

Aqua Trol®

Diagnostics Manual



Turbo Cell & Control Electronics

Software Revision 1.45

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Aqua Trol Diagnostics



High Voltage Electrocution Hazard

Hazardous voltage can shock, burn, cause serious injury and or death. To reduce the risk of electrocution and or electric shock hazards:

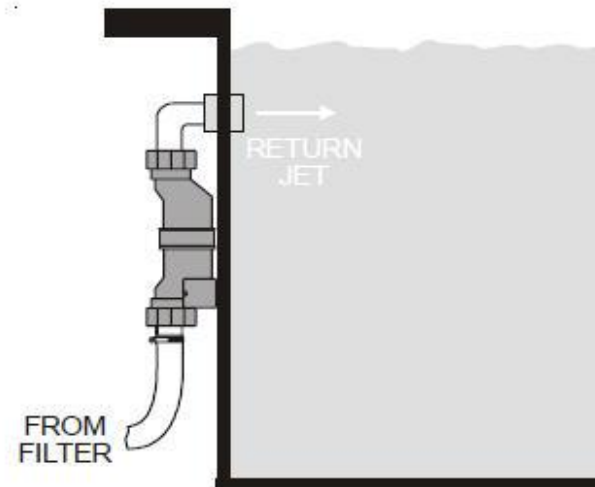
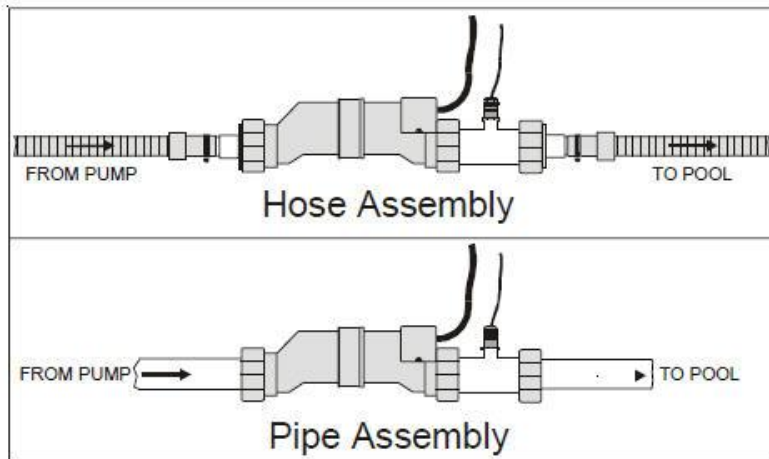
- Only qualified technicians should remove the panel
- Replace damaged wiring immediately
- Insure panel is properly grounded and bonded

Overview

The Aqua Trol incorporates a built in timer to control the pool pump, controls a T-cell-5, and is designed to handle the sanitization needs of above ground pools up to 18,000 gallons. The actual amount of chlorination required to properly sanitize a pool varies depending upon bather load, rainfall, temperature, and the pool's cleanliness. There are four models of Aqua Trol:

AQ-Trol-HP HP model with straight blade plug
AQ-Trol-HP -TL HP model with twist lock plug

AQ-Trol-RJ RJ model with straight blade plug
AQ-Trol-RJ -TL RJ model with twist lock plug



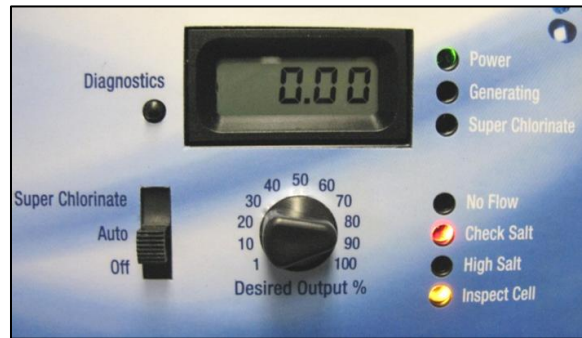
Overview



All Aqua Trol models are powered via a 120VAC line cord plugged into a GFCI receptacle. The “HP” designation stands for “Hose or Pipe”, and the RJ designation stands for “Return Jet”. On the “HP” option, the cell may be connected with flexible hose or rigid PVC pipe. The “RJ” model mounts directly to the pool return jet. The “HP” model can have the cell mounted horizontally or vertically, and incorporates a flow switch, which is a device that ensures that the turbo cell is generating only when there is at least 11 gallons of water passing through the cell. The “RJ” model requires that the cell be mounted vertically to the pool’s return jet.

Check Salt & Inspect Cell LED flashing or ON

Check Salt & Inspect Cell LED's will flash together when salt level is between 2400-2700ppm. Chlorine is still being produced. Check Salt & Inspect Cell LED's will be ON when salt level is 2300ppm or less. Chlorine production is halted. Inspect Cell LED will flash by itself when 500 operational hour countdown timer has expired. Requires manual reset. To manually reset the Inspect Cell LED, press and hold the Diagnostics button until LED goes out (approximately 3 to 5 seconds).



NOTE: Check Salt & Inspect Cell LED's will also be ON if the control is set for the wrong Turbo Cell type or the cell is unplugged. Check to make sure the Aqua Trol is controlling a T-Cell -5.

Step A

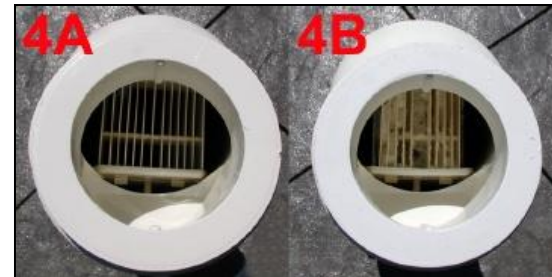
Verify salt level is 2700-3400ppm and check with independent test to ensure accuracy. 3200ppm is the ideal level.



If salt level is within range, go to step B.
If salt level is below range, add enough salt to achieve a salt level of 3200ppm.
(Refer to Salt Chart, Page 27)

Step B

Inspect and/or Clean Cell



If cell looks like 4A, go to step C.
If cell looks like 4B, clean cell.
(Refer to Pages 15 thru 17)

Check Salt & Inspect Cell LED flashing or ON

Check cell voltage and amperage in both polarities.

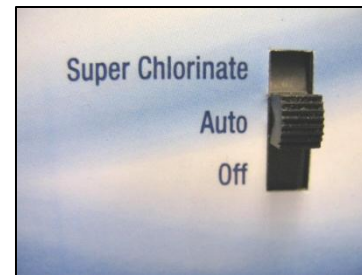
Step C



Voltage Range: 22.0 – 26.0 VDC



Amperage Range: 2.5 – 4.00 amps



To switch polarities, cycle Main Switch from
AUTO → OFF → AUTO.

Note: After cycling the switch to 'off' and back to 'auto', wait about 10 seconds, then press the diagnostic button 2 times to see the voltage reading and 3 times to see the amperage.

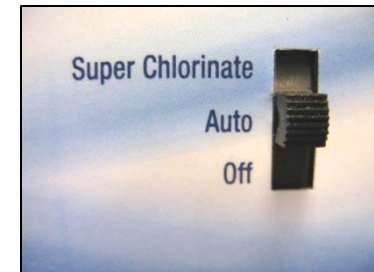
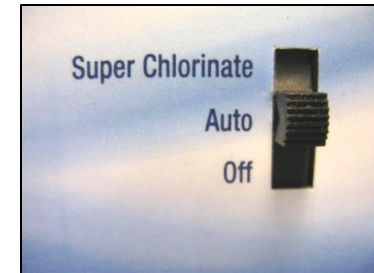
How to Reset Average Salt Level

The Average Salt level needs to be reset for start up and when a cell is replaced. (factory default is 2800ppm)

To reset, turn the unit to Off and then back to Auto. Wait for the relay to click (5 to 10 seconds).



