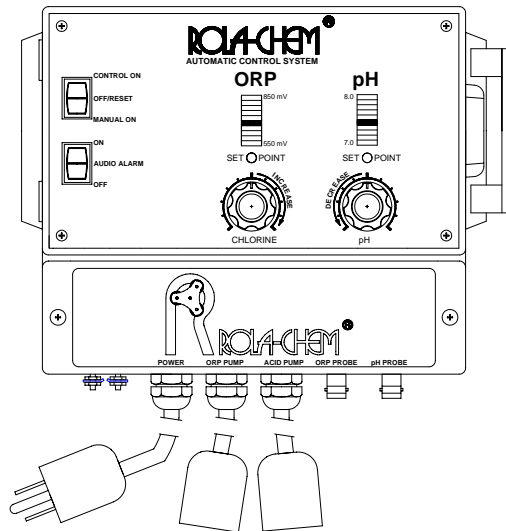




MODEL 553 Analog Controller

ORP/- pH Control



Operating Manual

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IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

- A- **WARNING:** Do not shut down circulating and control system immediately after using pool, spa or hot tube.
Systems must operate until water chemistry is stable. Systems must be restarted before water chemistry is out of NSPI recommended ranges or water chemistry must be manually corrected. **The pH must not be above the eighth light bar. (See manual "APPENDIX A.")**
- B- **WARNING:** Removing power from circulating pump must also remove power from the controller.
Provide a properly located outlet controlled by the circulating pump circuit.
- C- **WARNING:** Pool water must be balanced and stabilized before operating this controller.
- D- **WARNING:** Use a device such as a flow switch to shut-off power from the controller in the event of pool pump or circulation failure.
It is not safe to automatically dispensed chemicals into a circulating system that is not running.
- E- **WARNING:** Controller uses microprocessor.
Wireless communication equipment or other electrical operated devices operated in close proximity may cause inadvertent actuation of chemical feed pumps.
- F- **WARNING:** Risk of electric shock.
Connect power cord to ground-fault circuit interrupter (GFCI). Contact qualified electrician if you can not verify that your installation meets local electrical codes, including grounding of water system components.
- G- **WARNING:** Do not bury cords.
Locate cord to minimize abuse from lawn mowers, trimmers and other equipment. Replace damaged cords immediately. Do not use extension cords.
- H- **WARNING:** Do not install within an outer enclosure or beneath skirt of tub or spa unless so marked.

INTRODUCTION

Thank you for purchasing the Rola-Chem Controller. It is designed to maintain ORP levels and maintain or indicate pH in swimming pools and spas when installed and operated according to the instructions provided.

Read this entire manual for a complete description of proper installation, maintenance, and operation before installing or operating. (Note that this control will not make *bad* water conditions *good*. The recommended water conditions must be established in the body of water before the controller is operated.)

ORP/-pH Control

Controller monitors and controls the feed of both ORP and pH chemicals. The pH chemical is feed to lower pH (controller turns feed on when pH is above set-point). This control is typically used in sodium hypochlorite / acid systems.

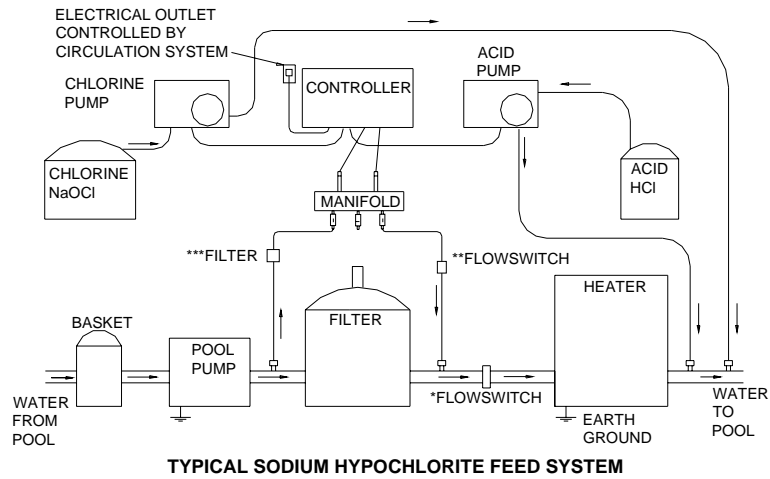
INSTALLATION

1. Unit Location:

Choose the best location for the controller to be mounted.

