

CLEARWATER™

POOL SYSTEMS

The Healthy Alternative in Pool Maintenance

INSTALLATION & POOL CARE MANUAL

MODEL PH-50



pH PURE™

CO₂ Injection for pH Control

Alternatives to Chlorine & Salt generated Chlorine

Ionization Systems

MineralPURE®

Mineral Ionization



- Generates safe copper ions
- 8 models from spas to 600,000-gallon pools
- Reduces chlorine use in residential pools 95%
- Reduces chlorine use in commercial pools up to 75%
- NSF approved and NASA licensed technology

Ultraviolet Ozone Systems

OzoneMAX™

Vacuum-ultraviolet Ozone System



- Compliments the **MineralPURE**
- Reduces chlorine use 50% alone, or up to 95% when used with **MineralPURE**
- Safely injects ultraviolet ozone
- Controls cryptosporidium & E. coli
- Enjoy crystal clear water
- Includes Ventrui Manifold Assembly

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Model PH-50

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Thank you for purchasing the **PH-50** unit for your swimming pool!

After a quick and easy installation, balancing the pool water chemistry will finally become easy. No more fighting with keeping both pH and Total Alkalinity in balance.

Please follow all instructions and keep this manual handy for quick reference. All of our manuals are available for download at www.clearwaterpoolsystems.com as well.



Manufactured by



A.) Important Safety Instructions

When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

IMPORTANT SAFETY INSTRUCTIONS:

1. READ AND FOLLOW ALL INSTRUCTIONS.

WARNING

To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

2. CO₂ Safe Storage & Transport:

- a. Care should be taken to prevent damage to the cylinder's valve and handle.
- b. If cylinder is determined to be leaking or venting, do not attempt to stop leaking as it can cause frost bit and evacuates the air.
- c. Cylinder's installed location should be secured to prevent tipping as the cylinder is heavy and can injure if it falls.
- d. Cylinder's installed location should be in cooler temperatures to prevent safety pressure release. A CO₂ cylinder will vent if the pressure is too high.
- e. Cylinder and unit should be located in an open space

3. Ensure injection only occurs when the circulation pump is running, and water is flowing through the pump and filter.

IMPORTANT TIPS:

1. The **PH-50** has a safety switch so it will not inject CO₂ if the pump is not producing enough pressure. This switch will also sync the injection time to your pumps schedule.
2. Keep the manual in case you need to refer to it.
3. Make sure to follow all directions through including ensuring pump prime & filter air release.

B.) Identifying the PH-50 Components

The PH-50 pH PURE unit should contain all the components listed below. Before installation, identify components shown below to help ease installation.



Control Unit (1)



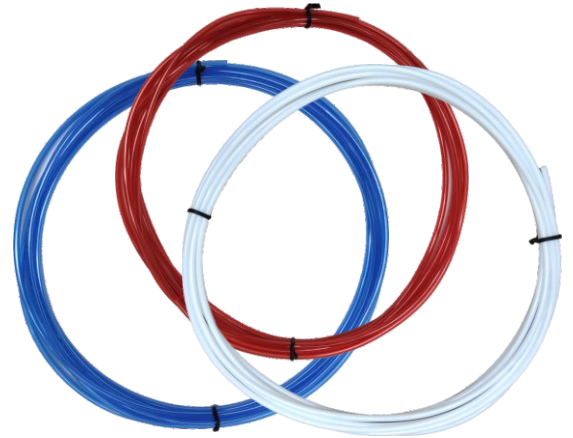
Injection Nozzle (1)



Pressure Sensor Fitting (1)



Quick connect in-line check valve (1)



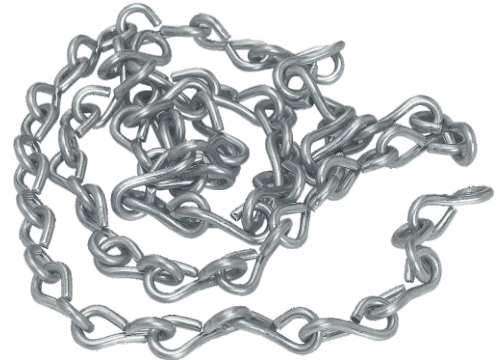
Blue, Red and White Tubing (1 of each color)



