



Precision-24 Hydrogen Peroxide Installation & Start-Up Guide

Thank you for purchasing a Clean Water System! With proper installation and a little routine maintenance, your system will be providing treated water for many years.

Please review this start-up guide entirely before beginning to install your system and follow the steps outlined for best results.

PEROXIDE CAN DAMAGE CLOTHING AND IRRITATE SKIN AND EYES.

USE RUBBER GLOVES AND EYE PROTECTION WHEN HANDLING.

WARNING: Risk of electrical shock.

Read Precision-24 Pump Installation Manual before installing. The pump is supplied with a grounding conductor and grounding type of attached plug. To reduce risk of electrical shock, be certain that it is connected to a properly grounded grounding-type electrical receptacle.

This pump is intended for indoor use. Sunlight can damage the tubing and degrade hydrogen peroxide.

2806-A Soquel Ave Santa Cruz CA 95062

For assistance call: 1-831-462-8500

Email us: office@cleanwaterstore.com

More information online: www.cleanwaterstore.com



Precision-24 Metering Pump

Warranty and Returns

- Your pump comes with a 1 Year Warranty from date of delivery.
- If your pump fails under warranty, please call or email our office to obtain a Returns Good Authorization Number before sending us back the pump for repair or replacement under the warranty. No returns can be accepted without an RGA number.

The Warranty covers repair and/or replacement of the metering pump but not shipping costs.

While defects are rare, we do our best to respond to warranty returns fast as we can. Please allow 3 to 5 business days after pump has been returned for your pump to be repaired or a new one supplied under the warranty agreement.

Conditions Not Covered By the Warranty:

1. Cutting off the power cord plug. This voids the warranty.
2. If your pump is 110 volt model: Plugging a 110-volt pump into 220-volt power will destroy the pump and is NOT covered under warranty. Please verify the voltage you are plugging your pump into.
3. Power surges or outages that cause pump failure are not covered under warranty.
4. Surge protection is recommended. If a pump is returned for warranty replacement and the cause of failure is determined to be from a voltage spike, the pump does not qualify for replacement.
5. If you need to return the pump to switch to a different voltage (say you ordered a 110v pump but find out you want 220v) please call our office and get an RGA# and return it, and we will send a replacement to you once we receive your returned pump. A \$9.95 flat fee shipping charge will be charged for shipping replacement pump ground in the continental U.S. unless you want to pay for expedited shipping, which is available.

Clean Water Systems & Stores Inc 2806-A Soquel Ave Santa Cruz, CA 95062

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Pre-Installation

1. Review your packing list and make sure you have received all the parts before beginning installation.
2. If you are going to be turning off the water to the house and you have an electric water heater, shut off the power to the water heater before beginning installation in case water heater is accidentally drained.
3. Pick a suitable location for your peroxide system on a dry level spot where it won't be exposed to freezing temperatures. Maximum line pressure is 100 PSI.
4. Get all of your plumbing parts together before beginning installation. Installation typically takes 1 to 5 hours.
5. After the system is installed and running, your water may temporarily be discolored water, or full of sediment or rust, particularly if you have older or corroded piping.

Best Practices for Installation

1. See typical installation for well water (see Fig 1).
2. Make sure that the Precision-24 Pump turns on and off with the well pump, or if you are using a flow switch, plug into the flow switch so the Precision-24 Pump is activated based on water flow.
3. Do not cut the cord on the Precision-24 Pump for direct wiring to the pressure switch. It is better to install a dedicated wall receptacle that is wired to power on and off with the well pump, unless you are using a flow switch.