Consider; the proximity to the controlled electrical outlet, proximity to acid and chlorine feeders and supply tanks, distance from the pool filter, weather, sun brightness, and unit accessibility for monitoring the system. Avoid close proximity to wireless communication equipment or electrical devices.

Note: A flow switch or other safety device (optional) which will shut off power to the controller if no flow is detected. (See warning on Figures 1 & 2)

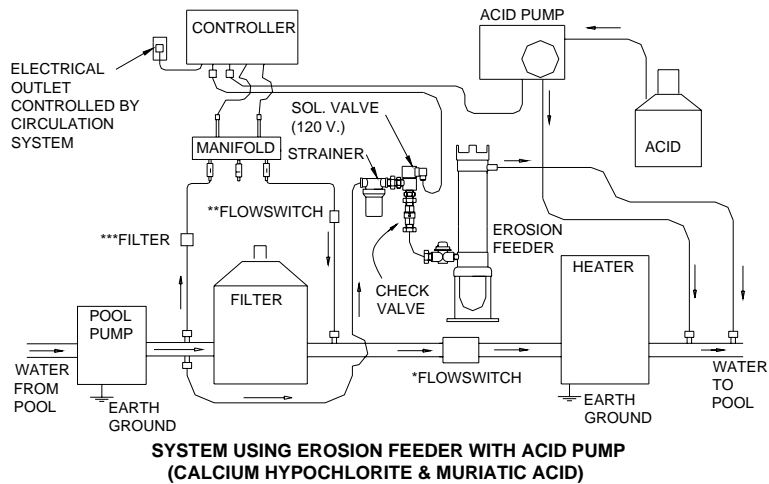


*SAFETY FLOWSWITCH FOR PROTECTION OF HEATER AND TO ENSURE DILUTION OF CHEMICAL INTO POOL.

**OPTIONAL SAFETY FLOWSWITCH TO ENSURE CIRCULATION TO CONTROL PROBES AND INDICATOR THAT POOL CIRCULATION IS OCCURRING.

*** OPTIONAL FILTER TO HELP KEEP MANIFOLD AND PROBES CLEAR OF DEBRIS.

Figure 1



*SAFETY FLOWSWITCH FOR PROTECTION OF HEATER AND TO ENSURE DILUTION OF CHEMICAL INTO POOL.

**OPTIONAL SAFETY FLOWSWITCH TO ENSURE CIRCULATION TO CONTROL PROBES AND INDICATOR THAT POOL CIRCULATION IS OCCURRING.

*** OPTIONAL FILTER TO HELP KEEP MANIFOLD AND PROBES CLEAR OF DEBRIS.

Figure 2

2. Install Manifold:

See Manifold Operating Manual.