Control Unit Mounting Brackets (4)
Mounting Bracket Screws (4)



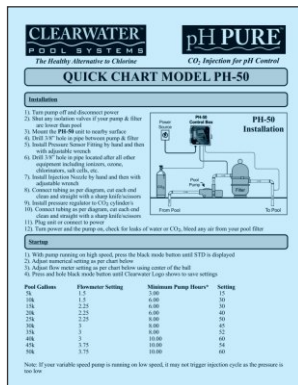
Regulator (1)



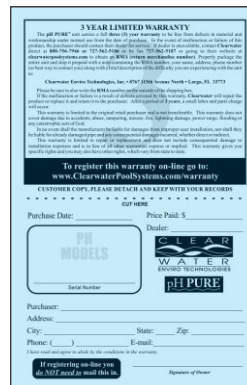
3 feet of chain (1)



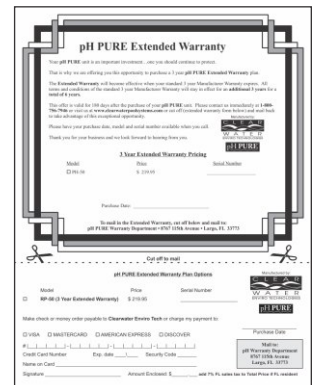
PH-50 User Manual (1)



PH-50 Quick Chart Card (1)

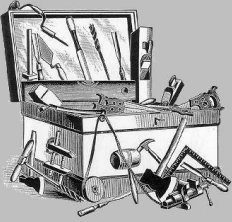


PH-50 Warranty Card (1)



PH-50 Extended Warranty Card (1)

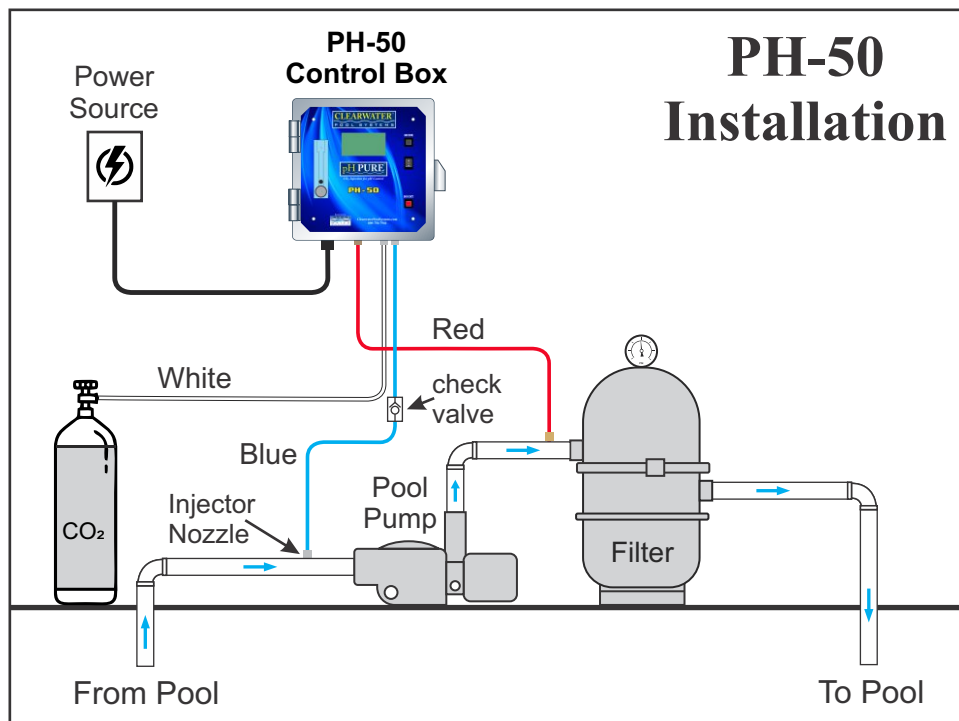
C.) Tools and Materials Required



- Bullet Level
- Drill & Drill Bit(s) 3/8"
- Screws & Anchors
- Crescent/Adjustable Wrench
- Screwdrivers, Flat & Phillips
- Sharp Scissors &/or Utility Knife
- Other tools may be required

