Precision-24 Pump Proportional Feed Chlorinator
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.

LIQUID POOL CHLORINE 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 liquid chlorine.

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 and flow sensor come with a 1 Year Warranty from date of delivery.
- If your pump or flow sensor 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 strongly 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. This is the leading cause of failure for pumps and valve control heads. Pump failure during or as a result of power failure is not covered under warranty.
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

831-462-8500 support@cleanwaterstore.com

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 accidentially drained.

3. Pick a suitable location for your chlorination 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.

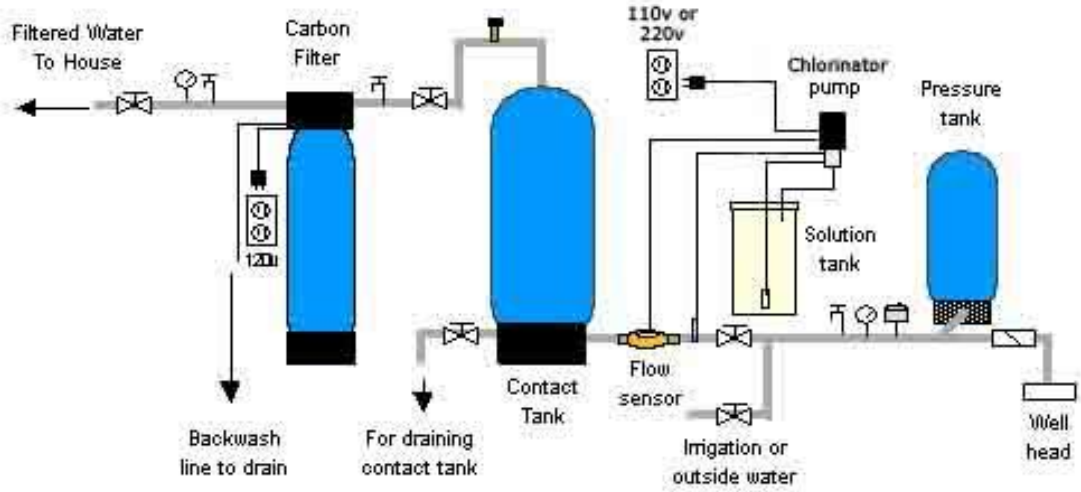
5. After the system is installed and running, your water may temporarily be discolored from the initial chlorinated water, or full of sediment or rust, particularly if you have older or corroded piping.

