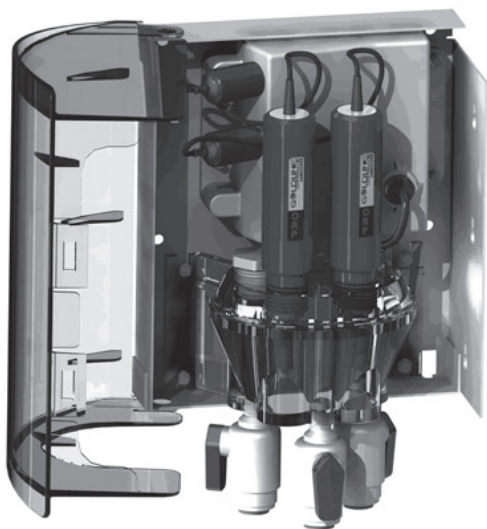


SENSE AND  
**DISPENSE™**

**Total Pool Chemistry™**  
for  
**Aqua Rite™ Pro**  
and  
**Pro Logic®**



**Installation and Operation Manual**  
for  
**AQL-CHEM**



June 2010  
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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) CO<sub>2</sub> dispense kit that plugs into the pigtail and will reduce the pool's pH level by injecting CO<sub>2</sub> 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.

## Compatibility

The AQL-CHEM is compatible with all Hayward Aqua Rite Pro and Pro Logic pool controls. An AQL-CL chemistry kit must be used with the Pro Logic if automatic chlorine generation is desired. The AQL-CHEM is not compatible with Aqua Rite or Aqua Logic controls.

# Installation

## Overview

Installing the AQL-CHEM requires the following steps:

- Mounting the Probe Cell
- Plumbing the Probe Cell
- Installing ORP and pH probes
- Wiring probes to Probe Cell communication box
- Wiring the Probe Cell to the Aqua Rite Pro or Pro Logic
- Wiring the pH Dispense Pigtail to the Aqua Rite Pro or Pro Logic
- Configuring the Aqua Rite Pro or Pro Logic
- Validating Operation
- Establishing Maintenance Schedule

## Materials Needed for Installation

- 7/16" drill bit
- 1/4" NPT tap
- Two small adjustable wrenches if side mounting to Aqua Rite Pro or Pro Logic
- 3/16" drill bit if side mounting to Aqua Rite Pro or Pro Logic
- Deburring tool or file if side mounting
- Tape and scissors if side mounting to Pro Logic (for drill template)
- Mounting hardware if surface mounting (not side mounting)
- Flex tubing cutter
- Water-tight strain relief for dispense pigtail
- Flathead screwdriver and mallet to remove knock-out and install strain relief
- 120VAC Ground Fault Circuit Breaker (GFCB) for powering 120VAC dispense pigtail or 240VAC (GFCB) for powering 240VAC dispense pigtail
- Extra wire, wire strippers, and wire nuts could be helpful in some installations
- Any items that would be required for wiring and installation per local code

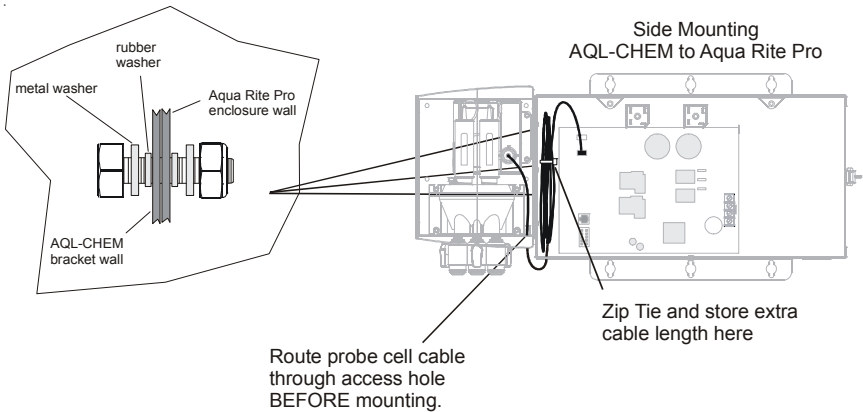
Before carrying out any part of the installation, be sure to shut off input power to the Aqua Rite Pro or Pro Logic. Turn off the pool filter pump, water features and any other related equipment. Relieve pressure from the pool filtration system.