D.) Site Survey

The **PH-50** should be installed at the pools pump and filter area. You will need to locate a place to mount the **PH-50** control box on a wall or such. This location will need to be within 6 feet of an electrical source. The CO₂ cylinder must be placed on a hard surface such as a concrete pad similar to the surface the pump & filter are located on. The CO₂ cylinder must be secured to a vertical surface such as a wall, post or other object to prevent tipping of the cylinder.



Note:

A quick connect in-line check valve (supplied) will need to be installed in the blue tubing between the control box and injector nozzle.

E.) Installing the Unit

Mounting the control box:

The **PH-50** should be installed at the pools pump and filter area. You will need to locate a place to mount the **PH-50** control box on a wall or such. This location will need to be within 6 feet of an electrical source.

- Unit must be installed in the upright position and can not be rotated into another position.

Mounting the Control Box

Keep the protective clear plastic sheet on during installation to stay clear of scratching the unit.

- 1.) Install the four mounting brackets using the enclosed screws to the back of the control box.



- 2.) Mount the control box to the wall using the mounting brackets installed. Hold the control box up to the wall or surface to where it will be mounted and mark the four screw holes. Using a level will ensure the control box is straight, so the flow meter functions correctly. Attach the control box to the wall according to the wall material using appropriate mounting hardware for that material, i.e. wood screws, mollys, concrete screws, or anchors.



E.) Installing the Unit (Continued)

Choosing a Power Source

The PH-50 unit is supplied with a plug that may be used with a 115 AC outlet that supplies constant power. If the installation location is outdoors, it is necessary to correctly use the outdoor in-use cover that prevents water from entering the outlet.

ATTENTION:

YOU MUST FOLLOW ALL APPLICABLE LOCAL, STATE, NATIONAL, OR INTERNATIONAL CODES WHEN INSTALLING THIS EQUIPMENT. A CERTIFIED ELECTRICIAN MAY BE REQUIRED FOR THIS PART OF THE INSTALLATION.

Choosing a power source

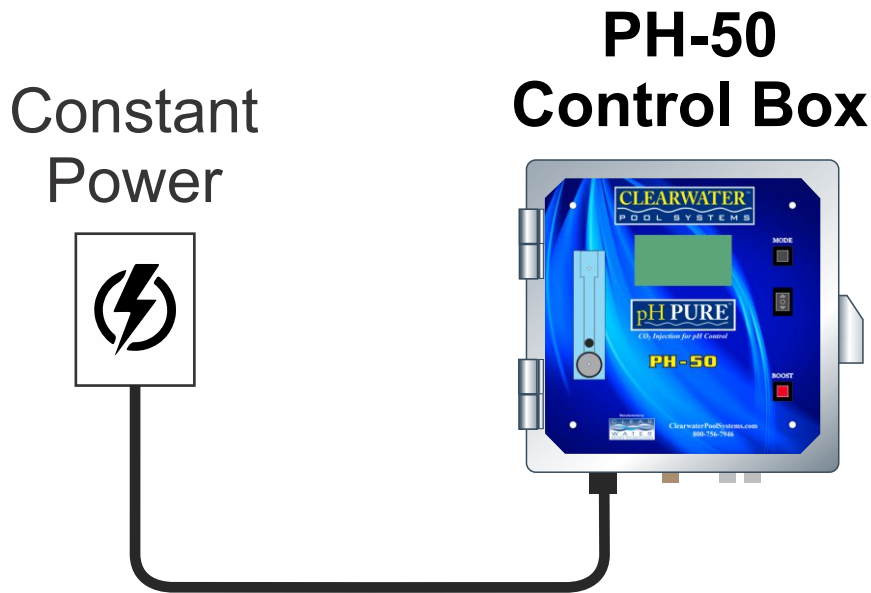
The plug for the **PH-50** may be plugged into a proper GFCI outlet with outdoor in-use cover. The power source should remain powered 24/7 and **MUST** be grounded per NEC standards. The power to the **PH-50** can be either 115 VAC or 230 VAC.

