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North Kingstown, RI 02852 USA

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Description

The AQL-CHEM is an ORP and pH sensing kit that is offered as an accessory for all Hayward Aqua Rite Pro chlorine generators and Pro Logic pool controls. With the AQL-CHEM, the Aqua Rite Pro or Pro Logic can provide a fully integrated chemistry solution for your pool. The AQL-CHEM continuously tests the pool's sanitation and pH levels allowing the Aqua Rite Pro or Pro Logic to automatically generate the correct amount of chlorine and dispense the proper amount of pH reducer. Together, they provide an automated system controlling both sanitization and pH balance.

The AQL-CHEM comes with two pigtails (120VAC and 240VAC) for connection to a pH reducing device like a peristaltic pump or solenoid valve (not included) that requires a line cord receptacle. For easy integration, Hayward offers the AQL-CHEM2 (120VAC) and AQL-CHEM2-240 (240VAC) CO₂ dispense kit that plugs into the pigtail and will reduce the pool's pH level by injecting CO₂ into the pool water.

What's Included

The AQL-CHEM comes with everything needed to allow the Aqua Rite Pro or Pro Logic to sense ORP and pH levels. The following is a description of the included components:

Professional Grade ORP probe- Samples water from the pool filtration system and sends signals to the Aqua Rite Pro or Pro Logic indicating the oxidation-reduction potential (redox) of the pool water. ORP is an actual measurement of sanitizer activity and bacteriological water quality rather than an expression of chemical residual levels. ORP is not fooled by the effects of pH, TDS (total dissolved solids) and other factors giving a more accurate measurement of the effectiveness of chlorine and water quality.

Professional Grade pH probe- Samples water from the pool filtration system and sends signals to the Aqua Rite Pro or Pro Logic indicating the acidity of the water. When used with a Hayward AQL-CHEM2 or other pH dispensing device, the Aqua Rite Pro or Pro Logic can keep the pool water's pH level balanced.

Probe Cell: The Probe Cell is used to house the probes and provide a location for water collection and testing. Two hoses are provided to connect the Probe Cell to the supply and return sides of the pool filtration system. The Probe Cell can be mounted directly to the Aqua Rite Pro/Pro Logic or remote mounted in the vicinity of the control (restricted by the length of the probe wiring).

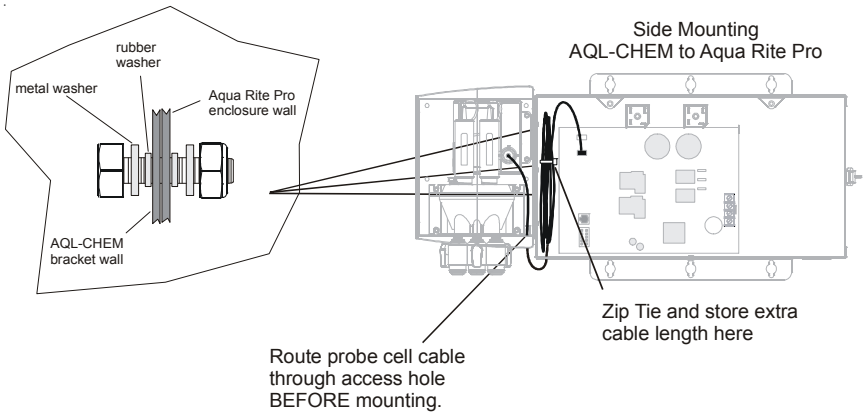
Additional Pro Logic Relay: An additional relay is provided for Pro Logic PL-PS-4 and PL-P-4 models operating with software version less than 4.00. Refer to the Pro Logic manual for instruction on how to determine your software revision. The additional relay allows the user to add the AQL-CHEM2 or other pH reducing device to these models. Install this relay only if you have one of these models and intend to add pH control.

pH Dispense Pigtails: The pH Dispense pigtails provide a plug-in receptacle for the AQL-CHEM2, AQL-CHEM2-240 or other pH related dispensing device (peristaltic pumps, solenoid valves, etc.) that will be controlled by the Aqua Rite Pro or Pro Logic.

Various Hardware: The AQL-CHEM includes the necessary tubing, tubing connectors and mounting hardware to complete the installation.

