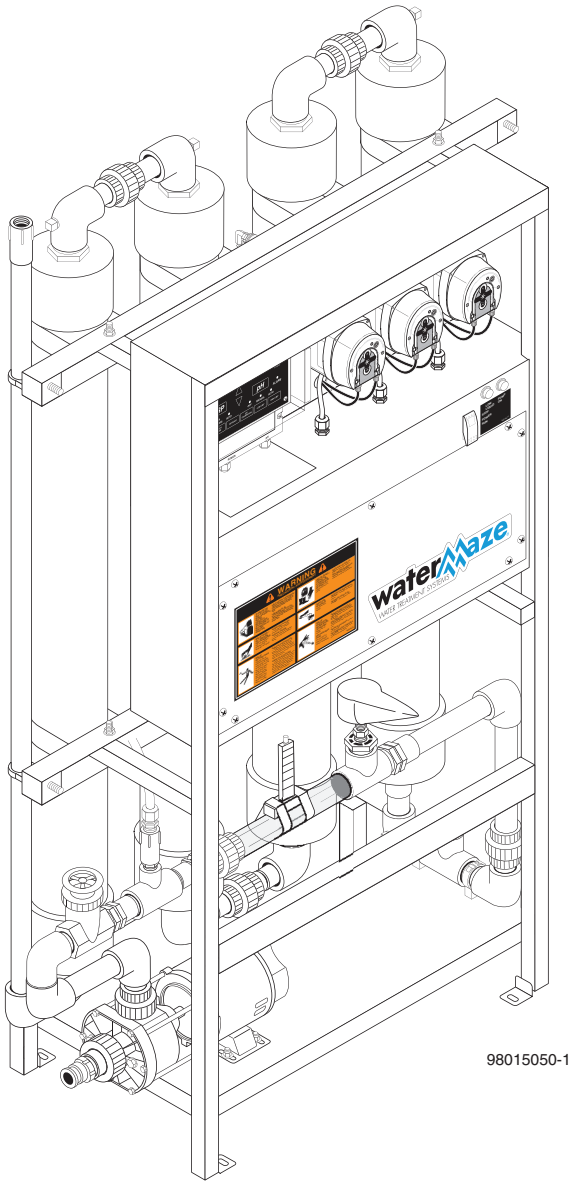
waterMaze®
WATER TREATMENT SYSTEMS

OPERATOR'S MANUAL

■ Compact CoAg Water Treatment System



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Patent Pending

For the dealer nearest you, consult our web page at **www.wmaze.com**

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CONTENTS

Part Number _____

Serial Number _____

Date of Purchase _____

The part and serial numbers will be found on a decal attached to the machine. You should record both serial number and date of purchase and keep in a safe place for future reference.

INTRODUCTION & IMPORTANT SAFETY INSTRUCTIONS

Your owner's manual has been prepared to provide you with a simple and understandable guide, for equipment operation and maintenance, based on the latest product information available at the time of printing. To keep your machine in top running condition follow the specific maintenance and troubleshooting procedures given in this manual. When ordering parts please specify model and serial number.

NOTE: *Water Maze* reserves the right to make changes at anytime without incurring any obligations.

Owner/User Responsibility:

The owner and/or user must have an understanding of the manufacturer's operating instructions and warnings before using this equipment. Warning information should be emphasized and understood. If the operator is not fluent in English, the manufacturer's instructions and warnings shall be read to and discussed with the operator in the operator's native language by the purchaser/owner, making sure that the operator comprehends its contents.

Owner and/or user must study and maintain for future reference the manufacturers' instructions.

SAVE THESE INSTRUCTIONS

This manual should be considered a permanent part of the machine and should remain with it if machine is resold.

When ordering parts, please specify model and serial number. Use only identical replacement parts.

This machine is to be used only by trained operators.

GENERAL SAFETY INFORMATION

WARNING

READ OPERATOR'S MANUAL THOROUGHLY PRIOR TO USE.

WARNING: When using this machine basic precautions should always be followed, including the following:

1. Read all the instructions before using the product.
2. To reduce the risk of injury, close supervision is necessary when a product is used near children.
3. Know how to stop the product and bleed pressures quickly. Be thoroughly familiar with the controls.
4. Stay alert – watch what you are doing.
5. Do not operate the product when fatigued or under the influence of alcohol or drugs.
6. Keep operating area clear of all persons.
7. Do not overreach or stand on unstable support. Keep good footing and balance at all times.
8. Follow the maintenance instructions specified in the manual.

WARNING

KEEP WATER SPRAY AWAY FROM ELECTRICAL WIRING.

WARNING: Wire the system for correct voltage. Refer to the information located on the serial plate.

WARNING: All wiring must be performed by a qualified electrician.

WARNING: Risk of Electric Shock

DANGER – Improper connection of the equipment-grounding conductor can result in a risk of electrocution. Check with a qualified electrician or service personnel if you are in doubt as to whether the machine is properly grounded. Have proper power connections installed by a qualified electrician. Do not use any type of adaptor with this product.

GROUNDING INSTRUCTIONS

This product must be connected to a grounded, metal, permanent wiring system; or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment-grounding terminal located on the product.

GROUND FAULT CIRCUIT INTERRUPTER PROTECTION

To comply with the National Electrical Code (NFPA 70) and to provide additional protection from the risk of electric shock, this machine should only be connected to a circuit protected by a ground fault circuit interrupter (GFCI).

9. Know the system application, limitations, and potential hazards.

WARNING

RISK OF EXPLOSION: DO NOT SPRAY FLAMMABLE LIQUIDS.

WARNING: Do not use near concentrations of flammable or explosive fluids such as gasoline, fuel oil, kerosene, solvents, etc. Do not use in explosive atmospheres. Liquids compatible with component materials should only be used. Failure to follow this warning can result in personal injury and/or property damage.

10. The main power must be brought from the circuit breaker and wired into the electrical box on the Compact CoAg. This power supply must be run through conduit in compliance with local and national electrical codes. A power disconnect should

be located near the machine for maintenance and emergency purposes.

11. Protect all electrical cords from sharp objects, hot surfaces, oil, sunlight, and chemicals. Avoid kinking the cords.

WARNING: If any cords or electrical wires appear to be frayed, damaged, or in poor condition, proceed with caution and immediately take steps to have the cords repaired or replaced.

12. Never make adjustments on the machine while it is in operation, except for those prescribed in this manual.
13. Follow the maintenance instructions specified in this manual.
14. Before servicing the machine, refer to all the MSDS's on the material identified in the waste stream. You must comply with all warnings and wear all protective clothing as stated on the MSDS's.
15. Inlet water temperature must not exceed 85°F.
16. The best insurance against an accident is precaution and knowledge of the equipment.
17. *Water Maze* is not liable for modifications or use of components not purchased from *Water Maze*.

18. Personal Safety:
    a. Wear safety glasses and other applicable protective clothing at all times when working on this machine.

Refer to item #14 under Important Safety Information.

    b. Keep your work area clean, uncluttered and properly lighted
    c. Replace all unused tools and equipment.
    d. Keep visitors at a safe distance from work area.
19. Running the system without water will damage the pumps and will void the warranty.
20. Release all pressure within the system before servicing any component.
21. Drain all liquids from the component before servicing.
22. Check hoses for weak or worn conditions before each use, making certain that all connections are secure.
23. Periodically inspect pump and system components. Perform routine maintenance as required.
24. Do not touch an operating motor. Modern motors are designed to operate at high temperatures.
25. Do not touch any electrical component with wet hands, when standing on a wet or damp surface, or in water.
26. The pump motors are equipped with a thermal protector. Tripping is an indication of motor overloading as a result of operating at excessively high or low voltage, inadequate wiring, incorrect motor connections, or a defective motor or pump.
27. **Keep machine from freezing.**
28. Do not spray water directly at machine.

WARNING: This system contains moving parts in the control center and in the pumps. Follow safe practices when performing maintenance and when troubleshooting. Disconnect the power before servicing this machine. If the power disconnect is out of sight, lock it in the open position and tag it to prevent unexpected application of power.

WARNING: Make sure to take precautions when performing maintenance on the pump in the catch basin. Turn off the power to the pump and make sure electrical cords are well maintained.

APPLICATION AND INTENDED USE

Compact CoAg Water Treatment Unit:

The Compact CoAg water treatment unit can be installed as a **recycle or a treat & discharge water system**. The Compact CoAg may also be installed as a component of a system that incorporates multiple water treatment technologies. In certain applications the constituents in the water may require additional pre-treatment or post treatment of the fluid stream.

