

# In Ground Salt Chlorination:

## Salt Chlorination: General Overview & Features



TTP-CHLOR206d

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# Product Overview

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# Product Overview: AquaRite900

## AQR940 & AQR925



**\*Includes extended life cell**

## Features:

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- 1.45 or .98lbs of chlorine in 24hrs (depending on model)
- Up to 40,000 gallons residential (AQR940)
- 120/240 direct wiring
- Diagnostics display for easy troubleshooting
- Robust metal enclosure
- Easy to use interface
- Multi-system hookup and Hayward Automation compatible

## Optional Accessories:

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- |               |                            |
|---------------|----------------------------|
| GLX-CELLSTAND | (cell cleaning stand)      |
| GLX-CELL-PIPE | (cell removal pipe)        |
| E-KIT         | (electrical kit (install)) |

# Product Overview: AquaRite

## AQR15, AQR9, & AQR3



## Features:

- 1.45, .98, or .53lbs of chlorine in 24hrs (depending on model)
- Up to 40,000 gallons residential (AQR940)
- 120/240 direct wiring
- Diagnostics display for easy troubleshooting
- Robust metal enclosure
- Easy to use interface
- Multi-system hookup and Hayward Automation compatible

## Optional Accessories:

- |               |                            |
|---------------|----------------------------|
| GLX-CELLSTAND | (cell cleaning stand)      |
| GLX-CELL-PIPE | (cell removal pipe)        |
| E-KIT         | (electrical kit (install)) |

# Product Overview: AquaRitePro

## AQR15-PRO, AQR9-PRO, & AQR3-PRO



## Features:

- 1.45, .98, & .53lbs of chlorine in 24hrs (depending on model)
- Up to 40,000 gallons residential (AQR15)
- Sense & Dispense ready
- 120/240 direct wiring
- Diagnostics display for easy troubleshooting
- Robust metal enclosure
- Multi-system hookup and Hayward Automation compatible

## Optional Accessories:

HL-CHEM (sensing Kit)  
AQL-CHEM4-ACID (acid dispense kit)

GLX-CELLSTAND (cell cleaning stand)  
GLX-CELL-PIPE (cell removal pipe)  
E-KIT (electrical kit (install))



# Product Overview: Saline C 6.0

## HCSC60



## Features:

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- 6lbs of chlorine in 24hrs (depending on salt level)
- Up to 125,000 gallons residential
- Constant chlorination based on power percentage (rather than time based)
- 120 plug-in power cable
- Robust metal enclosure
- One button interface
- Built in external control circuit

# Product Overview: Salt Chlorination Accessories

## All Chlorinators

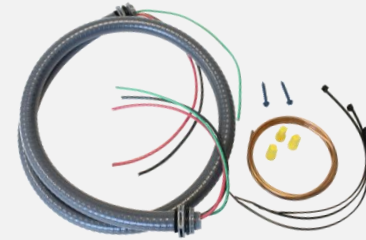


GLXSALTSOLN2PK



GLX-SALTMETER

AQR, AQR (900 series),  
& AQR-PRO ONLY



E-KIT



GLX-CELLSTAND



GLX-CELL-PIPE

# Product Overview: Salt Chlorination Cells

## For AquaRite940 & AquaRite925

### **TCELL940**

- Rated for 40,000 gallons (for residential applications).
- Capable of producing 1.48 lbs of chlorine (24 hours).
- 4 year parts warranty.



### **T-CELL925:**

- Rated for 25,000 gallons (for residential applications).
- Capable of producing .98 lbs of chlorine (24 hours).
- 4 year parts warranty.





# Product Overview: Salt Chlorination Cells

## For AquaRite & AquaRite Pro

### T-CELL-15:

- Rated for 40,000 gallons (for residential applications).
- Capable of producing 1.48 lbs of chlorine (24 hours).
- 3 year parts warranty.



### T-CELL-9:

- Rated for 25,000 gallons (for residential applications).
- Capable of producing .98 lbs of chlorine (24 hours).
- 3 year parts warranty.



### T-CELL-3:

- Rated for 15,000 gallons (for residential applications).
- Capable of producing .53 lbs of chlorine (24 hours).
- 3 year parts warranty.



# Product Overview: Commercial Applications

- Number of chlorinators required is determined by state codes, there is no “rule of thumb”. Consult state and local health guidelines before determining how many units are required.
- Each chlorine generator unit will require its own power supply, turbo cell and flow switch.
- Cells should be plumbed in parallel to avoid inaccurate readings from subsequent cells.
- For large residential and commercial applications check out the Saline C 6.0; it not only produces up to 4 times a T-CELL-15 but the unit also supports with higher flow rates (up to 125GPM).



# Product Overview: System Start-up Checklist

- ❑ Start with a clean and balanced pool.
- ❑ Test Salt and Stabilizer for correct levels.
- ❑ Existing pools:
  - Add metal remover.
  - If biguanide – follow manufacturers recommendations to remove from the water.
- ❑ Initial factory default – salt display is 2800ppm.
  - Run pump for 24 hours.
  - Allow system to acclimate.
- ❑ Initial chlorine generator settings:
  - Desired Output: 50%
  - Mode Switch in Auto
- ❑ Test Chlorine levels every 2-3 days and adjust accordingly.

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# Chemistry Requirements

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# Chemistry Requirements: Balance Table

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

**\*Typical commercial requirements.**

# Chemistry Requirements: Salt Requirements

## Type of Salt to Use:

- It is important to use only sodium chloride (NaCl) salt that is greater than 99% pure.
- This is common food quality or water softener salt and is usually available in 40-80 lb. bags labeled "Coarse Solar Salt".
- It is also acceptable to use water conditioning salt pellets, however, it will take longer for them to dissolve.
- Potassium Chloride (KCL) – use 17% more than NaCl

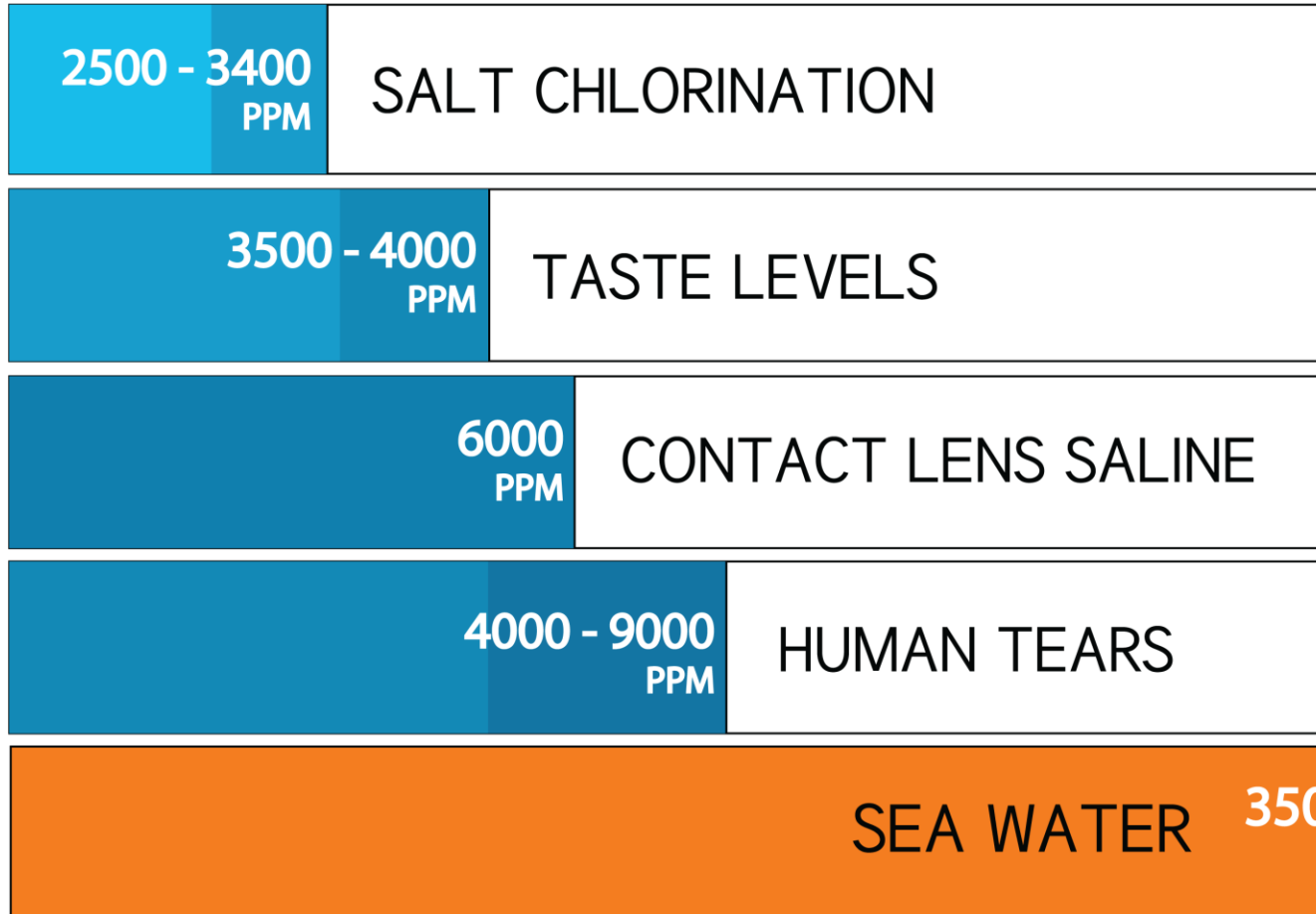
**NOTE: DO NOT use rock salt (takes too long to dissolve and may not be 99% pure), salt with yellow prussiate of soda, salt with anti-caking additives, or iodized salt (can cause staining).**



# Chemistry Requirements: Salt Addition Table

Gallons	Current Salt Level																		
	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600
<b>2,000</b>	53	50	46	43	40	36	33	30	27	23	20	17	13	10	7	3	Ideal	Ok	Dilute
<b>4,000</b>	106	99	93	86	80	73	66	60	53	46	40	33	27	20	13	7	Ideal	Ok	Dilute
<b>6,000</b>	159	149	139	129	119	109	99	89	80	70	60	50	40	30	20	10	Ideal	Ok	Dilute
<b>8,000</b>	213	200	186	173	160	146	133	120	107	93	80	67	53	40	27	13	Ideal	Ok	Dilute
<b>10,000</b>	267	250	234	217	200	184	167	150	134	117	100	83	67	50	33	17	Ideal	Ok	Dilute
<b>12,000</b>	320	300	280	260	240	220	200	180	160	140	120	100	80	60	40	20	Ideal	Ok	Dilute
<b>14,000</b>	373	350	326	303	280	256	233	210	187	163	140	117	93	70	47	23	Ideal	Ok	Dilute
<b>16,000</b>	427	400	374	347	320	294	267	240	214	187	160	133	107	80	53	27	Ideal	Ok	Dilute
<b>18,000</b>	480	450	420	390	360	330	300	270	240	210	180	150	120	90	60	30	Ideal	Ok	Dilute
<b>20,000</b>	533	500	466	433	400	366	333	300	267	233	200	167	133	100	67	33	Ideal	Ok	Dilute
<b>22,000</b>	587	550	514	477	440	404	367	330	294	257	220	183	147	110	73	37	Ideal	Ok	Dilute
<b>24,000</b>	640	600	560	520	480	440	400	360	320	280	240	200	160	120	80	40	Ideal	Ok	Dilute
<b>26,000</b>	693	650	606	563	520	476	433	390	347	303	260	217	173	130	87	43	Ideal	Ok	Dilute
<b>28,000</b>	747	700	654	607	560	514	467	420	374	327	280	233	187	140	93	47	Ideal	Ok	Dilute
<b>30,000</b>	800	750	700	650	600	550	500	450	400	350	300	250	200	150	100	50	Ideal	Ok	Dilute
<b>32,000</b>	853	800	746	693	640	586	533	480	427	373	320	267	213	160	107	53	Ideal	Ok	Dilute
<b>34,000</b>	907	850	794	737	680	624	567	510	454	397	340	283	227	170	113	57	Ideal	Ok	Dilute
<b>36,000</b>	960	900	840	780	720	660	600	540	480	420	360	300	240	180	120	60	Ideal	Ok	Dilute
<b>38,000</b>	1013	950	886	823	760	696	633	570	507	443	380	317	253	190	127	63	Ideal	Ok	Dilute
<b>40,000</b>	1067	1000	934	867	800	734	667	600	534	467	400	333	267	200	133	67	Ideal	Ok	Dilute