## Mounting the Probe Cell

The Probe Cell can be mounted directly on the side of the Aqua Rite Pro/Pro Logic or mounted up to 15' away (limited by length of Probe Cell cable). The key to successful Probe Cell installation is in the plumbing. A pressure differential is required to allow clean, untreated water to pass through the cell and across the probes. Consider this when looking for an ideal mounting location.

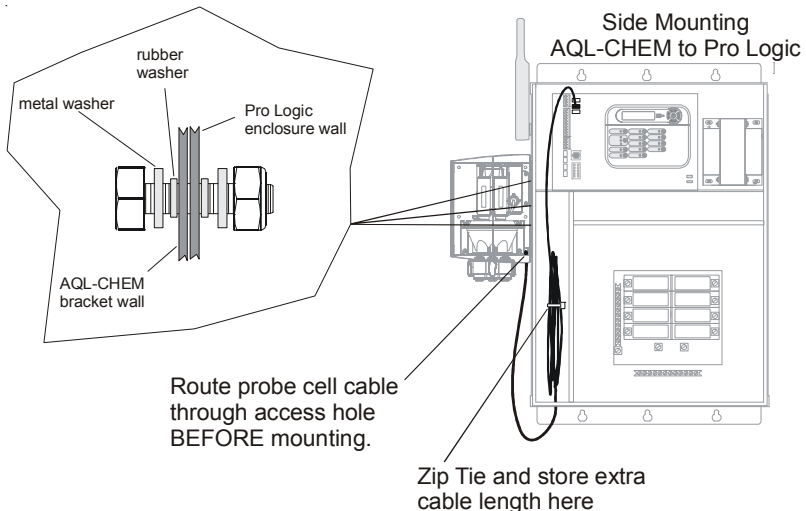
## Aqua Rite Pro

**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.

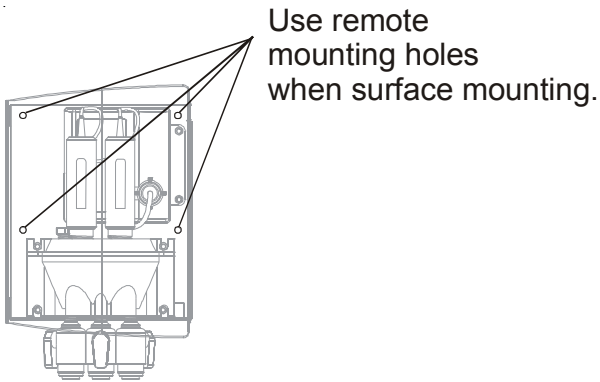


## Pro Logic

**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.

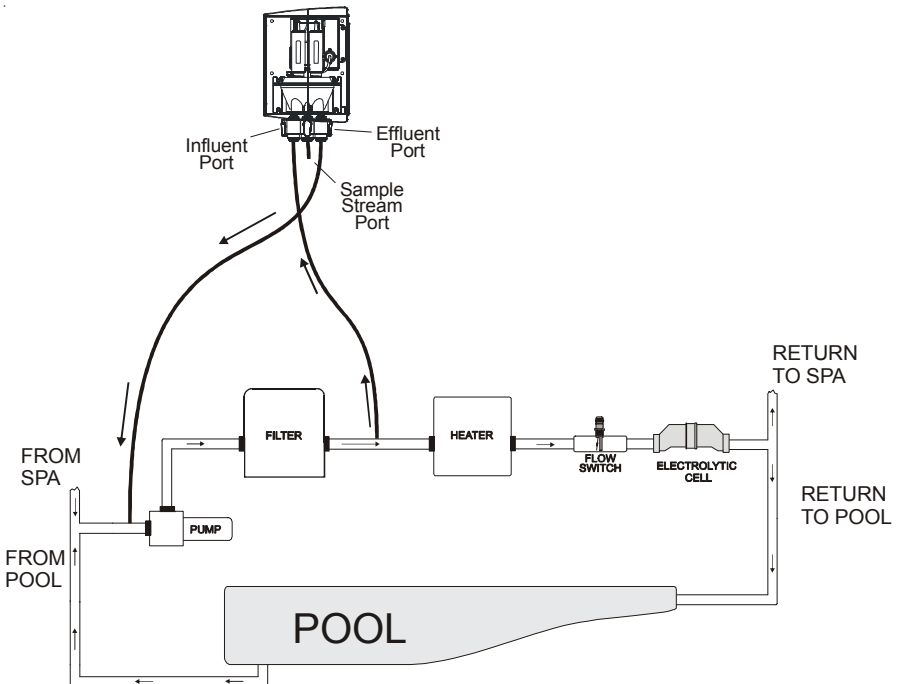


**Remote surface mounting the AQL-CHEM:** The Probe Cell can be mounted up to 15' away from the Aqua Rite Pro or the Pro Logic (limited by