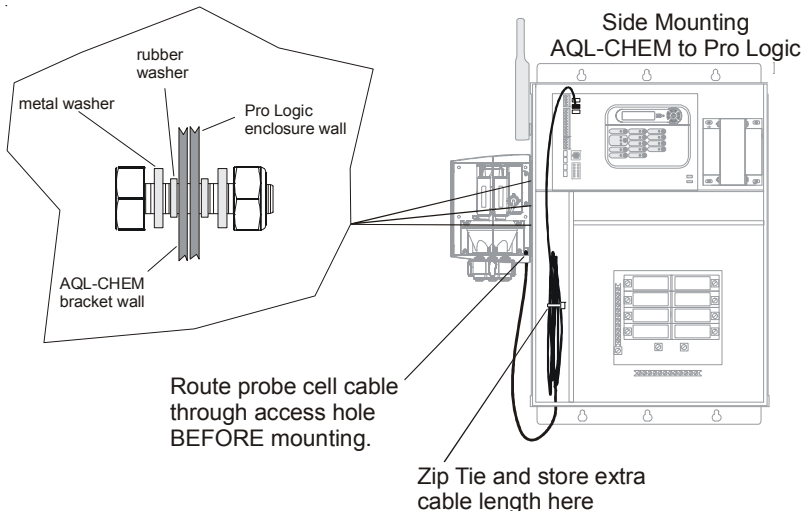
Aqua Rite Pro

Side mounting AQL-CHEM to the Aqua Rite Pro: Side mounting the AQL-CHEM will require drilling 3 mounting holes through the Aqua Rite Pro enclosure. Dimples have been pre-punched on the enclosure at the drilling location (template not needed). After drilling, be sure to remove any burrs and brush away any metal shavings. Route Probe Cell cable through the access hole at the bottom of the mounting bracket BEFORE screwing the bracket in place. For easiest installation, fasten the nylon lock nut loosely, then slip the bracket keyhole slots over the bolt head and tighten. After installation, coil excess cable in the Aqua Rite Pro enclosure. Refer to the diagram below.



Pro Logic

Side mounting AQL-CHEM to Pro Logic: Side mounting the AQL-CHEM will require drilling 3 mounting holes through the Pro Logic enclosure. A drill template is included with the AQL-CHEM to assist with the positioning of the holes. After drilling, be sure to remove any burrs and brush away any metal shavings. Route Probe Cell cable through the access hole at the bottom of the mounting bracket BEFORE screwing the bracket in place. For easiest installation, fasten the nylon lock nut loosely, then slip the bracket keyhole slots over the bolt head and tighten. After installation, coil excess cable in the Pro Logic enclosure. Refer to the diagram below.



Normal Operation

During normal operation, the AQL-CHEM will sense ORP and pH requiring no user input. The current ORP and pH levels will periodically be shown on the display. Pushing the "<" or ">" buttons will advance you to this display quickly. For the Pro Logic, this information can also be found within the Diagnostic Menu.

The desired ORP and pH levels can be changed by restarting the Chemistry Config Wizard.

Maintenance

Water Chemistry

Always test water chemistry with a quality manual test kit. The AQL-CHEM provides instrument grade accuracy which exceeds that of most liquid-standard water testing kits. Therefore, it may be preferable to calibrate pH using commercially available reference solutions. Calibrate pH periodically using the pH Calibration Wizard as described earlier in this manual. It's important to note that changes in pH, cyanuric acid concentration, total dissolved solids, and use of additional or alternative sanitizers will all affect the primary sanitizer residual level relative to ORP. Maintain total alkalinity on regular basis to ensure pH stability. To maintain a consistent sanitizer residual in parts per million (ppm), periodically adjust the ORP level.

Probe Maintenance

The probes must be clean and free from oil, chemical deposits and contamination to function properly. After saturation in pool or spa water, the probes may need to be cleaned on a weekly or monthly basis depending on bather load and other pool specific characteristics. Slow response, increased need to calibrate pH, and inconsistent readings are indications that the probes are in need of cleaning.

To clean the ORP and pH probes, run the Clean Probe Wizard within the Settings Menu on the Aqua Rite Pro or the Maintenance Menu on the Pro Logic. This Wizard will walk the user through the probe cleaning process. Answer the questions when prompted, and follow the instructions for proper cleaning.

To clean the probes without running the Wizard, turn off input power to the Aqua Rite Pro or Pro Logic. Disconnect the probe connectors from the communication box, unscrew the probe and carefully remove them from the Probe Cell. Clean the reference junction (the white ring at the bottom of the probe body) with a soft toothbrush and regular tooth paste. A household liquid dishwashing detergent may also be used to remove any oil. Rinse with fresh water, replace teflon tape on threads and reinstall probes. If properly cleaned probes continue to provide unstable readings or require excessive calibration, the probes should be replaced.