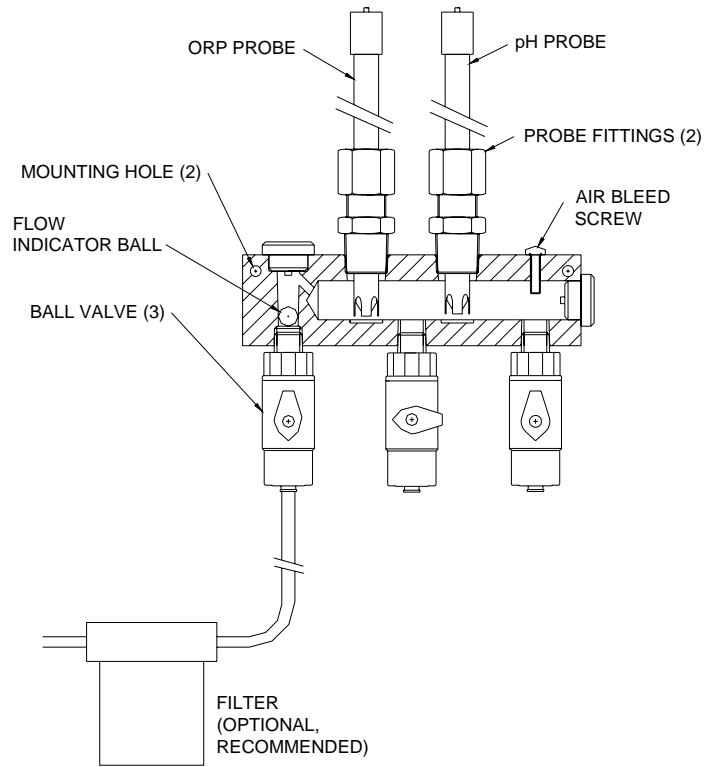


Figure 3

3. Mount Controller Unit:

(See separate sheet for 240 volt. unit.) In the location chose earlier, mark (3) screw hole locations using the template sheet supplied. For wood mounting, drill 1/8" diameter holes. (For cement use anchors that will accept #10 screws.) Screw top center screw into the wall leaving about 1/4" gap between the screw head and the wall. Hang the controller unit from this screw by "keyhole" on center back of the unit. (Two additional screws can be used to further secure the unit to the wall if desired. The two additional screw holes are revealed by removing lower access cover of the unit. There are two screws holding it in place. Two additional screws can now be threaded though holes in the unit into the two holes drilled into the wall.)

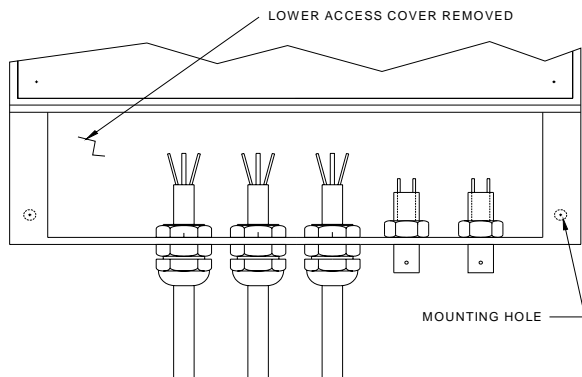


Figure 4

Replace the access cover. Do not over tighten screws.

Connect the two probe cables:

The blue banded probe cable connects to fitting on the bottom of the controller labeled "pH Probe." Push the connector onto the jack and turn clockwise about 1/4 turn.

The red banded probe cable connects to fitting on the bottom of the controller labeled "ORP Probe."

3.A. Chlorine Pump /pH (Acid) Pump, Installation:
(Refer to Fig. 1) ORP/-pH Control

This is a typical sodium hypochlorite/muriatic (HCl) installation.

Check pump size, see pump chart enclosed separately. Follow the manufacturer's installation instructions for these devices. Plug the pH pump (acid pump) to female extension plug labeled "Acid/pH Pump" protruding from the bottom of the controller.

Similarly, plug the ORP pump (chlorine pump) to the female extension plug labeled "ORP Pump" protruding from the bottom of the controller unit.

Turn the pump switches of these two pumps to their "on" position. Installation is now complete.

Use installation check list included with system to ensure proper installation.

3.B. Erosion Feeder Installation- General Information

Caution!!! Erosion feeder must be sized to body of water. Use control valve on erosion feeder to control output as required. Follow erosion feeder instructions for use with ORP control, or consult manufacturer of erosion feeder.

The hardware kit needed for the erosion feeder connection is contained in Rola-Chem Kit #550290 (kit does not include the erosion feeder itself.)

3.B.1 Erosion Feeder/ pH (Acid) Pump Installation:
(Refer to Fig. 2) ORP/-pH Control

This is a typical calcium hypochloride/muriatic acid (HCl) installation. Follow the manufacturer's installation instructions for these devices.

Plug the pH pump (acid pump) to female extension plug labeled "Acid/pH Pump" protruding from the bottom of the controller.