length of cable). Use the four mounting holes on the back of the bracket when surfacing mounting. Common wood screws can be used for most applications.



### Plumbing the Probe Cell to the pool plumbing

The Probe Cell requires connection to the pool plumbing using the supplied flex tubing. Two ports on the Probe Cell, influent and effluent, are connected to the supply and return sides of the pool plumbing. Refer to diagram below as well as the following steps:



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.

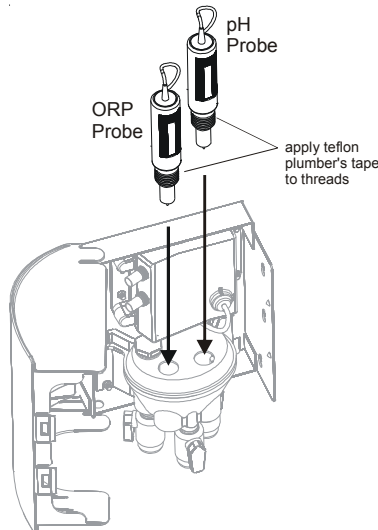
Cut a 3" length of flex tubing and insert it into the sample stream port. This port can be used to draw water samples if needed.

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.

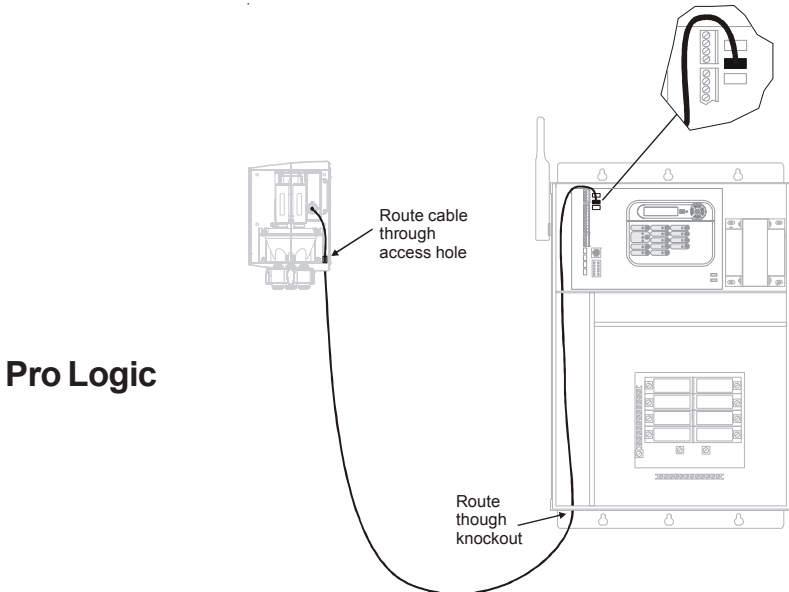
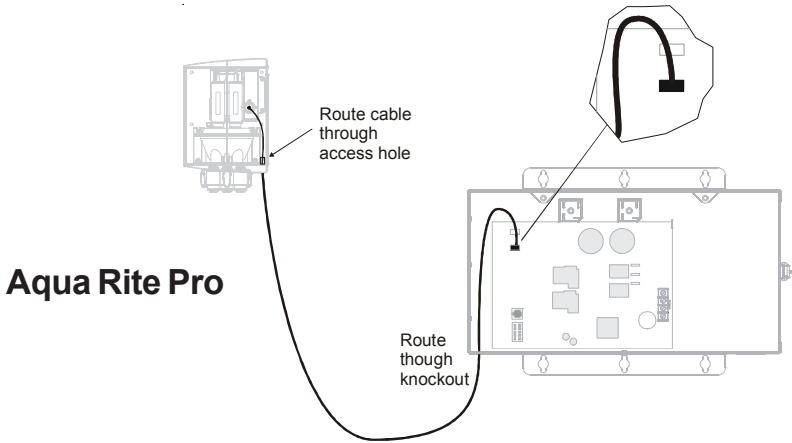


