Sense & Dispense

HL-CHEM & AQL-CHEM4-ACID:

General Overview & Features

TTP-CHEM208c

HAYWARD®

Product Overview

Product Overview: Sense vs. Dispense

Sense (Read):
The Sensing portion employs two electrical probes to measure both the ORP and pH of the water that passes through the flow chamber.

Dispense (pH React):
The Dispense feature automatically lower the pH of the water using either CO_2 or Muriatic Acid as its agent.

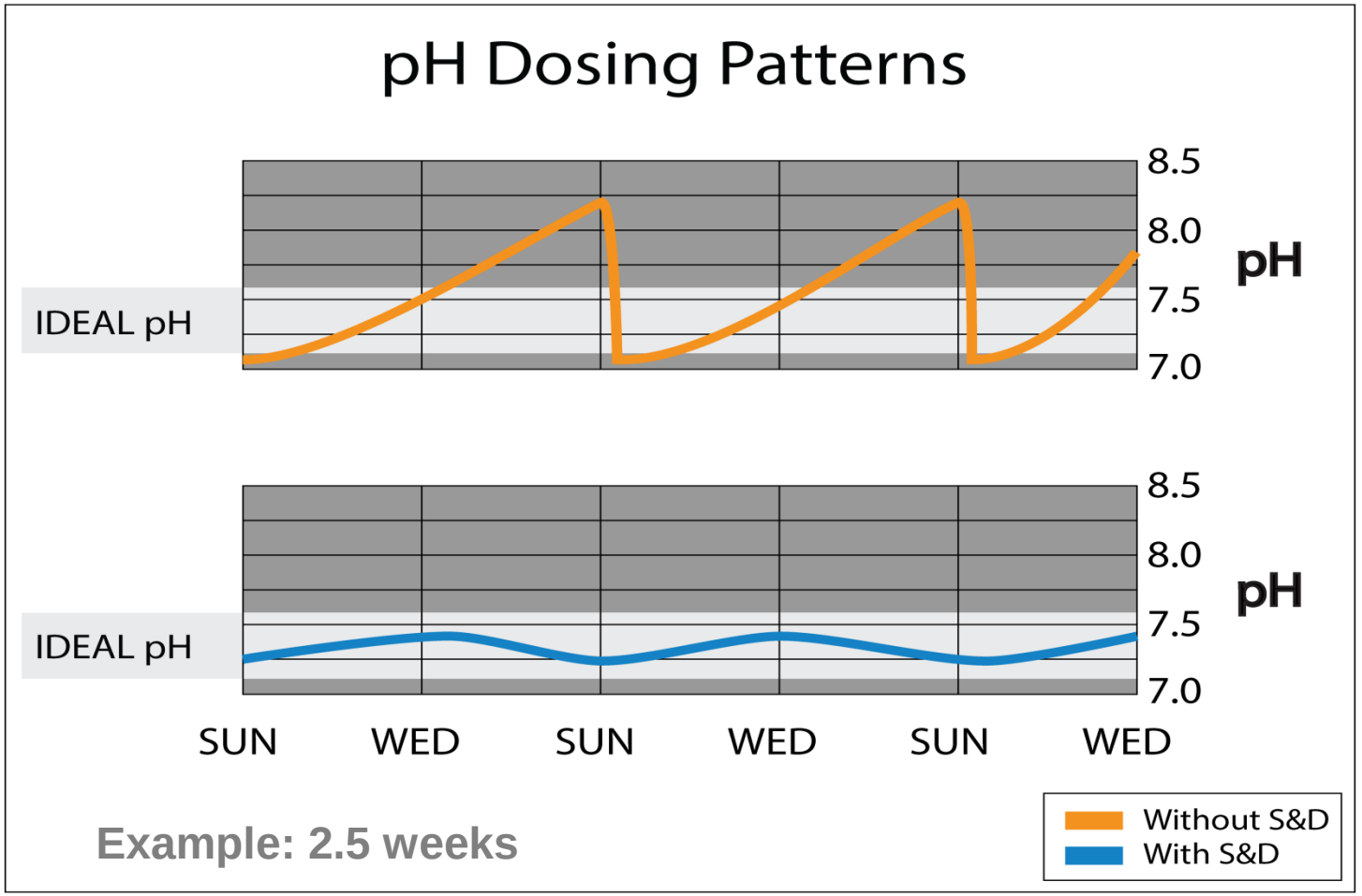
Product Overview: Why Choose Sense & Dispense

3 Main reasons for using Sense & Dispense:

- Better Water Quality
- Reverses pH rise caused by Salt Chlorination
- Convenience

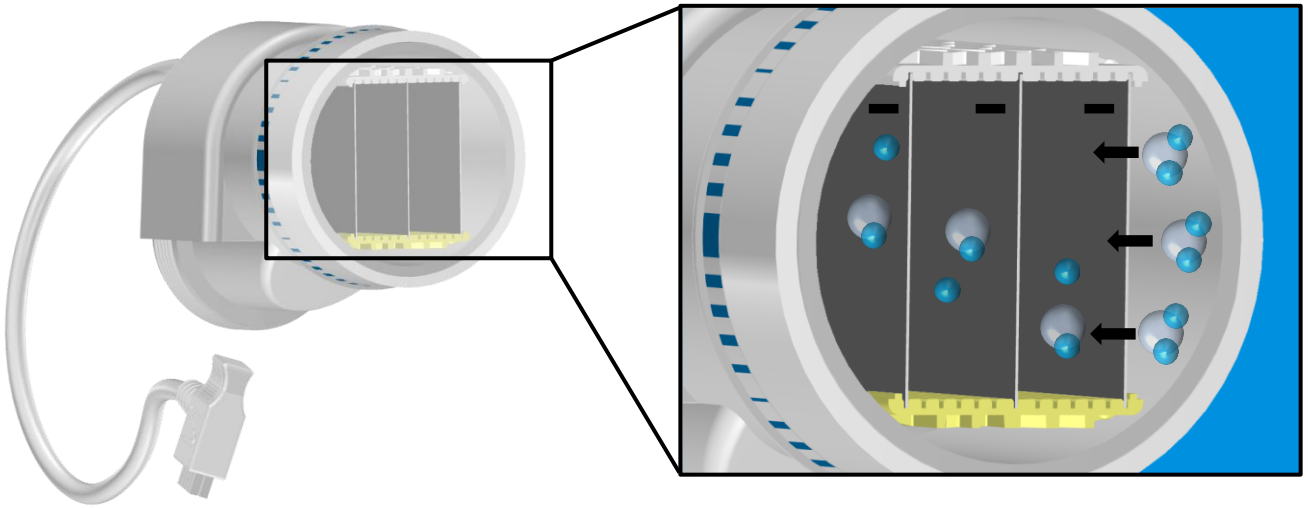
Water Quality: pH Regulation (With & Without)

pH and Chlorine dosing is less variable with S&D:



Reversing pH Rise: Causes of Electrolysis

On the Cathode (-) side Hydrogen and Hydroxides are converted from water. **(Hydroxides are highly basic which means pH is high on the negative side).**