Press Diagnostics button 5 times to display Instant Salt level. Wait for the number to settle.



Cycle slide Main Switch from
Auto → Super Chlorinate → Auto

Adjusting Chlorine Output

Desired Output % Dial

1 to 100% sets the level of cell operation in % of operating time..

Example: 50% (factory default) cell is operating and generating chlorine 50% of the total pump/filter operating time.

Refer to page 28 for important additional information !



Rotate the dial to adjust.

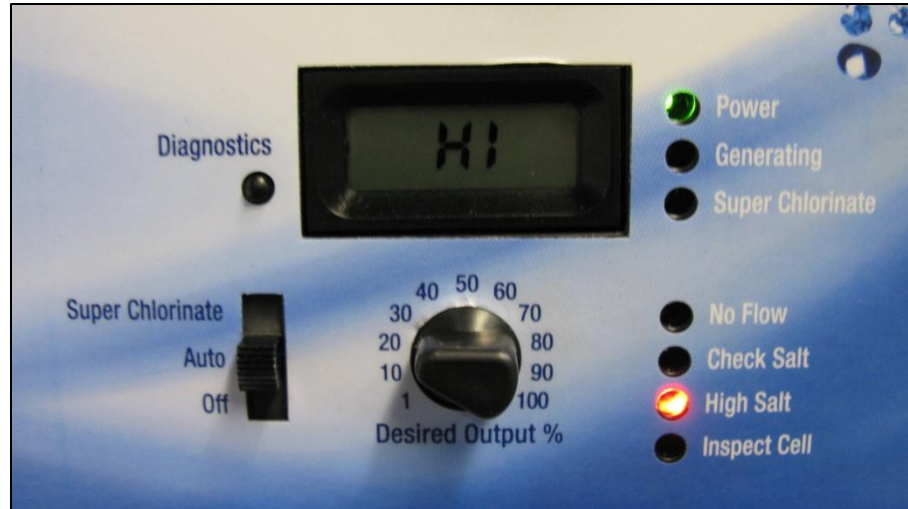
Note: If the chlorine level does not increase within 24 hours after increasing output, test water with independent tests to determine current salt, stabilizer, phosphate, and nitrate levels.

Note: Output is scaled back to 20% of desired output setting at 60° F and output stops at 50° F.

High Salt LED ON

*The High Salt LED will be ON when the cell amperage is above the maximum limit. High Salt LED will also be ON if the control is set for the wrong Turbo Cell type. Check to make sure the cell installed is a T-Cell-5.
The LCD display will read "HI".*

Verify salt level is 2700-3400ppm and check with independent test to ensure accuracy.



Maximum Current (Amps) before shutdown is 4.0 amps.

If salt level is above the range, partially drain pool and/or spa and refill with fresh water to achieve a salt level of 3200ppm.

(RULE of THUMB: Each inch of water drained will reduce the salt level 100ppm.)

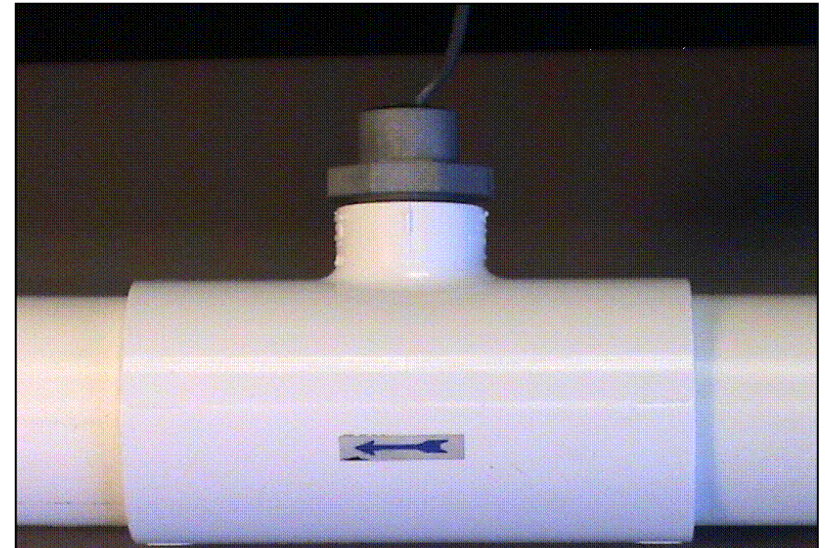
No Flow LED flashing or ON

No Flow LED will flash for up to 60 seconds on start-up.

No Flow LED will be ON when there is a flow switch problem.



If LED is flashing, wait 60 seconds after starting filter pump. Check for possible turbulence inside of flow T. Installation requires 12 inches of straight pipe before flow switch. There should be no elbow after the flow switch.

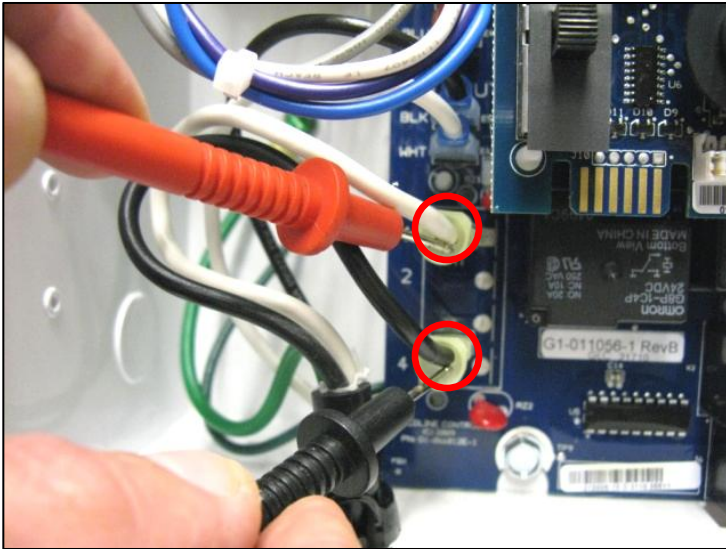


If LED is ON, check for flow switch installed backward. Arrows at the top of the hex nut need to point in the direction of water flow. Flow switch requires a minimum flow rate of 11 gpm to stay closed consistently. Check for damaged or cut wire.

No LED's/LCD display

**Verify 115-125 VAC
at input terminal TB1.**

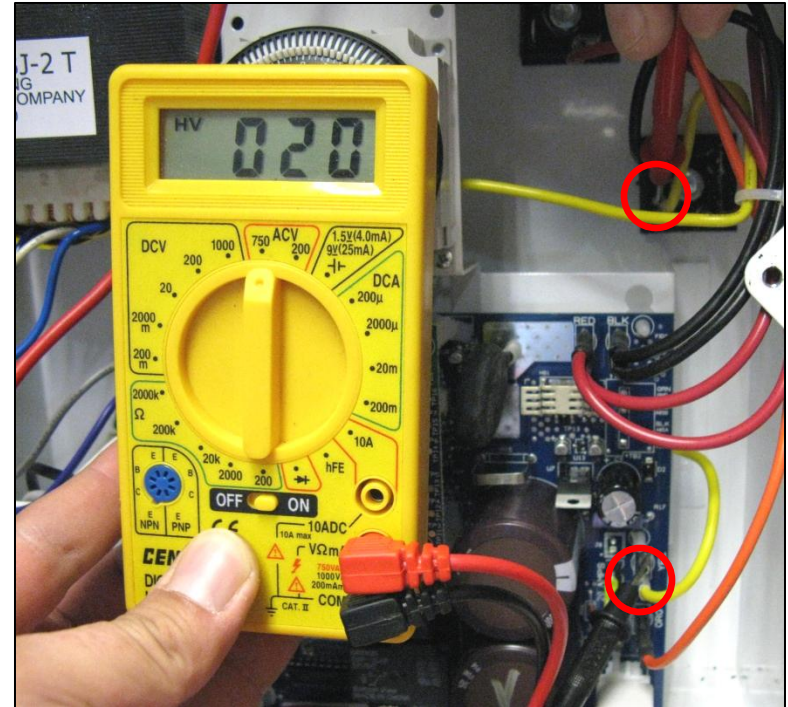
Step C



If voltage is good, go to step D.
If no voltage, check to see that breaker
and/or time clock are not off.