To assure the best processed water quality, pretreatment of the waste water should be applied to address the following waste water characteristics:

- **Heavy solids:** Excessive amounts of heavy solids (especially solids that quickly fall out) should be removed prior to entering the Compact CoAg system.
- **Free-oils** (oils that are floating on the surface of the water): Although the Compact CoAg will typically address both free-oils and emulsified oils, excessive amounts of free-oils should be removed prior to entering the system.
- **pH of the water:** Typically, the Compact CoAg system performs best when the pH of the influent waste water is between 7 and 8. If the pH is outside these limits, pH adjustment will be necessary. Consult Water Maze for recommendation.
- **Post-treatment:** Subject to the application requirements, additional water treatment may be required.

Consult a Water Maze representative prior to combining the Compact CoAg with other pre-treating and post treating equipment.

TCLP Testing:

TCLP is one of the Federal EPA test methods that are used to characterize waste as either hazardous or non-hazardous for the purpose of disposal. TCLP is an acronym for Toxicity Characteristic Leaching Procedure. A TCLP test may be required prior to disposal of your solid waste. Consult a Water Maze representative for details.

Site Preparation:

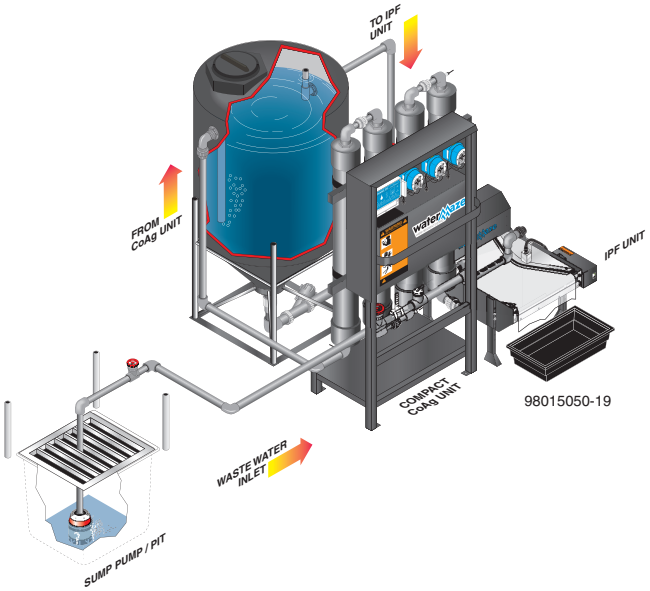
The installation site surface should be of compacted materials, such as concrete, asphalt or pavement and capable of supporting the Compact CoAg treatment system.

Typical Applications

This section outlines some of the common configurations for the Compact CoAg module.

As a treatment & discharge system:

1. Compact CoAg unit receives pretreated water and applies pH control (if required); applies chemical coagulant and chemical flocculent.
2. A small cone-bottom reactor tank is positioned immediately after the Compact CoAg unit, which allows for mixing of the chemical flocculent and provides additional processing dwell time.
   a. This is the most (highly) recommended configuration. (See special note* below).
   b. Maximum estimated flow rate = up to 20 gpm
3. An IPF2-20D Indexing Polishing Filter (standard unit, or High-boy unit), along with a lower water retention container is positioned after the above reactor tank. The IPF2-20D unit provides for separation and dewatering of the gathered (flocculated) matter.



The above shows a typical (most common) configuration for **treatment & discharge (to sewer) applications.**

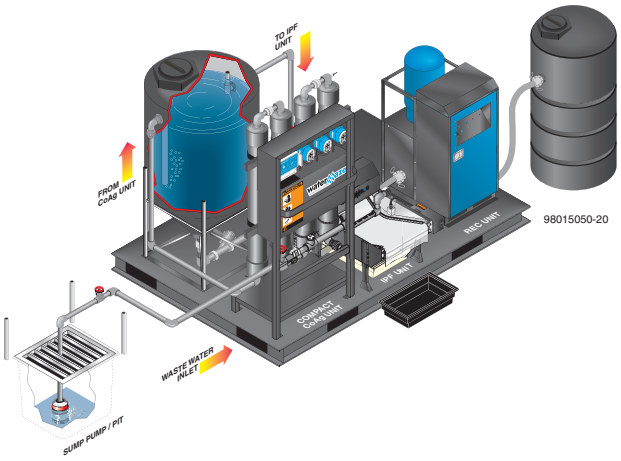
SPECIAL NOTE* – Configuring the 150-gallon tank (as shown), or another size of cone-bottom tank.

This tank receives the CoAg+ coagulated water (CoAg+ chemical injected in the 1st mixing tube) immediately after the EC+ flocculent is injected in the 4th mixing tube. Please take note of the pipe on the inside of the tank. It must be positioned near where the sloped-bottom begins and it should have an elbow (45 or 90 degree) at the bottom that releases the water on an oblique angle, which effectively allows the water to swirl and to complete the mixing of the EC+ coagulant. Also note the vertically oriented PVC Tee on the opposite

side of the tank. Its orientation limits the release of floating matter. As the flocked matter settles to the bottom of the tank, the AMC-1000D auto-purge valve will occasionally purge the matter to the IPF2-20A Indexing Polishing Filter.

As a treatment and recycle system:

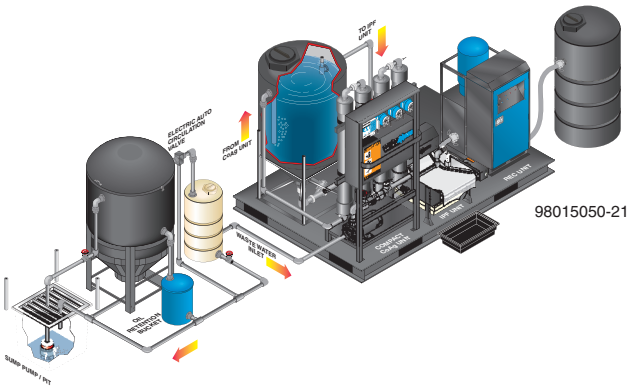
4. Typically, above items (1, 2, and 3) will be incorporated as pretreatment to the following components.
5. A REC2-20A recycle control center module draws water from the water retention container and pumps it into a clean water storage tank where ozone or bioremediation can be applied. Please refer to the Water Maze product catalog for additional information.
6. A clean water storage tank (size to be determined) will be required.



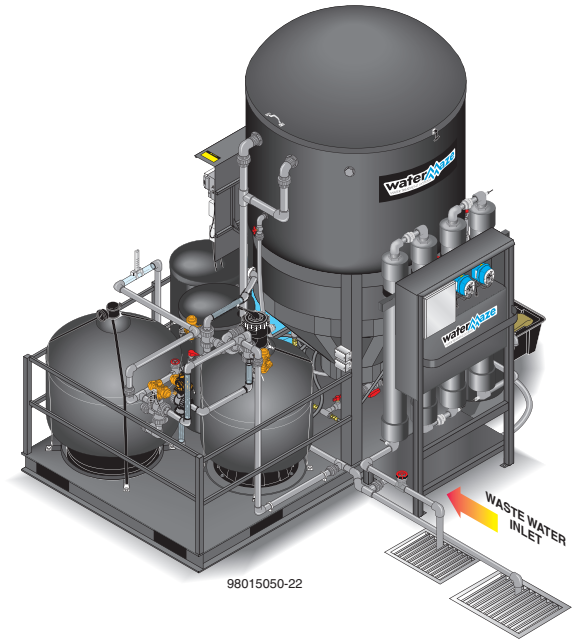
The above shows a typical (most common) configuration for **treatment & recycle applications.**

As pretreatment to, or as a supplement to an existing water treatment system:

7. As a pretreatment (in line) module to an existing water treatment system that is struggling with emulsified oils and / or suspended solids.
8. Configured as a “side-car” (e.g., pulls a partial slip stream) from the main process water where the existing water treatment system is struggling with emulsified oils and / or suspended solids.



The above shows a typical (most common) configuration for **treatment & recycle with clarifier** applied for pretreatment to remove excessive amounts of free-floating oils and settleable solids.

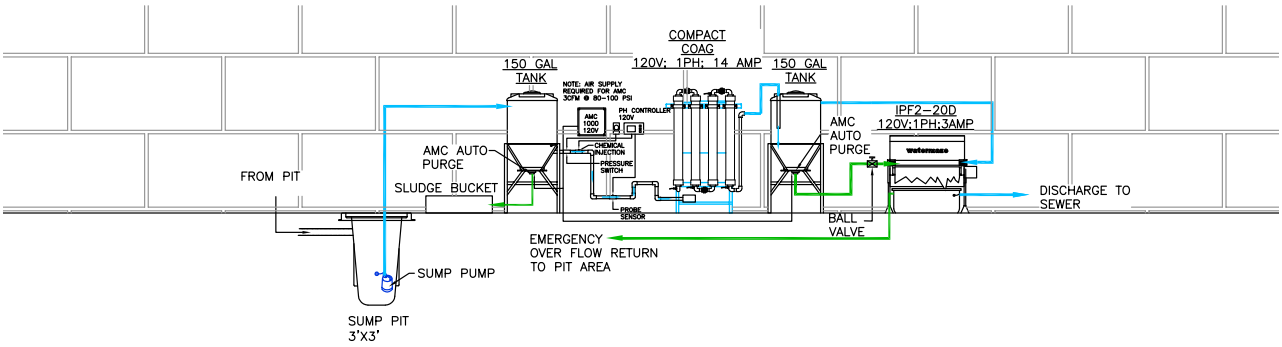


The above shows how a Compact CoAg can be installed in conjuction with another treatment system.

