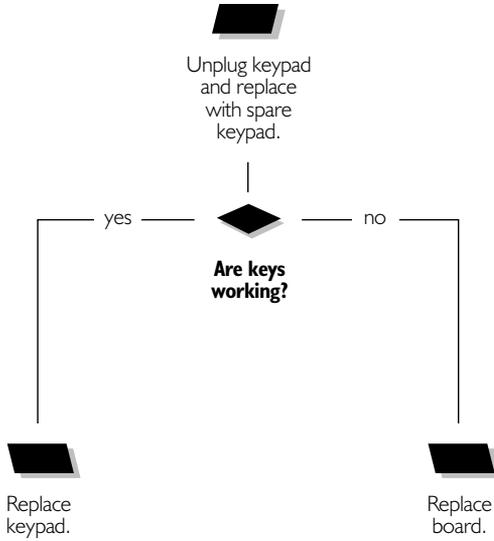
The reading should be:
≈ 240 VAC for 240 VAC pump
≈ 120 VAC for 120 VAC pump



Circulation pump fuse

- 4 • If you don't get a voltage reading, replace board's circulation pump fuse.
- 5 • If problem persists, replace the board. (Refer to "How to Replace the Board" section.)

If any of the keys on the keypad display do not seem to be working, follow Troubleshooting Flow Chart below to identify the problem:



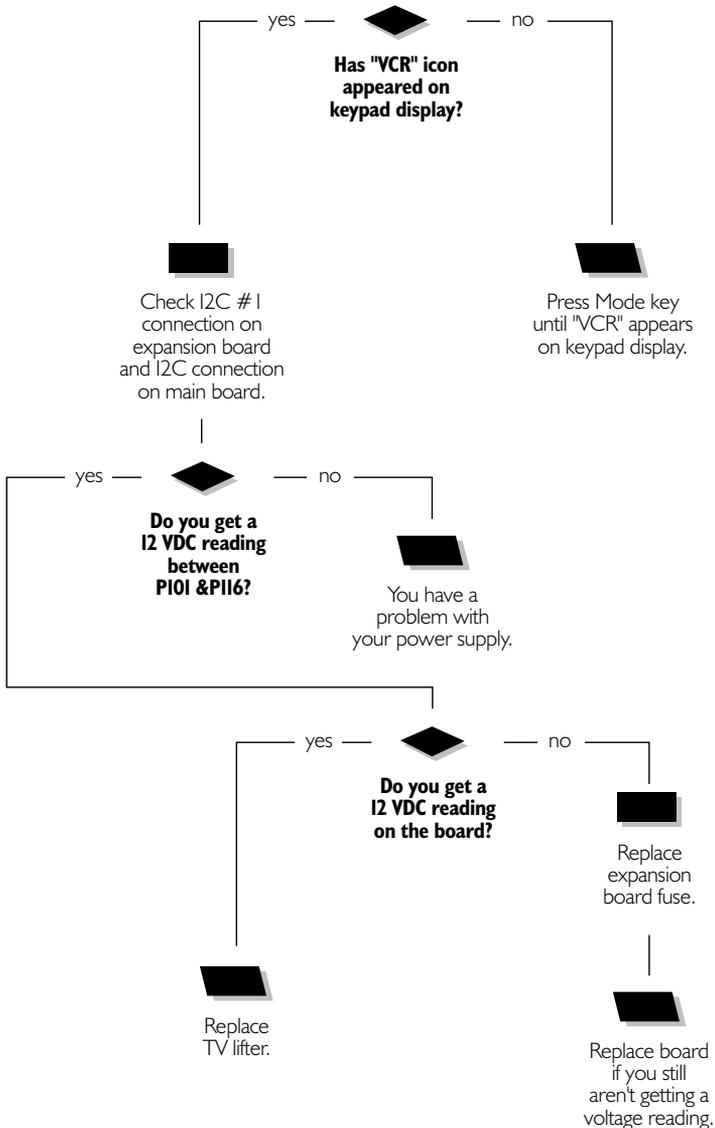
Keys Aren't Working!

If any of the keys do not seem to be working, carry out the following tests to correct the problem:



- 1 • Replace keypad with a spare keypad.
- 2 • Verify if keys respond correctly.
- 3 • If they do, replace keypad.
- 4 • If they do not respond, replace board.