**Verify 20-24 VAC
between yellow wires**

Step D

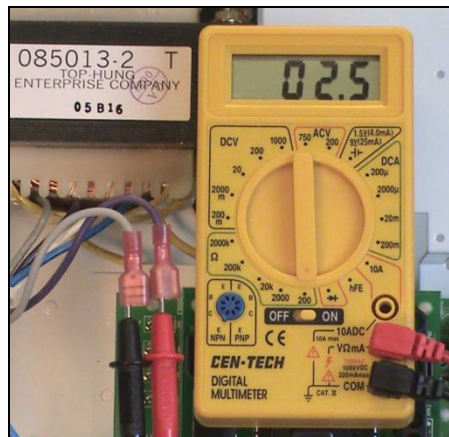
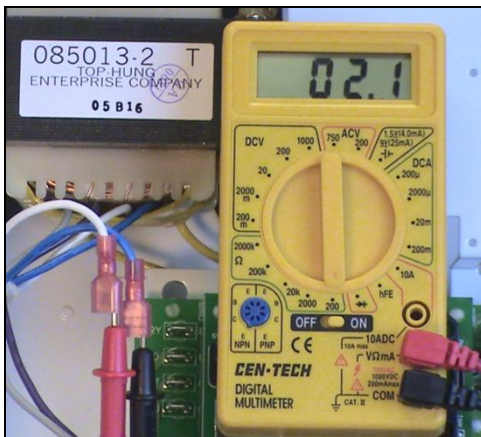


If no voltage go to step E.
If voltage is good go to step F.

No LED's/LCD display

**Shut off power to the control box.
Disconnect the blue, white, gray and
violet wires from the main board and
measure the following:**

Step E

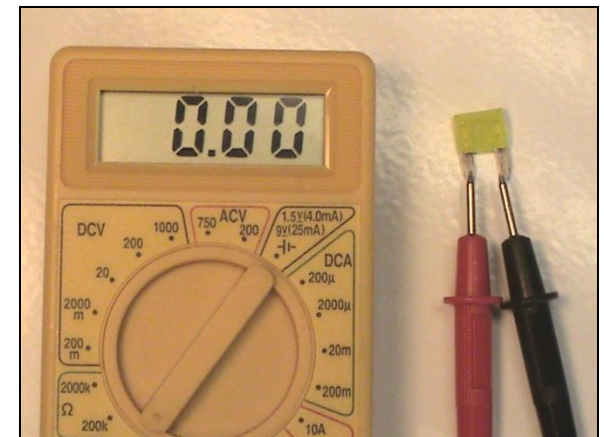


**Insert probes and measure resistance between the
Blue & White wires and the Violet & Gray wires.
The readings should be 2.0- 2.9 Ohms.**

**If the readings of either of the two measurements are not
2.0 – 2.9 Ohms, the transformer is faulty and should be replaced.
If measurements are OK, go to step F.**

**Test for continuity of
20 amp slow blow fuse**

Step F

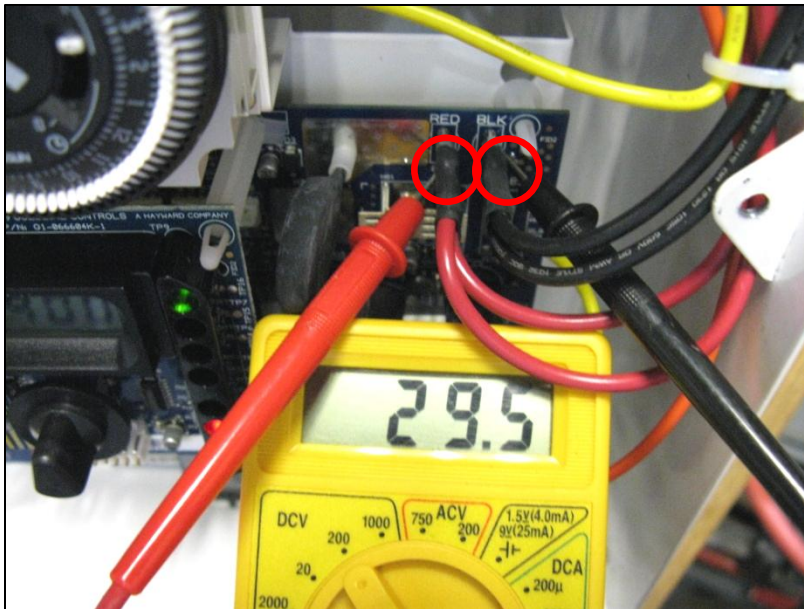


Replace fuse if blown. If fuse OK, go to step G.

No LED's/LCD display

**Verify 18-33 VDC between
black & red wires on main board**

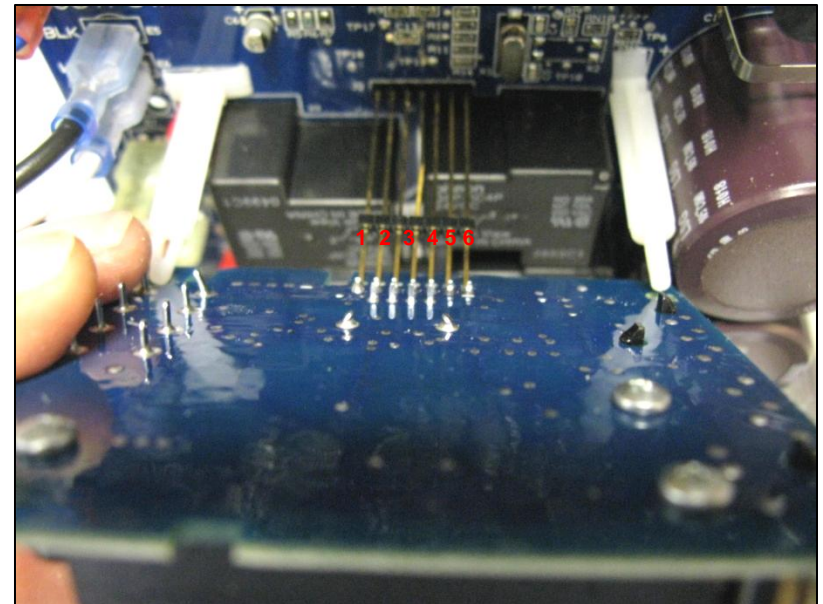
Step G



If no/low voltage replace rectifiers.
If voltage OK, go to step H.