Line Diagram for Electricians

L1 = Black

L2 = White

Ground = Green



E.) Installing the Unit (Continued)

Cylinder location

The CO₂ cylinders should be mounted and secured so they can not tip over. ***ONLY*** locate the cylinders on a hard surface such as concrete, pavement, etc & with a suitable wall or structure safety chains can be attached to prevent tipping. Use the included safety chain with appropriate screws or anchors to mount, Example, wood screws for mounting to wood surface, or concrete anchors for mounting to concrete or block wall. The location should be partially or fully shaded to prevent the cylinder from venting due to overheating.



Cutting the tubing:

Use a new utility knife or scissors to cut tubing. Ensure the cut is straight across & smooth. Examples below:



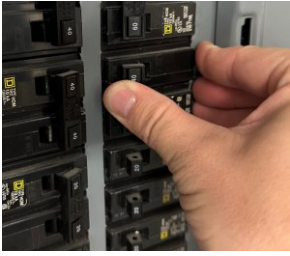
GOOD - Straight across and smooth

BAD - Rough edges will not seal properly

BAD - Not straight across and will not seal properly

E.) Installing the Unit (Continued)

Installation



1. Shut off power to the pump with breaker or disconnect.



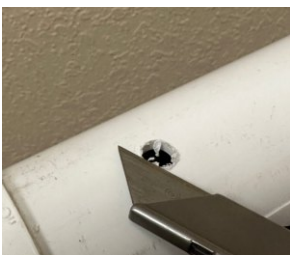
2. If applicable, close valves that are before and after installation locations as needed to minimize water draining from piping. Example, valves before pump, backwash valve & return to pool valves.



3. Set cordless drill to the drill setting, not a torque number setting or hammer function.



4. Drill straight into the pipe & do not use the drill to remove any burrs. Only install pressure sensor & injection nozzle in rigid PVC pipe. Flexible PVC, fittings, filters are not approved installation locations.



5. With a utility knife remove any burrs from the outside edge of the pipe.

E.) Installing the Unit (Continued)

Pressure switch install:

Ensure power is shut off & valves are closed to isolate the pump and filter area if applicable

Identify location of pressure switch installation: Between the pump outlet and filter inlet



1. Use a 3/8" standard drill bit & drill straight down into the pipe. Some water may drain from the hole and is expected.



2. Start installation of pressure sensor by hand turning clockwise and applying light pressure. Pressure sensor will make it's own threads as installed.



3. Using an adjustable wrench, continue turning clockwise until fully seated.



4. Push one end of the red tubing into this fitting.



5. Route the red tubing back to the left most connection on the **PH-50** unit.

E.) Installing the Unit (Continued)

Injection nozzle install:

Identify location of injection nozzle installation: At the pipe before pump strainer basket housing



- 1) Use a 3/8" standard drill bit & drill straight down into the pipe. Some water may drain from the hole and is expected.



- 2) Start installation of injection nozzle by hand turning clockwise and applying light pressure. Injection nozzle will make it's own threads as installed.



- 3) Using an adjustable wrench, continue turning clockwise until fully seated.



- 4) Push one end of the blue tubing into this fitting.

- 5) Install quick connect "in-line" check valve in blue tubing midway to the controller.



- 6) Route the blue tubing back to the right most connection on the **PH-50** unit.

E.) Installing the Unit (Continued)

Attach regulator & connect to PH-50 unit:

Important Notes:

- Ensure plastic sealing washer is in place to prevent slow leaks of CO₂. Plastic sealing washer should be used for each cylinder & replaced every other cylinder change. These are available from your CO₂ supplier, Amazon & other sources.
- The number of cylinders connected must match the number of regulator connections you have. Example, you cannot connect a two-cylinder regulator to only 1 cylinder.



- 1) Plastic sealing washer is attached to each cylinder stem with a zip tie.