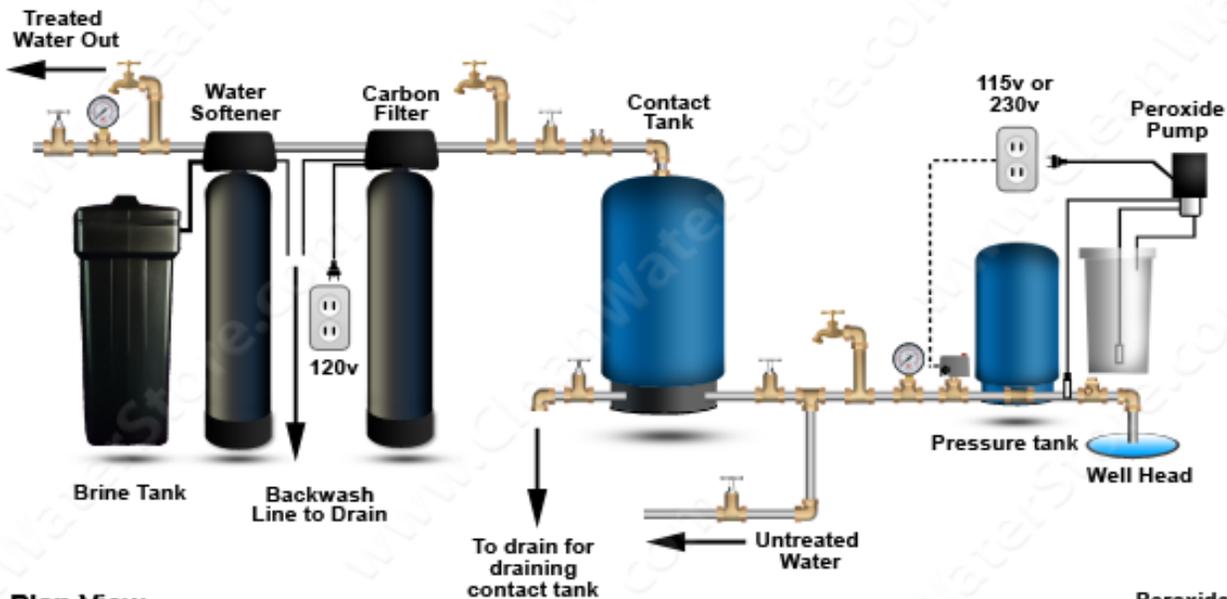
Quick Start Guide

1. Install metering pump so it turns on and when the well pump runs.
2. Fill suction tubing with plain water.
3. Adjust Stroke Knob to 100%.
4. Put 2 gallons of clean water in the solution tank (no hydrogen peroxide yet)
5. Turn on pump and allow pump to prime and start pumping.
6. Adjust Speed setting to desired speed (typically 20 – 60 %) using the up or down arrow speed setting.
7. Adjust the Stroke knob to the desired setting (typically 50% to 90%)
8. READ ON FOR MORE DETAILED INSTRUCTIONS

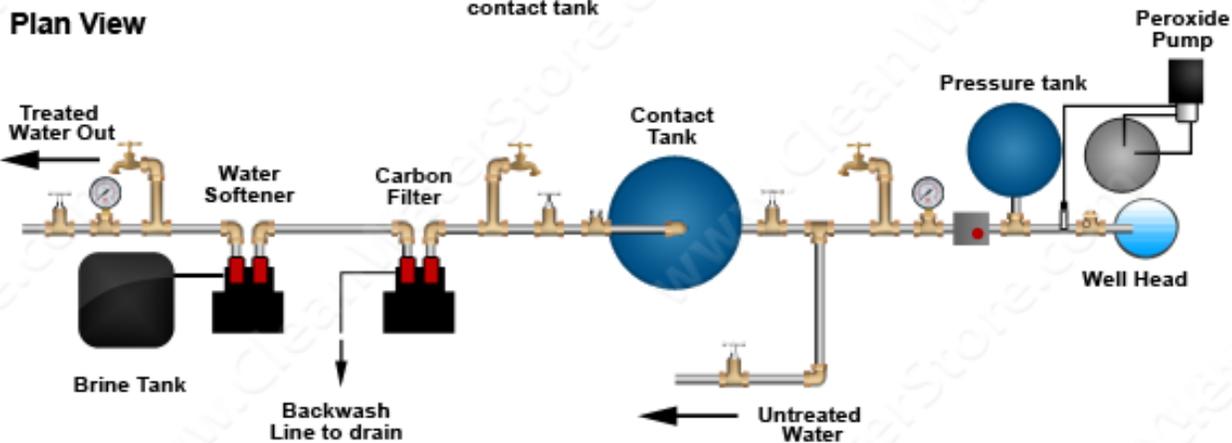
How Your Peroxide Injection System Works

See Fig 1. The well pump is controlled by the pressure switch. A dedicated outlet for the Precision-24 Pump is installed and wired so it is energized when the well pump is energized. When the water pressure in the pressure tank drops below the cut-in point on the pressure switch, the well pump and metering pump turn on. As water is pumped through the system, a small amount of hydrogen peroxide is pumped into the water by the hydrogen peroxide metering pump.

Fig 1: Typical installation with contact tank and carbon backwash or iron filter. NOTE – Precision-24 Pump must be wired so it switches on and off with well pump by wiring to same circuit as well pressure switch. Alternatively a Flow Switch can be used (Option 2 on next page).