Reseat DSP Board

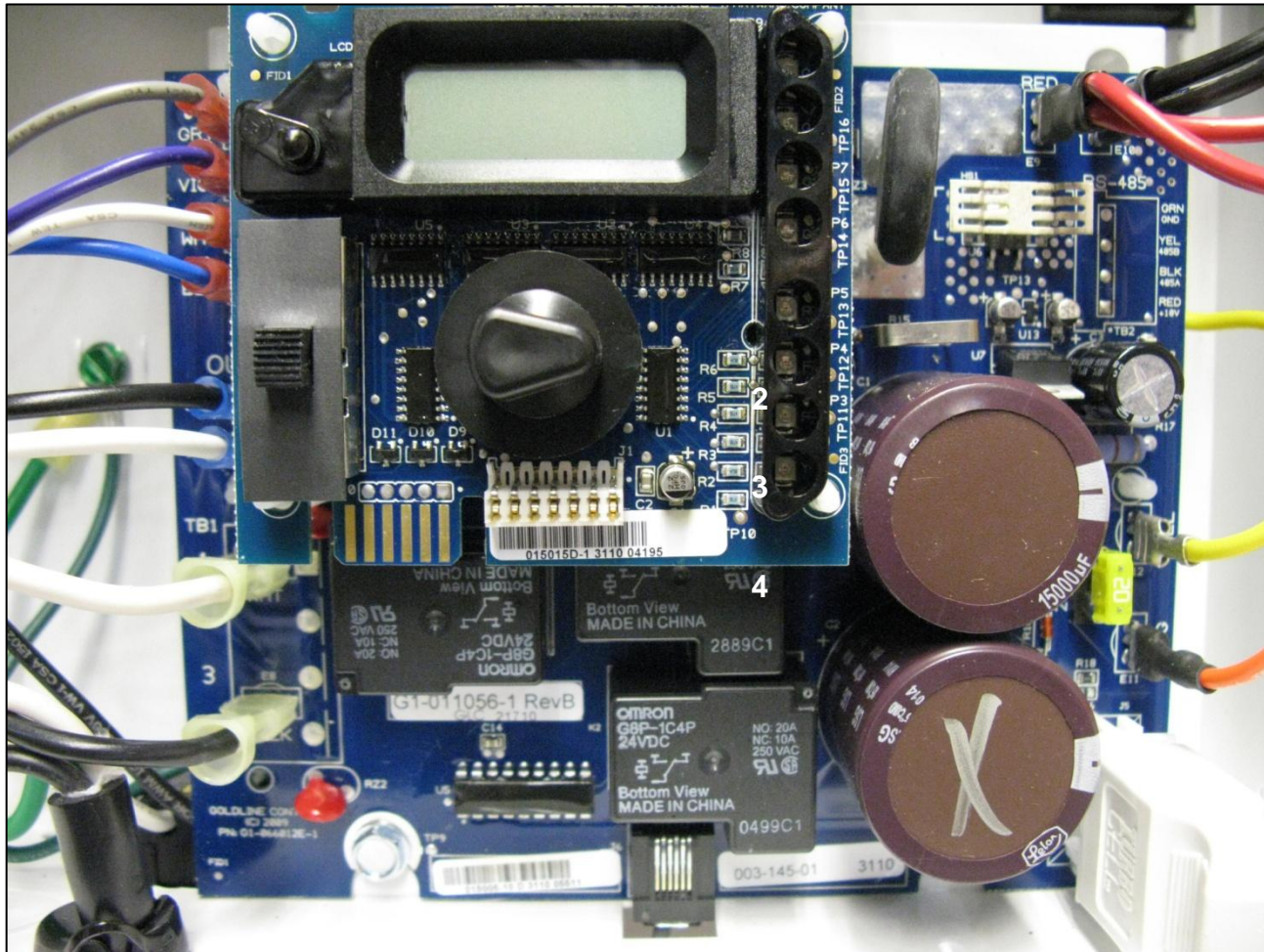
Step H



Remove and/or reseat DSP board. Pins may be
shorted together or not making contact with
connector. If pins are good, check for 3 to 5 volts (DC) on pins 2
& 4, starting from the left. If DC voltage is correct, replace DSP
board.

No LED's/LCD display

Step 1



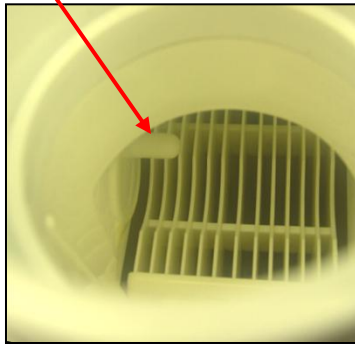
Visually inspect main PCB board for any damaged or burnt components. If damaged or burned, replace the main PCB.

Low/High Cell temperature

The operating temperature range for the cell is 50° F to 140° F.

Verify actual water temperature

Cell Temperature
Sensor



LCD display will read “COLD” when the water temperature is below 50° F
LCD display will read “HOT” when the water temperature is above 104° F
If the water temperature reads an erroneously high number, the cell temperature sensor is shorted and the cell needs to be replaced.

Output is scaled back to 20% at 60° F and output stops at 50°

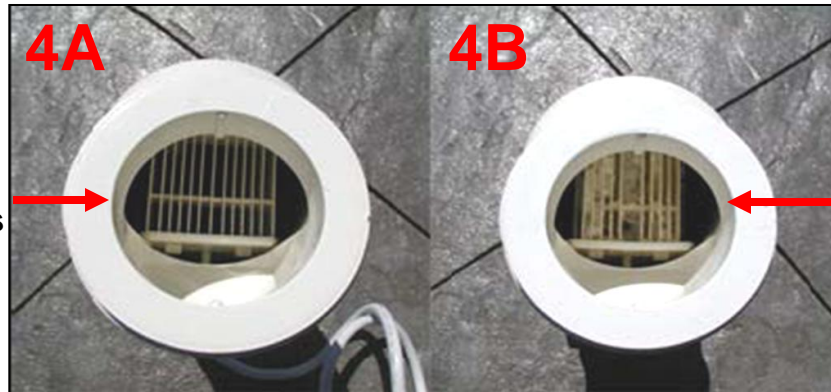
F

Cell Cleaning

Cell cleaning frequency is dependent on several factors; pH and calcium levels in the water are the two that have the greatest effect on how often the cell requires cleaning. Maintaining pH at the levels recommended in the Operating Instructions (7.2 - 7.8) should result in the cell being cleaned 3-4 times a year in areas with hard water. Cells may be cleaned less frequently in soft water areas.

After removing the Turbo Cell from the plumbing of your pool; inspect the cell for white deposits between the plates inside of the cell. Please remember that even if you cannot see deposits on the cell it still may need cleaning. If no deposits are found (4A), the cell may have to be held towards ample amounts of light and angled in different directions to reveal smaller white deposits deeper within the nest of the cell.

Hold to light to
look for small deposits



Cell is dirty.
Note the deposits.



CAUTION

ALWAYS ADD ACID TO WATER, NEVER WATER TO ACID. ALWAYS WEAR PROPER EYE PROTECTION AND PROTECTIVE GLOVES. USE IN A WELL VENTILATED AREA. MURIATIC AND OTHER ACIDS CAN CAUSE SEVERE INJURY, BURNS AND RESPIRATORY PROBLEMS IF NOT HANDLED PROPERLY. REFER TO THE MANUFACTURER'S DIRECTIONS FOR SAFE HANDLING.

Cell Cleaning Instructions

Cleaning instructions using a container.



We strongly recommend using a Goldline Controls cell cleaning stand. (GLX-CELLSTAND)

Step 1: Use a water hose to dislodge small debris.

Step 2: Use a non-metal (plastic or wood), non-abrasive tool to dislodge minor calcium buildup and small debris.

Step 3: Use a solution of water and Muriatic acid. Stand the cell vertically in the solution. Mix 1 part acid to 4 parts water. The level of the solution should be slightly over the product label. Let the cell stand in the solution for 15 minutes (Fig. 6A below), then flip the cell over and let stand on the other end (Fig. 6B below) for an additional 15 minutes. Although the cord can be submerged, be sure that the connector does not come in contact with the solution.

Inspect the cell after both sides have soaked. If there are no deposits after soaking, rinse with water and reinstall. If there are still deposits after soaking, repeat the soaking procedure until clean. The water/muriatic acid mixture can be stored for later use or it can be disposed. Follow chemical manufacturer's recommendations when storing or disposing the water/acid solution.

After you inspect the cell (and clean, if necessary) press the small "diagnostic" button next to the display for 3 seconds to stop the flashing "Inspect Cell" LED and reset the countdown timer for another 500 operational hours.



Cell Cleaning Instructions

Using the Goldline T-Cell Cleaning Stand

Follow the same safety and mixing instructions as described when using a container on page 14. Mix enough solution to fill the inside of the cell (Approximately 1.5 qts). Mix 1 part acid to 4 parts water.