## Wiring the probes to the Probe Cell

Both probes must be wired to the communication box within the Probe Cell. The probe cables use typical BNC connectors that attach to the designated connectors on the communication box. Refer to the label on the communication box for the appropriate connections. Push the connectors in and turn clockwise until locked. After connecting, route the wires in a manner where they will not interfere with the door of the Probe Cell. Save BNC connector protective covers for future use.

## Wiring the Probe Cell to the Aqua Rite Pro or Pro Logic

The Probe Cell is supplied with a 15' cable which connects to the circuit board of the Aqua Rite Pro or Pro Logic. Route the cable through an available knockout and make the proper connection as shown below. When side mounting the Probe Cell, route the cable through the access hole at the bottom of the mounting bracket BEFORE screwing the bracket in place.



# 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.

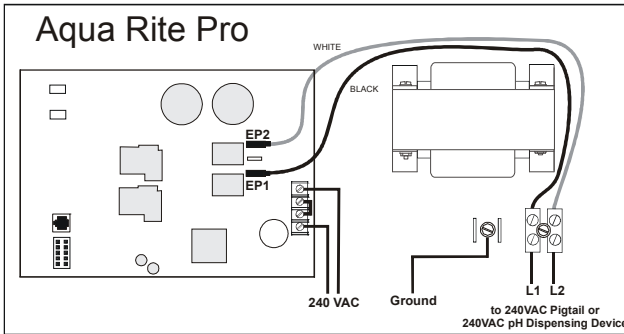
A screw terminal block located inside of the Aqua Rite Pro enclosure is provided for connection to the pigtail or pH dispensing device. If connecting to a Pro Logic, the 120VAC pigtail or 120VAC direct wired pH dispensing device will connect to one of the internal relays. If using a P-4 or PS-4 operating 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.

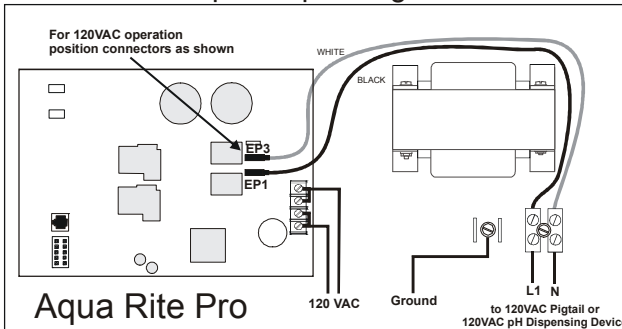
## Aqua Rite Pro

**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





**IMPORTANT:** The dispensing device must be powered by the same voltage used to power the Aqua Rite Pro. Configure the output voltage to the pH device by moving the wiring connections on the mainboard according to the diagrams on page 7.