# Chemistry Requirements: Salt Concentrations



# Chemistry Requirements: Cyanuric Acid Addition Table

Current Stabilizer Level	Pounds of Stabilizer (Cyanuric Acid Needed for 40 ppm)								
	8,000	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000
0 ppm	2.7	3.4	4.0	4.7	5.4	6.0	6.7	7.4	8.0
10 ppm	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
20 ppm	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.3
30 ppm	0.7	0.8	1.0	1.2	1.4	1.5	1.7	1.8	2.0
40 ppm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Current Stabilizer Level	Pounds of Stabilizer (Cyanuric Acid Needed for 40 ppm)							
	26,000	28,000	30,000	32,000	34,000	36,000	38,000	40,000
0 ppm	8.7	9.4	10.0	10.8	11.4	12.0	12.7	13.4
10 ppm	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
20 ppm	4.3	4.6	4.9	5.4	5.7	6.0	6.3	6.6
30 ppm	2.2	2.4	2.6	2.8	2.9	3.0	3.2	3.4
40 ppm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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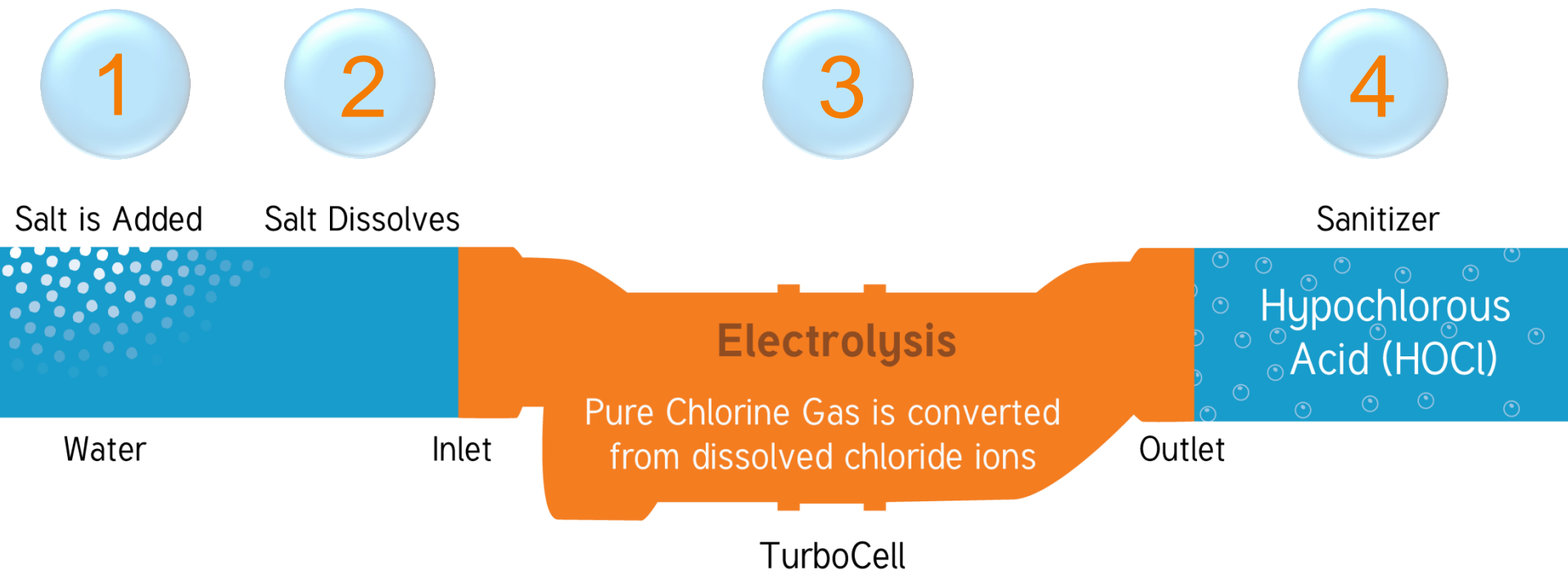
# Electrolytic Process

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# Electrolytic Process: Reaction Overview

## Converting 99% pure salt into HOCl:

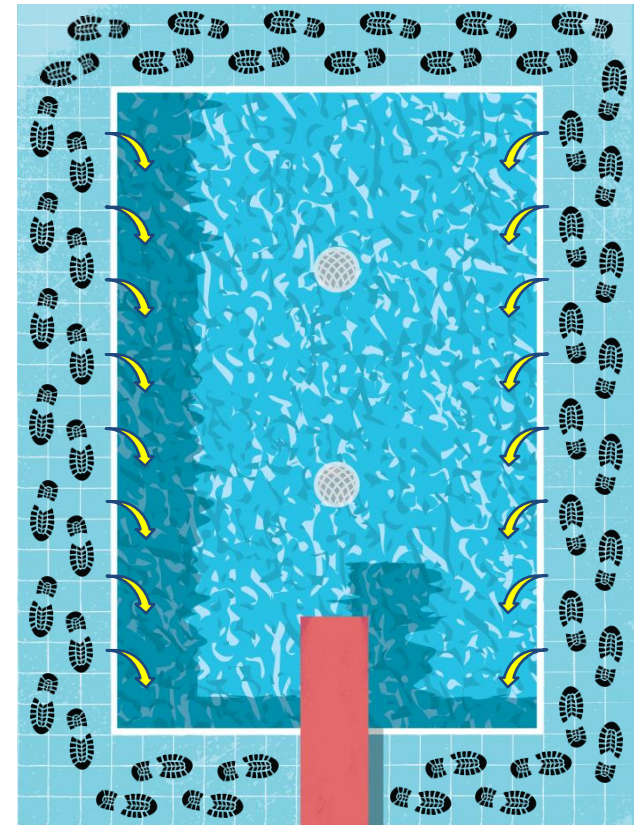


# Electrolytic Process: The Addition of Salt

1

99% pure NaCl (Sodium Chloride or Salt) is added to the pool.

NOTE: Salt should be distributed around the perimeter of the pool. DO NOT ADD SALT DIRECTLY TO THE SKIMMER!



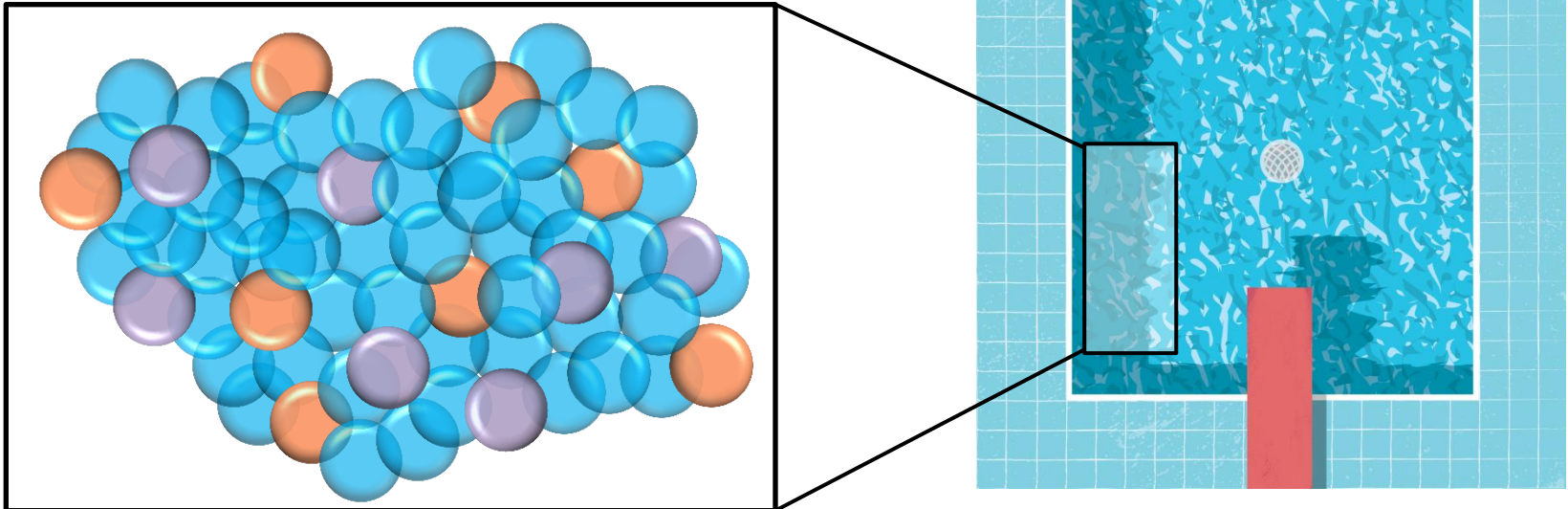


# Electrolytic Process: What Happens with Salt Dissolves

2

When introduced to H<sub>2</sub>O, the Na<sup>+</sup> and Cl<sup>-</sup> ions separate (this is the process of salt dissolving in water):