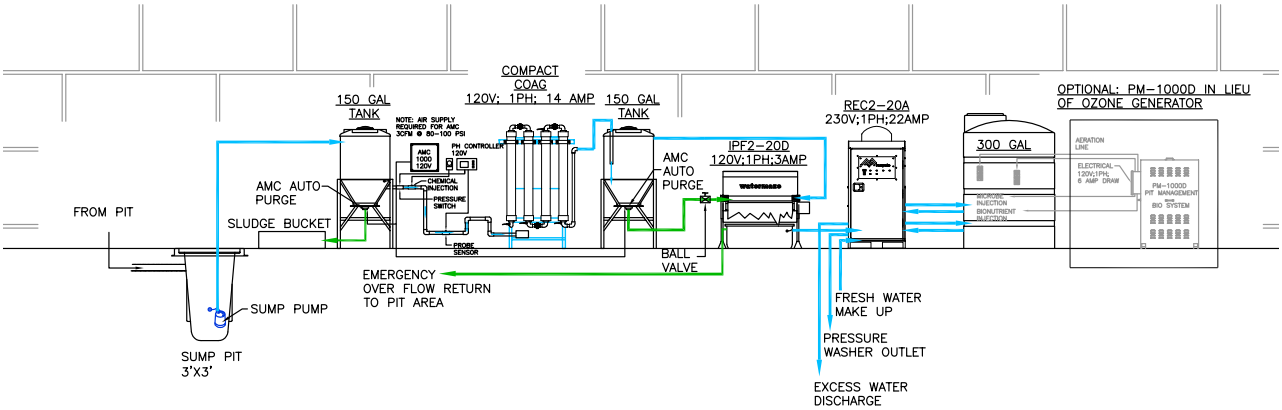
Available Options

- AMC-1000D Auto-Purge system—factory installed control cabinet. Includes control center with timer control, air solenoid and 1.5 inch air actuated/spring shut purge valve (to be installed on a cone-bottom reactor tank positioned immediately after the Compact CoAg unit).
- pH (only) controller with chemical injector pump.

FLOW DIAGRAM



Typical Flow Diagram (Treatment And Discharge) With Pretreatment Tank



Typical Recycle Components With Optional PM-1000D Biosystem

INSTALLATION & OPERATING INSTRUCTIONS

The following instructions will provide adequate information to fully install your Water Maze Treatment and Recycling System. Please follow these instructions step by step to ensure proper installation.

Equipment and Supplies Needed for Installation

Aside from having a general assembly of tools on hand, you will need to supply a few additional items to complete the installation of your system.

- Forklift
- Level
- Grey Flex Hose Pipe #8.711-813.0 Sold by Ft.
- Tape Measure
- Hose Clamps

UTILITY USAGE

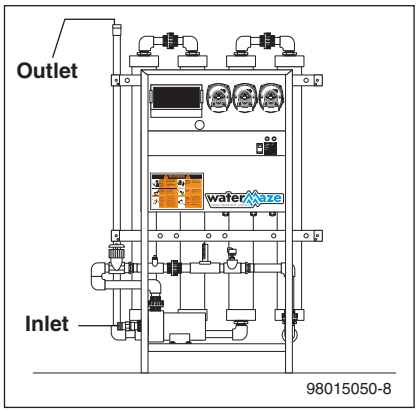
Water: 30-90 PSI

Electrical: 120 Volts, 1 PH, 20 Amps

General Notations: Compact Coag System

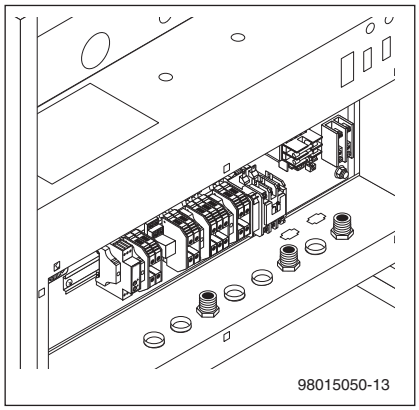
1. Inlet from pretreatment pit system to tank:
   a. Flooded suction is most desirable. When drawing water up from a pit, a foot valve (check valve) may be required.
   b. Cam lock (male and female) supplied with system.
2. Typical pretreatment considerations may include:
   a. Settling of heavy solids
   b. Removal of free floating oils
   c. pH adjustment
3. Outlet Indexing Paper Filter or another dewatering device:
   a. Cam lock (male and female) supplied with system
   b. Hose (1.5 inch diameter) is not included.

INSTALLATION & START-UP INSTRUCTIONS

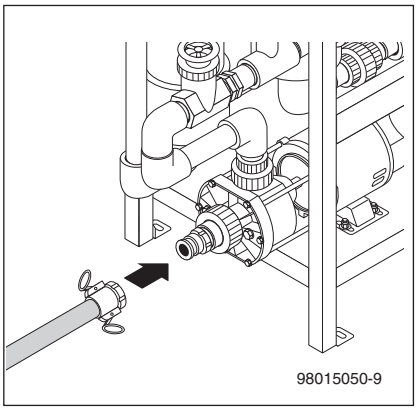


STEP 1: The Compact CoAg water treatment system must be installed on a level surface. If surface is not level, shimming is required.

STEP 2: Connect the inlet piping from either the above ground feed tank to the optional infeed pump installed on the chassis of the Compact CoAg. Or, connect the inlet piping from a sump pump to the inlet manifold on the Compact CoAg unit.

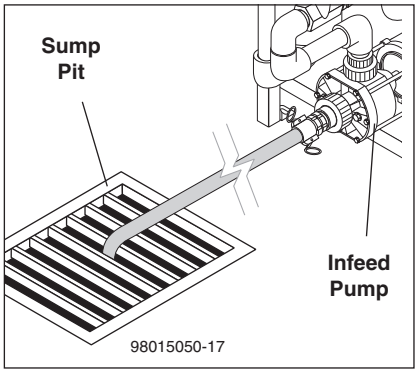


STEP 3: An electrician will connect incoming electrical power to the power block in the electrical box. When connecting to the power supply, follow all electrical and safety codes as well as the most recent National Electric Code (NEC) and Occupational Safety and Health Act (OSHA). Ground system before connecting power supply.

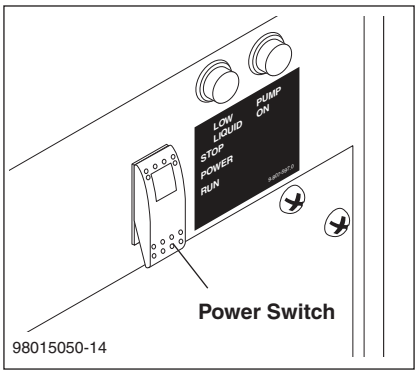


STEP 4: Assemble a flex hose with cam-lock fittings and connect from your waste water source to the waste water inlet connection on the left side of the machine.

INSTALLATION & START-UP INSTRUCTIONS



STEP 5: Fill the sump pit with (waste water source) water.



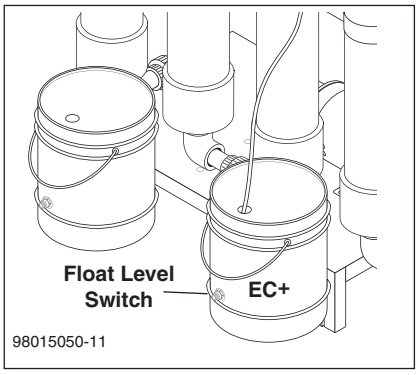
STEP 6: Press and hold power switch in ON position for 3 seconds then release.

STEP 7: With the (optional) infeed pump/sump pump running, adjust the incoming flow rate with the flow control valve supplied as part of the inlet manifold on the Compact CoAg unit.

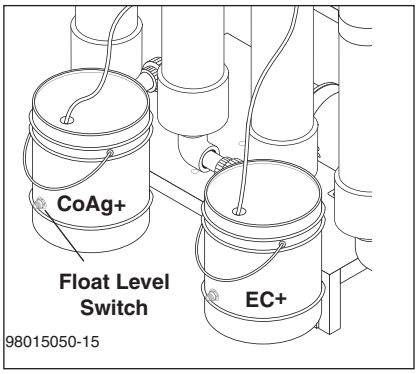
- For applications with the IPF unit immediately downstream, the maximum flow rate will likely be less than 5 or 6 GPM
- For applications with a cone-bottom receiver tank immediatley after the Compact CoAg unit, the flow rates may be up to 20 GPM.