Probe Storage

Exposure to atmospheric conditions will cause the probe tips to dry out. Store the probes with the included plastic probe storage caps if removed from the Probe Cell for more than one hour. If the storage caps have been misplaced, store the probes individually in small glass or plastic containers with clean water covering the probe tips. Store probes in a location that will not be subjected to freezing temperatures.

Drill and tap a 1/4" NPT hole using a 7/16" drill bit on the return side of the pool plumbing at a location just downstream of the filter, but upstream from the AQL-CL Electrolytic Cell. Use caution not to tap tapered threads too deeply. Using teflon plumber's tape, install a tubing connector into the hole. Run flex tubing from the tubing connector to the influent Probe Cell port. Push the flex tubing all the way into the pressure fitting to seat.

Drill and tap another 1/4" NPT hole on the supply side of the pool plumbing. Use caution not to tap tapered threads too deeply. Using teflon plumber's tape, install the remaining tubing connector and run flex tubing to the effluent Probe Cell port. Push the flex tubing all the way into the pressure fitting to seat.

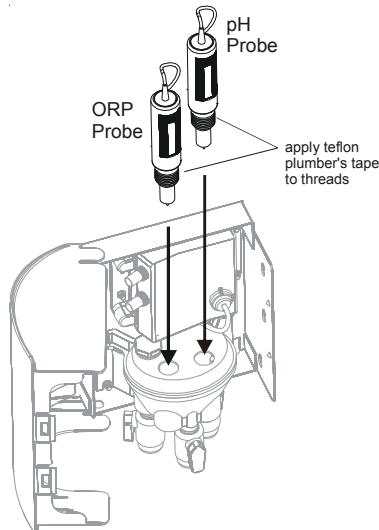
Cut a 3" length of flex tubing and insert it into the sample stream port. This port can be used to draw water samples if needed.

If flex tubing needs to be replaced, use only 3/8" UV-resistant cross-linked polyethylene tubing (PEX).

Installing ORP and pH probes to the Probe Cell

The ORP and pH probes are shipped "wet" in plastic storage caps. It's very important that the probes remain wet at all times. If the probes are allowed to dry out, they will fail and the AQL-CHEM will be ineffective. After installation, the Probe Cell will ensure that the probes are constantly exposed to pool water. During periods when the filter pump is off (even extended periods), there should be sufficient moisture remaining in the Probe Cell to ensure that the probes are protected.

Remove the ORP and pH probes from their plastic storage caps and save the caps for future use. To ensure that the probes continue to remain wet, fill the Probe Cell with pool water before installing the probes. Apply a length of plumber's tape to the probe threads. Hand-tighten the probes only. At startup, check for leaks. If probe leaks, do not tighten more—instead remove and re-apply new Teflon tape.



Aux1 Config. + to view/change	+ Push to access Aux options <> Move to previous/next configuration menu
Aux1 Name Aux 1	+-- Rotates between all available names <> Move to next menu item
Aux1 Function pH Dispense	+-- Rotates between Manual On/Off (default), Countdown Timer, Low Speed-Filter Timeclock, Solar, Low speed-Spa Filter, Group & Super Chlorinate, and pH Dispense <> Move to next menu item

Caution: *Be certain to verify that the proper relay has been used and configured for pH.*

- Verify proper relay operation by using the pH Reduction CTRL set to “Forced on”
- Observe that the relay immediately turns on and applies power to the CO2 feed solenoid or acid dispense pump
- Once this is verified, set pH Reduction CTRL back to AUTO

As a last check for proper configuration, push the corresponding output button for the pH Dispensing device. The device SHOULD NOT TURN ON. If it does, go back through the configuration to determine the problem.

Operation

Before operating the AQL-CHEM, test and adjust the pool water chemistry to the recommended levels in the Aqua Rite Pro or Pro Logic Operation manuals. This is an important step and is crucial to the successful operation of the AQL-CHEM. Adjust salt to recommended levels if using an Aqua Rite Pro or a Pro Logic with an AQL-CL chlorination kit.