Similarly, plug the chlorine feed solenoid to the female extension plug labeled "ORP Pump" protruding from the bottom of the controller unit.

Turn the pH pump switch to the "on" position.

Installation is now complete. Use installation check list included with system to ensure proper installation

Similarly, plug the chlorine feed solenoid to the female extension plug labeled "ORP Pump" protruding from the bottom of the controller unit.

3.B.2 Erosion Feeder with chemical that lowers pH
(i.e. tri chlor) ORP/+pH Control

This system is not recommended with this controller.

For this type of installation the pH condition is *only monitored*, not controlled by the controller.

To minimize the possibility of nuisance time-outs of the controller (due to a need to raise the pH, which the controller cannot do) set the pH dial clockwise (opposite the arrow's direction) as far as it will turn.

Note: the soda ash pump *does not* plug into the controller. It plugs in directly to an outlet, controlled by the circulation system. Use the feed rate control on the pump to maintain the pH level.

Caution!

We do not recommend manual soda ash feed. Do not attempt to manually control pH unless soda ash can be added daily at a rate not to exceed 1 oz. per 500 gallons of pool water, waiting at least one hour between doses.

START UP & OPERATION

It is essential that the **true** pH of water be determined. Water chemistry can cause test kits to give false readings. If the light bars on the controller do not show equivalent reading as the test kit (within one light bar) check the controller by placing its pH probe in 7.2 pH buffer solution. If the 2nd, 3rd, or 4th light bar is not illuminated the probe or controller may be malfunctioning. (The probe is 90% likely to be the cause, double check probe connections and labels. Also see probe cleaning instructions. If the controller reading is OK (2nd, 3rd, or 4th light bar using 7.2 pH buffer) adjust the pool water to the controller. **Take water sample from the manifold sampler valve when performing this water chemistry test.**

Before adding chemicals to adjust pH, double check the system. Take the water sample from the pool, it must give the same result as the sample from the manifold or the circulation system and/or manifold connections are improper. Correct as required before adding chemicals. Follow all code requirements when adding chemicals. Remember to maintain alkalinity and allow time for the water chemistry to stabilize.

The ORP/pH control is designed to control:
pH between the range of 7.2 - 7.8 and
ORP between the range of 580 mV - 820 mV.

You must balance water chemistry in the pool or spa to NSPI Standards prior to operating controller.

Caution: First set Alkalinity at 95-105 and pH at 7.4-7.5, then chlorine at 1.0-1.5 ppm.

Caution: Use chlorine neutralizer (thiosulfate) on water sample for pH test. Add neutralizer prior to adding reagent (i.e., phenol red) from test kit. Chlorine neutralizer is available from professional pool stores. Have water at proper pH (7.4-7.6) prior to testing for chlorine. If ORP light bar is at top light, excess chlorine will cause test kit to give false reading. Dilute water sample per test kit instructions or consult supplier of test kit to obtain true chlorine reading.

Note: In all installations, even if only one chemical feeder is being controlled, *both* ORP and pH probes must be installed and connected to controller. Failure to do this could cause unit to inadvertently go into time-out mode or not maintain proper chemistry levels.

1. Open the clear plastic door on the controller and turn on the unit by pushing the switch inward by the words "Control On". (Make sure the pool pump is on and the left and right manifold valves are open. The middle valve on the manifold should be closed.) Light bars will be in the middle ranges, if not, allow up to 30 minutes for light bars to come into range and stabilize before going to step 3.
2. Adjust the flow through the manifold: Leave the left valve full open. Close the right valve, then open it until the ball in the flow indicator is almost to the top of its chamber. Flow is too high if ball is at full top position. If the ball will not rise there is insufficient flow through the manifold, or flow is backward.
3. Turn the chlorine dial (ORP) counterclockwise (CCW) as far as it goes. Then slowly turn it clockwise (CW) until the set point light just goes 'on.' Then slowly turn it (CCW) until it just goes 'off.'
4. Turn pH dial clockwise (CW) as far as it goes. Then slowly turn it counterclockwise (CCW) until the set point light just goes 'on.' Then slowly turn it (CW) until it just goes 'off.'