NOTE: Until you are actually treating water (with chemical pumps turned on), the pumped water should be directed back to the sump pit.

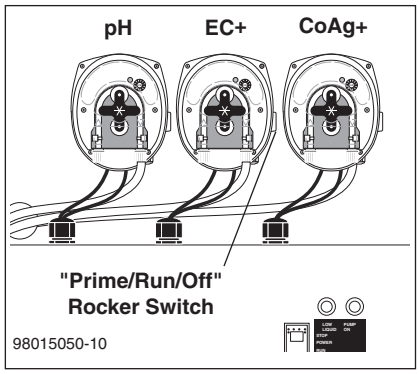
NOTE: Refer to **Process Objectives** on next page.



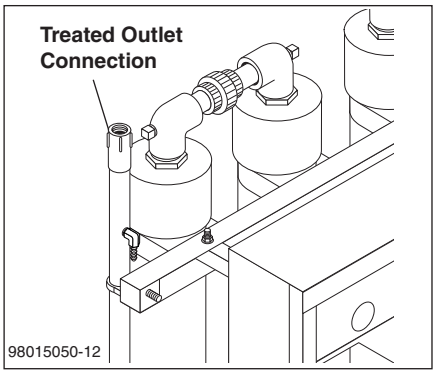
STEP 8: Unplug the float level switch connector. Add the 5 gallon container with EC+ Flocculent. Install EC+ pump tubing into the 5 gallon container. Reconnect the level switch connection. **NOTE:** Dial may be readjusted to produce the desired flocculent.



STEP 9: Add the 5 gallon container with CoAg+ solution to its location under the CoAg+ metering pump. Install the conductivity pump tubing into the 5 gallon container. **NOTE:** Dial may be readjusted to produce the desired conductivity and flocculant.



STEP 10: Turn "On" both metering pumps. The switches are located on the side of each pump. You will need to "prime" each line (with CoAG+ or EC+ chemicals) by holding each metering pump switch in it "prime postion". Release the switch to its normal "run" position.



STEP 11: Assemble a flex hose with cam-lock fittings and install from the treated water outlet connection to the inlet connection on the indexing polishing filter (IPF) (optional). We recommend you install a 1.5 inch ball valve inline with this connection to regulate the flow into the IPF.

If you are not using an IPF, this hose would connect to a treated water holding tank or go to discharge.

STEP 12: Adjust the flow rates of the in-feed water and the chemical injection pumps based on the following ***Process Objectives***:

1. As the influent water enters into the in-feed tank, the in-feed pump control float will rise and signal the in-feed pump to turn on and begin to pump water into the Compact CoAg unit.
2. Initial settings:
   a. Set the flow control as noted in Step #7.
   b. Set each peristaltic pumps (coagulant and flocculant) based on the designated settings for this application. Refer to the bench scale testing procedures conducted on a new water sample for this application (as noted on page #17 of this manual).
   c. Turn the CoAg+ (coagulant) pump on.
   d. Turn the EC+ (flocculant) pump off (until step 4 below is completed).
3 Locate the water sampling tap located between the upper portion of the mixing tubes (between the 2nd and 3rd tubes. Refer to component identification page). As water is flowing, drain water sample(s) into clear sided container to confirm if coagulation is taking effect.
   a. Compare the sample to an untreated water sample. You are looking for small formations of "pin-flocc"or globlets of matter forming within the body of water.
   b. Normally, it is easier to see the pin-flocc forming near the top portion of the cup.
4. Adjust the influent flow control valve up or down and/or the feed speed of the coagulant pump up or down until the "pin-flocc" is acheived.
   NOTE - the objectives are to:
   i. Maximize the influent water flow rate.
   ii. Minimize the speed (eg., consumption) of chemical injection.
5. Turn on the EC+ chemical flocculant pump. Take samples of water (as noted in #4 above). Adjust the EC+ pump speed until you see large gathering of matter forming within the body of water. As noted above, the objective is to minimize the consumption of chemical flocculant, and create a tight gathering of "pin-flocc".

STEP 13 : The pH controller must be programmed before start up. Press the up and down arrows at the same time, then let go to enter programming. "AC" stands for acid injection and "bA" stands for caustic injection. To toggle between the two, just press the up or down arrow one time. The controller will now show the flow switch setting ***(FLO)***. "FO" stands for flow switch OFF and F1 stands for flow switch ON. Set to F1. To toggle between the two, press the up or down arrow one time. Leave controller alone till the pH is showing on LED screen.

STEP 14 : To calibrate pH:

- Press ***(CALIBRATION)*** button
- Press ***(pH)*** button: display flashes
- Use the ***(UP)*** or ***(DOWN)*** arrows to adjust the value
- Press ***(CALIBRATION)*** button to again save value

STEP 15 : To change the setpoint:

- Press ***(SETPOINT)***
- Press ***(pH)*** button: display flashes
- Press ***(UP)*** or ***(DOWN)*** arrows to adjust the setpoint
- Press ***(SETPOINT)*** button to again save value

MAINTENANCE INSTRUCTIONS

OPERATING ENVIRONMENT

The Compact CoAg is designed to work in a wide variety of operating conditions. In normal operating environments, the system should perform as specified. In extremely hot or cold environments certain precautions need to be taken.

Operating Conditions

Air Temperature Range 40° - 120°F

Water pH 6.5 - 8.0

Cold Weather

⚠ CAUTION

DRAIN SYSTEM WHEN TEMPERATURES DROP BELOW FREEZING

Protect the Compact CoAg from damage that can occur when freezing water expands. Freezing water may cause pipes to burst.

Drain all pipes if a prolonged hard freeze is expected. Make sure all valves are open so water can completely drain from the system.

⚠ Cold Climate Conditions

In locations where freezing temperatures will be experienced on a regular basis or where very cold temperatures will be incurred, the water treatment system should be drained when the outside ambient temperature drops below freezing and/or the water treatment system (Compact CoAg) should be housed in a heated structure. The warranty on the water treatment system does not provide for repair due to freezing conditions.

Hot Weather

The Compact CoAg may encounter minor problems, such as a slight increase in odor, when operating in extremely hot temperatures in excess of 100° F.

Environmental

To reduce deterioration of equipment it is recommended that the Compact CoAg Water Treatment System be protected from environmental elements such as rain, snow, hail, direct sunlight, as well as freezing temperatures.

MAINTENANCE INSTRUCTIONS

Daily and weekly maintenance is important for your system to function consistently and properly. Maintenance frequency depends on many factors, such as usage, volume of sludge, etc. On-site personnel should be trained and be aware of the daily and weekly maintenance that is required to meet these performance factors. We recommend the following:

Daily Schedule:

(Performed by customer personnel)

1. Become familiar with the control panel and make sure that the electrical switch is in the ON positions. This will allow your system to operate automatically.
2. While operating the system, observe and repair any water leaks.
3. Check level of CoAg solution.