If the TV lifter does not appear to be working, follow Troubleshooting Flow Chart below to identify the problem:



TV Lifter Not Working!

If your TSPA-MP has a defective TV lifter, carry out the following tests to correct the problem:

To increase the life of the relay, a "snubber" circuit is used on the TV lifter relay. With this type of circuit, even if no TV lifter is connected to an output and relays are open, the voltmeter will continue to get a volt reading around 60. This is normal.

It is important to take voltage reading when circulation pump is connected to the pack. Power must remain On.



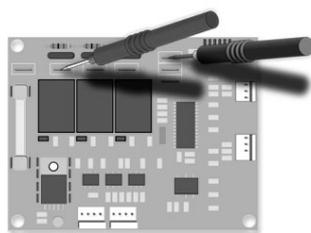
"VCR" icon

- 1 • Verify if "VCR" icon appears on keypad display.

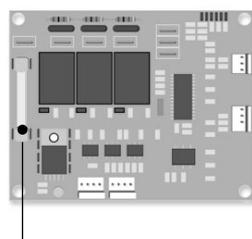
If not, use **Mode** key to put system in VCR mode.

- 2 • Check I2C #1 connection on expansion board and I2C connection on main board.
- 3 • Check voltage between P101 and P116.

If you do not get good reading, this indicates that you have a problem with your power supply.



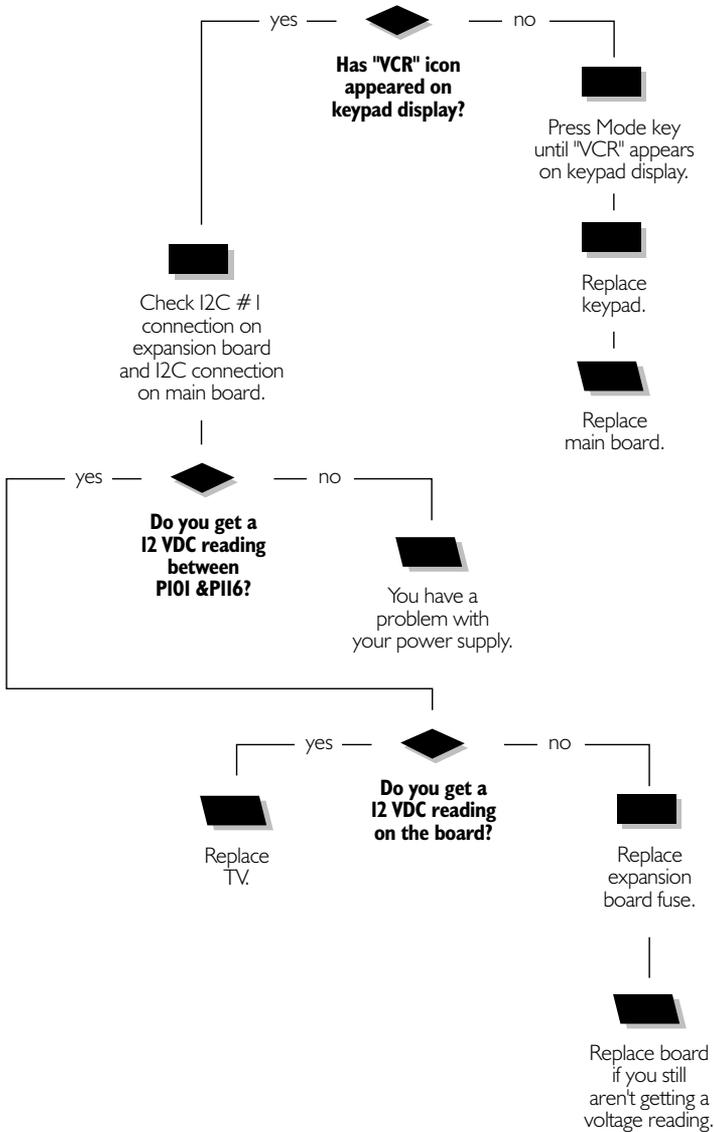
- 4 • If you get good voltage reading, take voltage reading between TV lifter's black and white wire connectors:
12 VDC lifter Up: P115 & P102
120 VDC lifter Down: P115 & P106
- 5 • Replace TV lifter if you get a good voltage reading.