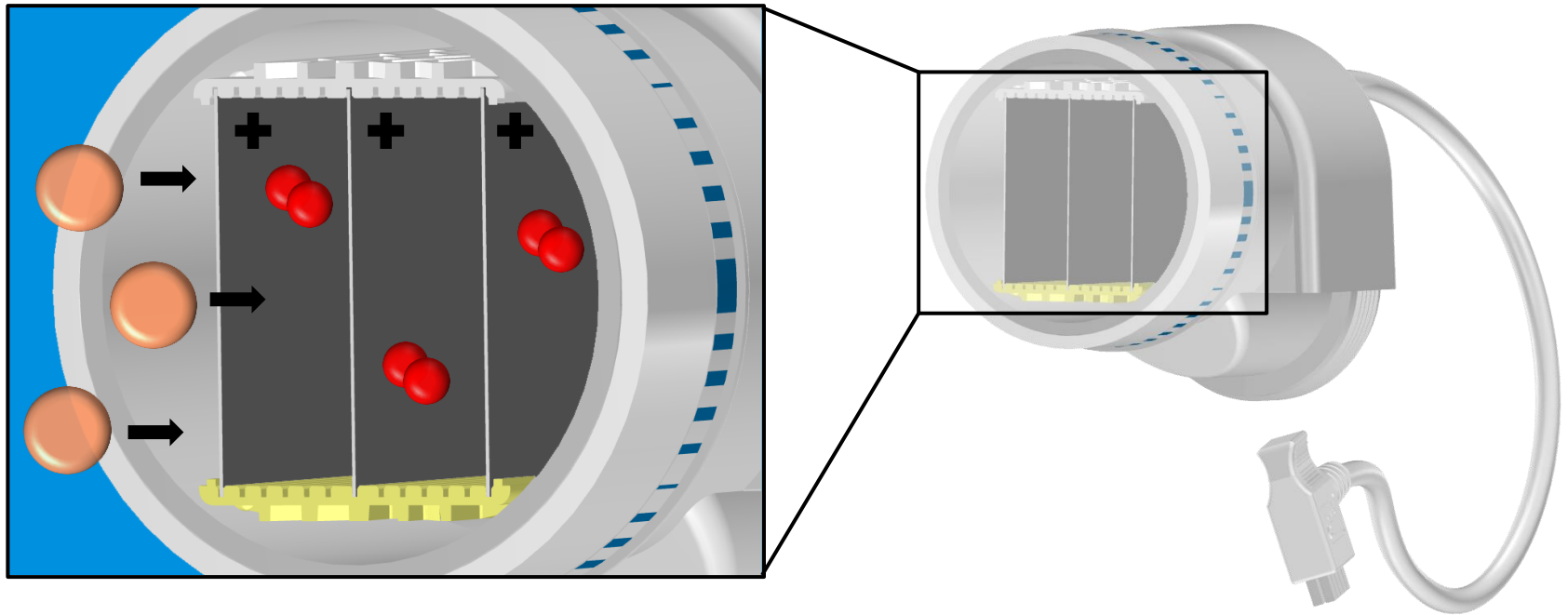
NOTE: Brushing salt particles around accelerates the dissolving process. Salt available in smaller granule sizes will also dissolve at a faster rate.



# Electrolytic Process: Anode Reaction

3

Chloride ions are oxidized on the Anode side (+) resulting in pure Chlorine gas ( $\text{Cl}_2$ ) being released from the cell plate:

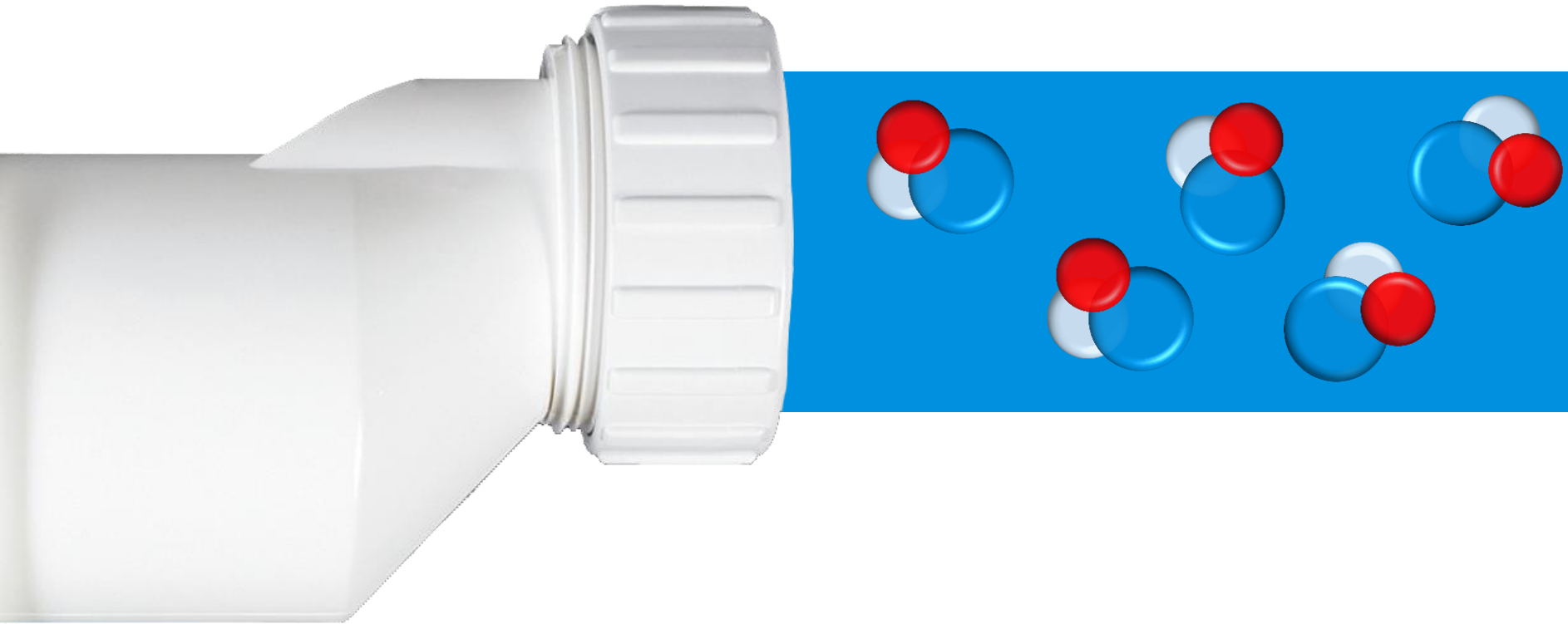


NOTE: Cell plates have been removed for demonstration purposes.

# Electrolytic Process: A Sanitizer is Born

4

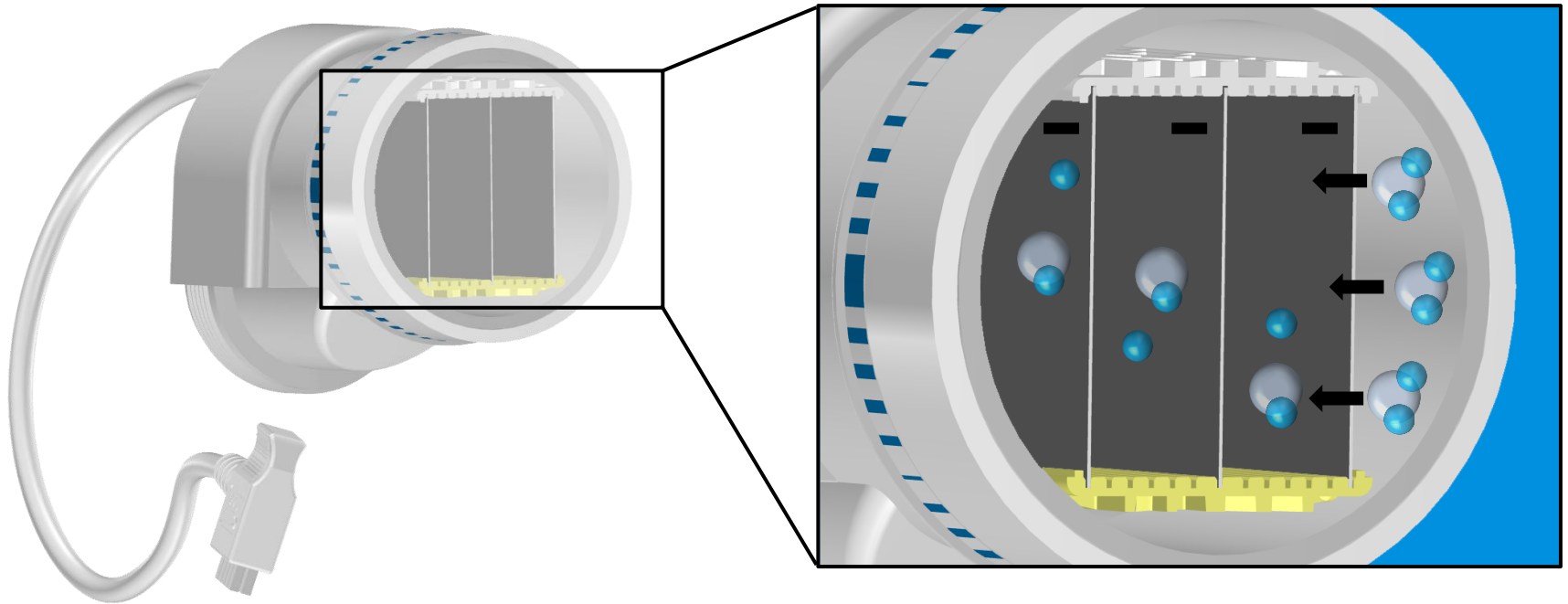
The chlorine gas quickly dissolves in the water to produce Hypochlorous acid.



# Electrolytic Process: Cathode Reaction

5

On the Cathode (-) side Hydrogen and Hydroxide are converted from water. (Hydroxides are highly basic which means pH is high on the negative side so scaling is much more prevalent here).

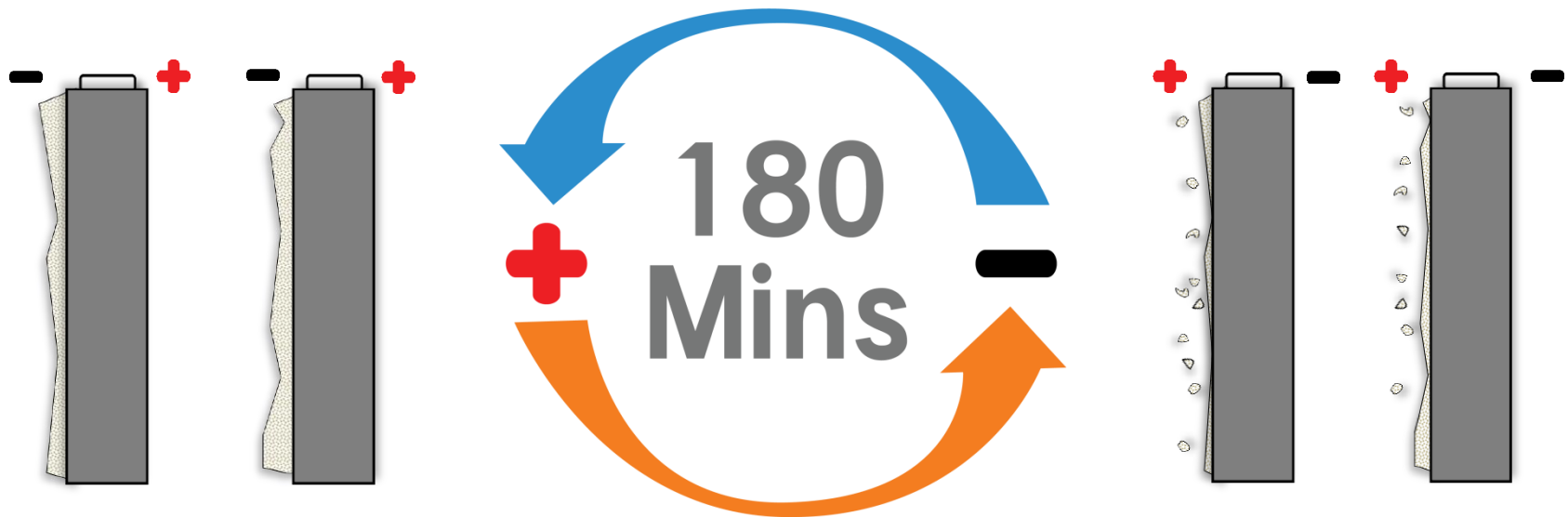


NOTE: Cell plates have been removed for demonstration purposes.