Plan View



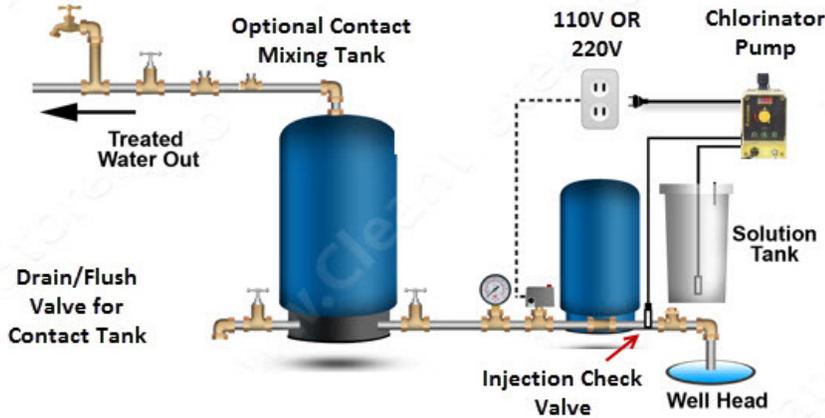
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Key

-  Water piping
-  Pressure Gauge
-  Pressure switch
-  Vacuum Breaker
-  Hose Bib
-  Check Valve
-  Gate or ball Valve

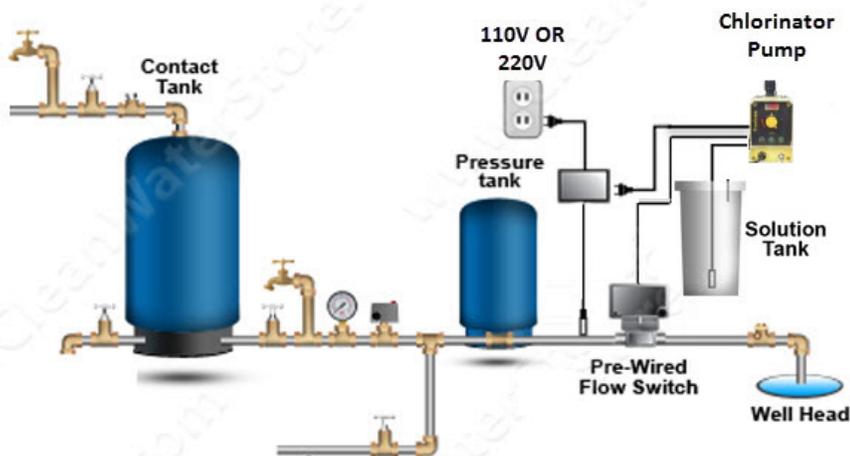
Two Options To Turn ON and OFF Peroxide Pump Automatically:

Option 1: Wire to your well's pressure switch. This is the lowest cost method. Simply install a dedicated wall outlet, that is wired in to the existing pressure switch and powered up whenever the well pump turns on (and off).



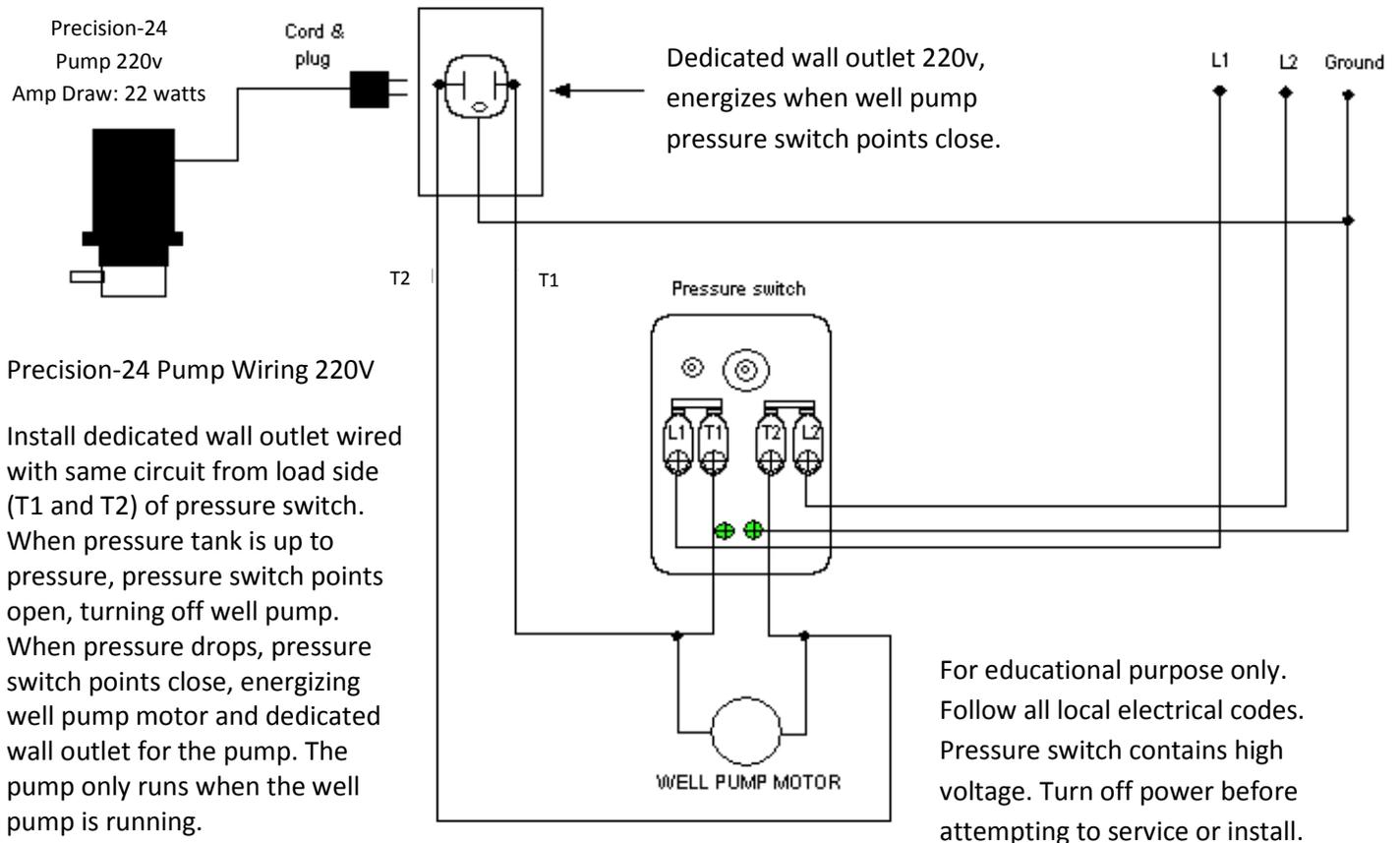
Option 2: Install a flow switch. This makes it fast and easy. No electrical wiring to do and any plumber, or person familiar with basic plumbing can install the Peroxide. No electrician required or electrical wiring to do.