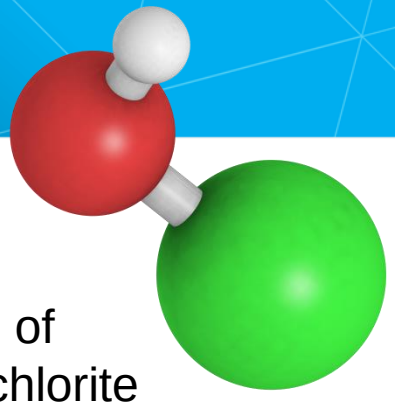


OH Hydroxide = ↑ pH

Neutral — H_2O — Water — Neutral

H_3O Hydronium = ↓ pH

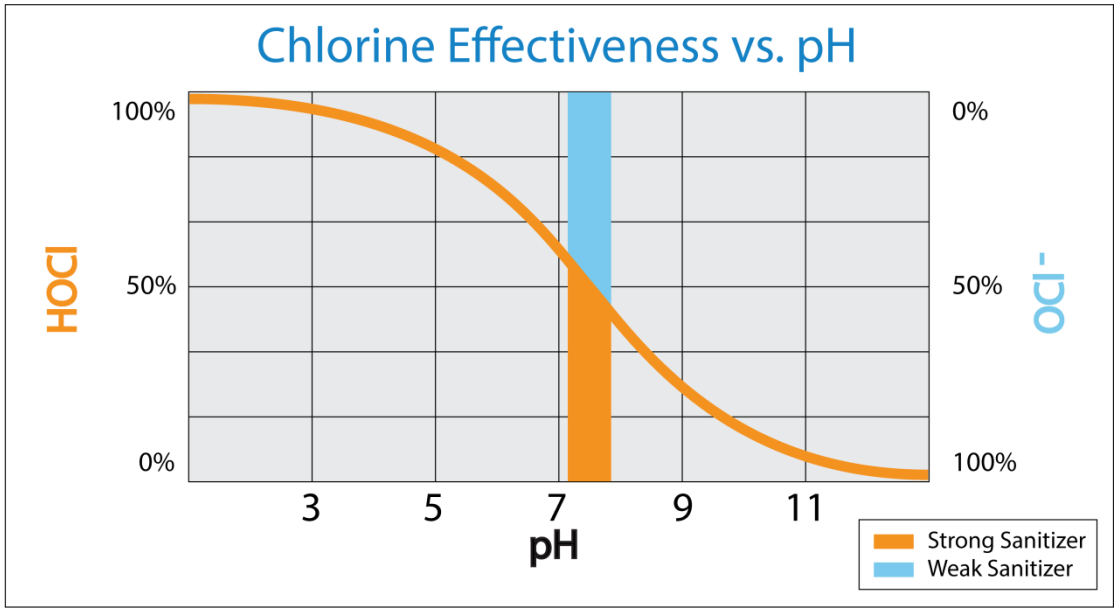
Reversing pH Rise: Relevance



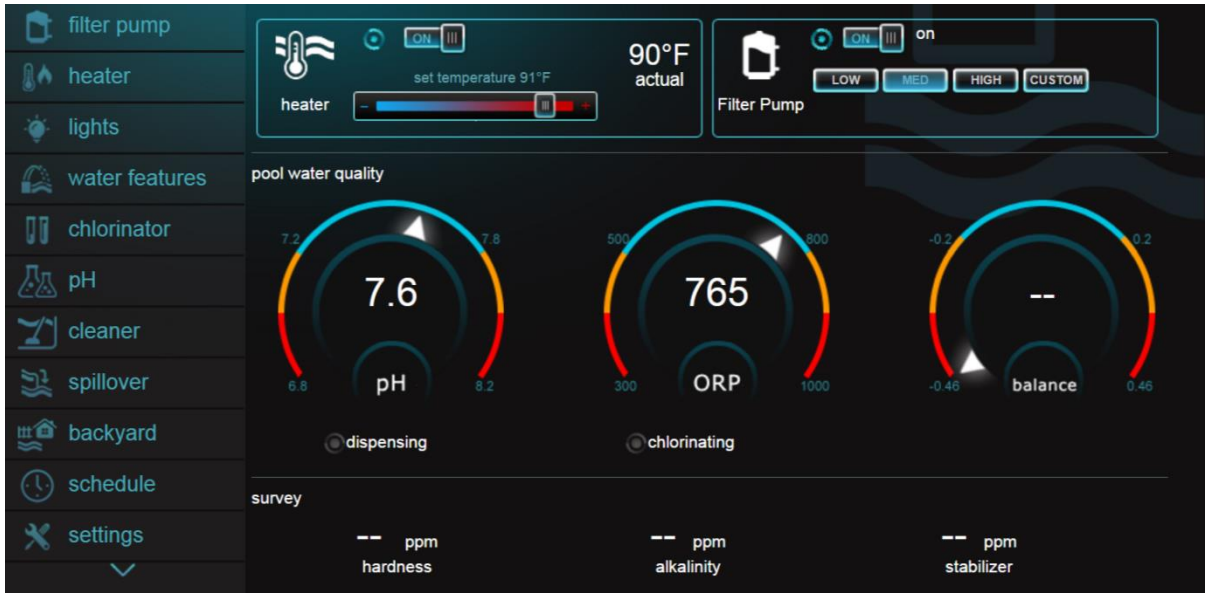
Chlorine Effectiveness depends on pH:

When chlorine is added to water, there are two species of chlorine present—hypochlorous acid (HOCl) and hypochlorite ion (OCl^-)

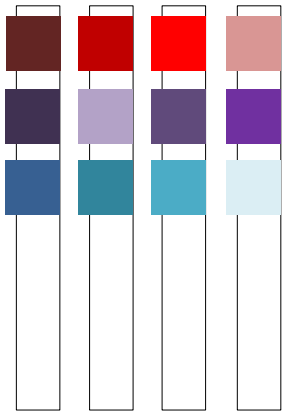
Of these, hypochlorous acid (HOCl) is more potent. It is best to operate at the lower end of the pH range (7.2-7.8), but lower than that range makes water corrosive to equipment.



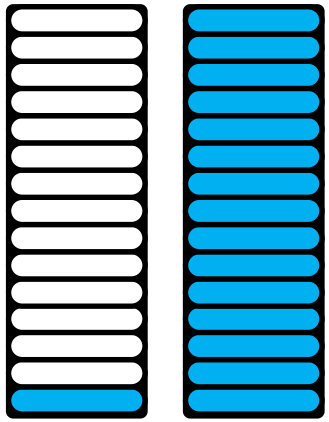
Convenience: pH Rise and Electrolysis



Obtain pH and ORP readings from the OmniLogic, ProLogic or AquaRite Pro.



Less manual measurements required and less reliance on the condition of strips and kits.



1 Gallon

15 Gallons

AQL-CHEM4-ACID holds up to 15 gallons vs. the traditional 1 gallon jug of Muriatic Acid.

Sense & Dispense: Compatibility

OmniLogic: (HLBASE)

Board Rev.	Date Issued	Status
All Boards	N/A	3

ProLogic Series: (AQL-P-4, AQL-PLUS, AQL-PS-X, PL-P-4, PL-PLUS, PL-PS-X)

Board Rev.	Date Issued	Status
Boards less than 3.0	Prior to 2.1.08	1
3.0 Boards (First Pro Logic Gen.)	2.1.08	2
Boards greater than 3.0	10.27.08	3

AquaRite Pro Series: (AQR-PRO)

Board Rev.	Date Issued	Status
All Boards	N/A	3

1. **Replace PCB with Rev. 4.20 (GLX-PCB-PRO) and P-4 units will require local display and wired remotes of Rev. 3.12 or higher, if the display does not qualify also replace.**
2. **This will work but requires the use of an auxiliary to manage the dispense portion of that feature.**
3. **Full Compatibility.**

Sense & Dispense: Compatibility

Automation

Salt Chlorination

HL-CHEM
(Sensor Kit)

Optional (Dispense)