TV lifter fuse

- 6 • If you don't get a voltage reading, replace fuse.
- 7 • If problem persists, replace the board. (Refer to "How to Replace the Board" section.)

If TV does not appear to be working, follow Troubleshooting Flow Chart below to identify the problem:

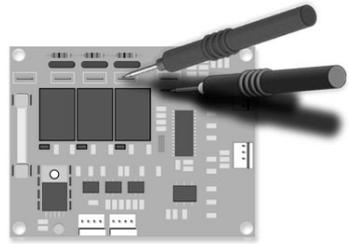


TV Not Working!

If your TV is not working, carry out the following tests to correct the problem:

To increase the life of the relay, a "snubber" circuit is used on the TV relay. With this type of circuit, even if no TV is connected to an output and relays are open, the voltmeter will continue to get a volt reading around 60. This is normal.

It is important to take voltage reading when circulation pump is connected to the pack. Power must remain On.

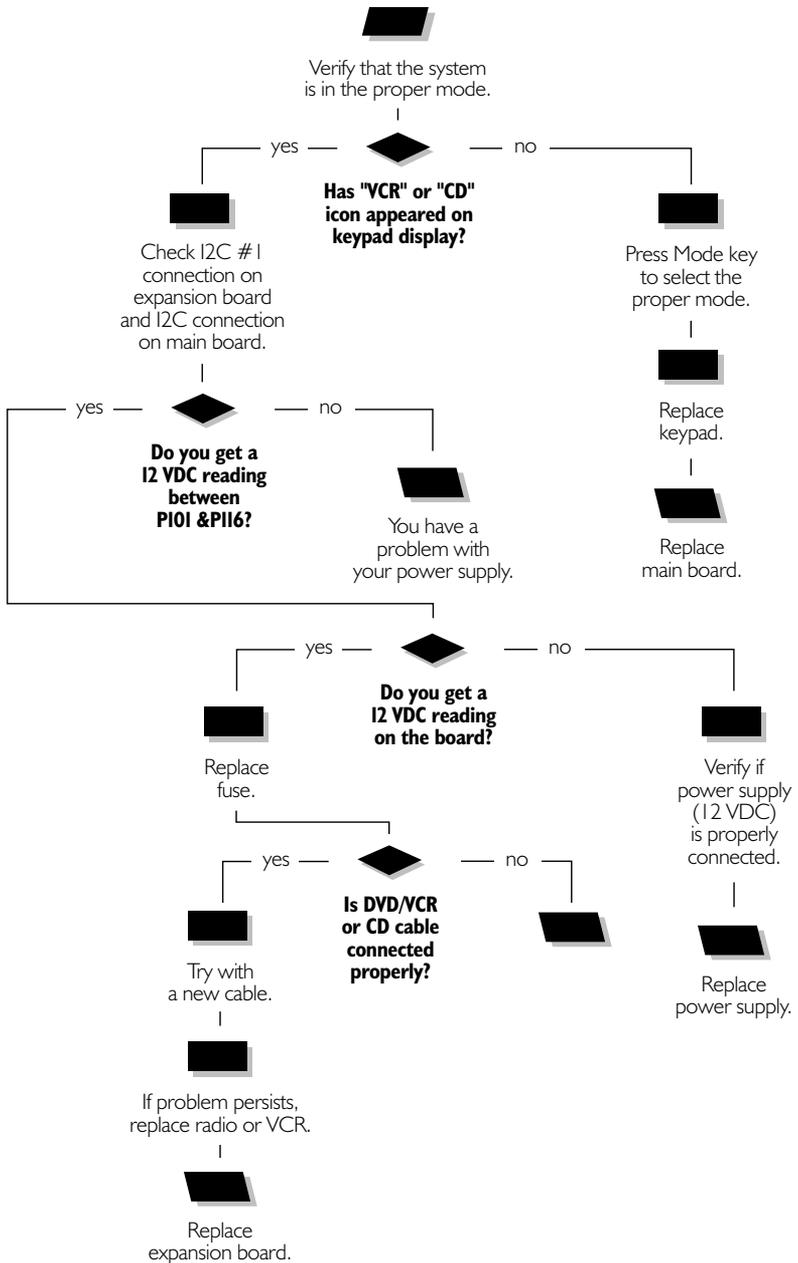


- 1 • Verify if "VCR" indicator appears on keypad display.
If not, use **Mode** key to put system in VCR mode.
- 2 • If "VCR" icon does not appear on keypad display, replace keypad.
- 3 • If "VCR" icon is still not appearing on display, replace main board.
- 4 • Check I2C #1 connection on expansion board and I2C connection on main board.
- 5 • Check voltage between PI01 and PI16.
- 6 • If "VCR" icon appears on display, verify if you can get a reading of 12 VDC on the board (PI12 & PI17).
- 7 • If voltage is correct, replace TV.
- 8 • If not, replace F1 fuse on expansion board.
- 9 • If problem still persists, replace expansion board.

If you do not get good reading, this indicates that you have a problem with your power supply.

VCR/DVD & CD/Radio Flow Chart

If your VCR/DVD or CD/radio does not appear to be working, follow Troubleshooting Flow Chart below to identify the problem:



VCR/DVD & CD/Radio Not Working!