- 2) Install the plastic sealing washer inside the CO₂ connection



- 3) Turning clockwise tighten until fully seated by hand.



- 4) Using an adjustable wrench, tighten fully.



- 5) Insert one end of the white tubing into the regulator connection. Your regulator may look different if it is for 2-3 cylinders, has a gauge, etc.



- 6) Route the white tubing back to the **PH-50** unit and insert into the remaining connection.

E.) Installing the Unit (Continued)

Pressure test connections:

Ensure CO₂ is not leaking by using soapy water. A few drops of household dish soap and water will suffice.

1. Open CO₂ cylinder valves fully. If CO₂ is heard leaking or CO₂ is felt, immediately shut valves completely by turning the valve clockwise.
2. Use a soapy water mix applied to the CO₂ connections. If bubbles appear and grow, tighten fitting until it stops.



NO LEAK



LEAK

IMPORTANT NOTES

1. Ensure all valves previously closed have been opened. Depending on your filter type and pipe routing, the setting of valves will be different from pool to pool. **DO NOT** start pump before reopening valves closed previously!
2. If water in strainer basket has drained out, ensure proper pump priming is complete by filling the strainer basket. Please follow your pool pump's manufacturer directions.
3. Once water is flowing, release any air from your filter using the air release valve located at the top of the filter. Open until all air is released.

F.) Balancing the Pool's Water

Before starting the **PH-50**, the pool's water must be clean and clear. Algae blooms will prevent the pH from lowering with the expected amount of CO₂.

Total Alkalinity - Maintain the **Total Alkalinity between 80 and 140ppm**. This should be tested once a week or after adding water to the pool.

Higher Total Alkalinity will cause an increase in the CO₂ required to keep the pH near 7.4

General water chemistry and sanitizer options:

The **pH PURE PH-50** will work with all sanitizer options including:

1. Traditional chlorine of all types: liquid, granular, tablet, etc.
2. Salt water chlorinators
3. Ionization & ozone combinations

The **pH PURE PH-50** has been designed to operate with a **Total Alkalinity of 80-140**. Following the next steps for calibration for your pool volume will maintain a **pH of 7.2-7.7**

Using the settings chart below find your setting:

NOTE: The chart uses an average of pools of varying volumes and features. Your exact setting may be slightly different based on the surface area of the water, spa or infinity edge spillover, fountains or waterfalls, etc.

Startup

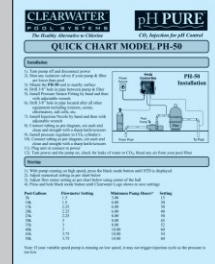
- 1). With pump running on high speed, press the black mode button until **STD** is displayed
- 2). Adjust numerical setting as per chart below
- 3). Adjust flow meter setting as per chart below using center of the ball
- 4). Press and hold black mode button until **Clearwater Logo** shows to save settings

Pool Gallons	Flowmeter Setting	Minimum Pump Hours*	Setting
5k	1.5	3.00	15
10k	1.5	6.00	30
15k	2.25	6.00	30
20k	2.25	6.00	40
25k	2.25	8.00	50
30k	3	8.00	45
35k	3	8.00	52
40k	3	10.00	60
45k	3.75	10.00	54
50k	3.75	10.00	60

Note: If your variable speed pump is running on low speed, it may not trigger injection cycle as the pressure is too low

G.) Proper Procedures of Maintaining a Healthy Pool

INCLUDED WITH THIS PACKAGE IS A "QUICK CHART" THAT GIVES YOU THE BASICS OF MAINTAINING A PROPER POOL. PLEASE REFER TO THAT SHEET WHENEVER POSSIBLE. IF YOU EVER HAVE ANY QUESTIONS, CONTACT YOUR DEALER OR CLEARWATER ENVIRO FOR ANY ASSISTANCE.



Total Alkalinity:

Keep the total Alkalinity between 80 - 140ppm. Alkalinity will increase when adding water from your city or well water and will not decrease from use of the **PH-50**.

Notes on Sanitizer, Stabilizer/CYA:

As there are many sanitizer options such as chlorine, salt generated chlorine, ionization, ozone & UV; keep the recommended amount that sanitizer recommends.