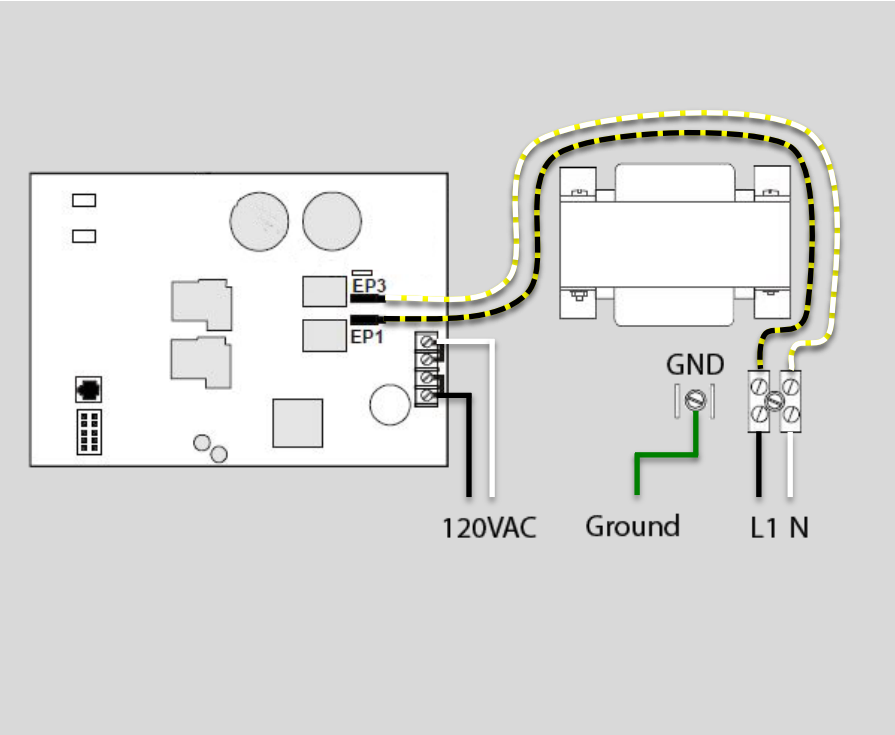
AQL-CHEM4-ACID
Acid Feeder

★ **A flow switch will be required for pH Dispense (GLX-FLO), the same flow switch can be used for both salt chlorination and dispense.**

Installation

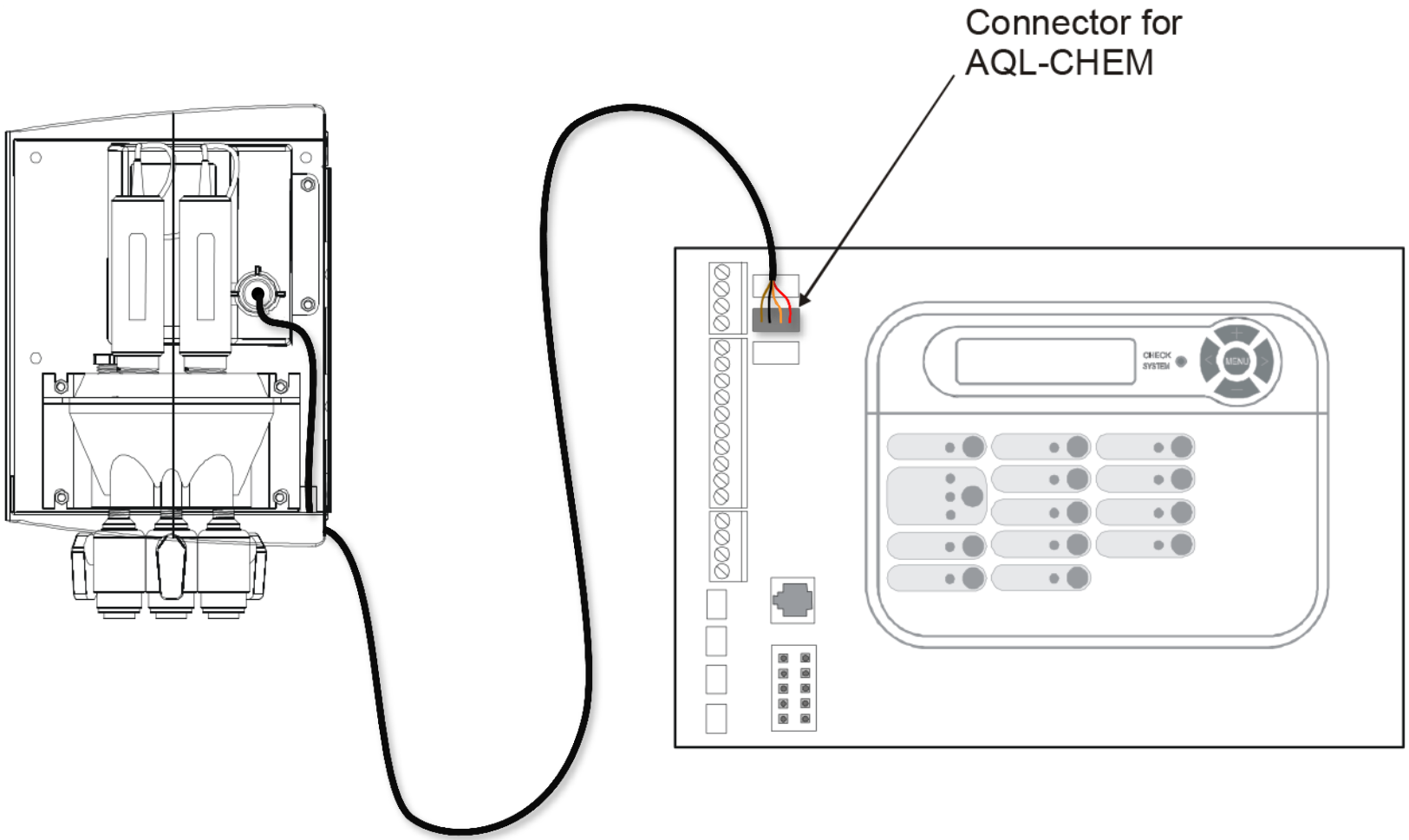
Installation: AquaRite Pro Direct Connection (Dispense)