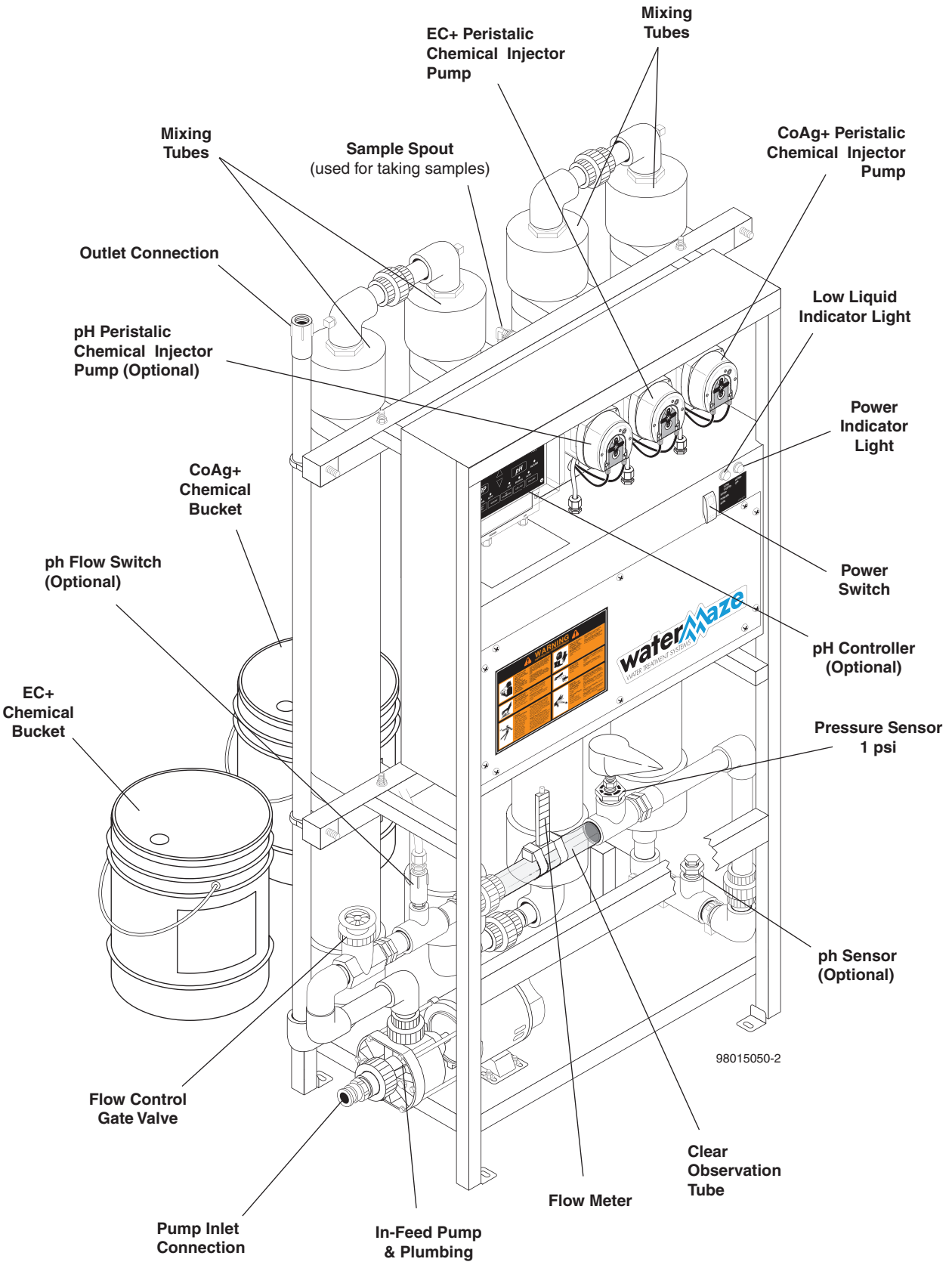
Weekly Maintenance Schedule:

(Performed by customer personnel)

1. Refill CoAg+ chemical container when level is low.
2. Fill EC+ flocculant solution container when level is low.
3. Lock or secure Water Treatment System.

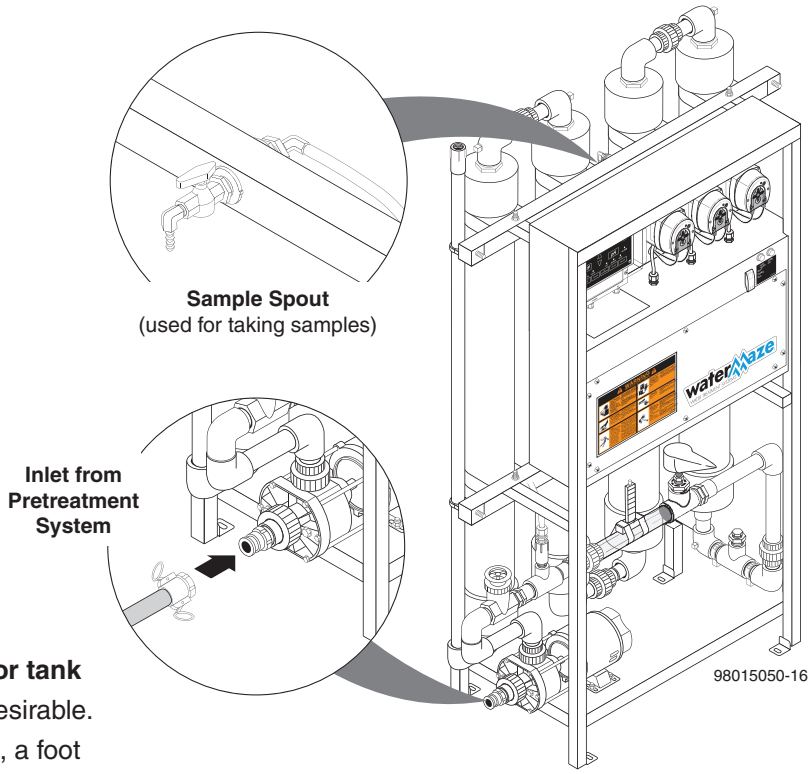
COMPACT COAG COMPONENT IDENTIFICATION

Shown with Options



COMPACT COAG+ SYSTEM

Shown with Options



CoAg+ System

Inlet from pretreatment pit system or tank

- **NOTE:** Flooded suction is most desirable. When drawing water up from a pit, a foot valve (check valve) may be required.
- **NOTE**: Cam lock (male and female) supplied with system.

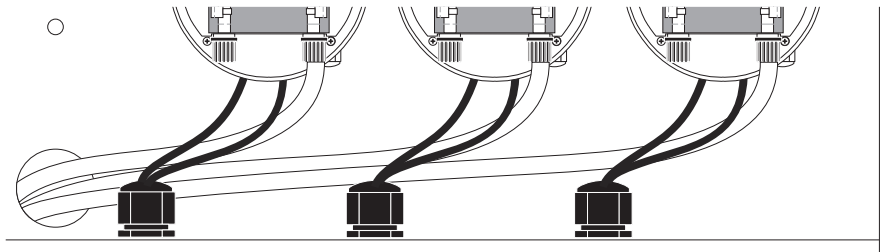
Typical pretreatment considerations may include:

- Settling of heavy solids
- Removal of free floating oils
- pH adjustment

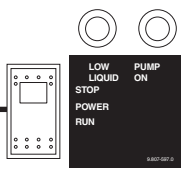
Outlet to Indexing Paper Filter or another dewatering device.

- Cam lock (male and female) supplied with system
- Hose (1.5 inch dia) is not included.

CONTROL PANEL VIEW



Hold "ON" to bypass pressure switch initial set-up.



METERING PUMPS

(Variable Speed Peristaltic)

TECHNICAL INFORMATION

Materials:

Squeeze Tubing	Special synthetic rubber
Strainer and Injection Point Fitting	PVC
Feed Rate:	1-7 or 8-45 GPD
Tubing Size:	1-7 or 8-45 GPD
Dimensions:	Height = 5"
	Width = 4"
	Depth = 4 1/4"

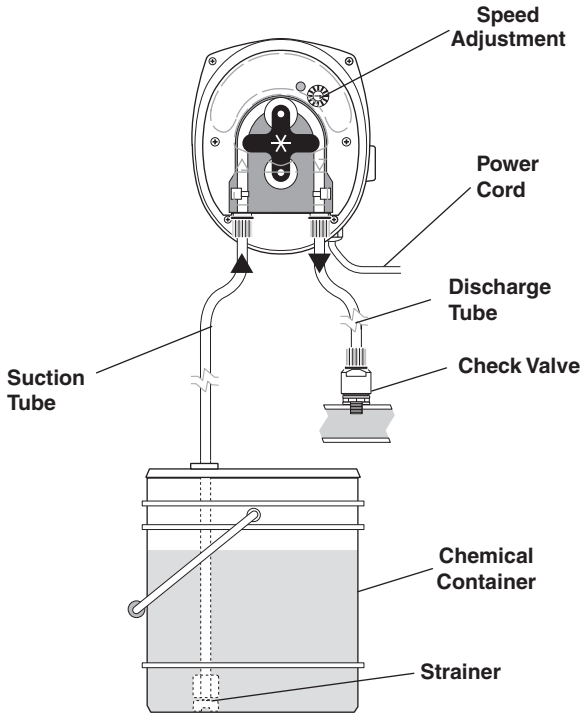
Standard Accessories Provided with Pump:

- Squeeze Tubing
- Check Valve Assembly
- Strainer with weight
- Bulkhead fitting with elbow

Electrical Rating:

- 20-265 VAC
- 7 W
- 50/60 Hz

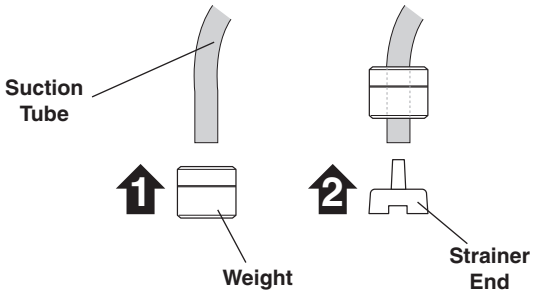
Maximum System Pressure: 45 PSI



INSTALLATION

1. **SUCTION TUBING:** Take the 5 ft. length of 1/4" O.D. tubing included, measure and cut the lengths needed to run from pump head to the chemical tank. Cut the tubing ends square.
2. **CONNECT SUCTION TUBING TO PUMP:** Remove compression fitting. Feed tube through fitting. Push end of the tube on fitting. Tighten fitting firmly.

NOTE: To soften the end of the tubing, immerse it in hot water.