Simply install the pre-wired flow switch. Plug the flow switch into a standard 120V wall outlet. Then, plug the Peroxide pump into the electrical outlet on the flow switch. Whenever there is flow, the metering pump will then turn on.



Wiring the Precision-24 Pump

Figure 2: (Option 1) Typical wiring 220v Precision-24 Pump on same circuit as well pump. Run wires from T1 and T2 (load side of pressure switch) to dedicated wall outlet, and plug Precision-24 Pump into an outlet so the Precision-24 Pump only runs when well pump is energized.

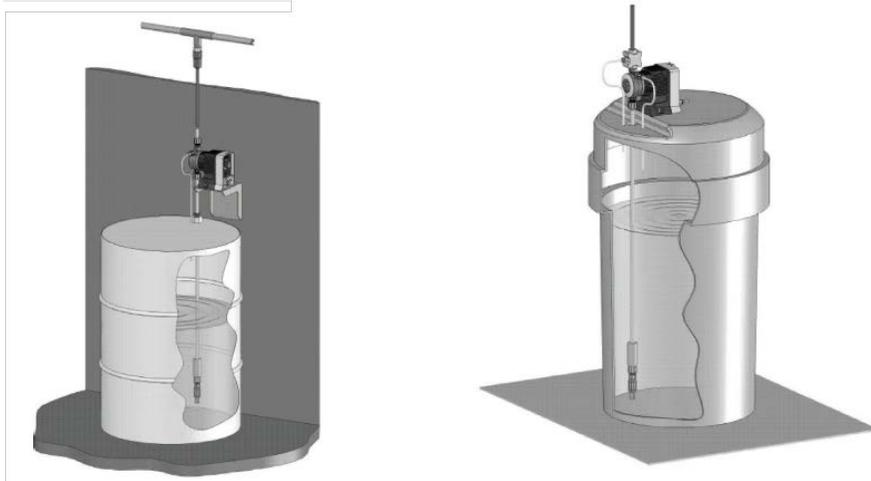


Precision-24 Pump Wiring 220V

Install dedicated wall outlet wired with same circuit from load side (T1 and T2) of pressure switch. When pressure tank is up to pressure, pressure switch points open, turning off well pump. When pressure drops, pressure switch points close, energizing well pump motor and dedicated wall outlet for the pump. The pump only runs when the well pump is running.

Installation Instructions

Typically the Precision-24 Pump is mounted on the tank, but can be mounted on a shelf above the tank as long as the pump is less than 60" from the bottom of the suction tubing.



Mounting Pump to Solution Tank

1. Position pump for installation. It doesn't really matter how the pump is oriented on the tank, just make sure it will be easy to change the pump settings and refill the solution tank with hydrogen peroxide.