AQR-PRO

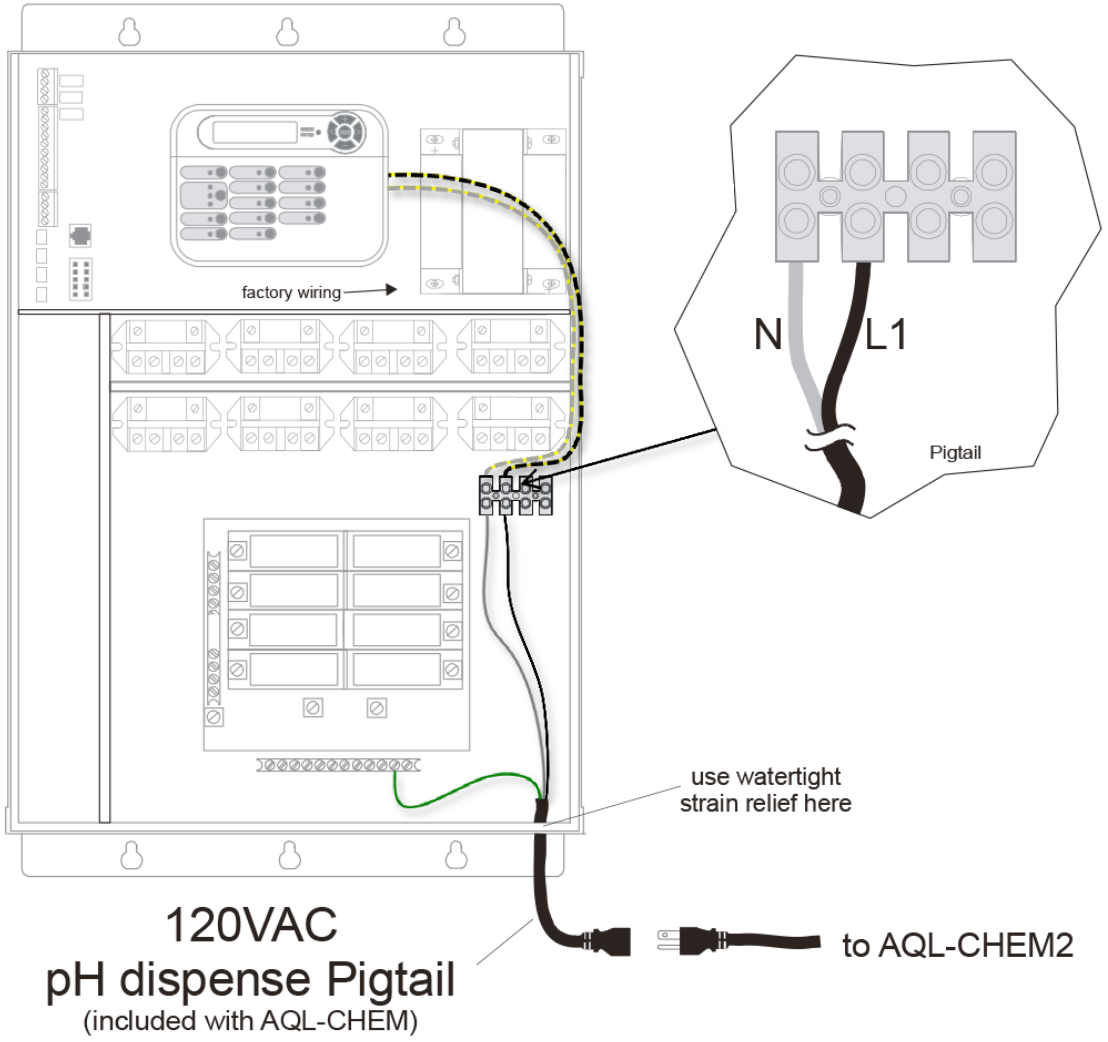


- When installing the AQL-CHEM4-ACID, it is important to wire the AquaRite Pro for 120VAC ONLY. Start by shutting down power to the salt chlorinator (via the breaker).
- The Dispense circuit plugs on the board should be changed to EP1 and pH N (EP3); this is the correct configuration for 120V applications.
- Finally verify that the pH dispense wires are prewired to the correct terminal block. Prior to restoring power to the AquaRite Pro.

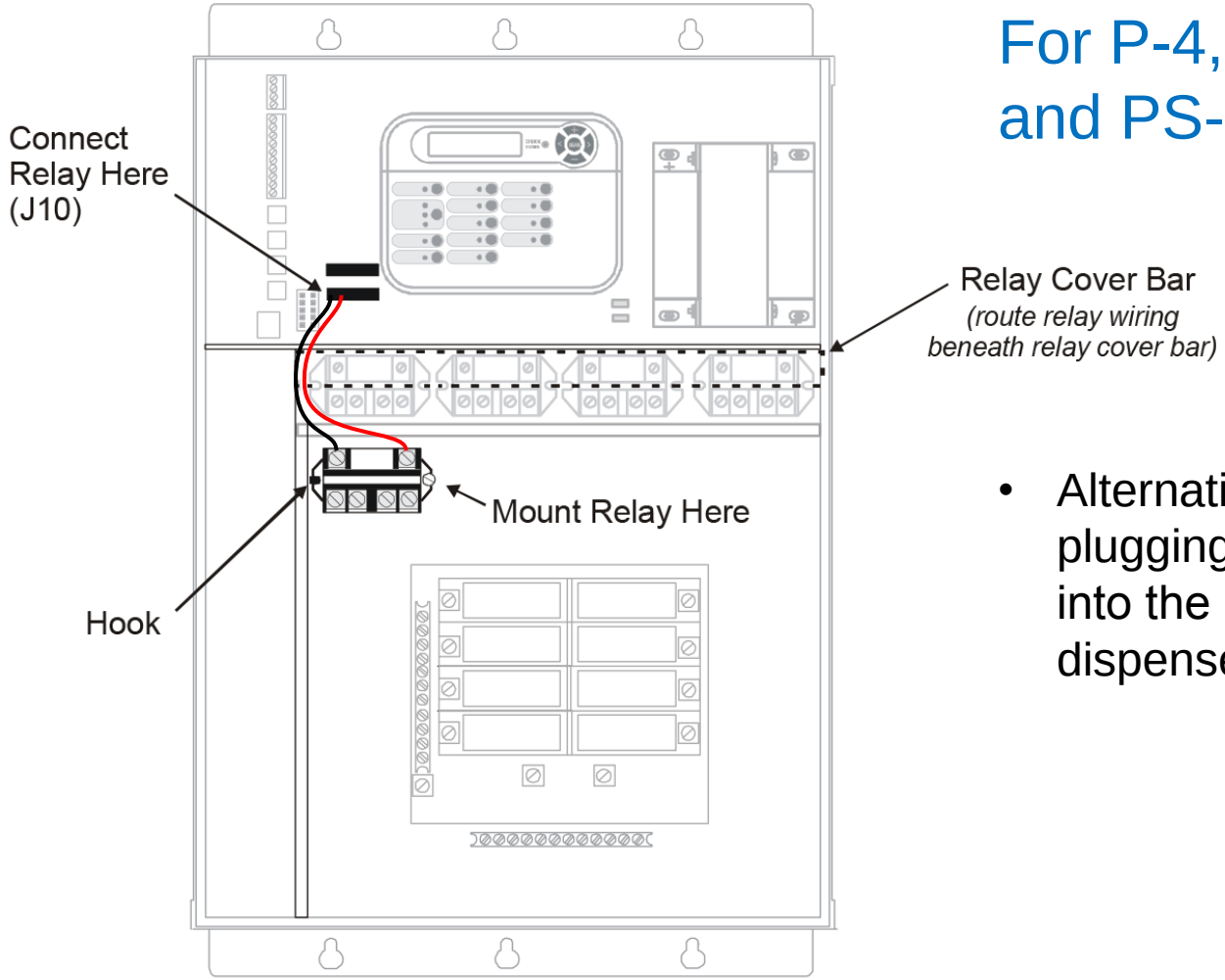
Installation: ProLogic (Sense)



Installation: ProLogic Direct Connection (Dispense)