Fasten the cell to the T-Cell Cleaning Stand with the cord side down (Fig. 6A below). Before filling cell with muriatic acid solution, put a container underneath to avoid any spills damaging the surrounding area. Fill the cell to the top with the solution and let soak for 15 minutes (Fig. 6B below). Empty the cell and inspect. If the cell is clean, rinse with water and reinstall. If there are still deposits after soaking, repeat the soaking procedure until clean. The water/muriatic acid mixture can be stored for later use or it can be disposed of. Follow the chemical manufacturer's recommendations when storing or disposing the water/acid solution.

After you inspect the cell (and clean, if necessary) press the small "diagnostic" button next to the display for 3 seconds to stop the flashing "Inspect Cell" LED and reset the countdown timer for another 500 operational hours. If the cell was cleaned because of 'Low Salt', be sure to reset the average salt reading by following the instructions on page 4.



Pump Not Turning On

Verify correct model # is displayed. AL-6 for HP units, AL-7 for RJ units. Press the diagnostic button 6 times from the default screen to display the model #.

Step J



If not correct, replace PCB.
Otherwise, proceed to Step K.

With the power switch in the “auto” position and the trippers in “on position”(out), check for continuity between the brown wires at J1 on the PCB.

Step K



If no continuity exists, replace time clock.
Otherwise, proceed to Step L.

Off
(In)



On
(out)

Pump Not Turning On

With the power switch in the center position and the trippers in “on position”(out), check for continuity between the brown wires at J1 on the PCB.

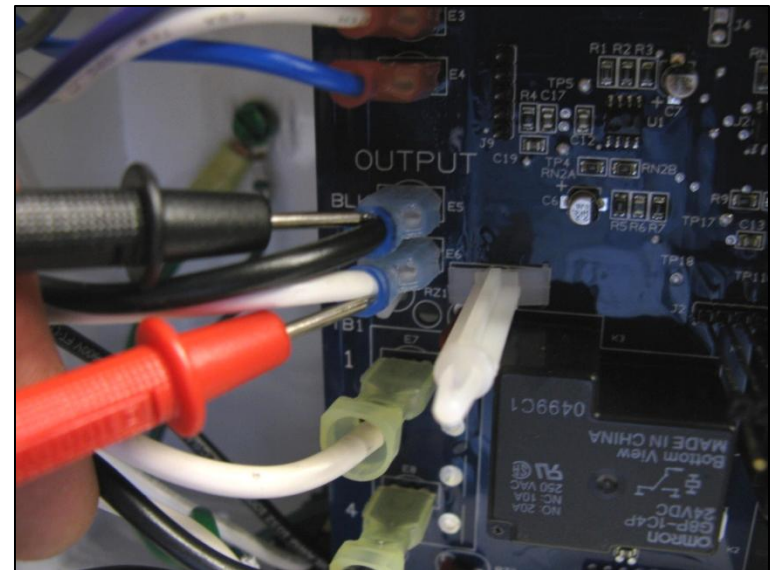
Step L



If no continuity exists, replace time clock.
Otherwise, proceed to Step M.

With the trippers still in the “on position” check for 115 – 124 VAC between terminals E5 and E6 on the PCB.

Step M



If voltage is not correct, replace the PCB.
Otherwise, proceed to Step N.

Pump Not Turning On

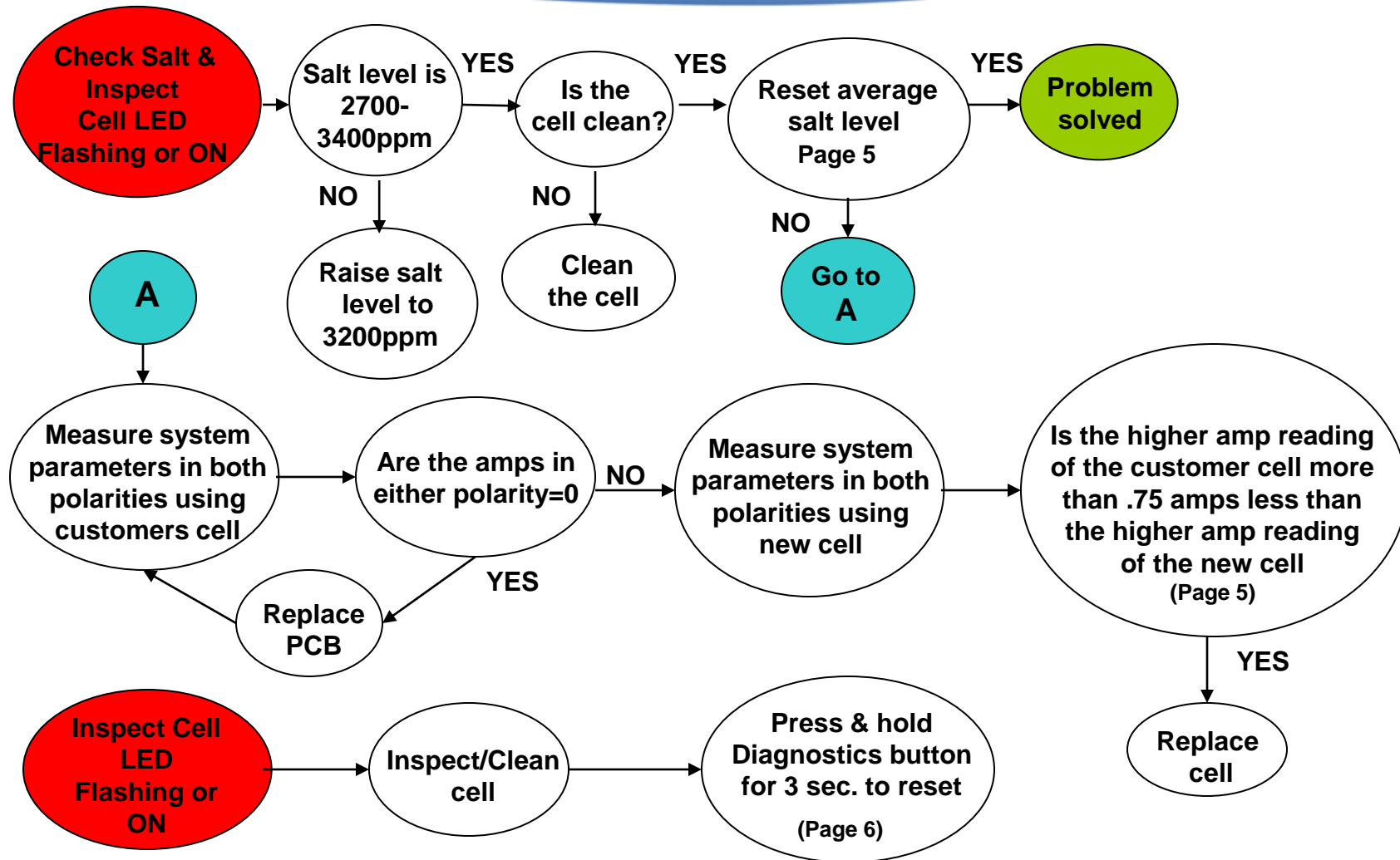
Verify 115-125 VAC is present at the pump receptacle on the bottom of the Trol.