*Example of AQL-CHEM2-240 used with Aqua Rite Pro:* The Aqua Rite Pro must be powered by 240VAC. Connect the 240VAC pigtail supplied with the AQL-CHEM2 to the Aqua Rite Pro's terminal block as shown in the diagram on page 9. The AQL-CHEM2-240 will then plug into the pigtail's 240VAC receptacle.

## **Pro Logic**

**NOTE:** The Pro Logic can only be used with a 120VAC pH dispensing device. There are two Pro Logic versions that require different installation techniques. Pro Logics operating with a software version less than 4.00 require the pigtail or pH dispensing device to be connected to an internal relay. Units using version 4.00 or later have a dedicated pH output through screw terminals mounted on the inside of the enclosure. Refer to the instructions that relate to your particular version.

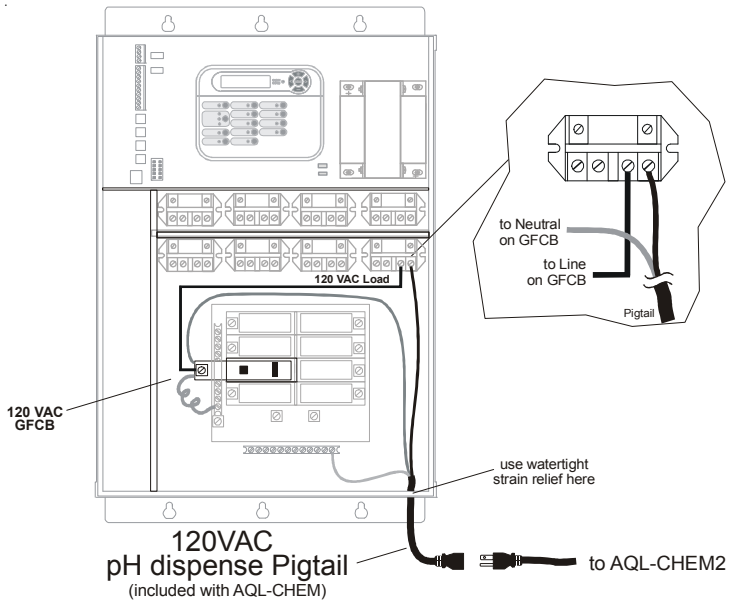
### ***Pro Logic operating with software version less than 4.00***

The 120VAC pigtail or 120VAC direct wired device is wired directly to one of the Pro Logic relays. The particular relay used will depend on the Pro Logic model and the auxiliary outputs that are already in use.:

*Pro Logic P-4 and PS-4 models:* The factory installed relays can not be used. The relay included with the AQL-CHEM kit must be installed and used to control the pH dispensing device on these models. Installation instructions for this relay can be found packaged with the relay. Once installed, wire the pigtail directly to this relay in a similar fashion to the diagram on page 9. If a direct wired device will be used, wire directly to this relay. The Pro Logic's Aux3 output will automatically be used to control this relay and the dispensing device.