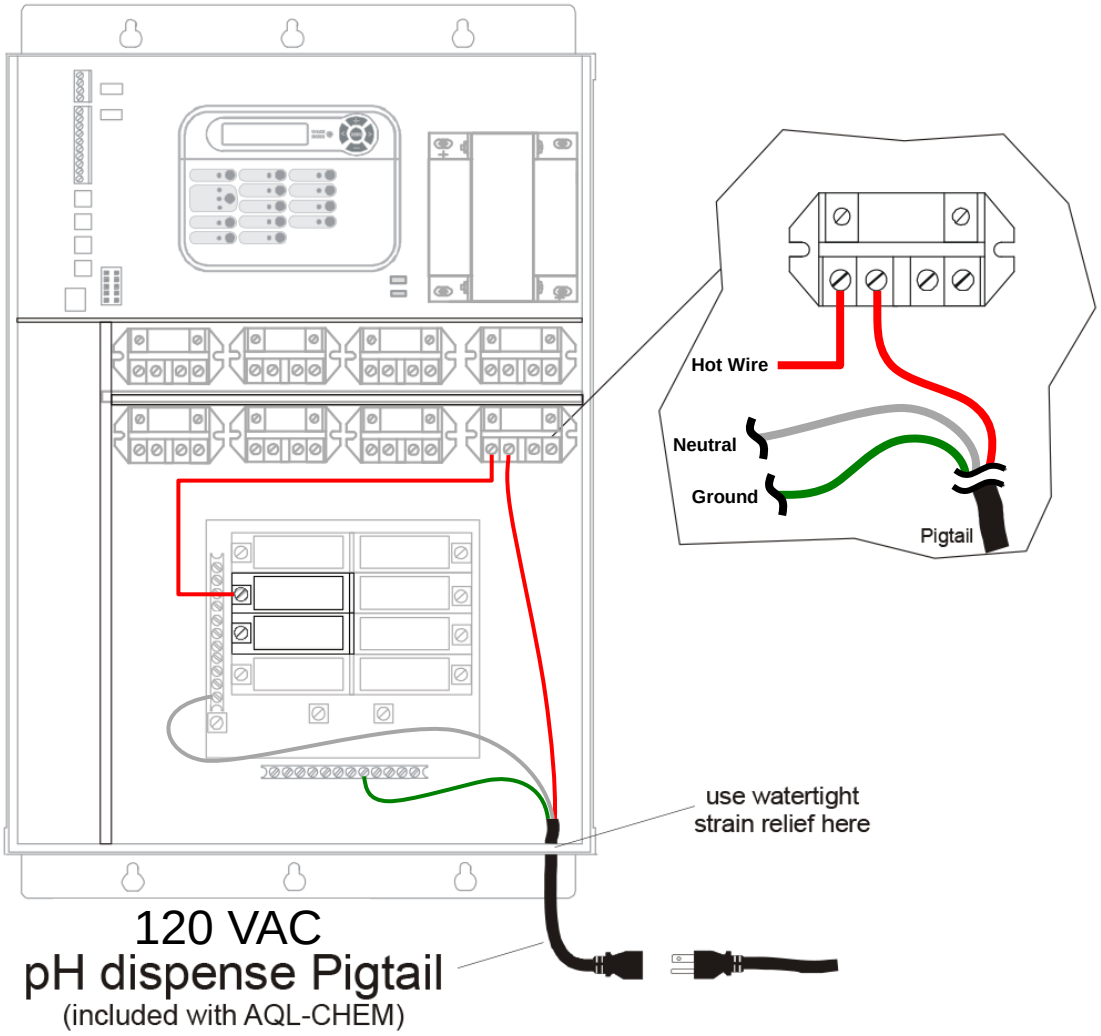
Installation: ProLogic Relay (Dispense)



For P-4, PS-4, and PS-8V units

- Alternative to plugging directly into the board's dispense circuit:

Installation: ProLogic Relay (Dispense)

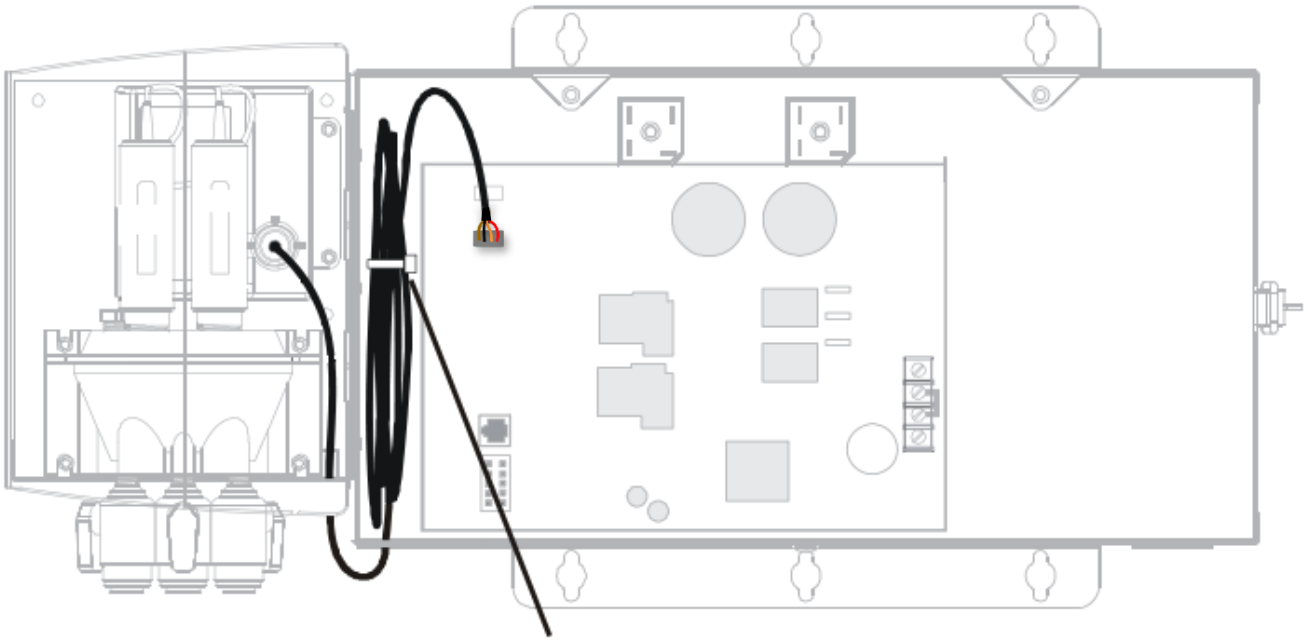


For PS-8, PS-16, and PS-16V units

- Alternative to plugging directly into the board's dispense circuit.
- NOTE: Make sure, if using a relay to control dispense, to change the function of that relay to "Sense & Dispense".