2. Mark where the anchor holes will connect the pump to the tank. Drill the pilot holes with a drill bit so that the pump can be mounted on the tank with two wood or sheet metal screws (screws not included). We recommend tightening the screws **after** the pump has been primed and the tubing has been hooked up for easiest installation.
3. Mark the hole for the suction tube and the degassing prime valve and drill with a 3/8" drill.



Installing the Pump Tubing



When attaching the tubing, make sure to push the tubing all the way to the end, so that it is up against the barbed compression fitting. Try heating the end of the tubing by dipping it in a cup of hot water or pressing it up against a hard surface if you are having trouble getting it to the end.

Discharge Side (tubing that feeds from top of pump into pipe where the water is to be injected with peroxide)

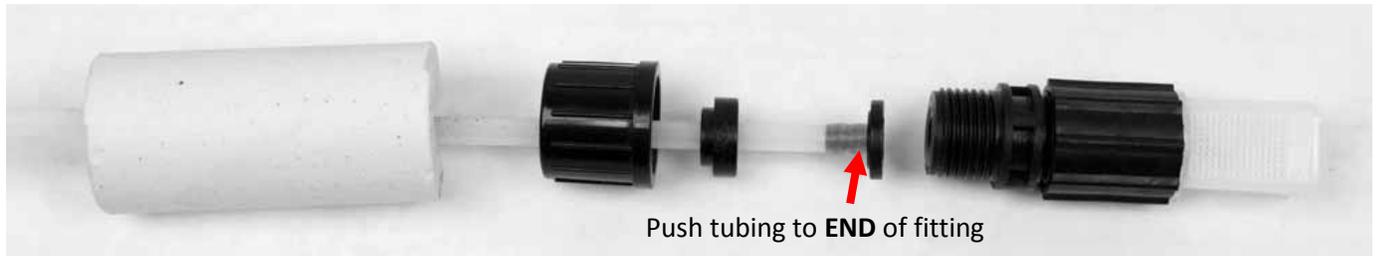
1. Shut off well pump or water supply and de-pressurize pipe.
2. Install injection check valve by installing a pipe tee in your pipe that has a ½" NPT fitting, where you can screw in the injection check valve (included with your Precision-24 pump). Wrap two wraps of Teflon tape on the ½" pipe threads of the injection check valve and apply a light coating of Teflon white pipe paste and install into pipes.
3. Install tubing that came with your pump and connect pump to injection check valve.
4. Cut lead tube to desired length with enough slack to avoid kinks. Hand tighten only. Do not use Teflon tape on the tubing fitting connections.

Degassing Prime Valve (tubing that allows the solution to be pumped back into the tank for fast priming)

1. Connect the 3/4" tubing supplied to the degassing prime valve to the solution tank by drilling a hole as shown on Page 6.
2. Insert and trim the tubing so it inserts into the solution tank a few inches, but does not touch the solution.

Suction Side (tubing inside solution tank)

1. Measure the lead tube on outside of solution tank to ensure it will be 2-3" from the bottom of the tank. Do not allow weight to sit at the bottom of the tank.
2. Run the lead tube to the solution tank. Allow for some slack in the tube to avoid kinks.
3. Add the weight, and connect the nut ferrule to the suction side of the pumping head (labeled 'in' on cover of head). Hand tighten only. Do not use Teflon tape.
4. Make sure that the tubing is FULLY inserted over the conical shaped fitting, so that it totally bottoms out and is pressed up against the fitting. If it is difficult to push the end of the tubing to the bottom of the fitting, try heating the tubing with water or hot air (such as a hair dryer). The tubing can then be worked a little back and forth and worked down until it is seated. Then proceed by putting the fitting on and tighten.



Prime & Start The Pump:

1. Fill solution tank with 7 gallons of clean water (don't add hydrogen peroxide yet), this will make it easier to prime the fill the suction tubing with water.
2. Fill suction tubing with water, by submersing the suction end in the water and rapidly jerking the suction tubing up and down. Within a few moments, the suction tubing will be full of water. Keeping the open end at a lower elevation will prime it faster. The suction tubing can also be submerged or filled with water manually. This makes it faster to prime. (Picture on right)
3. Connect the suction tubing and discharge tubing to your injection check valve.
4. Connect the degassing prime valve tubing and route to the solution tank, above the water line.
5. Open up the degassing prime valve three turns counter-clock-wise to open it up before priming. There may be back pressure on the pump, so it will be easier to prime if the degassing valve is open at first
6. Turn on the pump and adjust the Stroke Knob to 100% and Speed control to 100%.
7. You will quickly see water being pumped out the discharge tube.
8. After the pump is primed and is pumping, close the degassing valve 2-1/2 turns. The little valve should be just slightly open, so a small amount of hydrogen peroxide solution can be pumped back into the tank, when the pump is running.
9. Your pump is now ready for use!
10. After the pump has been in operation for an hour or so, you should re-torque the liquid end of the pump (back end) and re-tighten the screws on the head in a criss-cross fashion.
11. Add 1 gallon of hydrogen peroxide to 7 gallons of water, or follow your own solution strength and speed settings by consulting the formula below.