3. **CONNECT SUCTION TUBING TO STRAINER:** Install strainer so it's off the bottom of the chemical container. Cut the suction tubing to the length needed. Put weight on tubing. Push strainer end into tubing.

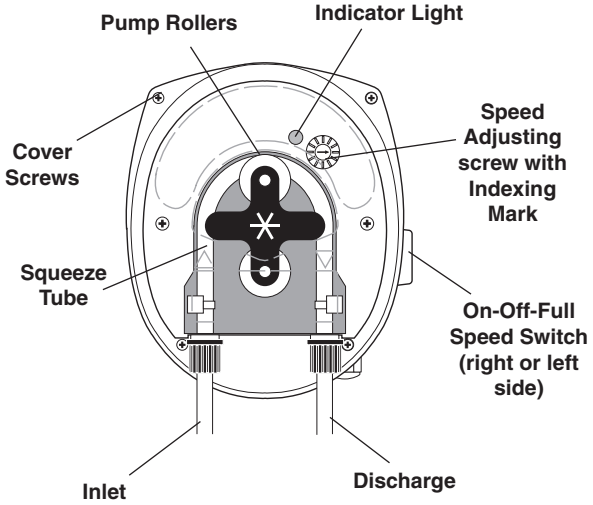
METERING PUMP OPERATION

If not already done, put the end of the suction tubing into the chemical container, near the bottom.

Move the "ON-OFF" switch to ON.

PRIME: To prime the pump and lines push the 3-way switch to full speed.

FEED ADJUSTMENT: (ONLY A QUALIFIED *WATER MAZE* SERVICE TECHNICIAN SHOULD MAKE THIS ADJUSTMENT.) The feed adjustment is under the cover plate. Remove the plate and turn the adjusting screws clockwise to increase feed or counterclockwise to decrease feed.



METERING PUMP MAINTENANCE

DANGER: DO NOT ATTEMPT TO USE CHEMICALS WITHOUT CONSULTING YOUR CHEMICAL DEALER OR CHEMICAL SUPPLIER. READ MSDS BEFORE HANDLING.

WARNING

PROTECTIVE EYEWEAR AND CLOTHING MUST BE WORN.

CAUTION: Wear protective gloves, goggles, and other adequate protection for the chemical hazard.

Before replacing the pump head, remove chemical from tubing as follows:

1. Remove strainer from chemical tank.
2. Run pump until all chemical is removed from the tubing.

FILL THE CHEMICAL TANK: To avoid running out, of chemical, follow a regular schedule of monitoring chemical supply. Also inspect and clean the strainer by flushing with a compatible liquid, as needed.

INSPECT SQUEEZE TUBING: Inspect tubing regularly and replace it if it is deteriorating.

REPLACE SQUEEZE TUBING:

1. Remove compression fittings from the tubing at the pump head.
2. Pull the suction and discharge tubing from the pump head.
3. Remove the front cover from the pump.
4. Rotate the pump rollers to a vertical position.
5. Lift the inlet fitting out of the housing.
6. Pull the tube out while rotating the pump rollers clockwise.
7. Remove the outlet fitting.
8. Install the inlet fitting for the new tube assembly.
9. Press the tube into place in front of a roller while rotating the roller assembly clockwise.
10. Install the outlet fittings.
11. Reconnect the suction and discharge lines.
12. Install the front cover.

CAUTION: DO NOT LOSE THE BEARING FROM THE CENTER HOLE IN THE BACK COVER.

TUBE REPLACEMENT:

Clear or transparent plastic tubing should be replaced at least every three months if exposed to the sun. Replace tubing yearly if feeder is installed indoors.

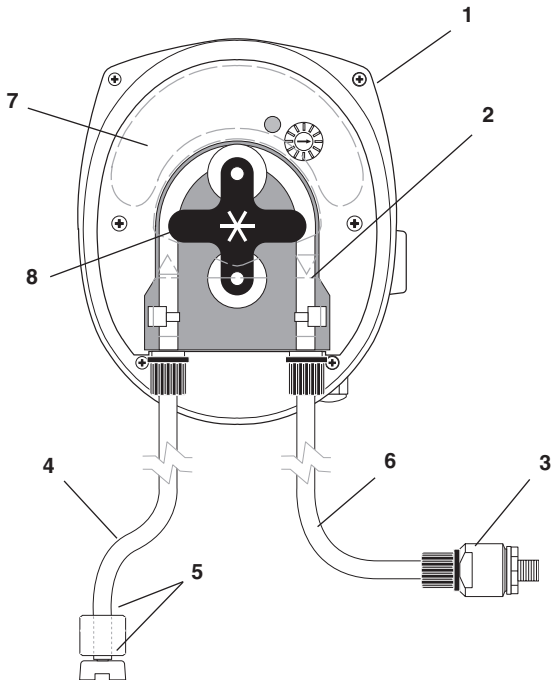
INSPECT FOR LEAKAGE:

Inspect the chemical system daily for any signs of leakage. If leaking occurs at tubing connections, tighten fitting compression nut finger tight. If leakage continues, remove pressure from the system. Disconnect the tubing, trim ends square and reconnect.

INSPECT FOR BLOCKED FLOW:

Precipitates or other chemical reactions cause injection points to clog. If the type of chemical being fed eliminates the use of flushing solution, the injection point must be inspected at regular intervals. Strainers must be kept clean with periodic back-flushing.

METERING PUMP AND PARTS LIST



ITEM	PART NO.	DESCRIPTION	QTY
1	8.749-856.0	Pump, Peristaltic, PRS-1, 1-7 gpd	2
2	8.749-862.0	Tube, Squeeze, Santoprene, * PR-7, 8-45 gpd	1
	8.749-864.0	Tube, Squeeze, Santoprene, * PRS-1, 1-7 gpd	1
3	8.749-860.0	Check Valve, PVC	1
4	8.749-857.0	Tubing, 1/4", PE, Black	AR
5	8.749-863.0	Strainer, w/Weight	1
6	8.711-737.0	Tubing, 1/8" , ID, Norprene	AR
7	8.751-801.0	Faceplate, PRS-1/PR-7	1
8	8.751-376.0	Roller Assembly, PRS-1	1

* Alternative tubing materials are available

CENTRIFUGAL PUMP

Your centrifugal pump has been quality-built and engineered to give you efficient, dependable service. It is equipped with union connectors to make installation and future service easier.

The advanced design uses a single speed motor which reduces operation and maintenance to simple, common-sense procedures.

PUMP OPERATION

(Infeed Pump)

⚠ WARNING

RISK OF ELECTRIC SHOCK: USE CAUTION WHEN HANDLING.

WARNING: Do not touch pumps, pump motors, water or discharge piping when the pumps are connected to electrical power. Do not handle a pump or pump motor with wet hands or when standing on a wet or damp surface or in water. Never touch a pump or discharge piping when a unit is operating or fails to operate. Always disconnect the pump cord (power) before handling.

1. The shaft seal depends on water for lubrication. Do not operate the pump unless there is water. Dry running (pump not pumping water) will cause seal damage and eventual pump failure.
2. The motor is equipped with an automatic reset thermal protector. This means if the temperature in the motor should rise unduly, the switch will cut off all power before damage can be done to the motor. When the motor has cooled sufficiently, the switch will reset automatically and restart the motor. If the protector trips repeatedly (cycling on protector) the pump should be removed and checked as to the cause of the difficulty. Low voltage, long extension cords, clogged impeller, very low head or lift, etc., could cause cycling. Cycling of the protector will cause eventual motor burnout.

INFEED PUMP MAINTENANCE

⚠ WARNING

RISK OF ELECTRIC SHOCK: USE CAUTION WHEN HANDLING.

WARNING: Before attempting to service, disconnect power from unit. Do not handle the pump with wet hands or when standing on a wet or damp surface or in water. Failure to follow precautions can result in personal injury and /or property damage.

NOTE: Only qualified electricians or servicemen should attempt to repair this unit. Improper repair and/or assembly can cause an electrical shock hazard.

1. Bearings in this unit are pre-lubricated. No additional lubrication is necessary.
2. Cleaning - Occasionally clean the Transfer pit and pump if dirt or foreign matter accumulate. Small stones, gravel, sand, dirt, silt, etc. can clog and damage the pump and pump seal, eventually causing pump failure.
3. Disassembly of the motor prior to expiration of the warranty will void the warranty. It may also cause internal leakage and damage to the unit. If repairs are required, return the pump to a local service station or return to dealer.
4. If the motor has been disassembled or the switch chamber opened after the warranty expiration date, the O-rings and gaskets must be replaced. Care must be taken to assure that the seals, the switch cover and air tube gaskets do not leak.
5. The pump should be checked for proper operation weekly or monthly by watching the operation of the pump. If anything has changed since the pump was new, the pump should be examined, and repaired if necessary.