Controlling ORP with the Aqua Rite Pro or Pro Logic

Follow these steps to set the desired ORP level:

1. **IMPORTANT:** Balance the pool water to the ideal levels shown in the Aqua Rite Pro or Pro Logic manuals, including pH, total alkalinity, cyanuric acid, hardness and salt level.
2. Adjust the chlorine to the ideal level as well; e.g. 1-3 ppm free chlorine. This chlorine level is what we want to maintain.
3. After allowing the system to run for 30-60 minutes, observe what the Sense and Dispense system reports as the pool water ORP level.
4. Set the ORP setpoint setting to this reported ORP level.
5. Monitor the free chlorine and ORP everyday for 1 week. If adjustments to the ORP setpoint are needed, make adjustments in increments of 10 or 20 mV units—**LARGE ADJUSTMENTS OF THE ORP SETPOINT SHOULD NOT BE NECESSARY IF YOU STARTED WITH A BALANCED POOL THAT HAD THE PROPER AMOUNT OF FREE CHLORINE.**
6. If the system is not stabilizing (or does not seem to be stabilizing) there are 3 things you can do:
 - a. Clean the probe
 - b. Rebalance the pool—including the free chlorine level
 - c. Check for combined chlorine—if high (>0.5ppm), shock treat with chlorine or non-chlorine shock.

Wiring the Pigtail or pH Dispensing Device

Two pigtails (120VAC and 240VAC) are included with the AQL-CHEM sensing kit to be used with pH dispensing devices (peristaltic pumps, solenoid valves, etc.) that require a plug-in receptacle, including the Hayward AQL-CHEM2 and AQL-CHEM2-240. If your pH dispensing device will be direct wired (hardwired), the pigtail is not necessary. Note that the Aqua Rite Pro can control a 120VAC or a 240VAC pH related dispensing device. The Pro Logic can only be used with 120VAC devices.

NOTE: Follow local codes for pigtail installation. Installation may require retrofitting a weather-tight outlet and plug to the pigtail and dispense hardware (such as Cooper WaterTight or similar connectors) or weather proof junction box.

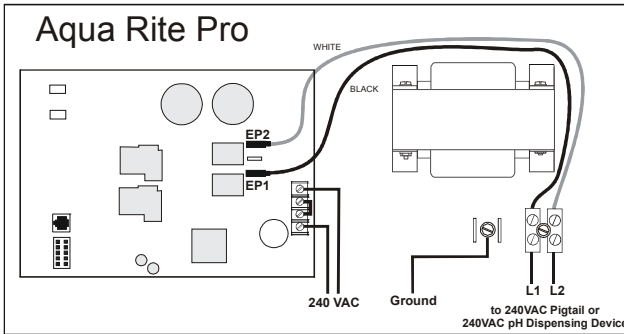
A screw terminal block located inside of the Aqua Rite Pro enclosure is provided for connection to the pigtail or pH dispensing device. If connecting to a Pro Logic, the 120VAC pigtail or 120VAC direct wired pH dispensing device will connect to one of the internal relays. If using a P-4 or PS-4 operating software version less than 4.00, the relay that is supplied with the AQL-CHEM must be installed and used for connection to the 120VAC pigtail or direct wired device.

Refer to the following information and diagrams for proper wiring of the pigtail or direct wired device.

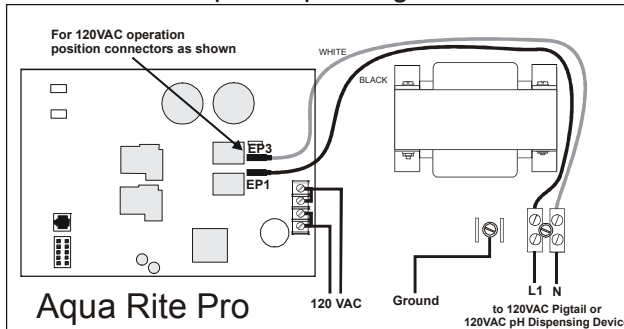
Aqua Rite Pro

IMPORTANT: Input power to the Aqua Rite Pro must be provided by a GFCB (Ground Fault Circuit Breaker).

240VAC pH Dispensing Device
(Factory Default)



120VAC pH Dispensing Device



Chlorine Feed (displayed for Aqua Rite Pro and Pro Logic if chlorinator is enabled)
Select the desired option related to chlorine generation.

ORP Auto Sensing The Aqua Rite Pro or Pro Logic refers to the ORP level in the pool and automatically adjusts chlorine output to maintain a desired level.