Adjusting the Metering Pump Settings:



How To Select the Hydrogen peroxide Solution Strength and Pump Setting

The goal of a properly functioning hydrogen peroxide injection system is to have a free-hydrogen peroxide residual of 0.2 to 1.0 ppm after sufficient contact time, before any carbon filter system. Or if no carbon filter or other de-chlorination is used, to have a free-hydrogen peroxide residual of 0.2 to 1.0 ppm at the end of the distribution system or furthest point in the plumbing.

This can be accomplished by adjusting the hydrogen peroxide solution strength and setting the Precision-24 Stroke Knob and/or adjusting the speed setting until you achieve the desired residual.

In determining your metering pump's settings and solution strength, keep in mind that it's best to make up fresh solution once every 1 to 3 months. The hydrogen peroxide solution loses strength as it ages, and is sensitive to heat and light. The peroxide levels desired can be accomplished by adjusting the hydrogen peroxide solution strength and setting the Precision-24 pump speed and stroke settings until you achieve the desired residual.

In determining your metering pumps settings and solution strength, keep in mind that it is best to make up fresh solution once every 2 to 3 months. The hydrogen peroxide solution loses strength as it ages, and is sensitive to heat and light. Generally, keep solution tank out of the sun and use fresh solution regularly for best results.

Step One: Determine flow rate of the water stream you are injecting into, in Gallons per Minute (GPM)

1. Open any hose bib or faucet until pump turns on.
2. Close hose bib or faucet and let pump fill up pressure tank until it turns off.
3. Using a 1 or 5 gal. bucket, open faucet, collect and measure all water discharged until pump turns on.
4. When pump turns on, immediately close faucet and start timing pump cycle.

5. When pump turns off, record pump cycle time to refill pressure tank in seconds.
6. Divide the number of gallons collected in Step 3 by the number of seconds in Step 5.
7. Multiply the answer from Step 6 by 60.
8. The answer in Step 7 is the average pumping capacity of the pump in gallons per minute (GPM).

Step Two: How Much Hydrogen Peroxide Should Be Injected? Determine the parts per million of hydrogen peroxide you are trying to achieve in parts per million (PPM).

Hydrogen peroxide is injected in parts per million ('ppm') which is the same as saying milligrams per liter ('mg/L'). The amount of hydrogen peroxide to add depends on the "hydrogen peroxide demand" of the water. Hydrogen peroxide demand is the amount of various contaminants in the water that combine with the hydrogen peroxide after the hydrogen peroxide has been injected and sufficient contact time has occurred.

After the hydrogen peroxide has combined with the various contaminants such as bacteria, iron, manganese and odor, some level of uncombined or "free" hydrogen peroxide will exist. The goal is to have some small amount of peroxide, usually around 0.2 to 0.4 ppm of peroxide, up to a maximum of 1.0 ppm of hydrogen peroxide before filtration.

For bacteria you want to inject 1 – 2 ppm of hydrogen peroxide with approximately 5 to 10 minutes of contact time depending on temperature and turbidity (cloudiness) in the water. If the water is colder than 50F (10C) and/or the pH is higher than 7.5 you may need longer contact time or a higher residual.

For each part per million of iron or manganese generally you want to inject 1 ppm of hydrogen peroxide. For each 1.0 ppm of hydrogen sulfide gas (which causes the rotten egg smell in water) you want to inject 1 to 2 ppm of hydrogen peroxide. So say you have bacteria and 4.0 ppm of iron. For our example here, we will assume you want to inject 5 ppm of hydrogen peroxide.

Step Three: Determine what solution strength of peroxide to use

Assume you are using a peroxide solution of 7%. This means that this solution contains 7% active hydrogen peroxide. 7% peroxide is equal to 70,000 parts per million (PPM). Note that for most applications the peroxide can be injected without diluting the solution. The solution strength required depends on the flow rate of the water you are injecting into, and the applied dosage you want to inject.

If you dilute the peroxide by adding 1 gallon of softened or purified water to 1 gallon of household peroxide, you end up with solution strength of approximately 3.5% or 35,000 ppm. In other words, 7% peroxide has solution strength of 70,000 ppm, and if you dilute it with 1 gallon of water, you end up with solution strength of 35,000 ppm.