CONFIGURING AND TUNING PERISTALTIC PUMPS

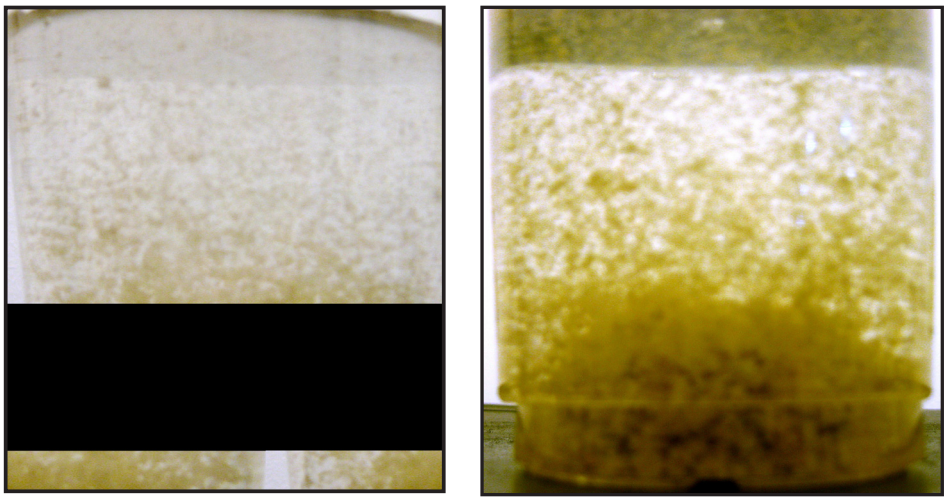
The following is a set of guidelines to be used when configuring the peristaltic pumps that inject Coag and EC chemicals into the WaterMaze water treatment system. Materials required for this process are included in the WaterMaze CoAg Test Kit. Materials include:

- Small quantity (4oz ea) of CoAg+ and EC+ chemicals to be used in system
- 500 ml capacity test sample containers
- Clean standard sized plastic transfer pipettes (20 drops/ml, 3.2 ml draw)
- Filter Paper (50, 20 and 5 micron)

Determining Required Chemical Concentrations:

1. Obtain a **representative water sample** of the waste stream (1-2 gallons).

   NOTE: Sampling is highly important. The sample should be representative of what will be processed by the CoAg treatment system. In other words, proper pretreatment should be applied to remove heavy solids (e.g., those that settle quickly within say 10 to 15 minutes) and to remove free oils (e.g., oils that can be skimmed from the surface of the water).
2. Pour a **500 ml sample** into a clear container (beaker, cup, etc.)
3. **Test the pH** of the sample.
4. **Adjust pH to 6.5 to 8**. In many cases, pH adjustment should be considered as part of the pretreatment process. Adjusting the pH may allow for additional separation of oils and solids.
5. **Add 2 drops (.1 ml) of CoAg+ coagulant** to the sample.
6. **Mix vigorously** for at least 45 seconds.
7. **Observe the reaction** noting the start of coagulation (clumping together of solids).
8. **Add 3 drops (.15 ml) of EC+ polymer and gently mix** (slowly) for 30 seconds.
9. If successful, a separation of the solids should occur with the majority of the solids falling to the bottom of the sample container with clear phase of liquid on the top of the sample.
10. This sample can then be **filtered through 50 micron paper** to remove the flocculated solids.
11. If a separation does not occur, repeat the above steps with a new sample and add one additional drop (.05 ml) of CoAg+. Unsuccessful results after further adjustments may indicate that a different treatment technology is required other than Chemical treatment.

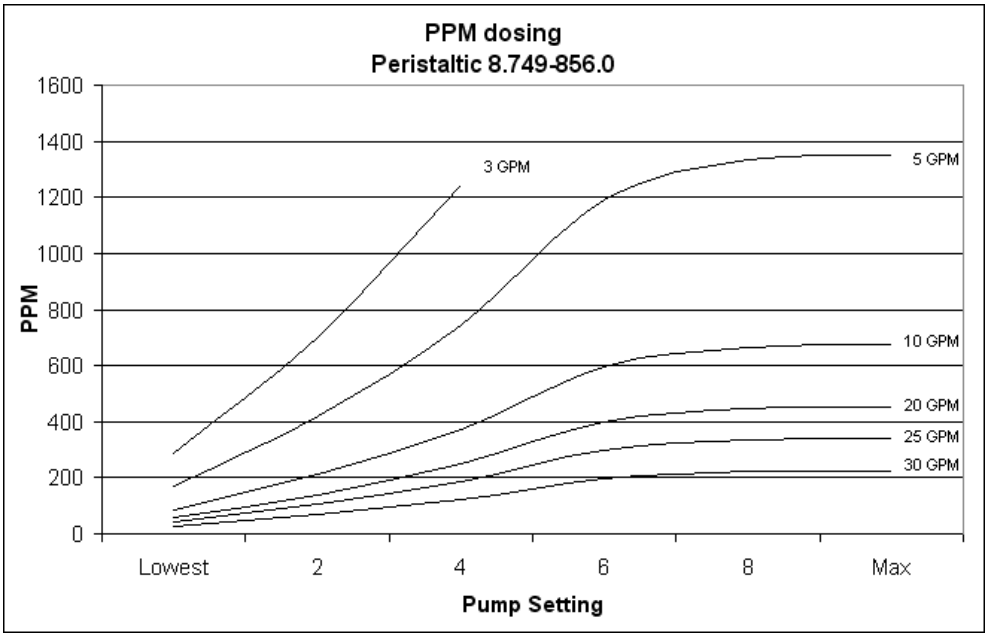


Water before (left) and after EC polymer is added to increase clumping.

CONFIGURING AND TUNING PERISTALTIC PUMPS

Calibrating Peristaltic Pumps:

1. Collect the ppm concentration values for the Coag and EC polymer injections. Use the chart on the last page to determine the correct setting for each peristaltic pump. Align the ppm requirements with the desired processing rate, in gallons per minute (GPM), and obtain an estimate for the pump setting from the continuum along bottom of the figure.
2. The pump settings reference the spaces between hash marks on the pump's flow rate adjustment dial. Figure 1 on the last page shows the notation for these markings. A small screw driver can be used to adjust the pump to match the setting that was estimated by the configuration chart.



Pump Configuration Chart for WaterMaze Coag/EC Water Treatment System.

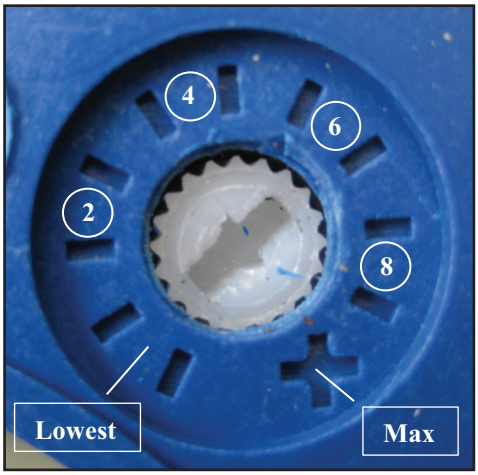


Figure 1. Peristaltic pump dial. This figure is a reference for the pump settings determined from the above chart . The dial in the image is currently at the "Lowest" setting.

Table 1. PPM concentration per drop of chemical. To be used with 20drops/ml transfer pipets and 500 ml of sample water.

# of Drops	PPM of Chemical
1	100
2	200
3	300
4	400
5	500
6	600
7	700
8	800
9	900
10	1000

Number of Drops	Observation

TROUBLESHOOTING - PUMP

PROBLEM	POSSIBLE CAUSE	SOLUTION
PUMP DOES NOT TURN ON	Circuit breaker shut "OFF	Turn "ON" circuit breaker.
	Accumulation of trash on float	Clean float.
	Float obstruction	Check float path and provide clearance.
	Defective switch	Have pump serviced by authorized service center.
	Defective motor	Have pump serviced by authorized service center.
	Low line voltage	If voltage under recommended minimum, check size of wiring from main switch on property. If OK, contact power company.
PUMP WILL NOT SHUT OFF	Float obstruction	Check float and float rod path. Provide clearance.
	Pump is air locked (Infeed Pump)	Shut power off for approximately 1 minute, then restart. Repeat several times to clear air from pump.
	Defective float switch	Disconnect switch, check with ohmmeter.
PUMP RUNS BUT DOES NOT DISCHARGE LIQUID	Lift too high for pump	Check rating table.
	Inlet to impeller plugged	Pull pump and clean.
	Low line voltage	If voltage under recommended minimum, check size of wiring from main switch on property. If OK, contact power company.
	Clogged impeller	Remove housing, unclog.
	Faulty motor protector	Replace pump.
PUMP DOES NOT DELIVER RATED CAPACITY	Low voltage, speed too slow	Check for proper supply voltage to make certain it corresponds to nameplate voltage.
	Impeller or discharge pipe is clogged	Pull pump and clean. Check pipe for scale or corrosion.
	Impeller wear due to abrasives	Replace worn impeller.
PUMP CYCLES CONTINUALLY	Low line voltage	If voltage under recommended minimum, check size of wiring from main switch on property. If OK, contact power company.
	Worn or defective pump parts or plugged impeller	Replace worn parts or entire pump. Clean parts if required.
	Pump air locked	Turn pump "ON" and "OFF" several times. Fill hose manually with water.