Some things to remember:

- With chlorine & salt generated chlorine:

- Stabilizer or Cyanuric Acid prevents the sun from burning off the chlorine but also reduces its oxidizing power. Take note of usage of tablets & tested stabilizer levels.
- Chlorine has more oxidizing power at a proper pH and decreases rapidly above 7.6 pH.

- With ionization:

- Keep the **pH between 7.2 - 7.6** for best performance of the ion system

Normal Pool Maintenance:

Always maintain the pool like you normally would. Keep the filter cleaned (clean or change filters, backwash, etc.) Empty the skimmer and strainer baskets as needed and keep the pool vacuumed & brushed as you have before. Good filtration and circulation are important to keeping the water clean, clear, and balanced.

H.) Starting Up the System / Operation Instructions

Starting the system:

1. The minimum pump run time is the minimum time for a full injection cycle. If your pump is scheduled to run for less time, please contact support at 800-756-7946 (SWIM).
2. While pump is running:
 - a. Press the black **MODE** button until “Standard” is displayed.
 - b. Press the up & down arrows to increase the setting based on the chart above. After 5 seconds the display will change to focus on operation status.
 - c. Adjust the valve on the flow meter to match the settings chart above.
3. LCD will show symbols below operation
 - a. Picture of Pump Symbol = Pressure switch is ON and injection can/will occur
 - b. Picture of Injection Symbol = Injection is occurring providing the CO₂ cylinders are full and valves open.
4. The next day, check the unit for any error messages. If the pump pressure is not high enough to allow a full injection cycle, the unit will display an error of: “Last injection cycle not completed”. This error resets after 24 hours of run time or once a full CO₂ injection cycle has completed. If this error remains, contact support at 800-756-7946 to get help changing to faster injection cycles.

Changing to ECO mode:

To save on CO₂ used once the water is fully saturated after 2 weeks.

1. Open the lid of the control unit
2. Press the black mode button until **ECO** is displayed
3. Close the lid

If after a week the pH has risen and is not supported by your pools features and CO₂ injection, a slight increase in CO₂ can accommodate while still being less than Standard mode used during startup.

If the minimum run time for the next higher setting is acceptable, leave the flow meter set and increase the setting.

If the next higher setting is longer than your pump run time, increase the flow meter setting to the next higher setting, Example 1.25LPM to 1.5LPM.

If pH starts to rise, increase setting 10%, Example 40 to 44

Once home screen with pump and CO₂ cylinder graphic display press and hold black **MODE** button to save and restart.

H.) Starting Up the System / Operation Instructions (Continued)

Changing cylinders:

1. Press the **MODE** button until the unit shows OFF
2. Close the cylinders valves
3. Loosen and remove the brass nut/nuts with an adjustable wrench, keep the regulator away from dirt and sand
4. Remove the chains and exchange the cylinders
5. Re-install the safety chains
6. Re-install or replace the plastic sealing washer
7. Re-install the regulator connections
8. Open the cylinder valves fully
9. Check for leaks with soapy water
10. Turn the system back on using the **MODE** button to either **STD** or **ECO**:
 - If previous setting was **ECO** mode.
 - a. If the cylinders were replaced quickly and water is still in acceptable pH range, you can go back to **ECO** mode.
 - b. If the cylinders were allowed to empty without noticing and pH is high, start with Standard (**STD**) mode first and wait 2 weeks before using **ECO** mode.

I.) Trouble Shooting

Error “Last injection cycle not completed”