You can vary the applied dosage of hydrogen peroxide by adjusting the peroxide solution strength and setting the Precision-24 stroke knob and/or speed setting until you achieve the desired residual.

Next, use the formula below to compute the gallons per day to adjust the pump to end up with the desired applied dosage.

The formula is simple, you only have to:

Multiply the Flow Rate (in gallons per minute) times the Applied Dosage in Parts Per Million Desired times 1440. Then divide by the Solution Strength in PPM that is being used.

Example: Assume that you have a well pump that has a flow rate of 12 gallons per minute (12 GPM) and that you want to inject 5.0 ppm of hydrogen peroxide into the water. You have decided to use solution strength of 17,500 ppm or 1 gallon of 7% peroxide to 3 gallons of purified or at least softened water.

There are 1440 minutes in 24 hour period, and the formula will tell you **how many gallons of hydrogen peroxide solution you will use for every 24 hours the well pump runs.**

Example formula: $12 \text{ GPM} \times 5.0 \text{ PPM} \times 1440$ and then divided by $17,500 = 4.9$ Gallons Per 24 hours of well pump run time.

This means that you need a metering pump that has an output of 5.0 (round to 5) gallons per day. The Precision-24 can pump 24 gallons per day, so we want to set the pump for 20% output. To achieve this we can set the stroke at 70% and the speed at 30%.

This will give you an applied hydrogen peroxide dose of 5.0 ppm, and you can adjust it later once you determine your actual peroxide residual.

Your well pump might run for 1 or 2 hours a day, but at this rate you would use 2.5 gallons of your hydrogen peroxide solution every 24 hours the pump runs. It is better to add more solution every one to two months as the solution can lose its potency over time.

Whatever your initial setting be sure to test for hydrogen peroxide and then adjust the pump and/or the solution strength to achieve your desired peroxide residual in your piping.

NOTE: if you find you do need to dilute the peroxide, use only distilled water, water from a reverse osmosis system, or at least softened water. Do not use untreated well water.

Bubble Test: if you have no hydrogen peroxide test kit to determine peroxide residual, you can use the Bubble Method. Turn up the metering pump until you see tiny bubbles when you run a faucet in the house, or hose bib after the peroxide system. The presence of tiny bubbles indicates excess peroxide. Turn back the metering pump until the bubbles are not noticeable.

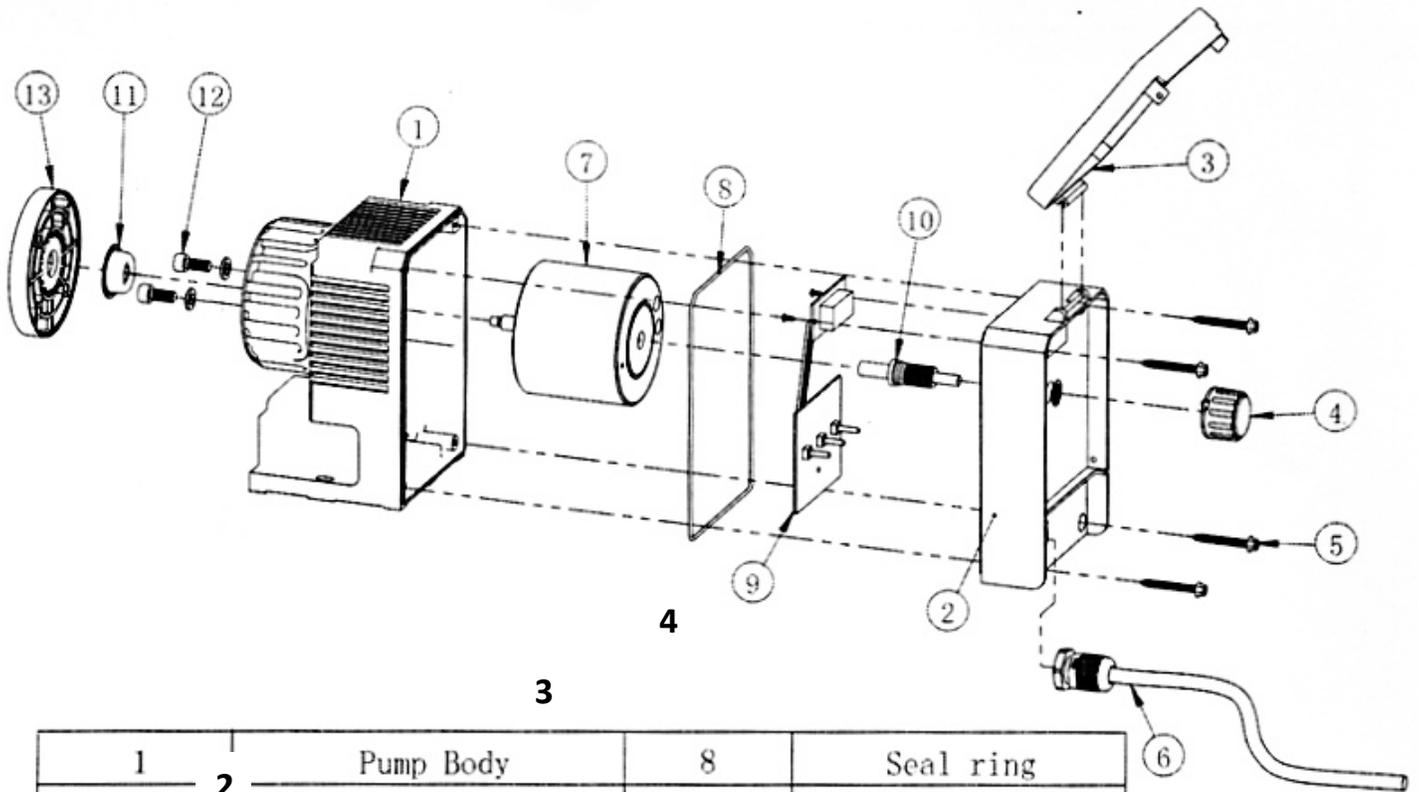
Maintenance: Check free-hydrogen peroxide residual at least once per month and adjust the Precision-24 Pump and/or solution strength if needed. See the Precision-24 Pump manual for routine maintenance. Change the pump tube every 1 – 3 years.