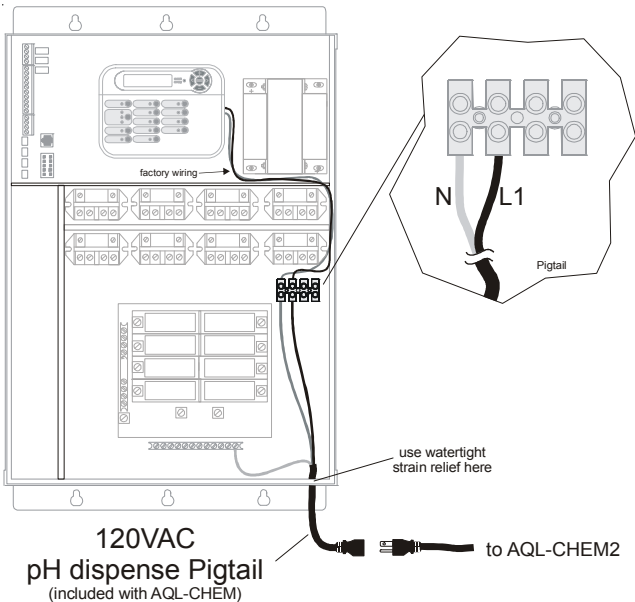
*Pro Logic PS-8 and PS-16 models:* Any available Aux or the Lights relay can be used. Locate a relay that is not already in use and wire the pigtail or direct wired device according to the diagram on page 9. After configuration, the relay's corresponding Aux/Lights output will be used to control the dispensing device.

The diagram on page 9 shows a typical installation of the 120VAC pigtail connected to a Pro Logic PS-8 relay. The Pro Logic will control an AQL-CHEM2 that plugs into the pigtail. If a direct wired pH dispensing device will be used, disregard the pigtail and connect directly to the relay.



***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.



## Configuring the Aqua Rite Pro or Pro Logic

After the AQL-CHEM is mounted, plumbed and wired, the Aqua Rite Pro or Pro Logic must be configured using the Chemistry Config. Wizard and pH Calibration Wizard. These wizards are found in the Settings Menu of the Aqua Rite Pro. For the Pro Logic, the Chemistry Config. Wizard is found in the Configuration Menu and the pH Calibration Wizard is found in the Maintenance Menu.

If a pH dispensing device is used, the relay that is used to control the device must be configured. Refer to page 12 for detailed information.

### Chemistry Config Wizard

The Chemistry Config Wizard will prompt the user for information and automatically configure the Aqua Rite Pro or Pro Logic to use the AQL-CHEM sensing kit. The procedure to perform the Wizard is shown below. Detailed information about specific screens relating to the configuration can be found on the following pages. To enter the Chemistry Config Wizard follow the steps below:

#### ***Aqua Rite Pro***

1. Press the "Settings" button.
2. Press ">" repeatedly until "Chemistry Config. Wizard" is displayed.
4. Push "+" to start Wizard.
5. Advance through the Wizard using "<" and ">" buttons. Use "+" and "-" buttons to answer questions when prompted.
6. Continue until finished.

#### ***Pro Logic***

If the AQL-CL chlorination kit will be used, be sure that it is enabled BEFORE entering the Chemistry Config Wizard.

1. Press "Menu" until Configuration Menu is displayed.
2. Hold both "<" and ">" for three seconds.
3. Press ">" repeatedly until "Chemistry Config. Wizard" is displayed.
4. Push "+" to start Wizard.
5. Advance through the Wizard using "<" and ">" buttons. Use "+" and "-" buttons to answer questions when prompted.
6. Continue until finished.

### Sensing System

Select Enable to configure the AQL-CHEM.

### pH Reduction Control

Select the desired option related to pH control.

*Disabled*      pH control is turned off. Select this mode if no pH dispenser will be connected to the Aqua Rite Pro or Pro Logic.

*Auto Sensing*      Use this mode when an AQL-CHEM2(-240) kit or other type of automatic pH reducer will be used. The Aqua Rite Pro or Pro Logic will dispense pH reducer (CO<sub>2</sub> or acid) when necessary to prevent the pH level from rising.

*Forced On*      pH reducer is added for 15 minutes regardless of pH level and then automatically goes to Auto Sensing mode. This mode is helpful when setting up and testing the AQL-CHEM2(-240) or other automatic dispenser.

**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 CO<sub>2</sub> 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 CO<sub>2</sub> 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

Timeout" message if the timeout value is exceeded (1-24 hours). This prevents a situation where the Aqua Rite Pro or Pro Logic is constantly generating chlorine because of a probe error or external problem with the pool and allows the pool owner to evaluate the pool chemistry before continuing with ORP control. The Timeout can be reset in the Check System Default Menu display.