5. Close and latch the clear plastic door. Failure to latch the door allows corrosion of electronic components and this may void your warranty.
6. After 2 hours, re-measure the alkalinity, pH, and chlorine with a test kit. Read & record the measurements from the test. Record the controller's dial settings as well as the "light bar" step levels on the controller. See Figure 5 for a typical example.

This example shows light bars are on #5 and dials are at 12 o'clock. A record keeping chart is included with literature package.

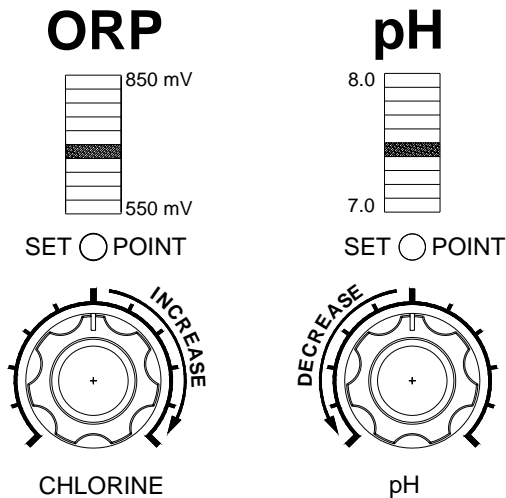


Figure 5

If the resultant reagent tests reveal that the pH and ORP are at acceptable levels, no further adjustments are necessary. The controller will maintain the controlled level. Alkalinity must be adjusted manually.

Caution:

Do not adjust dial more than ½ graduation at a time. Allow sufficient time (2 hours) after adjustments before retesting so pool chemistry can come back into balance.

When higher levels of chlorine are desired adjust dial in small increments (i.e., ½ graduation) until level is reached. Wait until pool chemistry is stable between incremental adjustments. Watch light bars, when you reach the 9th light bar you are at the practical limit of this controller. Remember, this controller measures the total sanitizing power of the water ORP, high chlorine levels may not be required, nor are they recommended. We recommend following NSPI specifications.

To change pH, adjust the dial, in no more than a ¼ to ½ graduation increment, allow pool chemistry to stabilize before making additional adjustments. Allow at least 2 hours between adjustments.

Alkalinity, TDS, stabilizer, and calcium hardness must be maintained at recommended levels for the ORP/pH control to operate properly. These levels do not change rapidly and are easily maintained by manual means with the aid of a test kit.

Caution:

Do not exceed a pH of 7.6 when feeding tri-chlor products.

Caution:

There is a *possibility* of radio waves interfering with controller performance. Hand-held radios, cell phones or transmitters in close proximity to the controller *may* trigger false signals to the unit and inadvertently actuate one or both chemical pumps. Also, electric motors or other electrical noise *may* trigger false signals to controller. Consult a qualified electrician as required.

CONTROLLER FEATURES

Several features are built into the controller to assist the operator in the use of this device.

1. Ten Minute Time-out:

If either probe senses that the pool has remained out of range ($550\text{mV} \leq \text{ORP} \leq 850 \text{ mV}$, $7.0 \leq \text{pH} \leq 8.0$) for more than 10 minutes, the corresponding chemical feed will shut off and the "light bar" will *flash* at the level it has read. Also, an audio alarm will sound—unless it is shut-off on front panel. When pH chemical feed shuts off the ORP feed will also shut down to prevent overfeed.

The audio alarm will automatically shut off, the "light bar" will stop flashing, and the control will resume its normal control function by either of two methods;

- if the pH and/or ORP returns into range (by any means), or
- if the "Control On" switch is switched to "Off/Reset" then back to "Control On."

Note: If either the pH and/or ORP remain(s) out of range for another ten minutes after reset, the time-out function will activate again.