If your VCR/DVD or CD/radio is not working, carry out the following tests to correct the problem:

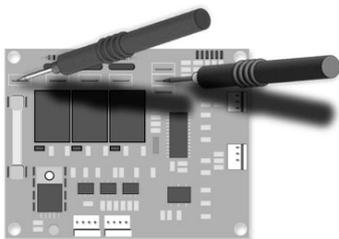
To increase the life of the relay, a "snubber" circuit is used on the TV relay. With this type of circuit, even if no TV is connected to an output and relays are open, the voltmeter will continue to get a volt reading around 60. This is normal.

It is important to take voltage reading when circulation pump is connected to the pack. Power must remain On.



"Audio" icon

- 1 • Verify if "VCR" or "CD" icon appears on keypad display. If not, use **Mode** key to put system in VCR or CD mode.



- 2 • If it does not work, replace keypad.

If problem persists, replace main board.

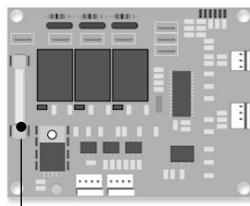
- 3 • Check I2C #1 connection on expansion board and I2C connection on main board.
- 4 • Check voltage between P101 and P116. If you do not get good reading, this indicates that you have a problem with your power supply.

- 5 • Verify if you can get a reading of 12 VDC at incoming power.

12 VDC: P101 & P116

If you do, verify if power supply is properly connected.

If you do not get a voltage reading, replace power supply.



F1 fuse

- 6 • Replace fuse (F1) if VCR/DVD or CD/radio is still not working.
- 7 • Verify if the communication cable is properly connected.

VCR/DVD: P119

CD/radio: P121

If yes, replace cable.

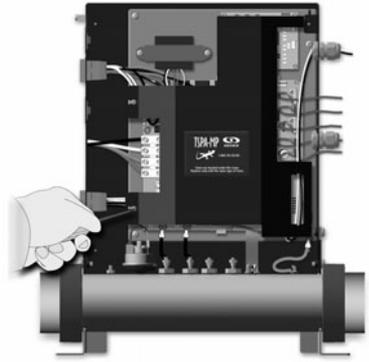
- 8 • If still not working, replace audio output (VCR/DVD or CD/radio).
- 9 • If problem still persists, replace expansion board.

How To Replace The Board

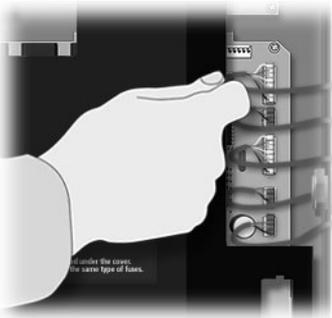
When replacing a TSPA-MP board, it is important to make sure to turn power off before proceeding.



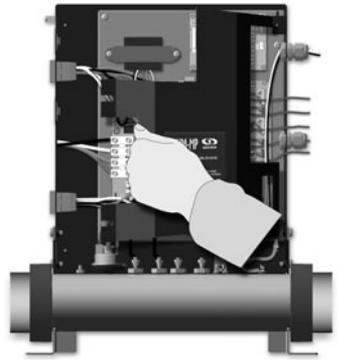
- 1 • Remove pack cover. Disconnect power input cables.