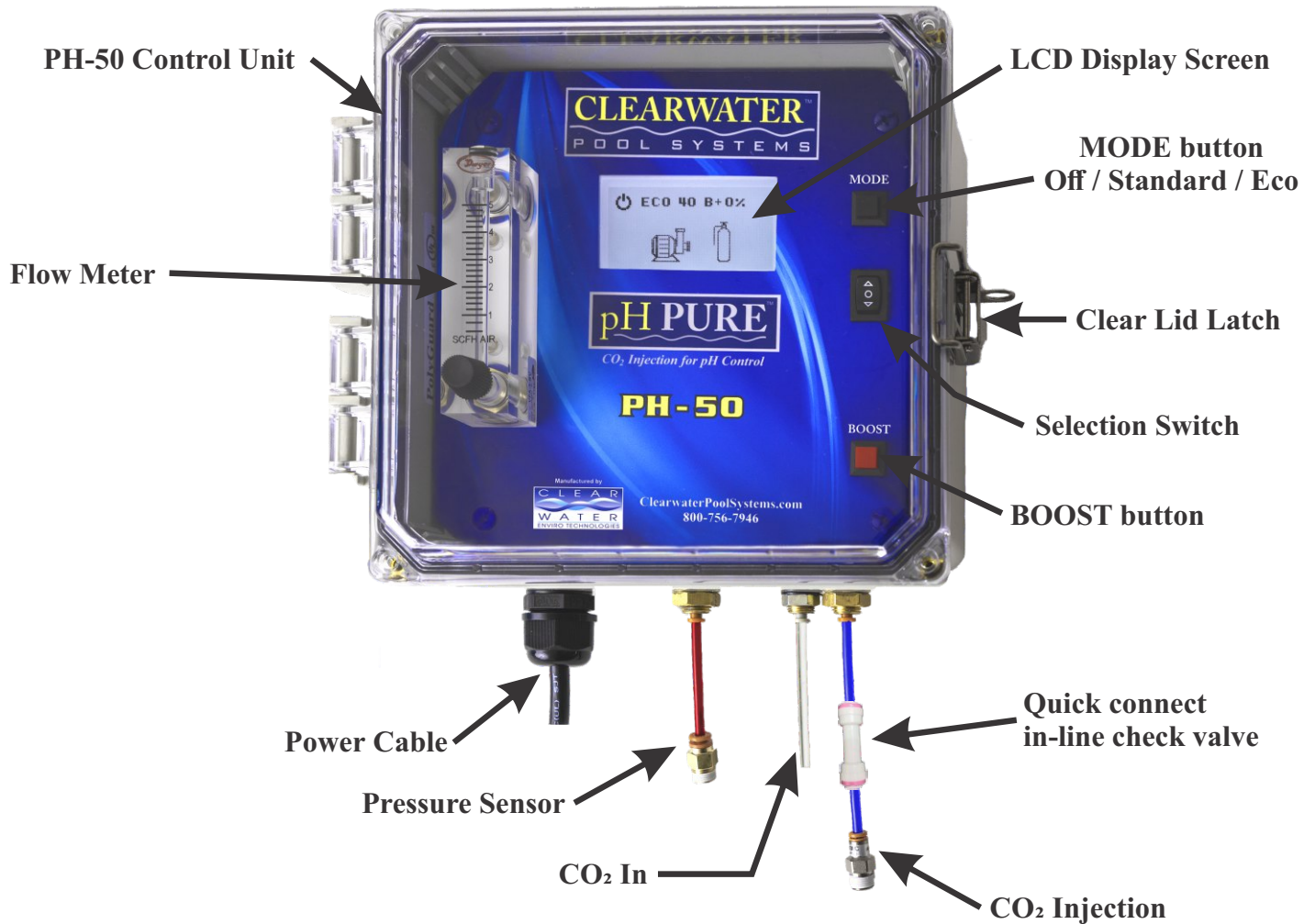
- Confirm minimum pump run time is not too short for your pump schedule. Note, slow flow settings on variable speed may be too low of a flow to allow injection. Increase higher flow rate time or contact support at 800-756-7946.

CO₂ runs out quickly:

- Check for leaks at all connections with soapy water. Note – cylinders must be full and with the valves open to find any leaks
- Verify setting on flow meter & injection setting is correct

J.) PH-50 Control Box Features

The **PH-50** control box has an LCD Display Screen, MODE button, BOOST button, a Selection Switch and a Flow Meter.





The Healthy Alternative in Pool Maintenance



CO₂ Injection for pH Control

Manufactured by



Phone: 727-562-5186 • Toll Free: 800-756-7946 • Fax: 727-562-5187

ClearwaterPoolSystems.com