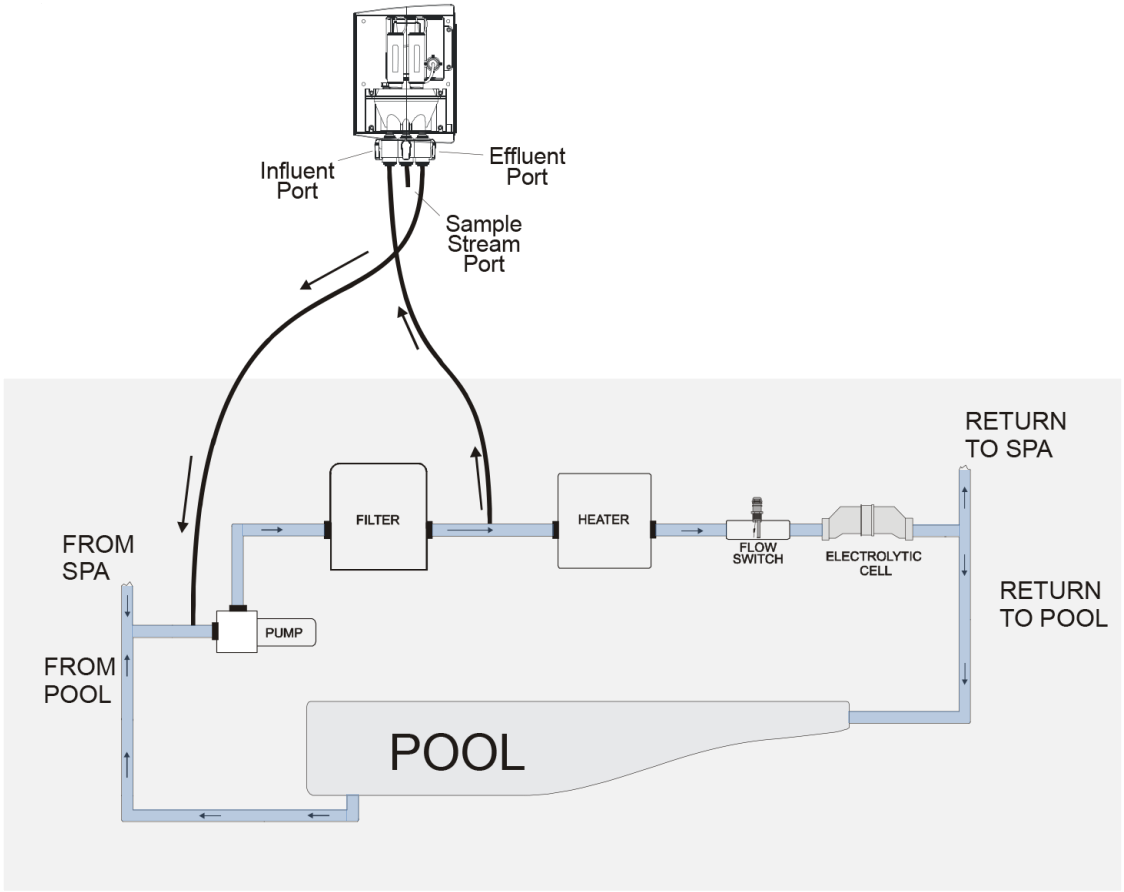
Installation: AquaRite Pro Communication

Side Mounting
AQL-CHEM to Aqua Rite Pro



Zip Tie and store extra
cable length here

Installation: Plumbing (Influent & Effluent)



- It is important to mount the check valves (for the influent and effluent line) into the side or underside of the PVC plumbing.
- This is especially important in low flow situations. If the plumbing contains air, the air will work its way to the top half of the pipe.

Operation

Operation: Key Terminology

- **ORP (Oxidation-Reduction Potential):** Measures the change in the water's oxidation state. The higher the ORP reading, the higher the oxidation potential of water. As water oxidizes, it cremates impurities.

- **pH:** The measure of how acidic or basic a solution is. Purely neutral water carries a pH of 7 and can be considered either a very weak acid or a very weak base.

- **mV (Millivolt):** A unit of potential difference equal to a thousandth of a volt. If V = a volt, a millivolt is V/1000 also expressed as 10^-3.

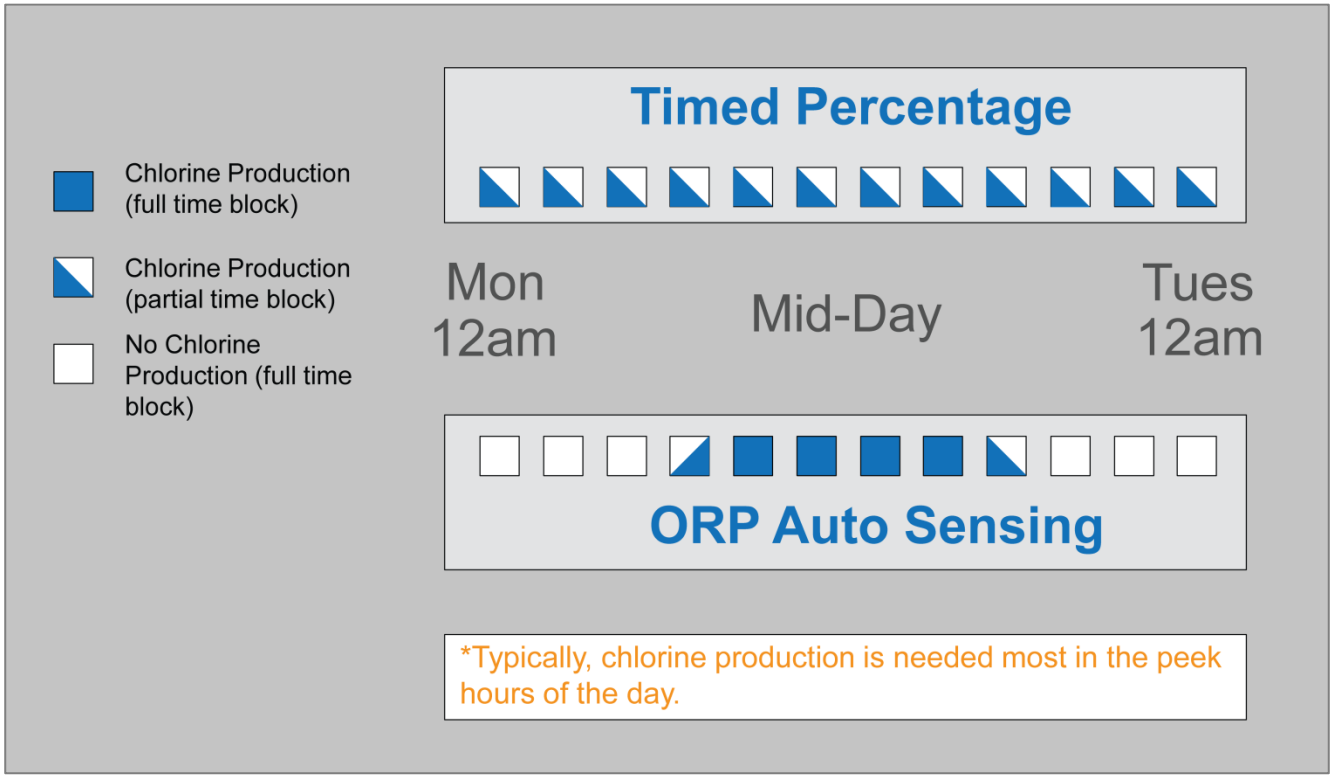
- **Influent:** Water diverted from the common line to enter the flow chamber. This water is used as the source for all testing.

- **Effluent:** An out-flowing of water. The effluent line carries water from the flow chamber and reintroduces it to the common line.

Operation: Chlorinator Operational Modes

ORP Auto Sensing vs. Timed %:

When both the chlorinator and sensing system are enabled salt chlorination can be controlled by either timed percentage (which is always used when Sense & Dispense is not connected) and ORP Auto Sensing (chlorination based on demand).



Operation: Dispense Rates

pH Reduction Control – Auto Sensing/Forced On 15mins/Disabled:
If the sensing system is enabled we can opt to reduce the pH level automatically based on a pH set point, force the pH dispense on for 15 minutes (usually done to determine pH dispense health) or we can disable this feature.