Diaphragm Replacement (refer to diagram below):

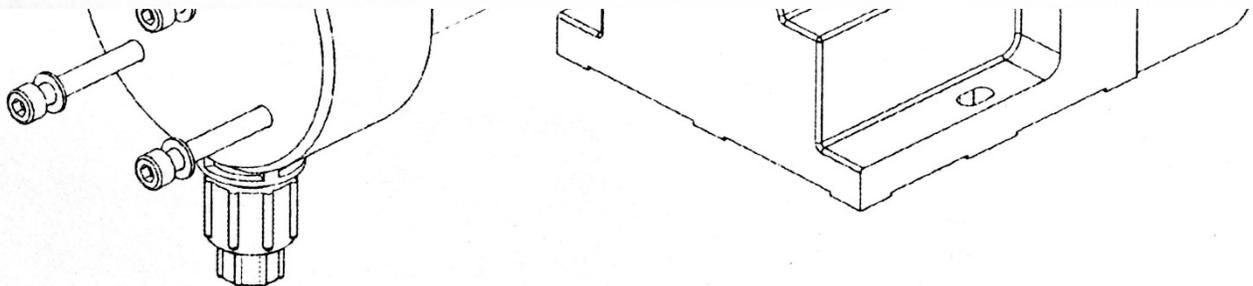
1. Adjust stroke length to 0% when the pump is working
2. Cut off the power, loosen the bolts (1)
3. Pull out the pump head (2) and bolts (1) from pump body
4. Turn the diaphragm counter-clockwise (3) and turn it off
5. Take off the adapter base (4)

6. Screw on a new diaphragm (3) clockwise, as tight as possible

Part Identification:



1	2	Pump Body	8	Seal ring
2		Rear end plate	9	Integrated circuit
1	3	Protective cover	10	Adjusting Screw
4		Stroke adjusting Knob	11	Safety diaphragm
5		Tapping Screw	12	Hexagonal Screw
6		Feed Cable	13	Adapter Base
7		Electro magnet		



Winterizing: do not let the Precision-24 Pump or tubing freeze. If you need to winterize, drain the hydrogen peroxide solution tank and discard hydrogen peroxide solution. Place the suction of the pump into a bucket of clean water and allow the pump to run until the Precision-24 Pump is free of any hydrogen peroxide solution. Remove the suction from the water, and allow the pump to pump dry. Pump is ready to store.

NOTE: when diluting the peroxide, use only distilled water, water from a reverse osmosis system, or at least softened water. Do not use untreated well water.

Need Assistance? Call us at 831-462-8500 or email support@cleanwaterstore.com

Spare Parts:



Part # P7007360 Spare Parts Package (foot valve, injection check valve, 12 feet of tubing)



Part # P7007300 De-gassing valve



Part # P7007350 Foot valve



Part # P7007270 Injection check valve



Part # P7007280 Precision-24 Pump diaphragm



Part # P7007290 Check ball fittings (for in or out, of metering pump) Installation Guide