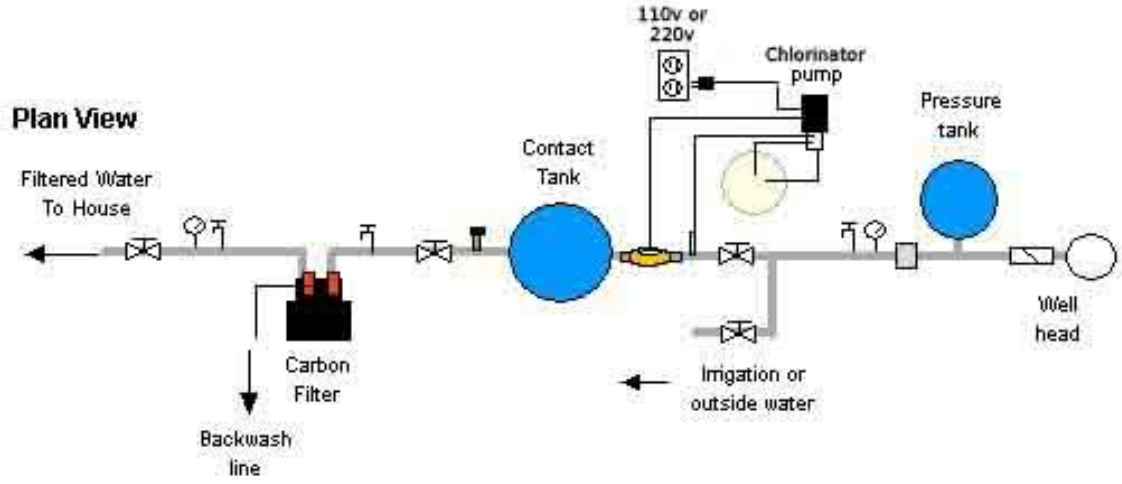
Quick Start Guide

1. See typical installation for well water (see Fig 1).
2. Install flow meter (must be installed on horizontal plane, with the meter face pointing straight up.)
3. Install Injection check valve. Make all tubing connections.
4. Plug Precision pump into an 110v wall outlet and leave plugged in. The pump will display "P" to show that the power is on, but it will not be in operation at this time.
5. Press and release the "Stop/Start" button. If the red digital display shows a number (u until the unit displays "0" to enter the Pulse Parameter programming. (See Page 8 for detailed set-up and program instructions)
6. **For Step 1: Set to 180** - press the "Start/Stop" button to select the value and the "Up" and "Down" arrows to change the value.
7. Advance to Step 2 and **Set to 1** for pulse function (multiplier).
8. Advance to Step 3 and **Set to 1** so that the pump will run 1 stroke per pulse.
9. Press and hold the "Stop/Start" button to exit the Pulse Parameter Programming, so that the pump displays "P", and then press the "Stop/Start" button once more to turn on the pump for service.
10. Install the meter **horizontally** with the display facing up and the inlet port facing the water supply line.
11. Wire the metering pump cable (grey) to the Precision pump.
12. Make sure that the Precision-24 Pump turns on and off with the flow sensed by the flow sensor by blowing into the flow sensor to turn the meter dials, eventually, you should hear the pump click, which is the pulse.
13. Fill suction tubing with plain water.
14. Adjust Stroke Knob to 100%.
15. Put 7 gallons of clean water in the solution tank (no chlorine yet)
16. Turn on pump and allow pump to prime and start pumping.
17. Adjust the Stroke knob to the desired setting (typically 70% to 90%)
18. **READ ON FOR MORE DETAILED INSTRUCTIONS**

How Your Chlorinator Works

Install the Flow Meter horizontally with the display facing up in a location where it is easy to connect with the Precision-24 and electrical outlet. It does not matter if it goes before or after the injection point, but should be installed after the pressure tank and before the contact tank.





Installation Layout

Here is the recommended order of products to install the proportional chlorination system (left to right, from supply into house):

Pressure tank (not shown) > PVC sch 40 pipe > schedule 80 union (optional) > y-strainer (recommended) > water meter > 12” sch 40 pipe > sch 40 tee with injection check valve > schedule 80 union (optional, not shown) > contact tank (not shown) > Remaining filtration systems or into house.

* Make sure to install the meter **horizontally** with the display facing up and the inlet port facing the water supply line.

Wiring the Precision-24 Pump

After placing the equipment where you would like it to be installed, plug the Precision-24 into the outlet, and plug in the metering pump cable (grey) to the Precision-24.

To connect the Flow Meter Cable (coming from the flow meter) cut back the grey rubber on the metering pump cable, and then cut back the coating on the WHITE and RED wires to expose the copper wire. Ignore the other wires.

Next, connect the BLACK wire from the metering pump cable to the WHITE wire from the flow meter cable. Finally, connect the yellow wire from the metering pump cable to the red wire from the flow meter cable. It should look like the diagram below.

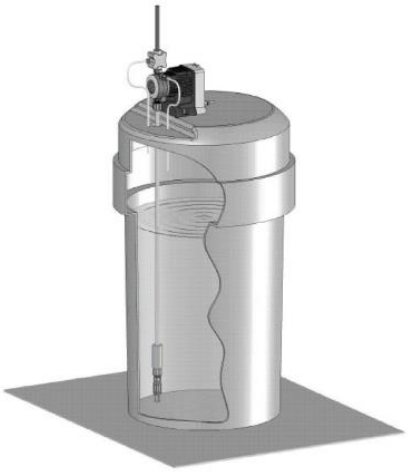
Metering Pump Cable BLACK >>>>>>>> Flow Meter Cable WHITE

Metering Pump YELLOW >>>>>>> Flow Meter Cable RED

Solder or connect the wires with wire nuts, and then seal the connection with heat shrink tape or electrical tape.