2. Three Hour Time-out:

If the controlled feed function is not sufficient to bring the pool chemistry level to the set point within three hours the feeders will stop feeding chemical, the "Light Bar" will flash the current reading, and the audio alarm will sound. Again, the ORP/pH control can be manually reset or, if the pool's pH and/or ORP levels are brought to set point by any means, the control will resume normal operation, the alarm will shut off, and the "Light Bar" will stop flashing.

If ORP control times out (10 min. or 3 hr.) the controller will shut down the ORP pump only. If the pH control times out (10 min. or 3 hr.) the controller will shut down both pH and ORP pumps.

These two warning conditions are designed to alert the operator that the pool chemistry is outside the desired area and the controller was not able to correct the problem within the time allotted (10 minutes and three hours.)

Caution - The time-out functions do not operate while in "Manual On" mode.

"MANUAL ON" OPERATION

The "Manual On" switch position (located on the upper rocker switch on the controller's front panel) de-activates automatic operation. On this setting the controller supplies continuous electric power to the feeder outputs. The feeders must now be operated manually by adjusting the feed rate control on the feeder. The "Light Bars" will continue to give the actual pH and ORP levels of the pool water. Use this feature during routine pool maintenance when it is expected that pool chemistry (pH and/or chlorine levels) will be changing significantly, i.e., backwashing filters, topping off pool's water level, or chlorine shocking." Do not return to automatic control until the water chemistry has stabilized within NSPI recommended limits. ORP and pH light bars must return to their near-center positions. Adjust pH as required.

Note: "Off" switch position turns control and pump outputs "off."

Caution: When filling a spa or hot tub, turn controller off until filling is completed and chemicals are stable and within guidelines. Manual Mode may be used to restore chemical levels using the chemical feeders.

MAINTENANCE

1. Refer to your feeder manuals for instructions on their maintenance.
2. Refer to your Manifold/Flowcell manual for instruction on manifold and probe maintenance.
3. Clear plastic controller door must be closed and latched when not operating controls. Also, the lower access panel must be closed and screwed tight. This protects vital components, failure to do so voids warranty.

TROUBLESHOOTING

If light bars are on top or bottom position, the water pH is 7.4-7.6, (see caution on page 14) and the chlorine is 1-3ppm, check the probes. If water is not in this range, correct the water condition and re-check the light bar positions. Check pH probe in a 7.2 buffer solution and view the light bars, if 2nd, 3rd, or 4th light bar from bottom is illuminated the probe is good. 7.2 pH buffer solution is available from test kit manufacturers or Rola-Chem. Prepare a mixture of 1 pint (16oz.) 7.4-7.6 pH bottled water plus 1 drop of 5.25% bleach (household bleach). Check with test kit for 1~2 ppm free chlorine. Add one drop of chlorine at a time to adjust test mixture as required. Put ORP probe in mixture. If any 3rd through 7th light bar is illuminated the probe is good.

Note: It may take five minutes for probes to respond to solutions. If it takes longer, clean or replace probes.

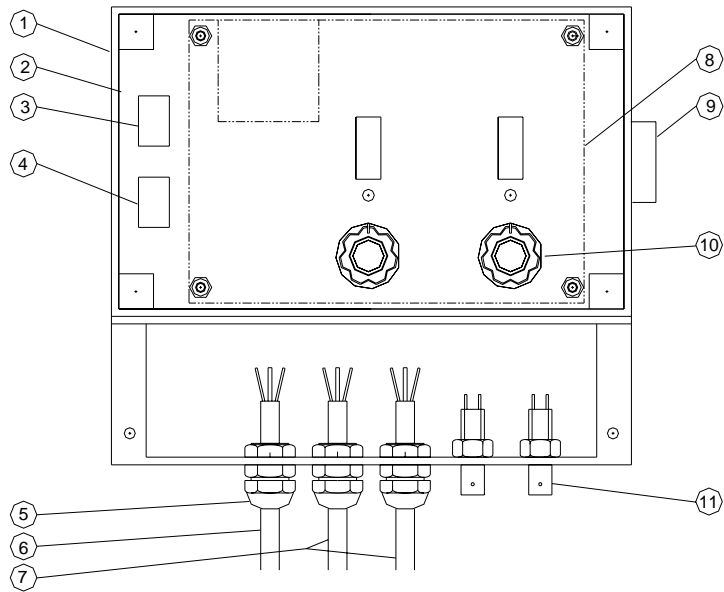
Probes can be cleaned by washing with dish washing liquid and a Q-tip or cotton cloth and then soaking for 3 min. in solution of muriatic acid diluted 20:1, followed by rinse with bottled water.