TROUBLESHOOTING - INFEED PUMP

PROBLEM	POSSIBLE CAUSE	SOLUTION
INFEED PUMP DOES NOT OPERATE	Sump or pre-treatment tank has low water level	Raise level in sump or pre-treatment tank.
	Control panel pump switch is in the OFF position	Confirm that control panel pump switch is in the ON position.

TROUBLESHOOTING - PUMP MOTOR

PROBLEM	POSSIBLE CAUSE	SOLUTION
MOTOR WILL NOT RUN	Disconnect switch is "OFF"	Be sure switch is on.
	Breaker is tripped	Reset breaker.
	Starting switch is defective	Replace starting switch.
	Wires at motor are loose, disconnected or wired incorrectly	Refer to instructions on wiring. Check and tighten all wiring.
MOTOR RUNS HOT AND OVERLOAD KICKS OFF	Motor is wired incorrectly	Refer to instructions on wiring.
	Voltage is too low	Check with power company. Install heavier wiring if wire size is too small. See wiring instructions.
	Defective float switch	Disconnect switch, check with ohmmeter.
MOTOR RUNS BUT NO WATER IS DELIVERED	Pump in a new installation did not pick up prime through: a. Improper priming b. Air leaks	 a. Re-prime (3 or 4 times may be needed) by stopping and starting motor several times. b. Check all connections on suction line.
	Pump has lost its prime through: a. Air leaks b. Water level below suction of pump	 a. Check all connections on suction line, air volume control, jet and shaft seal b. Lower suction line into water and re-prime.
	Check valve is stuck in closed position	Replace check valve
	Pipes are frozen	Thaw pipes. Bury pipes below the frost line. Heat pipes below frost line. Heat pit or pump house.

TROUBLESHOOTING - WATER SOLENOID

PROBLEM	POSSIBLE CAUSE	SOLUTION
VALVE LEAKS WHEN "OFF"	Dirt or debris on diaphragm seat	Clean diaphragm seat.
	Solenoid not fully closed after manual operation	Turn solenoid clockwise to fully seated position.
	Solenoid O-ring damaged or twisted	Turn off water, inspect O-ring. Reseat if twisted, replace if damaged.
	Diaphragm damaged	Turn off water, remove bonnet screws and inspect diaphragm for nicks or damage **NOTE:** Diaphragm has one bleed hole molded into it. Replace, if necessary, with diaphragm kit.
	Dirt interfering with solenoid operation	Turn off water, remove solenoid and flush seating surface in bonnet and at bottom of solenoid with water.
	Solenoid damaged	Turn off water supply and replace solenoid.
WATER WON'T SHUT OFF	Valve in manual "ON" position	Turn solenoid clockwise to "OFF" position.
	Diaphragm bleed hole blocked	Use Manual Flush Mode. Turn water supply "OFF" and immediately back "ON" to clear blockage. If still blocked, turn off water and inspect diaphragm looking for blockage.
	Damaged solenoid	Turn off water supply and replace solenoid.
LOW OR INADEQUATE FLOW CONDITION	Gate valve not fully open	Open gate valve fully.
	Pipeline blockage	Clear pipeline.
VALVE WON'T TURN ON ELECTRICALLY	No power to solenoid	Make sure solenoid has power.
	Low voltage	Check for proper voltage to unit.
	No water pressure	Make sure water pressure is available to valve. Turn off water, without cutting wires, unscrew and swap solenoids between valves. Turn on water and test again. If problem stems from the solenoid, replace solenoid.

TROUBLESHOOTING - WATER SEALS

PROBLEM	POSSIBLE CAUSE	SOLUTION
CRACKED OR BROKEN STATIONARY SEAT (CERAMIC)	Seal ran dry and heated up. When liquid reached seal faces it was cooler, causing thermal cracks	Check to insure seal chamber is full of liquid before starting pump. On high temperature application insure proper flushing at seal faces.
CARBON WASHER SCORED AND GROOVED	Dirty system	Have system cleaned and flushed. Consider use of Tungsten Carbide or Silicon Carbide Rings.
CARBON WASHER WORN UNEVENLY	Seal improperly installed	Check installation instructions for proper assembly.
BUNA DIAPHRAGM HARD OR BRITTLE. RAPID CARBON WEAR.	Air leak on suction side of pump	Check cover gasket, hand knobs, hose, clamps, etc. Replace or tighten as necessary.
DIAPHRAGM SOFT AND STICKY; APPEARS TO BE DISSOLVING.	Bellows not compatible with material being pumped	Consult dealer for recommendation advising of pumpage and temperature.

LIMITED NEW PRODUCT WARRANTY
WASH WATER / WATER TREATMENT SYSTEMS

WHAT THIS WARRANTY COVERS

All *WATER MAZE* water treatment systems are warranted by to the original purchaser to be free from defects in materials and workmanship under normal use, for the periods specified below. This Limited Warranty, subject to the exclusions shown below, is calculated from the date of the original purchase, and applies to the original components only. Any parts replaced under this warranty will assume the remainder of the part's warranty period. A 60 day grace period will be given for installation.

ONE YEAR PARTS AND 30 DAY LABOR WARRANTY:

All components excluding normal wear items as described below.

WARRANTY PROVIDED BY OTHER MANUFACTURERS:

Motors, which are warranted by their respective manufacturers, are serviced through these manufacturers' local authorized service centers. *WATER MAZE* cannot provide warranty on these items.

WHAT THIS WARRANTY DOES NOT COVER

This warranty does not cover the following items:

1. Normal wear items, such as seals, filters, gaskets, O-rings, packings, pistons, brushes, filtering media, ozone bulbs, sensors, UV scanners, oil-skimmer belt, impedance sensor. Minor leaks covered first time on original start-up only.
2. Damage or malfunctions resulting from accidents, abuse, modifications, alterations, incorrect installation, improper servicing, failure to follow manufacturer's maintenance instructions, or use of the equipment beyond its stated usage specifications as contained in the operator's manual.
3. Damage due to freezing, sludge build-up, chemical deterioration (oxidation, chloride or fluoride corrosion), and rust.
4. Damage to components from fluctuations in electrical or water supply.
5. Normal maintenance service, including adjustments.
6. Transportation to service center, field labor charges, or freight damage.
7. Consumables and water quality.

WHAT YOU MUST DO TO OBTAIN WARRANTY SERVICE

While not required for warranty service, we request that you register your *WATER MAZE* Product by returning the completed registration card. In order to obtain warranty service on items warranted by *WATER MAZE*, you must return the product to your Authorized *WATER MAZE* Dealer, freight prepaid, with proof of purchase, within the applicable warranty period. If the product is permanently installed, you must notify your Authorized *WATER MAZE* Dealer of the defect. Your Authorized *WATER MAZE* Dealer will file a claim with *WATER MAZE*, who must subsequently verify the defect. In most cases, the part must be returned to *WATER MAZE* freight prepaid with the claim. For warranty service on components warranted by other manufacturer's, your Authorized *WATER MAZE* Dealer can help you obtain warranty service through these manufacturers' local authorized service centers.

LIMITATION OF LIABILITY

WATER MAZE'S liability for special, incidental, or consequential damages is expressly disclaimed. In no event shall *WATER MAZE'S* liability exceed the purchase price of the product in question. *WATER MAZE* makes every effort to ensure that all illustrations and specifications are correct, however, these do not imply a warranty that the product is merchantable or fit for a particular purpose, or that the product will actually conform to the illustrations and specifications. Our obligation under this warranty is expressly limited at our option to the replacement or repair at a service facility or factory designated by us, of such part or parts as inspection shall disclose to have been defective. **THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY WATER QUALITY, MERCHANTABLIITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WARRANTY.** This warranty gives you specific legal rights and you may also have other rights which vary from state to state. *WATER MAZE* does not authorize any other party, including authorized *WATER MAZE* Distributors, to make any representation or promise on behalf of *WATER MAZE*, or to modify the terms, conditions, or limitations in any way. It is the buyer's responsibility to ensure that the installation and use of *WATER MAZE* products conforms to local codes. While *WATER MAZE* attempts to assure that its products meet national codes, it cannot be responsible for how the customer chooses to use or install the product. Some states do not allow limitations or exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

watermaze
WATER TREATMENT SYSTEMS

Form #9.801-505.0 • Revised 7/13 • Printed in U.S.A.