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.



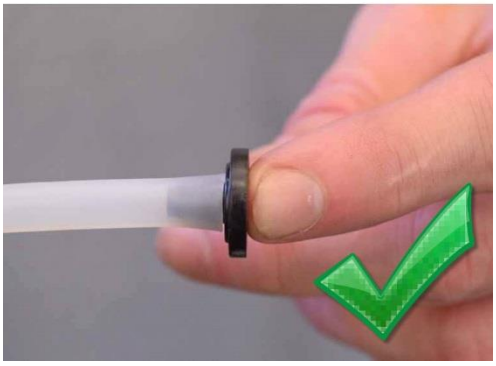
Mounting Pump to Solution Tank

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 chlorine.

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 chlorinated)

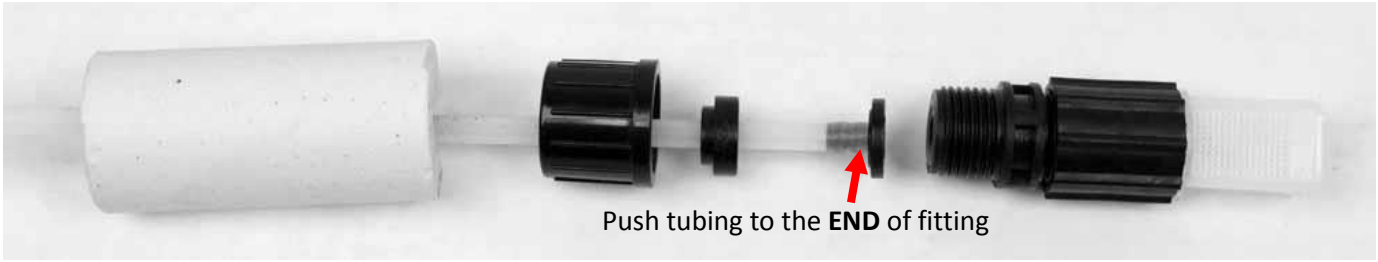
1. Shut off well pump or water supply and de-pressurize pipe.
2. Install injection check valve by installing a pipe tee in your pipe that has a ½" NPT fitting, where you can screw in the injection check valve (included with your Precision-24 pump). Wrap two wraps of Teflon tape on the ½" pipe threads 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 2 gallons of clean water (don’t add chlorine bleach yet).
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 chlorine 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 chlorine to 3 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 Chlorine Solution Strength and Pump Setting

The goal of a properly functioning chlorine injection system is to have a free-chlorine 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-chlorine 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 chlorine bleach 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 chlorine 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 Chlorine Should Be Injected? Determine the parts per million of chlorine you are trying to achieve in parts per million (PPM).

Chlorine is injected in parts per million ('ppm') which is the same as saying milligrams per liter ('mg/L'). The amount of chlorine to add depends on the "chlorine demand" of the water. Chlorine demand is the amount of various contaminants in the water that combine with the chlorine after the chlorine has been injected and sufficient contact time has occurred. After the chlorine has combined with the various substances such as bacteria, iron, manganese and

odor, some level of uncombined or "free" chlorine will exist. The goal is to have some small amount of free-chlorine, usually around 0.2 to 0.4 ppm of free-chlorine, up to a maximum of 1.0 ppm of free-chlorine.

For bacteria you want to inject 1 – 2 ppm of chlorine with approximately 10 minutes of contact time. 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 chlorine. For each 1.0 ppm of hydrogen sulfide gas (which causes the rotten egg smell in water) you want to inject 2 to 3 ppm of chlorine. So say you have bacteria and 2.0 ppm of iron. For our example here, we will assume you want to inject 3 ppm of chlorine.