### **pH Calibration Wizard**

After installation, the pH probe must be calibrated using the pH Calibration Wizard. Periodically, a pool water test should be compared to the pH level reported by the Aqua Rite Pro or Pro Logic. If there is a discrepancy between the two values, the pH Calibration Wizard should be redone.

Run the pool pump for a minimum of 20 minutes before starting the pH Calibration Wizard. The procedure to perform the Wizard is shown below. Detailed information about specific screens can also be found below.

#### ***Aqua Rite Pro***

1. Press the "Settings" button.
2. Press ">" repeatedly until "pH Calibration Wizard" is displayed.
3. Push "+" to start Wizard.
4. Advance through the Wizard using "<" and ">" buttons. Use "+" and "-" buttons to answer questions when prompted.
5. Continue until finished.

#### ***Pro Logic***

1. Press "Menu" until Maintenance Menu is displayed.
2. Press ">" repeatedly until "pH Calibration Wizard" is displayed.
3. Push "+" to start Wizard.
4. Advance through the Wizard using "<" and ">" buttons. Use "+" and "-" buttons to answer questions when prompted.
5. Continue until finished.

### **Enter Independent pH Test Result**

Test the pH of the pool water with a dependable quality test kit after the pool pump has been running for a period of time. Hayward suggests that you take more than one test and average the results before entering the value in the pH Calibration Wizard. After entering the pH value, press the "+" button to calibrate the pH probe. A "Check System" warning will display if the probe value and the entered value are different by  $\pm 1.0$  or greater. If this is the case, retest the pH (possibly with another test kit) and consider cleaning the pH probe per the instructions found in the Probe Maintenance section of this manual.

### **Configuring the pH Dispense Relay (*Pro Logics operating with software version less than 4.00*)**

**IMPORTANT:** The relay used to control the AQL-CHEM2(-240) or other pH dispensing device needs to be configured properly to prevent accidental release of CO<sub>2</sub> or acid into the pool water. Determine which relay is being used (this is the relay that the pigtail or 120VAC pH dispensing device is connected to). Follow the configuration procedure found in the Pro Logic Installation and Operation manuals under Configuration Menu to set the function of this relay to "pH Dispense". An example of this (using Aux 1) is shown on page 13. Note that PL-P-4 and PL-PS-4 models will require the additional relay to be installed and automatically use Aux 3.

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.

## Controlling pH with the Aqua Rite Pro or Pro Logic

Plaster pools and pools serviced by salt-chlorine generators typically cause a slow pH rise which must be managed. With the Sense and Dispense technology, CO<sub>2</sub> or acid is dispensed into the filter system's return water as needed until the pH probe reports proper pH level.

Hayward strongly recommends CO<sub>2</sub> injection instead of acid feed systems for pH control of residential pools. Both systems are effective at reducing pH, but CO<sub>2</sub> is much safer to handle and store. The Hayward AQL-CHEM2(-240) are CO<sub>2</sub> dispensing systems that eliminate the need to handle acid and are economical and efficient methods for effective pH control. When the CO<sub>2</sub> gas is injected into water, it dissolves and becomes carbonic acid, a weak acid that is very effective at lowering pH but becomes self-limiting if over-fed.

IF YOU CHOOSE AN ACID FEEDER FOR pH CONTROL, additional safety precautions are required to ensure that an equipment malfunction is detected. Great care must be taken when installing, maintaining and operating acid pump feed systems. Acid is dangerous to handle, and will harm people and equipment if not properly contained, transported, poured, stored, and dispensed.

**CAUTION:** Equipment failure can potentially cause too much acid to be dispensed into the water, causing an equipment and health hazard which would not be detectable without the use of independent pH measurement.