If test kit readings of ORP or pH do not compare with the approximate "Light Bar" readings on controller it *may* be because the water flow rate is high through the manifold. If this is the problem it can be remedied by readjusting the flow through the manifold. See page 15, Item 2.

Verify that the probe ends are in the flow stream of the manifold.

If control shuts down with *no* light bars lit and one or both set point lights flashing indicates that there is no water flow or inadequate flow through the clear manifold. (If flow appears adequate but lights are in this described mode, the switch *may* need re-adjustment. Consult factory.)

PART LIST



ITEM NO.	PART NO.	DESCRIPTION
1	550003	ENCLOSURE
2	550004	FRONT PANEL
3	550007	SWITCH, CONTROL
4	550008	SWITCH, ALARM
5	550137	STRAIN RELIEF, CORD (120 VOLT ONLY)
6	524155	POWER CORD (120 VOLT ONLY)
7	550011	PUMP CORD (120 VOLT ONLY)
8	CONSULT FACTORY	CIRCUIT BOARD ASSEMBLY
9	550084	LATCH, ENCLOSURE
10	550006	KNOB, SET POINT
11	550009	BNC CONNECTOR, PROBE
12	550192	INSTRUCTION MANUAL

WATER CHEMISTRY RANGES

(These ranges are in accordance with suggested NSPI Standards for swimming pools.)

pH: 7.4 -7.6
(Approximate light bar 5 or 6.)
(One hash mark on the pH dial roughly corresponds to 0.1 on pH scale.)

Alkalinity: Approx. 80-120 ppm **
(parts per million) higher levels may be acceptable in areas where it naturally occurs in the local water supply. Consult a pool professional in your area.

Cyanuric Acid: 0-50 ppm.
(Maintain at 30 ppm or less for best probe life.)*

TDS (Total Dissolved Solids): 300 - 2000 ppm

Calcium Hardness: 200-400 ppm

Free Chlorine: 1.0 - 3.0 ppm (> 700 millivolts ORP)

*20-30 ppm of cyanuric acid provides approx. 95% of the shielding effect for chlorine.

**When using tri-chlor, recommended alkalinity is 95-125 ppm.

Warranty and Service

Limited Warranty

Rola-Chem Corporation warrants the original purchaser that this unit is free from manufacturing defects in material and workmanship from the date of the original purchase for one (1) year. If this unit fails within the one (1) year period, it will be repaired or replaced (Rola-Chem's option) at no charge, when returned to Rola-Chem Corporation with proof of purchase receipt. This warranty does not apply to any product damage caused by improper use, accident, misuse, improper line voltage, fire, flood, lightning, earthquake or other acts of nature, or, if product was altered or opened by anyone other than qualified Rola-Chem personnel.

All expendable items- hoses, etc., are not covered under this warranty.

Standard probes are warranted from the date of original purchase for ninety (90) days. Heavy duty probes are warranted from the date of original purchase for one (1) year.

Rola-Chem Corporation, under no circumstances, shall be liable for any consequential damages directly or indirectly caused by this unit. Please observe all rules and regulations required by state and local regulations, building codes, health codes, OSHA, etc.

Service Procedure

For operation assistance in the United State, please call:
(800) 549-4473 or FAX (651)-653-0989
Monday thru Friday 8:00 am-5:00 pm, Central Time.

Rola-Chem Corporation has specialized knowledge and equipment to properly test your unit and help you with special problems. After talking to our service personnel, the product in need of service should be shipped with RGA#, freight prepaid, via UPS if at all possible to:

Rola-Chem Corporation
5858 Centerville Road
St. Paul, MN 55127-6804