Step N

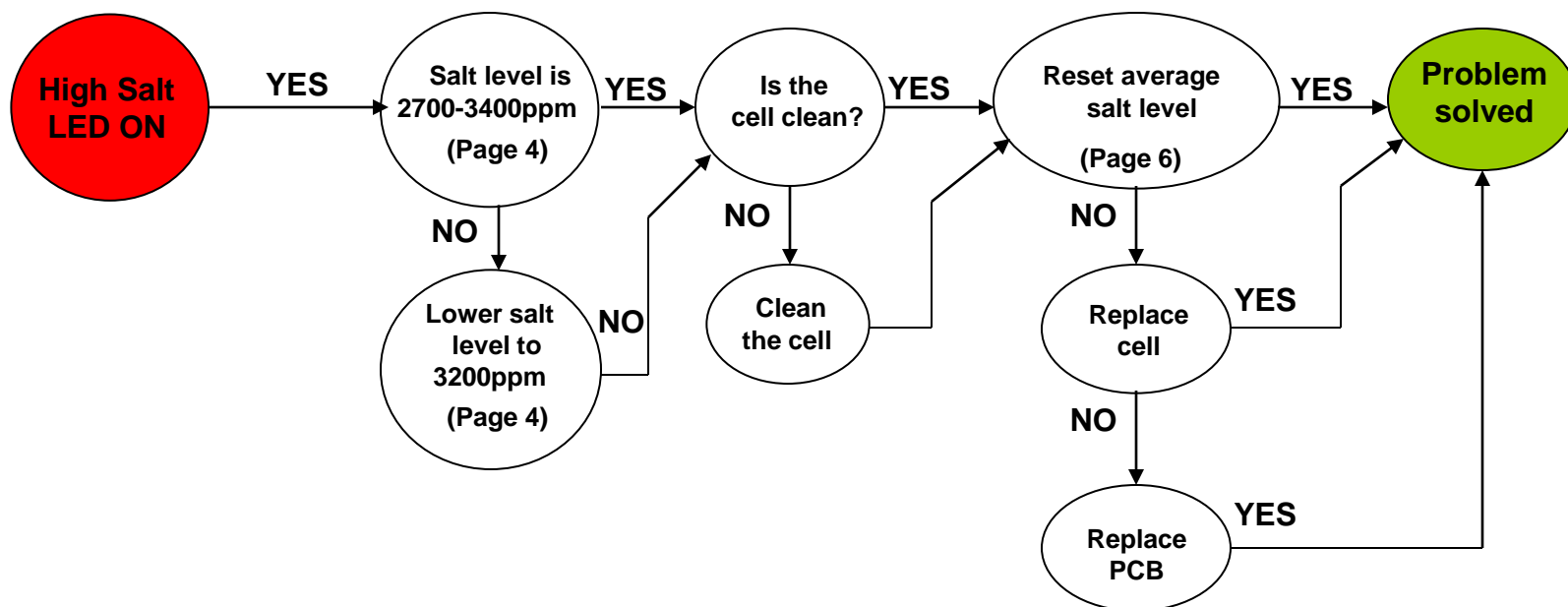


**If voltage is not correct, replace receptacle.
Otherwise, the Trol is working correctly and the pump
is where the problem lies.**

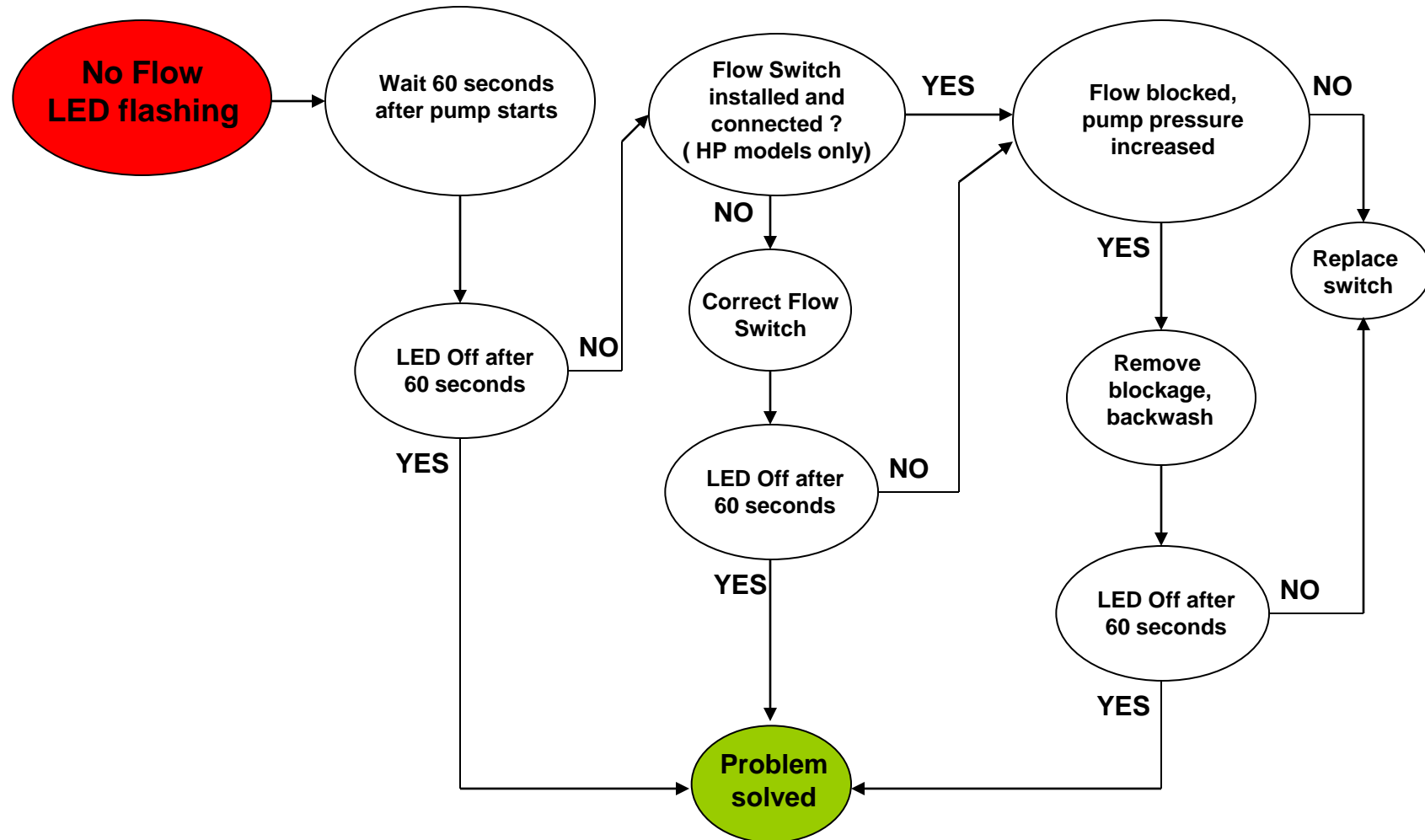
Check Salt & Inspect Cell LED flashing or ON Troubleshooting Chart