# Electrolytic Process: Reverse Polarity

5b

After 180 minutes, the cell plates will reverse polarity, this prevents scale from forming on one half of the cell AND promotes a self cleaning cycle:



(+) = Anode, (-) = Cathode

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# Installation

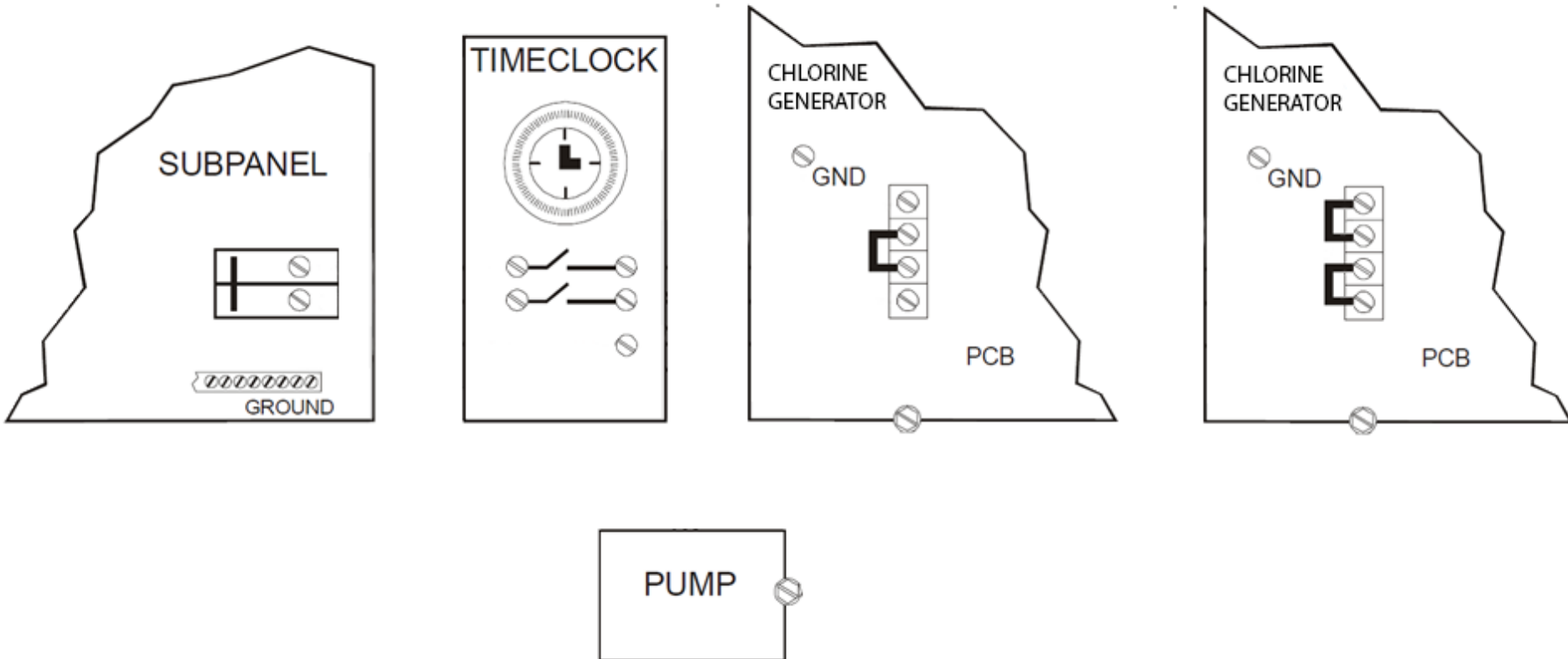
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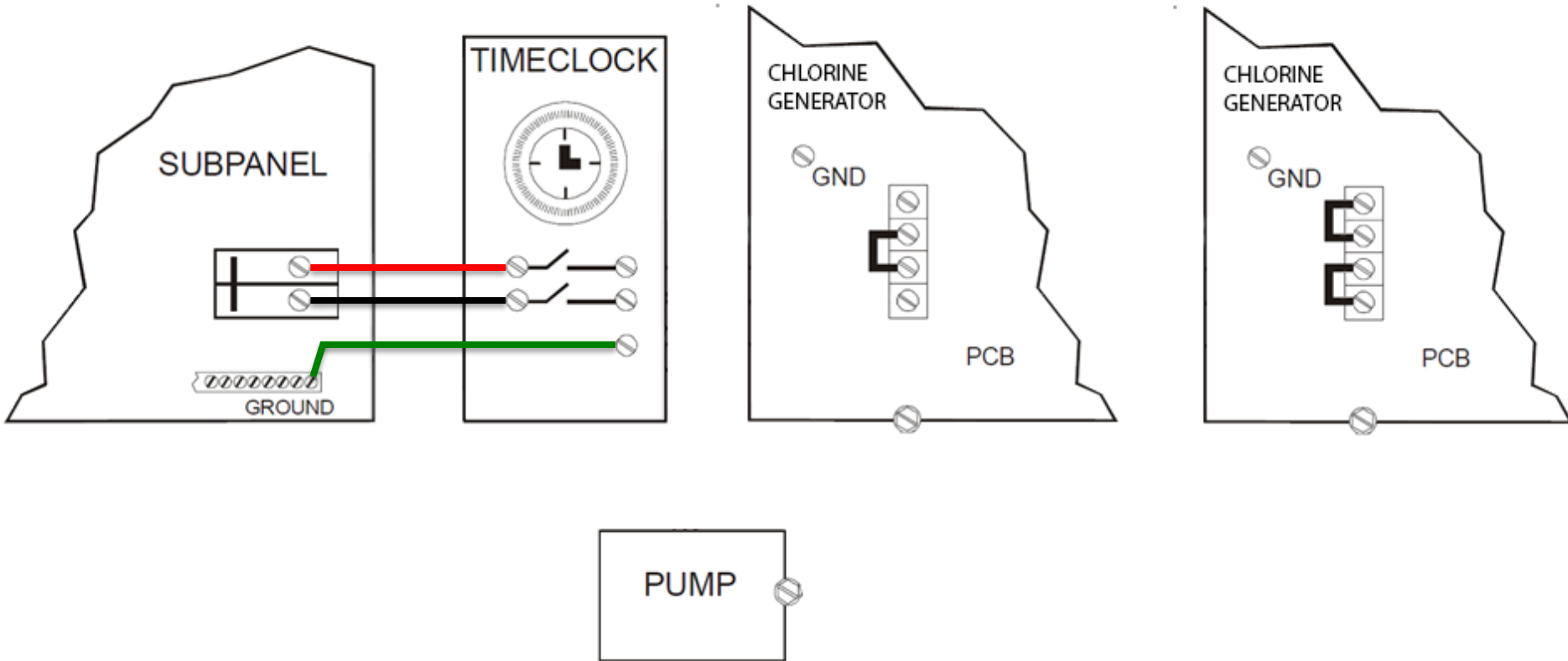
# Installation: AQR & AQR900 Series Part I

## AQR and AQR900 Series: TYPICAL 240 VAC WIRING



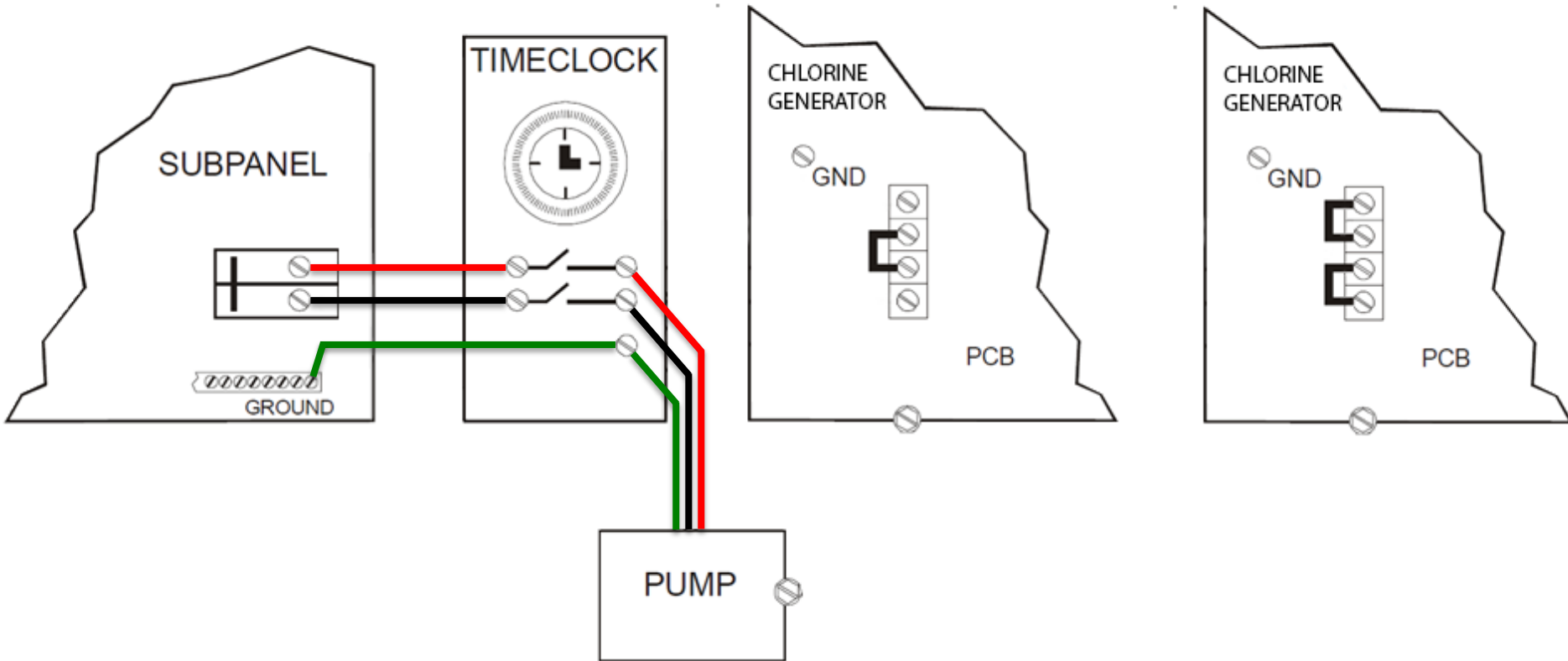
# Installation: AQR & AQR900 Series Part II