- 3 • Remove 2 screws that hold metal cover in place (on the left side of the power box).

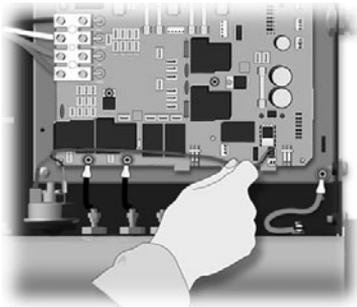


- 2 • Unplug keypad(s) and all connectors located on the right side of the power box.

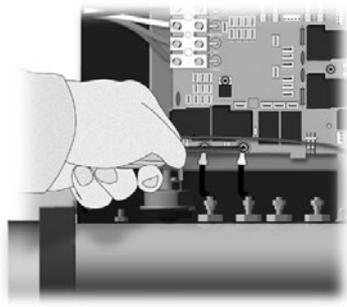


- 4 • Lift up the cover starting on the left side and slide it out from the guide points.

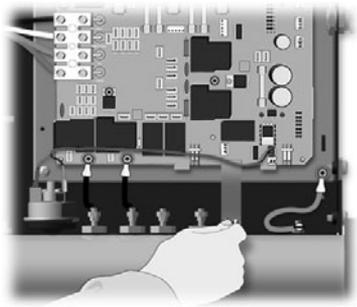
How To Replace The Board



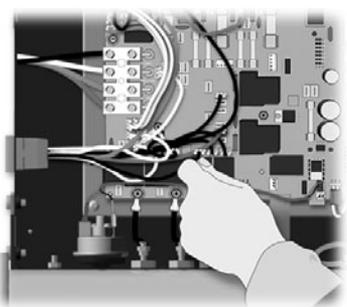
- 5 • Disconnect pressure switch cable and light socket.



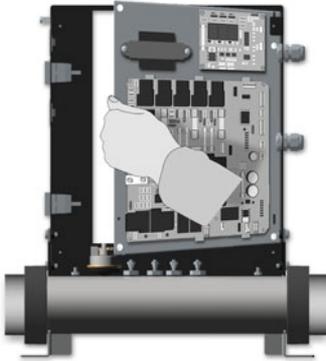
- 7 • Disconnect heater output by removing 3 screws at the bottom of circuit board on heater.



- 6 • Unscrew wing nut that holds hi-limit latch in place. Slide out hi-limit sensor.



- 8 • Disconnect J&J mini connectors from the board.

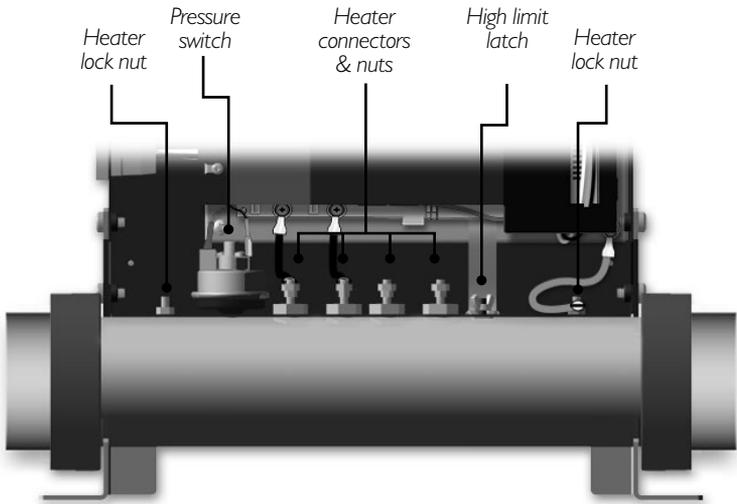


- 9• The circuit board is supported by a metal plate, with the entire assembly being held in place by 4 screws (one attached to ground wire). Remove screws and disengage the defective board/plate assembly (**Note:** transformer remains attached to board.)
- 10• Correctly align replacement board/ metal plate assembly with original screw holes and reattach to board with 4 screws. Switch transformer from one plate to the other.
- 11• 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.
- 12• Re-connect heater cables.
- 13• Re-connect pressure switch cable and light socket, and put hi-limit sensor back in place.
- 14• Verify all connections. Reposition metal cover in the guide points and put the screws back.
- 15• Re-connect keypad(s) and all connectors.
- 16• Re-connect power cable and turn power back on.