Pool

pH Variance	Seconds
Greater than .5	Constant dispense
0.5	ON 50, OFF 10
0.4	ON 40, OFF 20
0.3	ON 30, OFF 30
0.2	ON 20, OFF 40
0.1	ON 10, OFF 50

Spa

pH Variance	Seconds
Greater than .5	Constant dispense
0.5	ON 10, OFF 50
0.4	ON 8, OFF 52
0.3	ON 6, OFF 54
0.2	ON 4, OFF 56
0.1	ON 2, OFF 58

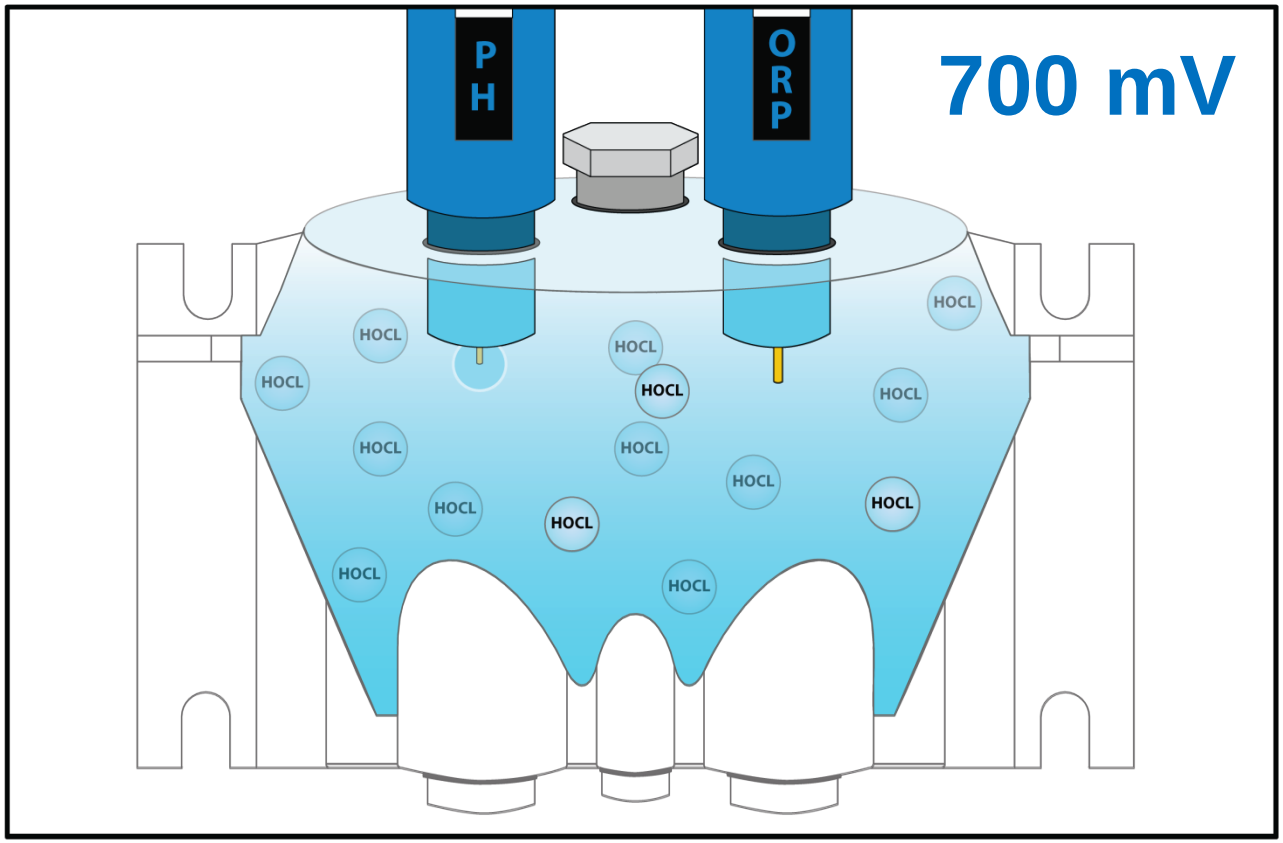
Operation: Chemistry Requirements

Agents	Ideal Levels	Too Low	Too High
Salt	2700 to 3400 *3500 to 5000	Check System: Low Salt.	Check System: High Salt Amps.
Free Chlorine	1.0 to 3.0 ppm *2.0 to 5.0ppm	No chlorine is in reserve for future demand.	Conditions in the water are uncomfortable and potentially irritating.
pH (Potential Hydrogen)	7.2 to 7.6	Metals corrode, staining, H2O unpleasant.	Scaling and chlorine's effectiveness is drastically reduced.
Cyanuric Acid (Stabilizer)	20 to 50 ppm (0 ppm indoor)	Chlorine has a short life span.	Chlorine lock.
Total Alkalinity	80 to 120 ppm	Etching, staining, pH bounce.	pH is difficult to control/adjust.
Calcium Hardness	200 to 400 ppm *180 to 280 ppm	Water may be corrosive.	Water has a tendency to scale.
Metals	0 ppm	No such thing.	Staining
Saturation Index	-0.2 to +0.2 (0.0 preferred)	Corrosive conditions	Scaling conditions.

***Typical commercial requirements.**

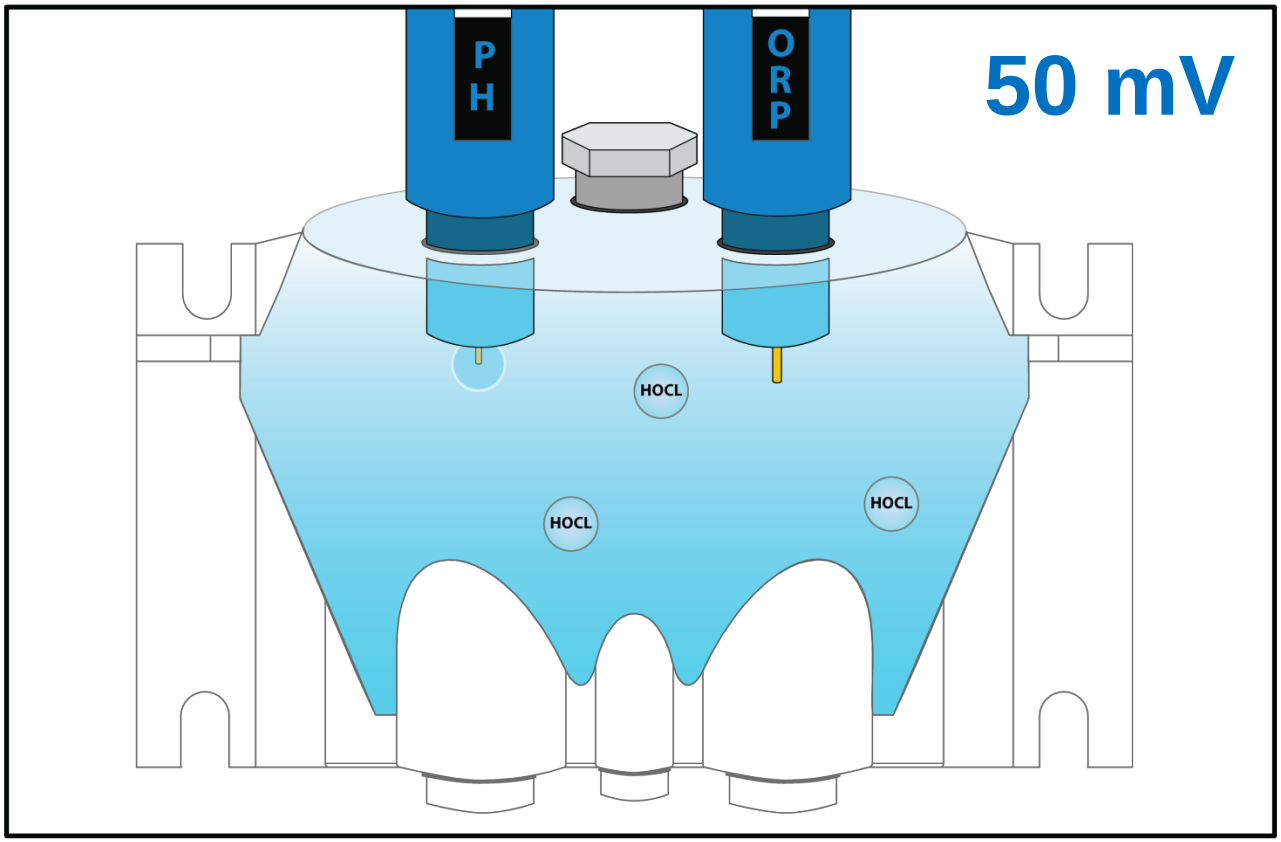
Operation: ORP Sensing

When the system measures ORP it is tracking how much oxidation potential exists in the water. If the ORP level is high then it is likely that a lot of chlorine is present in the water and inversely so if little chlorine exists.