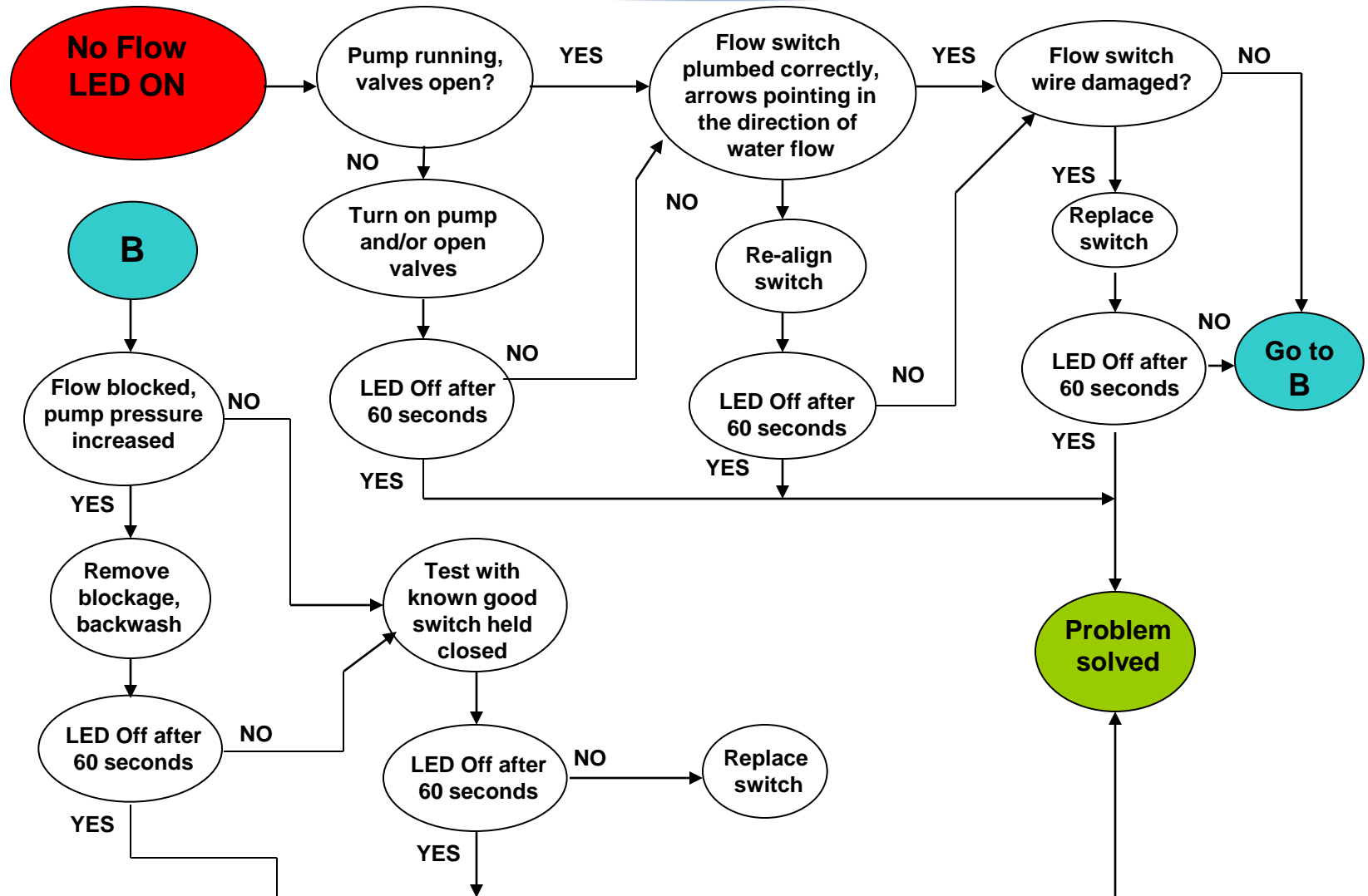
High Salt LED ON Troubleshooting Chart



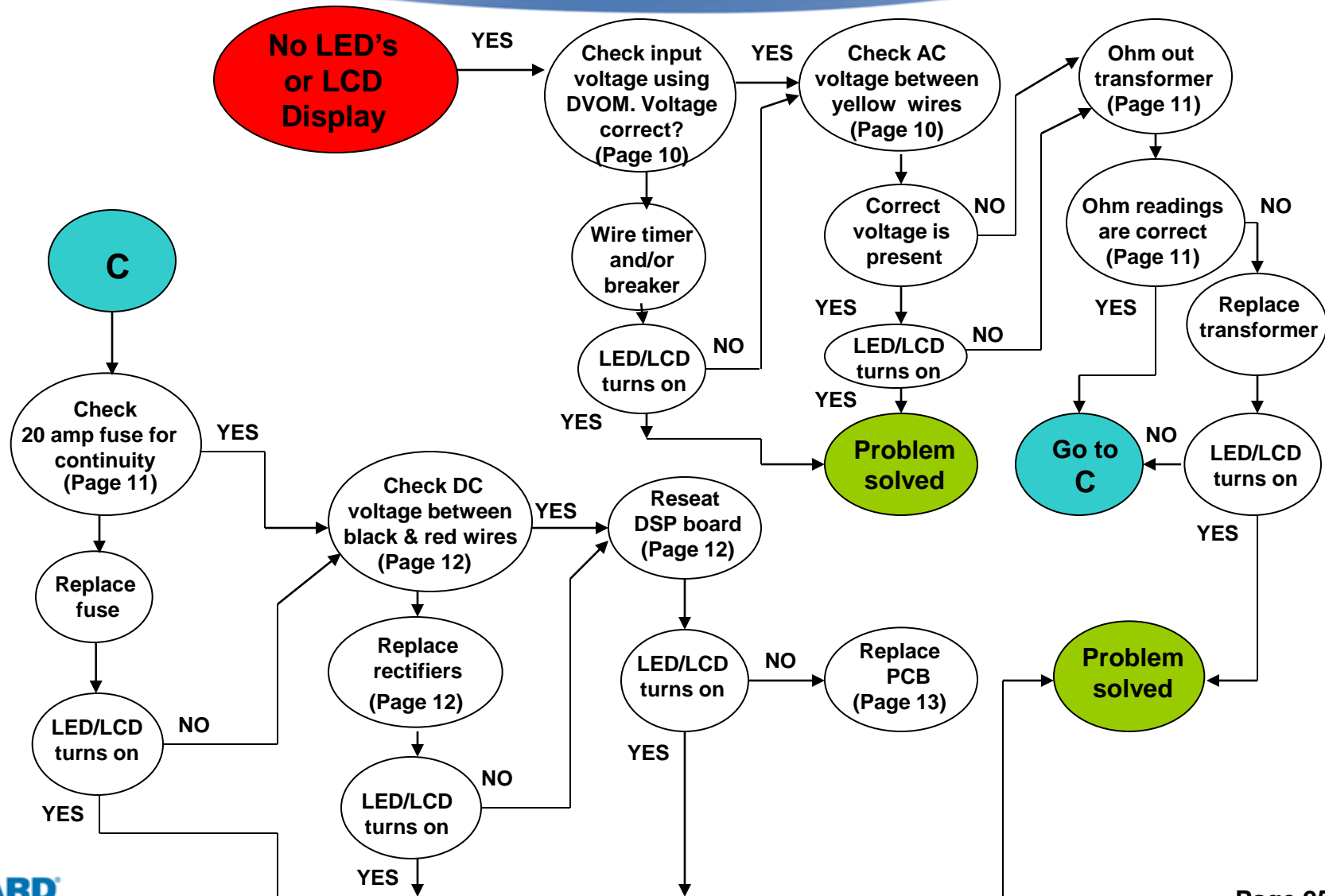
No Flow LED Flashing Troubleshooting Chart