How To Replace The Heater

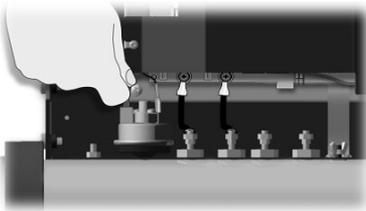
Follow instructions below to replace a TSPA-MP pack heater configured for standard horizontal position.

Note: Make sure to turn power to the pack off before proceeding.

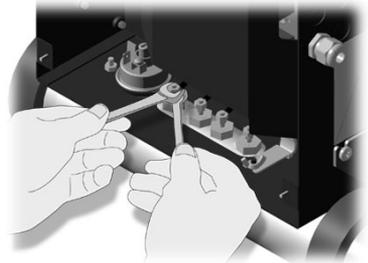


Important: Before starting removal procedure be sure to:

- disconnect pack power input cables;
- ensure spa water valves are closed.

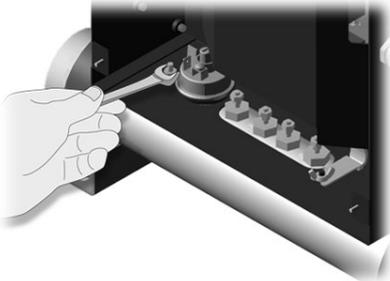


- 1 • Disconnect the two connectors on top of the pressure switch and unscrew and remove pressure switch.

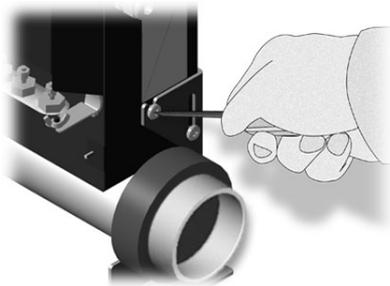


- 2 • With wrenches, disconnect heater by removing the four nuts on top of the elements.

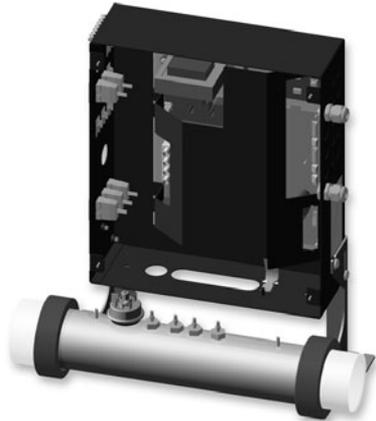
How To Replace The Heater



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



- 4• Loosen the two screws that hold mounting feet on each side of the pack and slide heater out.



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

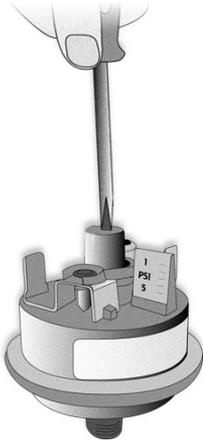
The two nuts must be well tightened because they are also used as a current collector in case of heater failure.

- 6• Connect the four 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.

- 7• Check if wires for the element are connected properly to the board.

- 8• Reinstall pressure switch and re-connect pressure switch cables (in no particular order).



When a voltmeter is not available:

- 1 • Turn Pump 1 off.
- 2 • Decrease the pressure switch setting to 0.5 P.S.I. or until service icon is displayed.
- 3 • Start increasing pressure switch setting by very slowly turning adjustment screw counter clockwise until service icon disappears. Then, decrease another full turn.
- 4 • Turn pump on at low speed for 30 seconds; there should be no service icon on display.
- 5 • Turn pump off and wait 30 seconds. You should not see the service icon.
- 6 • If you see an error; restart the adjustment procedure.

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

How To Adjust The Pressure Switch

When a voltmeter is available:

- 1 • Set voltmeter to " Ω " (while both probes are touching one another, voltmeter should beep to show there is continuity).
- 2 • Turn Pump 1 off.
- 3 • Do you have continuity on pressure switch?

If you have no continuity, go to step 4.

If you do have continuity, increase pressure switch setting by turning clockwise until voltmeter stops beeping. Then, decrease another full turn.