Operation: ORP Sensing

In the example shown below the amount of free chorine available is significantly smaller, therefore this sample will show a really low ORP level if anything at all. If all the chlorine is used up the ORP level will read 0 because there is no potential for oxidation.



Maintenance

Maintenance: Overview

Recommended probe maintenance schedule:

Residential – at least once every three months.
Commercial – every 30 days.

Important Maintenance Information:

1. Probes must be clean and free of oils, mineral deposits, and contamination in order to function properly.
2. Probe tips must be kept wet at all times, if left out of water or storage solution the probes will dry out and permanent damage will result.
3. Probes must be removed and kept wet during winterization.
4. Replace acid feed tubing annually.

Probe maintenance indicators:

1. Slow response to water chemistry changes.
2. Increased need to calibrate pH.
3. Inconsistent readings.

Maintenance: Probe Cleaning

Step 1

Disconnect the probe connectors from the flow cell.

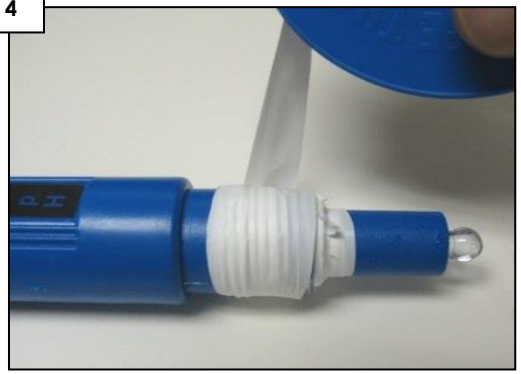
Step 2

Unscrew & remove the probes from the flow cell chamber.

Step 3

Clean the probe tip and white reference area with a soft brush and toothpaste or liquid dish washing detergent.

Step 4



Rinse with fresh water, remove and replace the Teflon tape, & reinstall the probes. Finally recalibrate the probe.

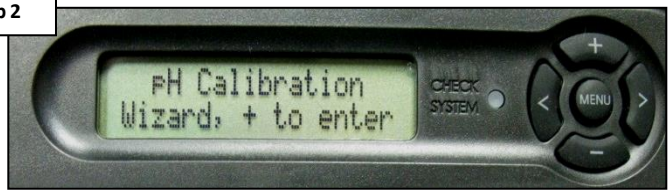
Note: During the cleaning process it is crucial to keep the tips of both the ORP and pH probes wet. If the probes dry out they will be incapable of providing an accurate reading.

Maintenance: pH Calibration (ProLogic)

Step 1

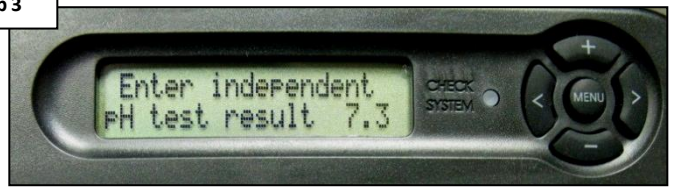
Press the 'Menu' button until 'Maintenance Menu' is displayed.

Step 2



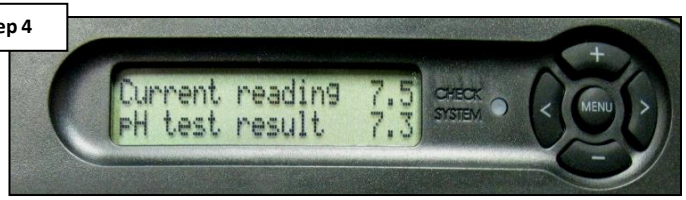
Press the right arrow button one time and press the plus (+) button to enter pH calibration.

Step 3



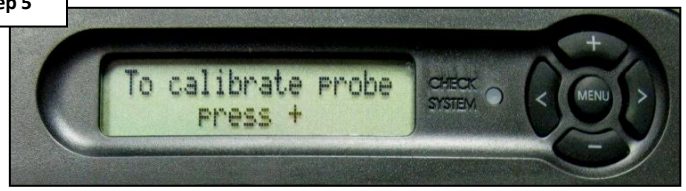
Use the plus (+) or minus (-) keys to increase or decrease the pH value.

Step 4



Press the right arrow key to show current reading and new results. Press the right arrow again.

Step 5



Press the plus (+) key to save the value.

Step 6

Press the right arrow key twice to complete.

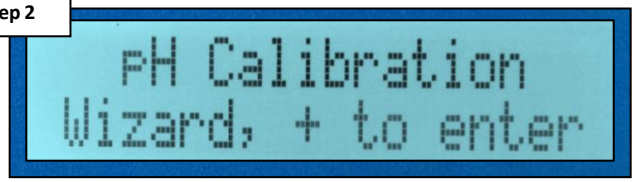
Always verify that the pH probe is clean prior to running the calibration procedure. Also, when testing the pH reading independently, it is important to obtain test water from the flow cell chamber (where the probes measure the water).

Maintenance: pH Calibration (AquaRite Pro)

Step 1

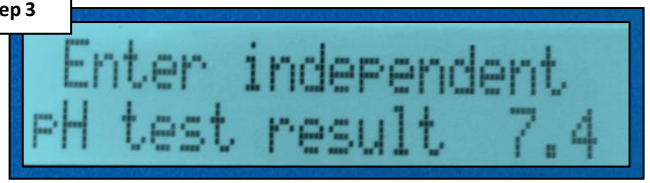
Press the 'Settings' button shown above. The 'Settings Menu' will appear.

Step 2



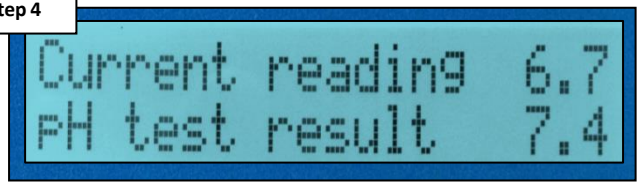
Press the right arrow three times & press the plus (+) button to enter pH calibration.

Step 3



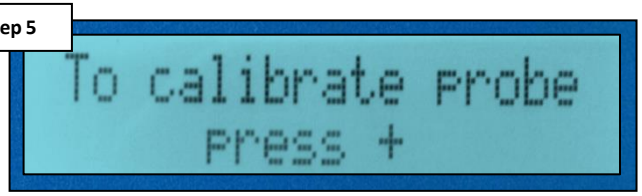
Use the plus (+) or minus (-) keys to increase or decrease the pH value.

Step 4



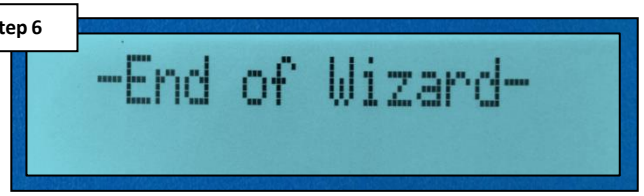
Press the right arrow key to show current reading and new results. Press the right arrow again.

Step 5



Press the plus (+) key to save the value, then proceed to step 6.

Step 6



Press the right arrow key twice to complete the calibration.

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