Step Three: Determine what solution strength of bleach to use

Household bleach is approximately 5% chlorine; pool chlorine is 10 to 12%. 5% is the same as saying 50,000 parts per million (PPM) and 10% is the same as saying 100,000 PPM.

Regarding the solution strength: If you dilute the bleach by using 3 gallons of pure water to 1 gallon of household bleach, you end up with solution strength of approximately 1.25% or 12,500 ppm. In other words, household bleach has a solution strength of 50,000 ppm, and if you dilute it with 3 gallon of water, you end up with solution strength of 12,500 ppm, which is a good solution strength to use for most home well water applications with water flow rates of 5 to 20 gallons per minute. Regarding setting the output of the metering pump: You can vary the applied dosage of chlorine by adjusting the chlorine bleach solution strength and setting the Precision-24 Pump Feed Rate Stroke Dial until you achieve the desired residual.

Step Four: Programming
Press and hold the "Stop/Start" button to enter the programming menu:

0: Set to 100, press the "Start/Stop" button to select the value and the "Up" and "Down" arrows to change the value
1: Set to 180
2: Set to 1. Zero is Manual, keep it there when priming the pump.
3: The meter sends a signal, each time a gallon is pumped. If you set this at 1, then the chlorine pump will squirt once per gallon. 2 will squirt twice per gallon, etc.
4: Must be set at zero, if set at 1, the pump won't work, tt is for a remote signal sensor.

Press and hold the "Stop/Start" button to exit the Pulse Parameter Programming, so that the pump displays "P", and then press the "Stop/Start" button once more to turn on the pump for service. The pump will still stay on P when in Pulse Mode, and will start pumping when in manual Mode.

Formula for Finding the Solution Strength and Metering Pump Settings:

1.0 Chlorine Calculations (Using an example or assumed maximum flow rate of 15 gallons per minute, which is a typical maximum flow rate for many homes. You can change the calculations by using your number, this is an example only.)

Max flow rate: 15 gpm
Minimum flow rate: 0.5 gpm
Applied chlorine dose: 4.0 ppm
Solution strength: 1% sodium hypochlorite (5,000 ppm) diluted from 5% bleach by adding 9 gallons of pure water to 1 gallon of 10% pool chlorine.

Formula Steps: (formula below uses cubic centimeters, or CC's of which there are 3785 CC's in one gallon)

1.1 Figure Pump Size and Model Required

15 GPM x 3785 x 1 = 11 cc/minute
5,000 ppm

Choose Precision 24 metering pump, which has output of 0.25 to 63 cc/min

1.2 Figure Percent of pump output required related to maximum output of pump.

11 cc/min required output 17% of pump output required
63 cc/min max. output

1.3 Choose Pulses Per Gallon Setting

Choose pulse rate to yield 50-100 pulses/min. at maximum water flow rate.
Maximum pump rate of pump is 100 pulses per minute. Over 100 pulses per minute, the pump will not pump.

Choose 2 pulse/gallon; i.e. program FT420 flow computer for 2 pulse per gallon.

40 GPM x 2 P/G = 80 pulses/minute to pump at the maximum speed.

1.4 Figure Stroke Length Setting of Pump.

.57 of pump output req = .71 = 70% stroke length knob setting
.80 of max. pump speed determined by flow meter