## AQR and AQR900 Series: TYPICAL 240 VAC WIRING



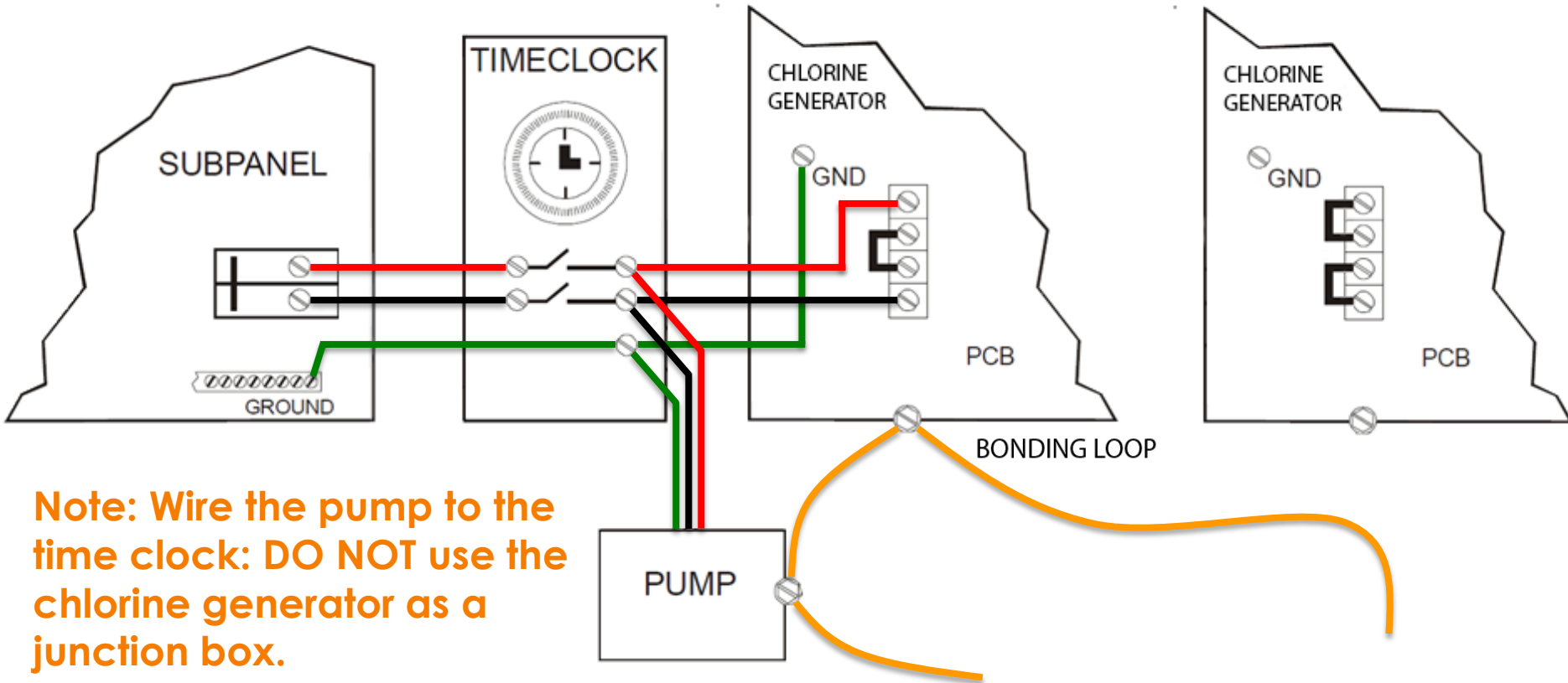
# Installation: AQR & AQR900 Series Part III

## AQR and AQR900 Series: TYPICAL 240 VAC WIRING



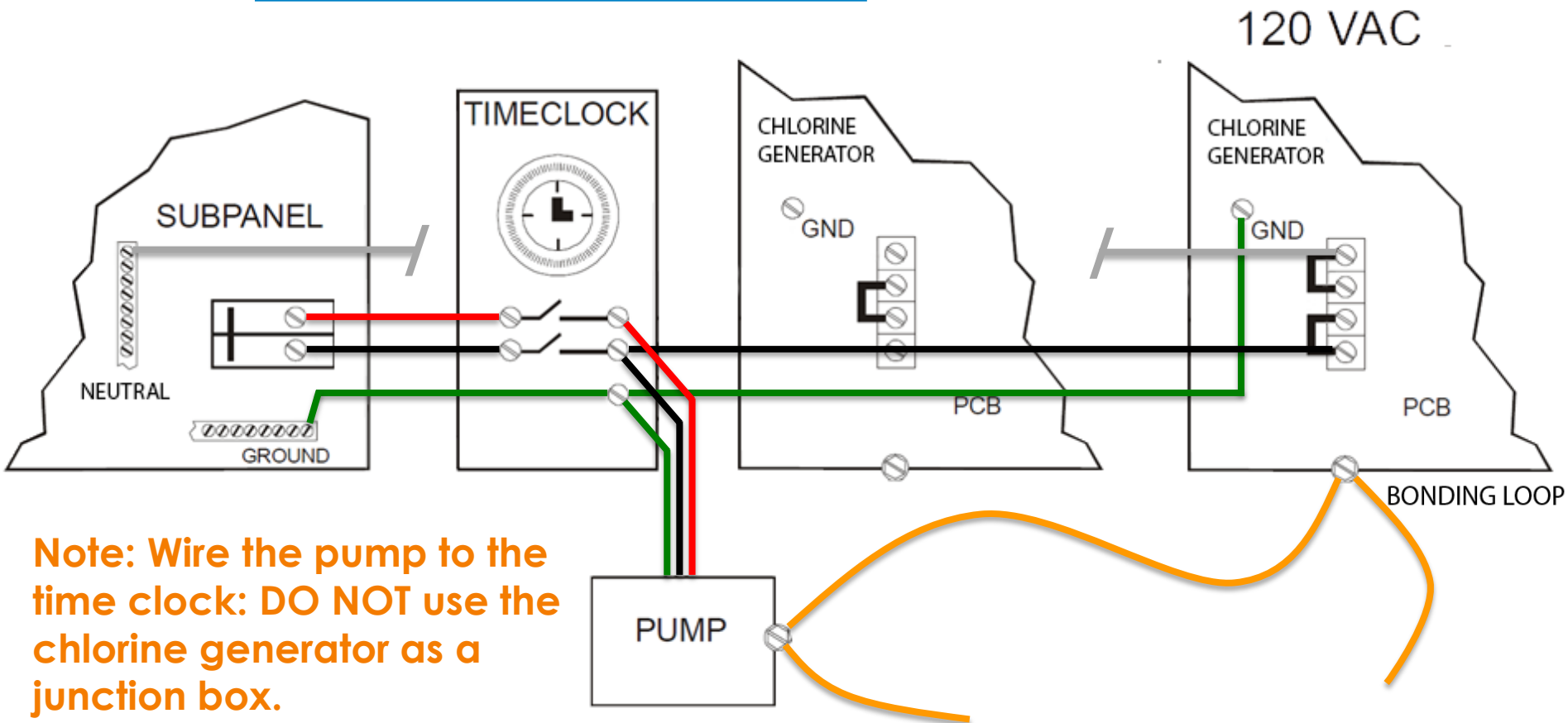
# Installation: AQR & AQR900 Series Part IV

## AQR and AQR900 Series: TYPICAL 240 VAC WIRING



# Installation: AQR & AQR900 Series Part V

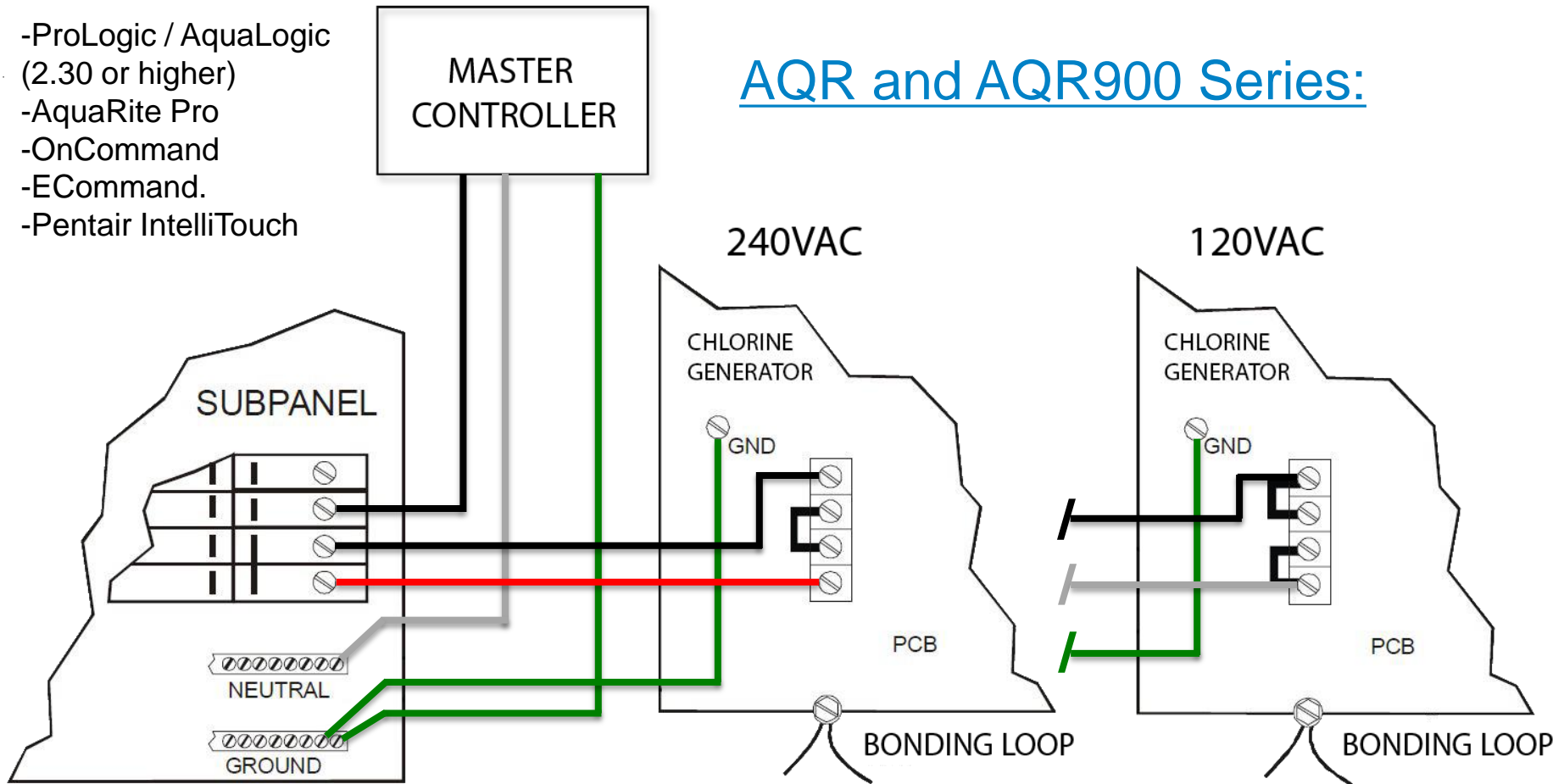
## AQR and AQR900 Series:



# Installation: AQR & AQR900 Series Part VI

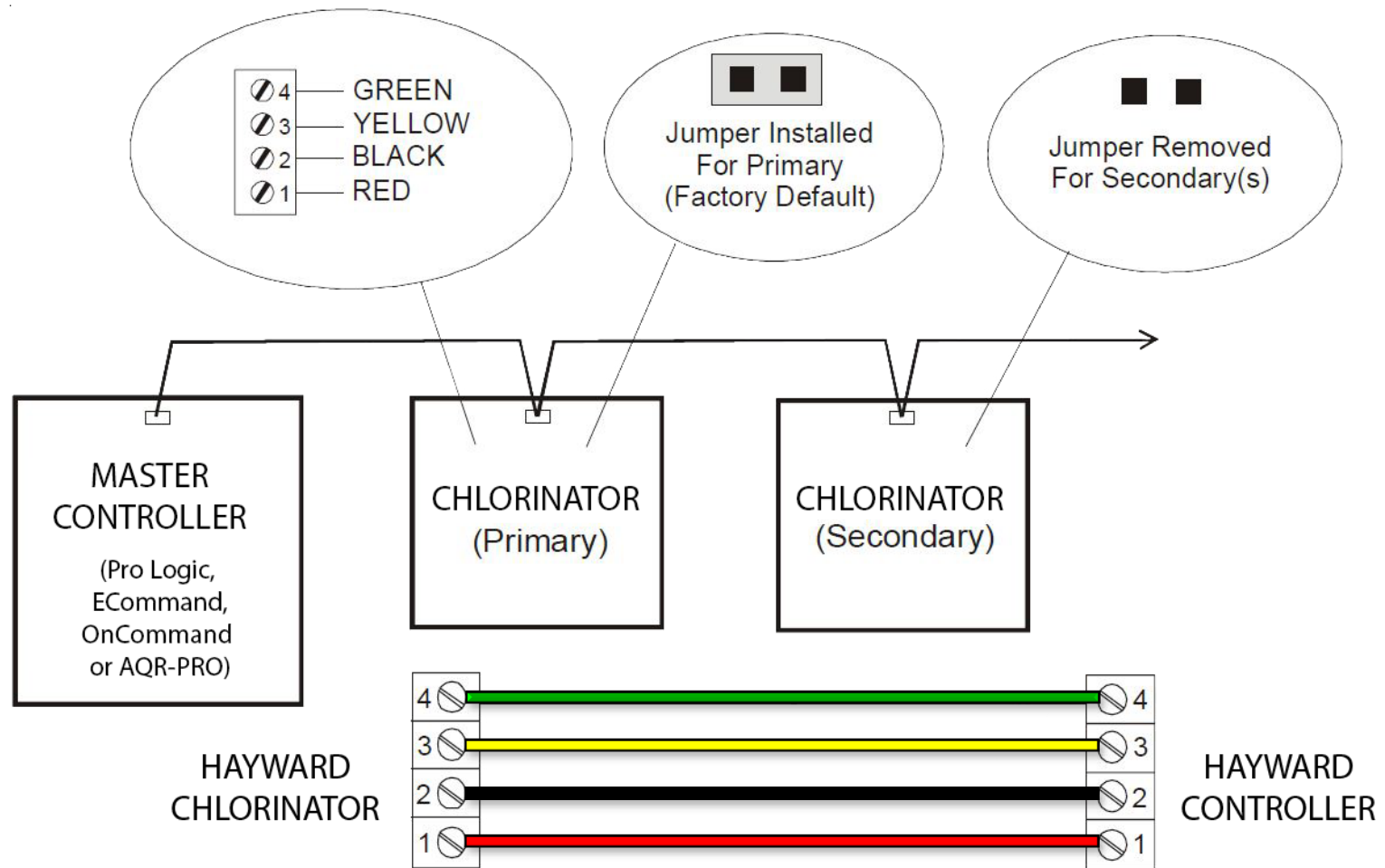
- ProLogic / AquaLogic (2.30 or higher)
- AquaRite Pro
- OnCommand
- ECommand.
- Pentair IntelliTouch

## AQR and AQR900 Series:





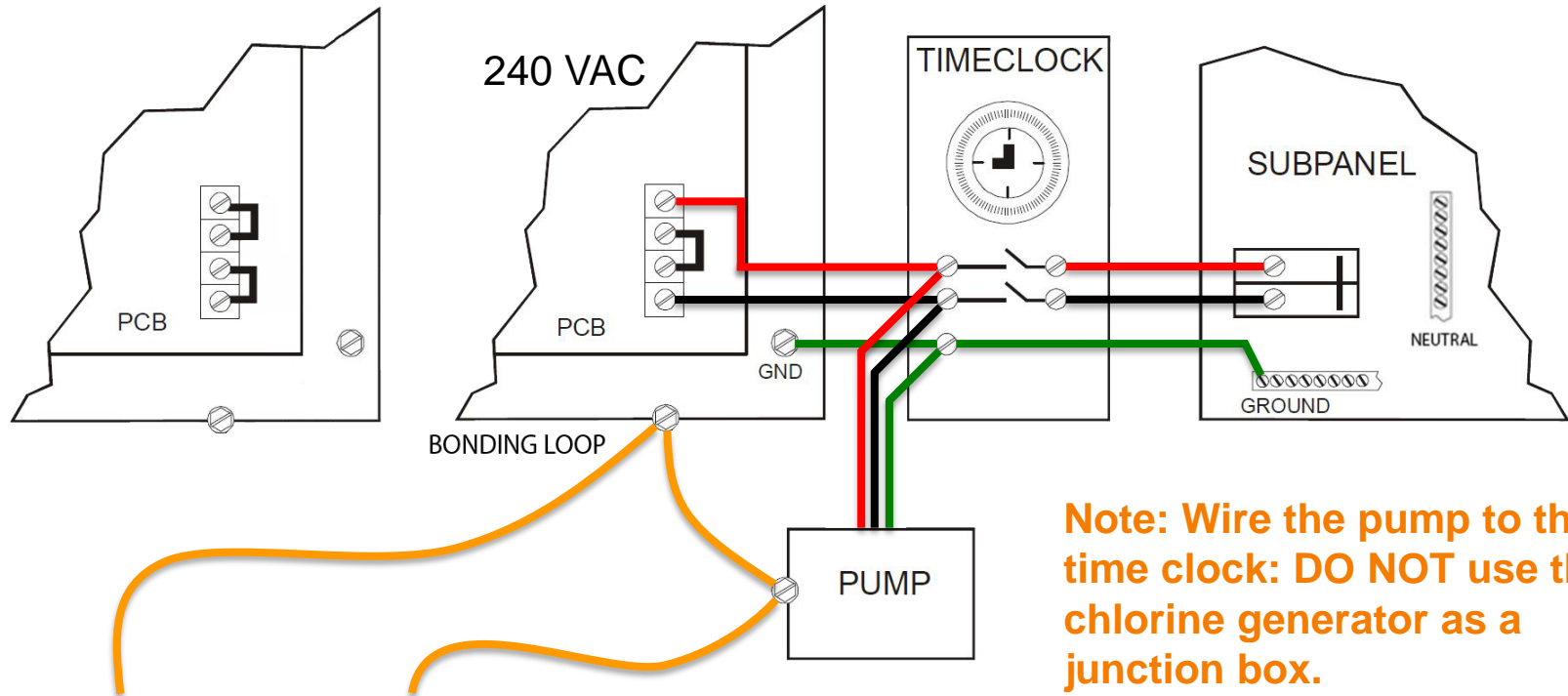
# Installation: External Control



# Installation: AquaRite Pro Part I

## AQR-PRO

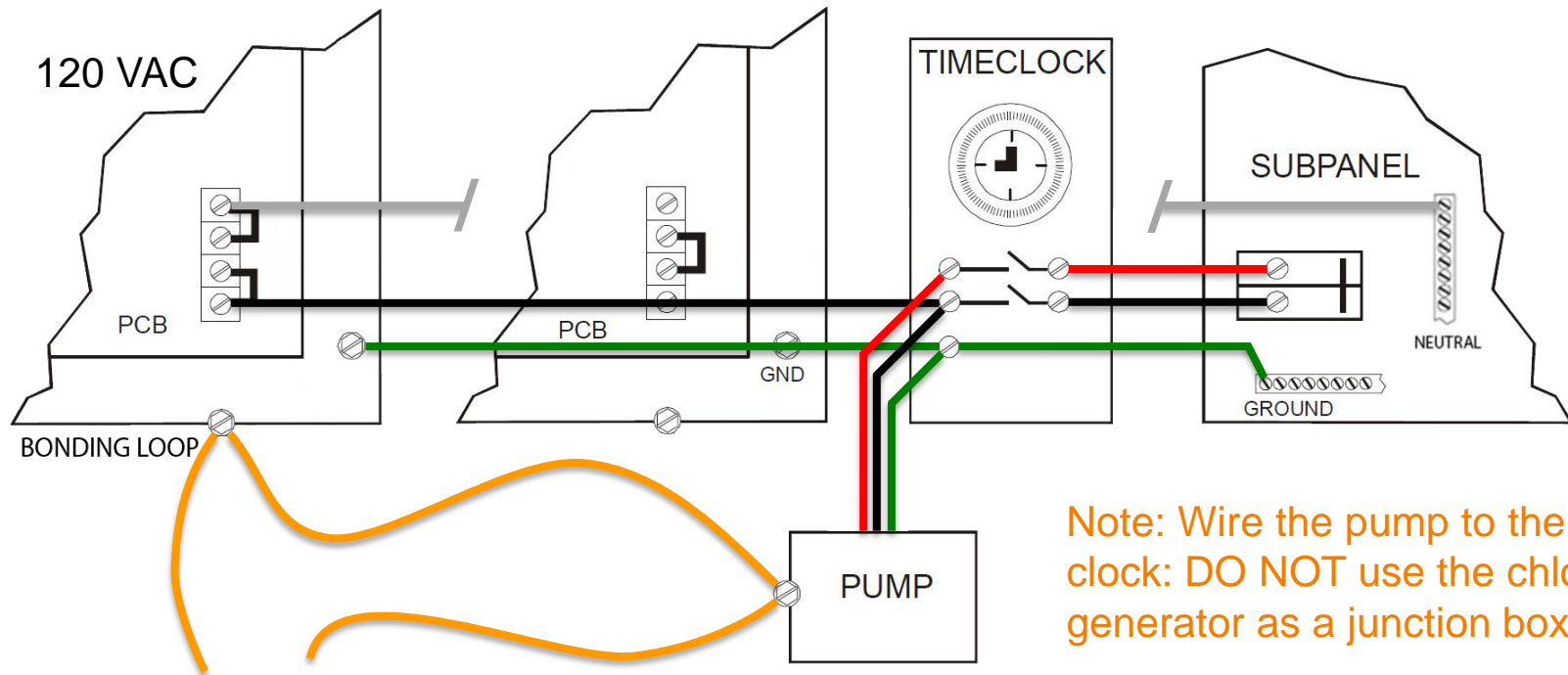
- As in the Aqua Rite the Aqua Rite Pro should be wired to the load side of the filter timer.