- 4 • Turn Pump 1 on at low speed and wait a few minutes.

If service icon does not appear, you have adjusted the pressure switch successfully.

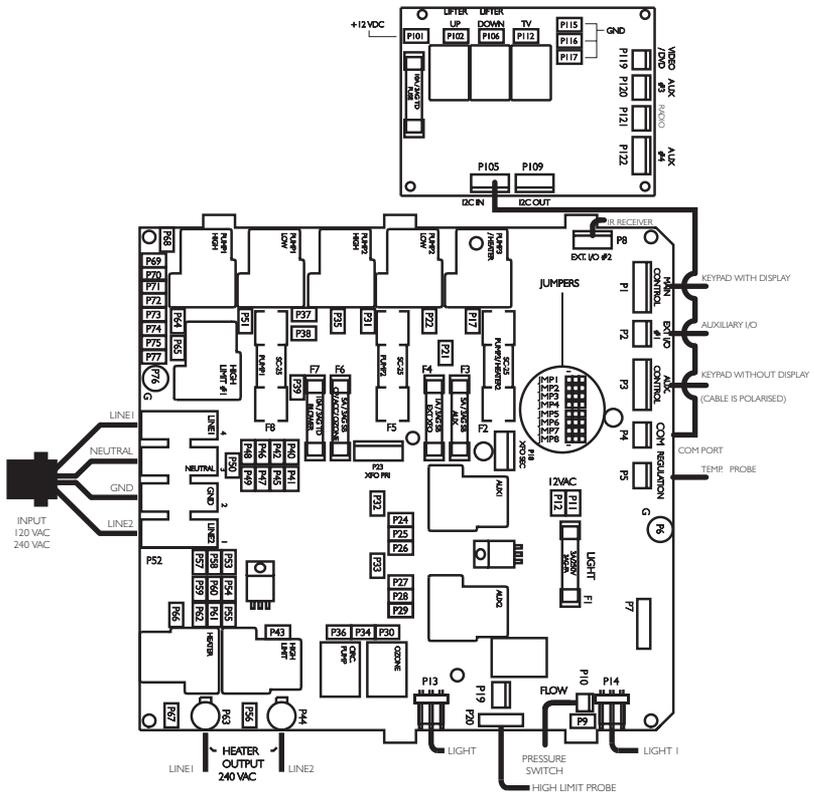
If service icon appears, decrease pressure switch setting by turning counter clockwise until voltmeter starts beeping (there is continuity). Then, decrease another 1/4 of turn. Turn pump off.

The service icon should not appear (restart procedure if service icon appears).

- 5 • When adjustment procedure is completed, apply Loctite 425 to the adjustment screw to secure it in place.



The wiring diagram below provides a general idea of TSPA-MP wiring, but it is important to note that it may not apply to all systems. The wiring diagram including an inside power box cover is the one to be used as main reference for the spa you are servicing.



Pump 1		
Voltage	120 v	240 v
Green / Ground	P69	P69
Red / Low Speed	P37	P37
Black / High Speed	P64	P64
White / Com	P48	P57

Ozone		
Voltage	120 v	240 v
Green / Ground	P73	P73
Black / Line	P30	P30
White / Com	P46	P60

Fiber Box		
Voltage	120 v	240 v
Green / Ground	P75	P75
Black / Light	P24	P24
Red / Motor	P28	P28
White / Com	P50	P50

Pump 2		
Voltage	120 v	240 v
Green / Ground	P70	P70
Red / Low Speed	P22	P22
Black / High Speed	P35	P35
White / Com	P45	P58

Accessory Connector		
Voltage	120 v	240 v
Green / Ground	P77	P77
Black / Line	P34	P34
White / Com	P47	P61

Light Connector (24W max.)		
Light I		P14

Heater		
Heater 1 (4Kw)		P63, P44
Heater 2 (1Kw)		P21, P56

Lifter		
Lifter Up		P102
Lifter Down		P106
Ground		P115

Fan		
Green / Ground		P68
Black / Line		P65
White / Com		P42

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- Temperature probes
- Pressure switch cables
- Flow switches
- Elements
- Heater wires
- Transformer
- Ground lugs
- Gromets
- Standoffs
- Light cords
- Strain reliefs for light cord
- Plugs
- Fuse kits
- Screws



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