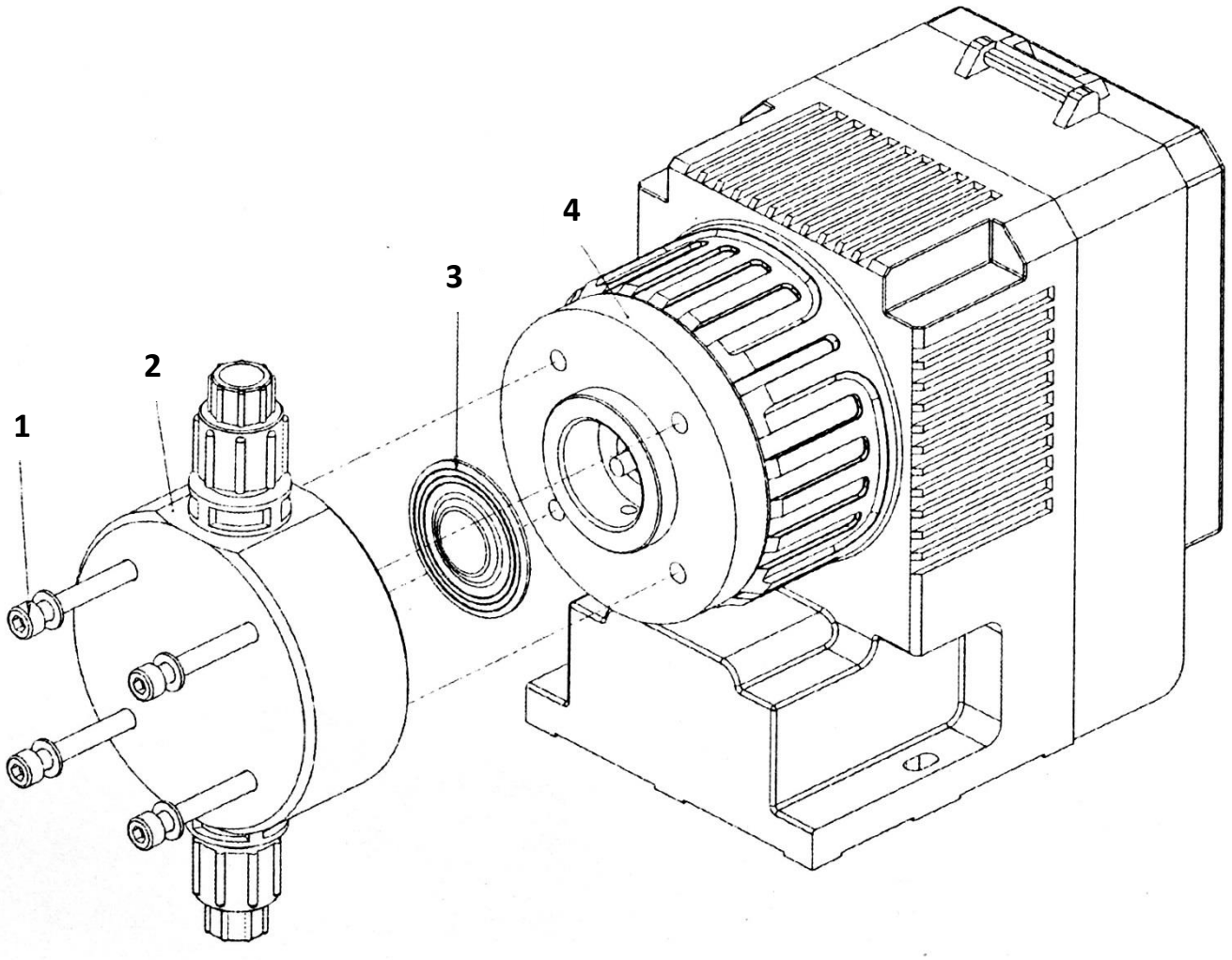
Troubleshooting and Maintenance:

Troubleshooting: If the pump does not keep the settings you have programmed, adjust the speed to the desired setting and allow it to rum for more than one minute before turning off the pump. **The pump need to run for at least one minute to remember the speed setting.**