Timed (%) The chlorine output is based on the manual setting only. ORP level is not used to control the chlorinator output.

Maintain pH Level

The Wizard prompts you to enter the desired pH level (7.5 default). The Aqua Rite Pro or Pro Logic will dispense CO₂ or other pH reducer when necessary to maintain this level. The adjustable range is from 7 to 8 in 0.1 increments. Enter the desired pH level.

pH Alarms

The Aqua Rite Pro or Pro Logic will automatically set a high and low alarm for the pH level. The high alarm point is 8.1 and the low alarm point is 6.9. If the pH level meets or exceeds these points, a "Check System" message will display locally and on all remote displays.

pH Feed Timeout

To protect the pool, the Aqua Rite Pro or Pro Logic control will automatically shut down pH control and display a "Check System" message if the AQL-CHEM2(-240) or other pH dispensing device runs continuously for more than the selected timeout value. This prevents a situation where the Aqua Rite Pro or Pro Logic is constantly feeding pH reducer because of a probe error or external problem with the pool and allows the pool owner to evaluate the pool chemistry before continuing with pH control. Use the "+" and "-" buttons to select a preset timeout value from 5 to 120 minutes. If the Aqua Rite Pro or Pro Logic exceeds this pH Feed Timeout, it can be reset in the Check System display.

Maintain ORP Level

The Wizard prompts you to enter the desired ORP level (650mV default). Note that the Aqua Rite Pro or Pro Logic will attempt to maintain this level but typically the pool's ORP level will vary above this value during normal operation. The adjustable range is from 400mV to 900mV in 5mV increments.

ORP Alarms

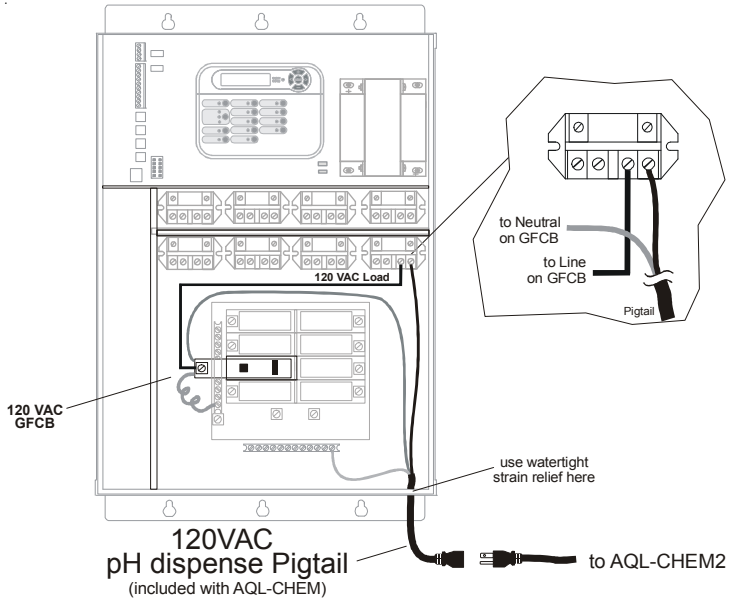
The Aqua Rite Pro or Pro Logic will automatically set a high and low alarm for the ORP level. The high alarm point is 850mV and the low alarm point is 350mV. If the ORP level meets or exceeds these points, an alarm message will display locally and on all remote controls. Also, if the ORP level is too high, chlorine generation will shut down.

Chemistry Extend (Pro Logic only)

When the Chlorine Feed selection is set to ORP Auto Sensing and/or the pH Reduction Control selection is set to Auto Sensing, the Pro Logic will keep the pool filter pump on regardless of its timer settings until the sanitizer level and/or pH level are within their programmed parameters. The pump will continue to run and either chlorine and/or CO₂ will continue to dispense until the programmed levels are reached. When both sanitizer level and the pH level are within the desired levels, the pump will be allowed to go back to automatic control.

Sanitizer Feed Timeout

When the Chlorine Feed selection is set to ORP Auto Sensing, the Aqua Rite Pro or Pro Logic control will automatically shut down ORP control and display a "ORP



Pro Logic operating with software version 4.00 or later

Pro Logics operating with software version 4.00 or later have built-in support for the AQL-CHEM2 or other 120VAC pH dispensing devices. A screw terminal block mounted inside of the Pro Logic enclosure offers a dedicated connection to the 120VAC pigtail or device. The diagram below shows typical wiring information for these Pro Logic units.