# Installation: AquaRite Pro Part II

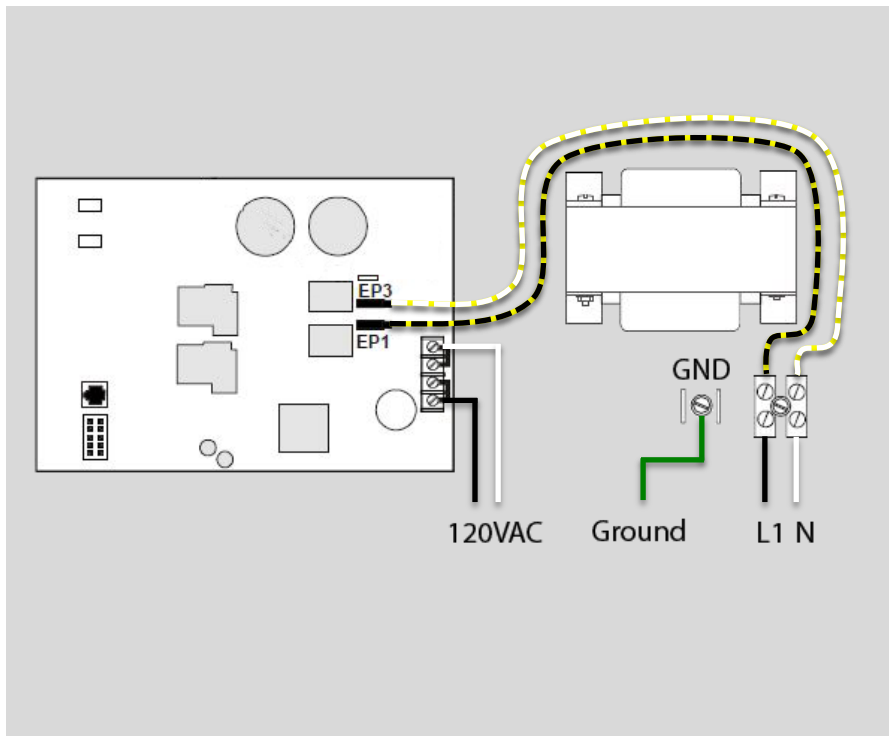
## AQR-PRO

- As in the Aqua Rite the Aqua Rite Pro should be wired to the load side of the filter timer.



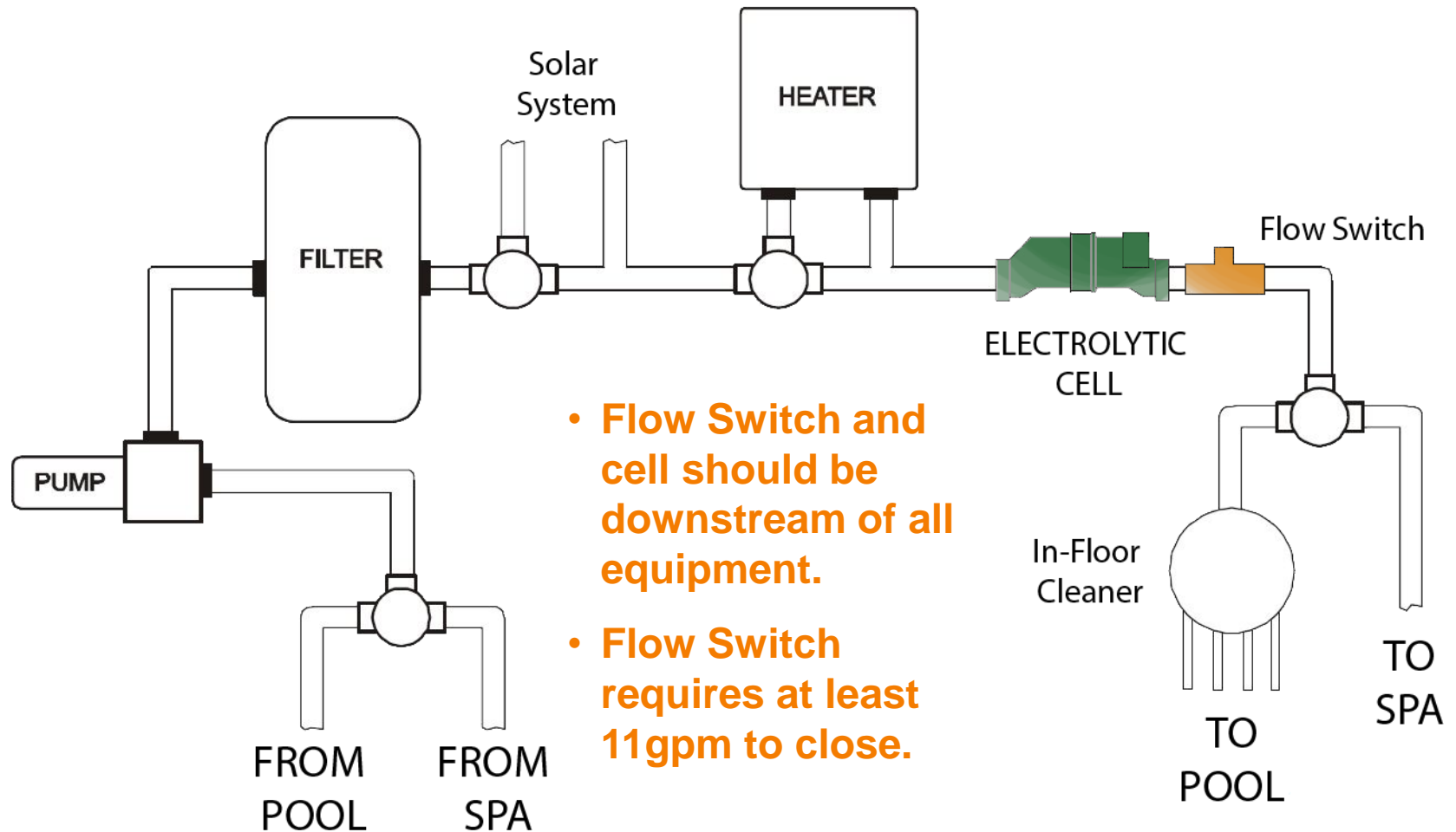
# Installation: AquaRite Pro Part III

## AQR-PRO

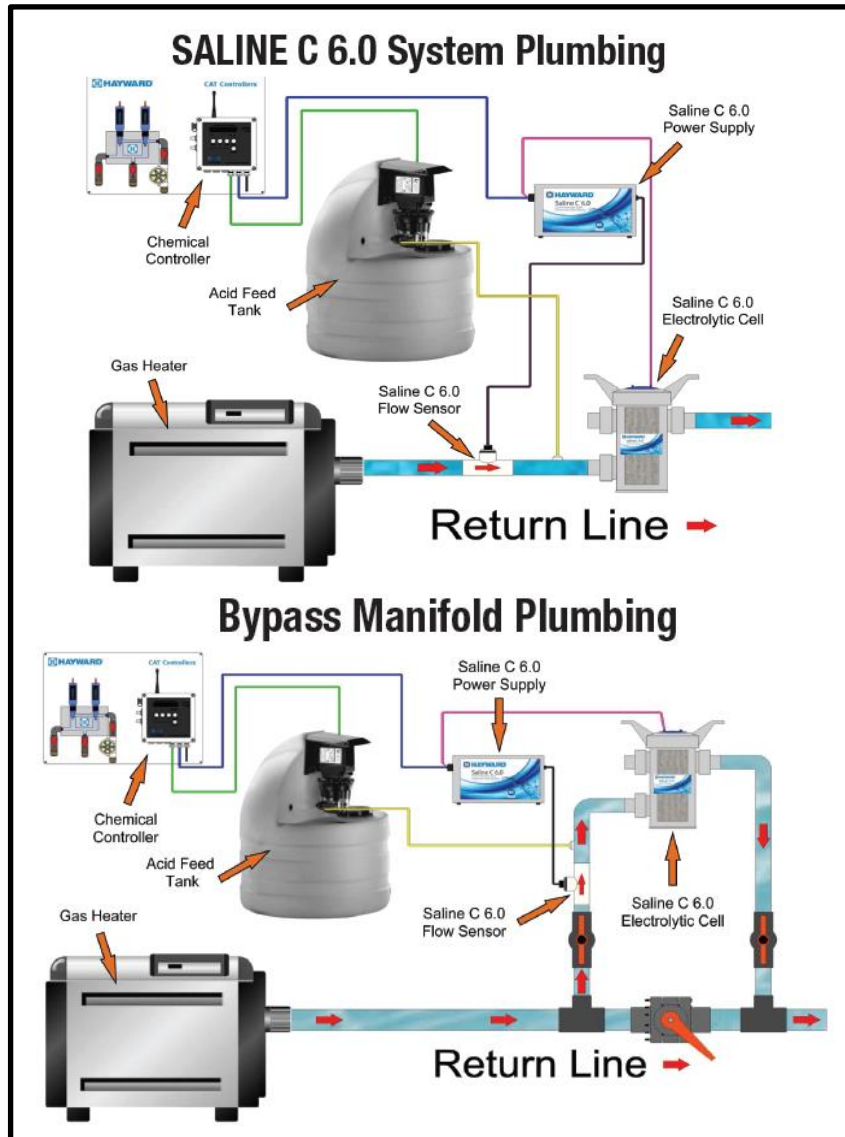


- When installing the AQL-CHEM4-ACID, it is important to wire the AquaRite Pro for 120VAC ONLY. Start by shutting down power to the salt chlorinator (via the breaker).
- The Dispense circuit plugs on the board should be changed to EP1 and pH N (EP3); this is the correct configuration for 120V applications.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

# Installation: Cell and Flow Switch Requirements



# Installation: Saline C 6.0



## Plumbing The System

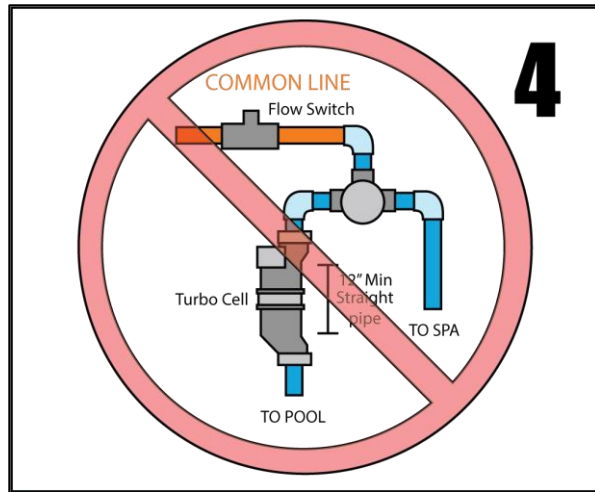
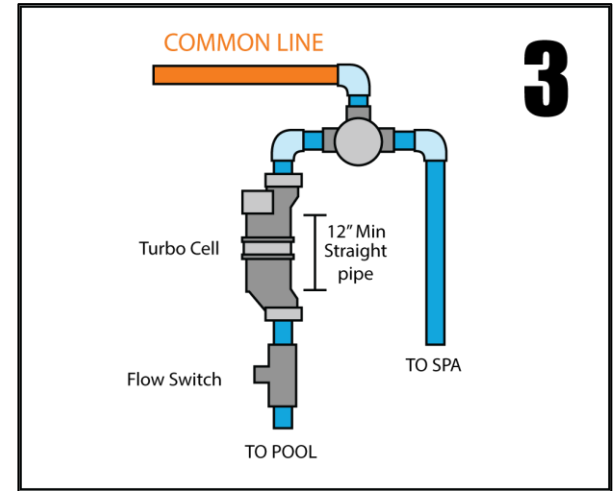
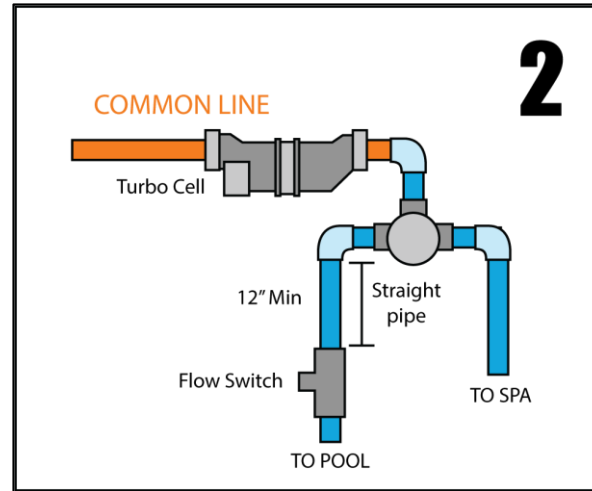
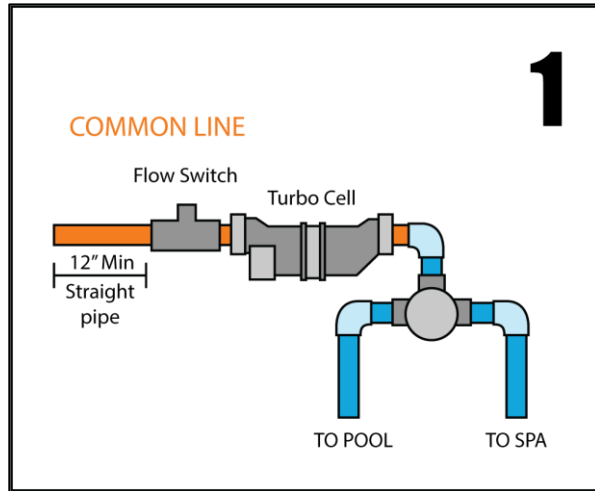
- Saline C 6.0 systems require a minimum of 40 gpm of flow through the electrolytic cell housing to achieve the rated production of chlorine.
- The system can be plumbed with the full flow of the circulation system flowing through the cell housing or a bypass can be created to achieve 40 gpm of flow through the cell housing.
- In either case the cell housing must be installed as the last component in the return to the pool, after all other equipment.
- The vessel has 4 mounting holes for attaching to a floor or mounting surface. See the plumbing diagrams (left).