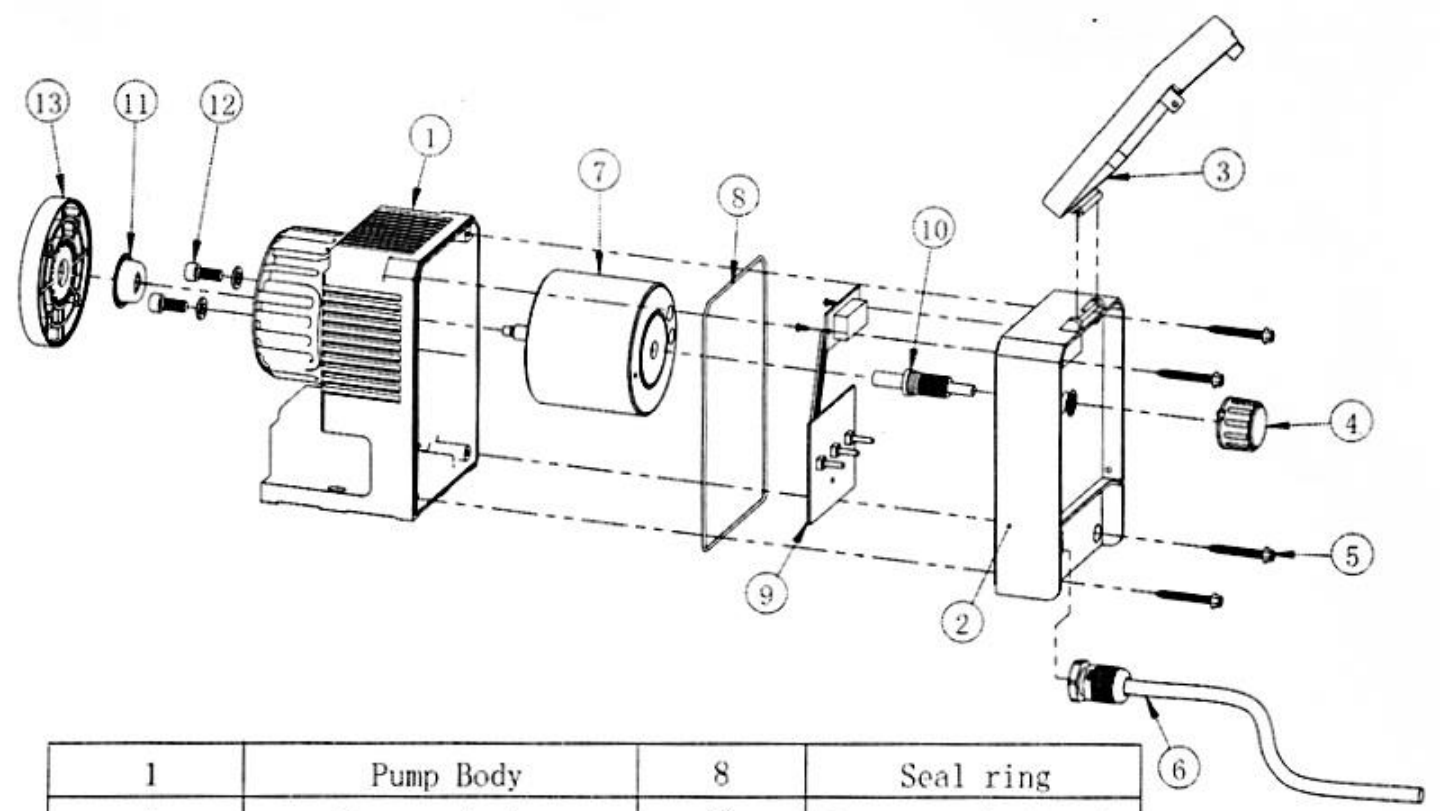
Maintenance: Check free-chlorine residual at least once per month and adjust the Precision-24 Pump and/or solution strength if needed. See the Precision-24 Pump manual for routine maintenance. Change the pump tube every 1 – 3 years.

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	Pump Body	8	Seal ring
2	Rear end plate	9	Integrated circuit
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 chlorine solution tank and discard chlorine 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 chlorine solution. Remove the suction from the water, and allow the pump to pump dry. Pump is ready to store.

NOTE: when diluting the bleach, 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 Pump diaphragm

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

Part # P7007300 Metering pump tubing, 12 Feet. Also can be purchased in longer lengths by the foot.