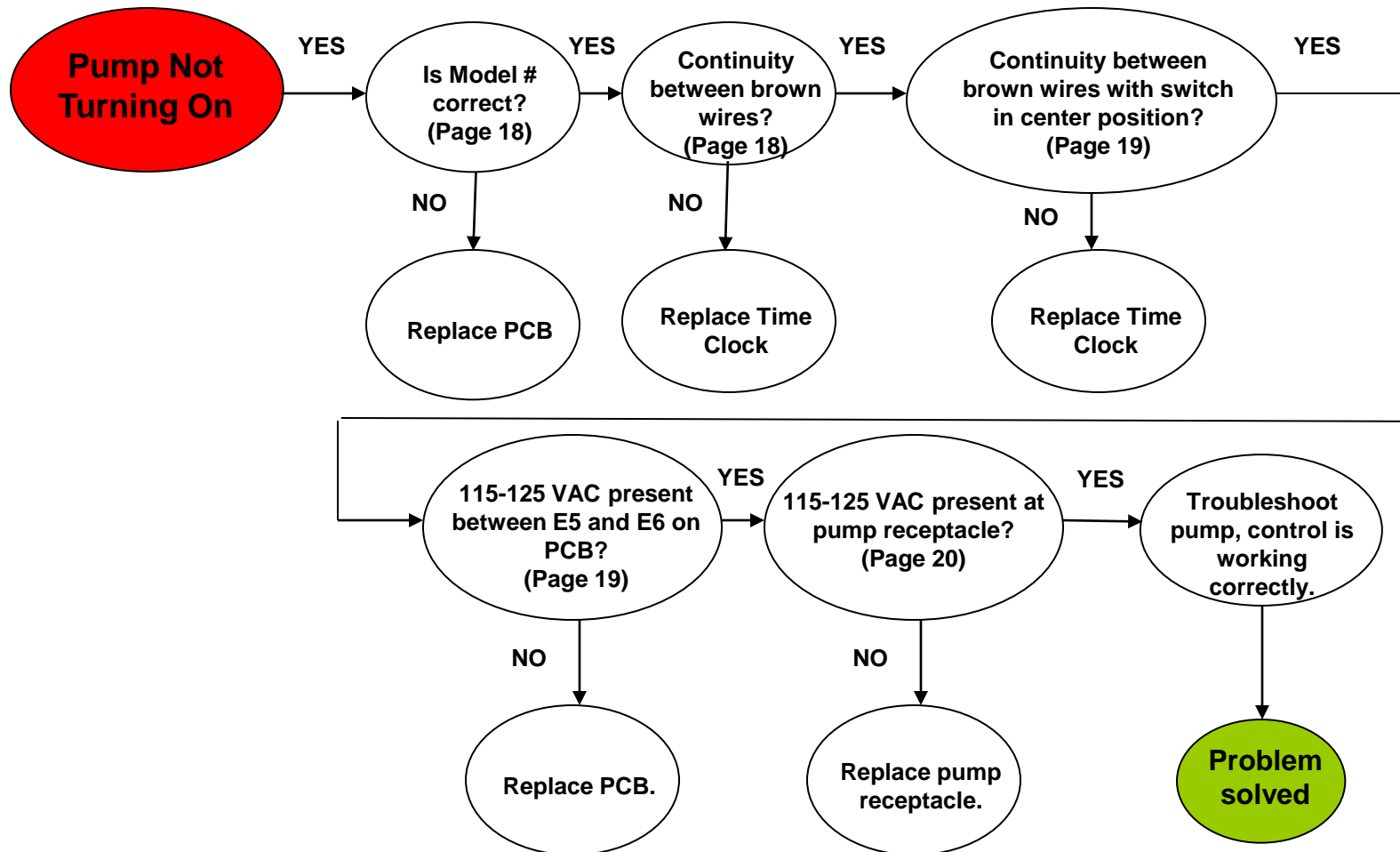
No Flow LED ON Troubleshooting Chart



No LED's/LCD Display Troubleshooting Chart



Pump Not Turning On Troubleshooting Chart



Salt Chart

Pounds of Salt required for 3200 ppm

| Current Salt Level (ppm) | Pool Size -- Gallons | | | | | | | | | | | | | | | | |
|--------------------------|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 8,000 | 10,000 | 12,000 | 14,000 | 16,000 | 18,000 | 20,000 | 22,000 | 24,000 | 26,000 | 28,000 | 30,000 | 32,000 | 34,000 | 36,000 | 38,000 | 40,000 |
| 0 | 213 | 267 | 320 | 373 | 427 | 480 | 533 | 587 | 640 | 693 | 747 | 800 | 853 | 907 | 960 | 1013 | 1067 |
| 200 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 | 1000 |
| 400 | 187 | 233 | 280 | 327 | 373 | 420 | 467 | 513 | 560 | 607 | 653 | 700 | 747 | 793 | 840 | 887 | 933 |
| 600 | 173 | 217 | 260 | 303 | 347 | 390 | 433 | 477 | 520 | 563 | 607 | 650 | 693 | 737 | 780 | 823 | 867 |
| 800 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | 600 | 640 | 680 | 720 | 760 | 800 |
| 1000 | 147 | 183 | 220 | 257 | 293 | 330 | 367 | 403 | 440 | 477 | 513 | 550 | 587 | 623 | 660 | 697 | 733 |
| 1200 | 133 | 167 | 200 | 233 | 267 | 300 | 333 | 367 | 400 | 433 | 467 | 500 | 533 | 567 | 600 | 633 | 667 |
| 1400 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | 390 | 420 | 450 | 480 | 510 | 540 | 570 | 600 |
| 1600 | 107 | 133 | 160 | 187 | 213 | 240 | 267 | 293 | 320 | 347 | 373 | 400 | 427 | 453 | 480 | 507 | 533 |
| 1800 | 93 | 117 | 140 | 163 | 187 | 210 | 233 | 257 | 280 | 303 | 327 | 350 | 373 | 397 | 420 | 443 | 467 |
| 2000 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 |
| 2200 | 67 | 83 | 100 | 117 | 133 | 150 | 167 | 183 | 200 | 217 | 233 | 250 | 267 | 283 | 300 | 317 | 333 |
| 2400 | 53 | 67 | 80 | 93 | 107 | 120 | 133 | 147 | 160 | 173 | 187 | 200 | 213 | 227 | 240 | 253 | 267 |
| 2600 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
| 2800 | 27 | 33 | 40 | 47 | 53 | 60 | 67 | 73 | 80 | 87 | 93 | 100 | 107 | 113 | 120 | 127 | 133 |
| 3000 | 13 | 17 | 20 | 23 | 27 | 30 | 33 | 37 | 40 | 43 | 47 | 50 | 53 | 57 | 60 | 63 | 67 |
| 3200 | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal | ideal |
| 3400 | ok | ok | ok | ok | ok | ok | ok | ok | ok | ok | ok | ok | ok | ok | ok | ok | ok |
| 3600+ | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute | dilute |

Note: Prior to adding salt, always test water with independent tests to determine current salt and stabilizer levels.

How to Add Salt

Brushing the salt around will speed up the dissolving process. Do not allow the salt to sit in a pile at the bottom of the pool. Salt water is heavier than fresh water so the salt water will tend to accumulate at the deepest part of the pool. Run the filter system with the suction coming from the main drain for 24 hours to evenly distribute the salt throughout the pool.

Note: Allow 10-14 days for the plaster on new pools to cure before adding salt

IMPORTANT !!!

More on Chlorine Output & Salt Levels

1. The 'Desired Output %' dial on the main panel sets the level of salt cell operation as a percent of the total operating time of the entire system. A simple example is that if the pump/filter is programmed to operate a total of 8 hours in a given day and the 'Desired output %' is set to 50% the salt cell will operate (and produce chlorine) approximately half the time, or 4 hours. 50% is the factory default.
2. The salt level that is calculated (and displayed) in the system is determined from several variables. It is possible that the displayed salt level can be significantly different from the actual salt level (when measured in the water with a tester). This can happen as a result of a dirty cell or from a cell that has begun aging. Low salt should always require a cell cleaning first and then an actual meter measurement of the salt level in the water. If the cell is clean and the level of salt measured in the water is correct, then the cell has begun to age, which results in a lower calculated salt level. This is an acceptable situation, assuming the level of free chlorine in the pool is appropriate. NEVER add additional salt in this circumstance.
3. If the free chlorine is not appropriate and the steps in item 2 have been followed and addressed as needed, then the 'Desired Output %' needs to be increased in a 25% increment (for example from 50% to 75%) to allow for the salt cell to operate for a longer period (% of total operating time) in order to produce a sufficient amount of chlorine as the cell begins to age. Allow 24 hours and re-test free chlorine. Increase in increments of +10% if required. Keep in mind this is assuming the chemistry parameters are correct in the pool and there is nothing that is creating a significant chlorine demand.
4. Super-chlorinate is an additional option to use in order to 'catch up' in chlorine production when making adjustments to the desired output level. Move the switch to 'Super Chlorinate' to enable.