- Always use a 4:1 dilution in the acid feed system.
- To prevent violent boiling and splashing, ALWAYS ADD ACID TO WATER, never add water to acid to dilute it. Some use the rhyme "Remember, do as you oughta- add acid to water"
- Strictly follow the acid vendor's safety and handling protocols including hand, body and eye protection when transferring or handling acid.
- Choose a 5 gallon per day acid feed pump to keep flow rate low.
- Limit the available acid reservoir to 1 gallon per 15,000 gallons of water. This limits the available acid in the event that equipment malfunctions and empties the tank into the pool or spa.
- Only a properly installed and maintained system will control the pH and sanitizer levels of the water.
- If acid is not diluted properly or the feed pump is oversized, it will overshoot the pH correction.
- Periodically use an independent pH and chlorine test kit to verify that pH is at a safe level, and that chlorine is at a safe level. If the probes are broken, depleted, dirty, fouled with oils, lotions, or other contaminants, they can report inaccurate result to the system causing incorrect water chemistry, which at worst, could harm people or equipment.
- Check the Aqua Rite Pro or Pro Logic's display each day before entering the water. If there is any Check System alarm, following the troubleshooting guide in this manual to understand and rectify the condition. If the display is blank, or reporting a communications error, troubleshoot the equipment and rectify the failure before entering the water.
- Follow the installation checklist to verify proper operation upon installation and at the beginning of each pool season.

## 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.



**Winterizing**

The AQL-CHEM probes must be protected from freezing conditions. If the pool is winterized, plan to remove and store the probes (as described above) as part of the normal pool winterizing process. The Probe Cell and related plumbing must be drained as well. BNC connectors should be capped with the original protective covers. A winterizing kit with probe caps, BNC covers, and other necessary winterizing accessories is available to replace any missing items. Contact your local Hayward dealer for more information.



**LIMITED WARRANTY (effective 04/01/09)** Hayward/Goldline warrants its Pro Logic and E-Command pool automation products as well as its Aqua Rite, Aqua Rite Pfo, Aqua Plus and SwimPure chlorination products to be free of defects in materials and workmanship, under normal use and service, for a period of three (3) years. Hayward/Goldline also warrants its Aqua Trol chlorination products to be free of defects in materials and workmanship, under normal use and service for a period of one (1) year. These warranties are applicable from the initial date of installation on private residential swimming pools in the US and Canada.

Hayward/Goldline warrants all the above-identified pool automation and chlorination products installed on commercial swimming pools and on swimming pools outside of the US and Canada for a period of one (1) year. Likewise, Hayward/Goldline warrants all accessories and replacement parts for the above-identified pool automation and chlorination products for a period of one (1) year. Each of these warranties is not transferable and applies only to the original owner.

Proof of purchase is required for warranty service. If written proof of purchase is not provided, the manufacturing date code will be the sole determinant of the date of installation of the product. To obtain warranty service or repair, please contact the place of purchase or the nearest Hayward/Goldline authorized warranty service center. For more information on authorized service centers please contact the Hayward/Goldline Technical Service Support Center (61 Whitecap Road, North Kingstown RI, 02852) or visit the Goldline web site at [www.goldlinecontrols.com](http://www.goldlinecontrols.com) or the Hayward website at [www.haywardnet.com](http://www.haywardnet.com).

#### **WARRANTY EXCLUSIONS:**

1. Material supplied or workmanship performed by others in process of installation.
2. Damage resulting from improper installation including installation on pools larger than the product rating.
3. Problems resulting from failure to install, operate or maintain the product(s) in accordance with the recommendations contained in the owners manual(s).
4. Problems resulting from failure to maintain pool water chemistry in accordance with the recommendations in the owners manual(s).
5. Problems resulting from tampering, accident, abuse, negligence, unauthorized repairs or alternations, fire, flood, lightning, freezing, external water, degradation of natural stone used in or immediately adjacent to a pool or spa, war or acts of God.

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## Questions?

Refer to [www.goldlinecontrols.com](http://www.goldlinecontrols.com) for latest manual revisions, additional information and helpful service.

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