# Installation: All Systems (Plumbing Requirements)

- Stainless Steel pool filters – **not recommended**
- Copper plumbing – pool chemistry is critical
- Heaters
  - Older designs had some issues with dissimilar metals
  - Newer models have no problem
- Anchors
  - Aluminum not recommended
  - Bronze or plastic are acceptable
- Pool finishes are acceptable
- Automatic pool covers or white covers
  - Periodically open cover to let gases out
  - Chlorine demand will go down



# Installation: Plumbing



Note: Example #4 can damage the cell, damage other pool equipment, cause inaccurate readings or can cause chlorine gas to build in the plumbing.  
**NEVER USE CONFIGURATION #4.**

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# Operation

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# Operation: AquaRite and AquaRite 900



# AQR Operation: Toggle Switch



## Off:

- Only the Power LED will be illuminated
- No chlorine is being generated



## Auto:

- Power and Generating LED should illuminate
- Chlorine will be generated
- Unit will reverse polarity every 3 hours of each cycle



## Super Chlorinate:

- Unit will run at 100% for 24 constant filtration hours.
- If pump or unit turns off Super Chlorinate will be forgotten.

# AQR Operation: Desired Output

## Desired Output Dial:

- The unit will make chlorine based on a percentage of time not on a percentage of power.

## Range (5%-100%):

- The unit can be set from 5% (lowest) to 100% (highest).

## 50%:

- Assuming the pump is reading for at least 3 hours, the unit will run for the first 90 minutes of the 180 cycle and turn chlorination off for 90 minutes.



# AQR Operation: Run Time %

If the dial is set to 50%:

**8:00AM**

- Pump Starts
- **ON** for 90 minutes.

**9:30AM**

- **OFF** for 90 minutes,

**11:00AM**

- **Polarity reverses**
- **ON** for 90 minutes.

**12:30PM**

- **OFF** for 90 minutes.

**2:00PM**

- **Polarity reverses**
- **ON** for 90 minutes.

**3:30PM**

- **OFF** for 90 minutes.

**5:00PM**

- **Polarity reverses.**
- **ON** for 90 minutes.

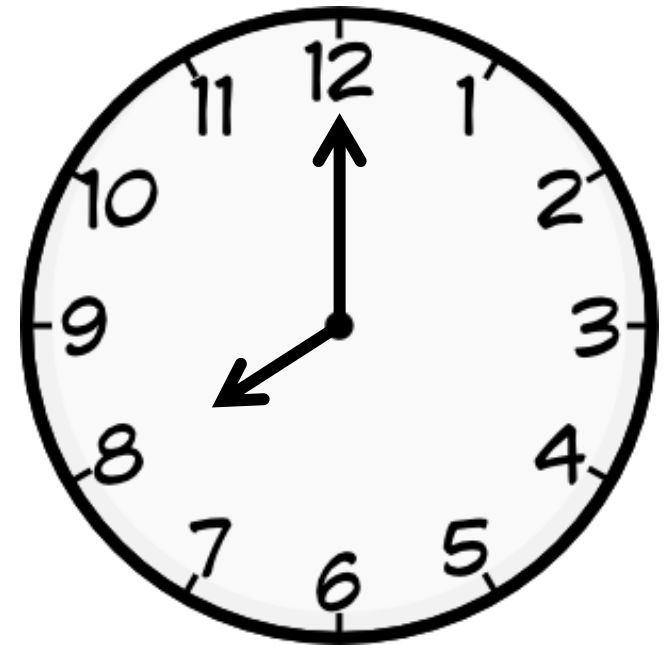
**6:30PM**

- **OFF** for 90 minutes.

**8:00PM**

- Pump Shuts Down

Pump Run Time:  
8am-8pm



# AQR Operation: Status LEDs

## Green LEDs:

- Green LEDs indicate chlorine generator's status
- Power, Generating, Super Chlorinate and Remotely Controlled.
- Generating LED indicates whether or not conditions are acceptable for chlorine production not whether the unit is making chlorine.

## Red and Amber LEDs:

- No Flow, Check Salt, High Salt and Inspect Cell.
- The inspect cell light is the only of the four that is amber instead of red.





# AQR Operation: Diagnostic Readings

## Display Readings

Average Salt Level (default)

1. Water Temperature (within cell)
2. Cell Voltage (22-32 VDC)
3. Cell Amperage (how well the cell IS or IS NOT working)
4. Desired Output % (% of cell time ON)
5. Instant Salt (what system is calculating for salt during chlorination cycle)
6. Program Code (AL 0-5 = product branding)
7. Main Circuit Board Revision (r 1.58)
8. Cell Size (t -15, t - 9, t - 5 or t - 3)

Cell size displayed, must match installed cell to ensure proper operations (including salt calculation)

	<b>3200</b>
<b>1.</b>	<b>73</b>
<b>2.</b>	<b>23.5</b>
<b>3.</b>	<b>5.20</b>
<b>4.</b>	<b>51P</b>
<b>5.</b>	<b>-2700</b>
<b>6.</b>	<b>AL-0</b>
<b>7.</b>	<b>r- 1.58</b>
<b>8.</b>	<b>t - 15</b>

# AQR Operation: Diagnostics – No Flow

- The No Flow LED will flash for up to 60 seconds when the pump first turns on. During this time the system is checking for consistent flow before the unit can make chlorine. Once confirmed the 'No Flow' LED should turn off.



- Solid No Flow LED indicates a problem with either the flow in the plumbing or the flow switch itself.
  - *When the No Flow LED is illuminated it indicates that chlorine production has been suspended.*

# AQR Operation: Diagnostics – Check Salt & Inspect Cell

- These LEDs will flash when the unit is identifying that the salt level is between 2400-2600ppm.
- The unit will continue to produce chlorine when these LEDs are flashing.
- These LEDs will be solid when the unit is identifying that the salt level is lower than 2400ppm.
  - *During this condition the unit will suspend all chlorine production until the average salt level is increased above 2300ppm.*



# AQR Operation: Diagnostics – High Salt LED

- This LED will illuminate when the amperage exceeds the level the unit identifies as acceptable.
- High Salt LED appears solid when the unit measures an amperage above the cell's threshold.
- When this LED is illuminated the unit will suspend chlorination to protect the system from high amperage draw through the circuit.
  - *The High Salt LED is not based on a specific salt reading. Check temperature, voltage and salt level.*



# AQR Operation: Diagnostics – Inspect Cell LED (alone)

- If the flashing Inspect Cell LED is not accompanied by the Check Salt LED then the system is reported that it is time to inspect the cell based on a 500hr timer.



- After the cell is inspected and cleaned (if necessary) hold down the diagnostics button for five seconds to clear the flashing LED.
  - *The Inspect Cell timer can only be cleared when the LED is flashing.*

# AQR Pro: Operation





# AQR Pro Operation: Keypad

- The core functionality between the AQR & AQR-PRO is the same. The programming and button selections are the only major differences:



Power (Chlorination)



Super Chlorinate (up to 96 hrs.)



Info (readings & diagnostics)



Settings and Configuration



# Saline C 6.0: Operation



# Saline C 6.0 Operation: LCD and Output Selector

- Chlorine output is a percentage of power not time:
  - Output Selector (up to raise, down to lower).

## System Operation

Saline C 6.0 systems operate when the main power supply cord is plugged in and the system has an input on the control connections from the flow switch and from a chemical feed controller. The Saline C 6.0 will continue to operate as long as there are inputs from those two sources.

Output is adjustable from 0 to 100% of the systems rating and is displayed as % output on the LCD display. To adjust the output, hold the output selector switch in the up position to increase output or in the down position to decrease output.

NOTE: Any time an output change is made with output selector switch, the Saline C 6.0 will record this change in its memory. In order for this to happen, the unit will wait 2 minutes from the time the change is made and shut down for 1 minute while it records the change. Output will resume after the 1 minute period.

## Low Salt Alarm

In the event that salt falls to a level too low for system operation, the system will stop generating chlorine and the LCD display will flash "LO SALT". To reset, correct the salt concentration and hold the output selector in the down position. When the fault is cleared, reset the output to the desired level.



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# Maintenance

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# TurboCell Operation: Inspecting the Cell

**1. Turn off the main power source at the breaker.** Remember to turn power back on when the process is complete.



**2. Unplug the turbo cell from the control box (optional):** The cell cable does not detach further from the cell.



**3. Remove Cell from the plumbing by loosening both unions:** Both unions will loosen in opposing directions.



**4. Inspect cell for calcium deposits:** Calcium forms as a white, chalky buildup inside the cells elements.



# TurboCell Operation: Cell Cleaning

**5. Remove any calcium that has formed:** First, spray out any loosely bound calcium using a garden hose and a nozzle.

**Note: Do not use a power washer to clean out the cell.**

Once the cell has been cleaned, re-inspect the element. If the element is free of calcium then reverse steps 3,2 and 1. If calcium is still present in the cell then proceed to step 6.





# TurboCell Operation: Cell Cleaning (cont.)

**6. Soak the turbo cell in a 4 parts water to 1 part Muriatic acid solution. Note: Always add acid to water, never add water to acid!**

Either use a cell cleaning stand or a bucket (preferably a one with a pour friendly ridge at the top - as shown).

Pour the mixture through the cell. Make sure the cell's element is completely submerged in the water.



# TurboCell Operation: Cell Cleaning (cont.)

## Step 6 continued:

- Typically cleaning takes about 15-20 minutes but this depends on how much calcium is built up inside the cell. When the calcium is reacting with the Muriatic acid the solution will effervesce.
- Once the reaction stops, rinse the cell with fresh water and reverse steps 3,2, and 1.
- Though acid solution is reusable when it is exhausted make sure to follow local guidelines for disposing of the water/acid mixture.

