

PM-1000 Bio Treatment System OPERATOR'S MANUAL



98073700-1



Part # 1.103-467.0

For technical assistance or the Water Maze Dealer nearest you,
consult our web page at **www.wmaze.com**

WARNING:



This product and accessories may contain a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

For more information about this regulation: www.P65Warnings.ca.gov

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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

INTRODUCTION

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 unit in top running condition, follow the specific maintenance and troubleshooting procedures given in this manual.

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 the manufacturers' instructions for future reference.

SAVE THESE INSTRUCTIONS

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

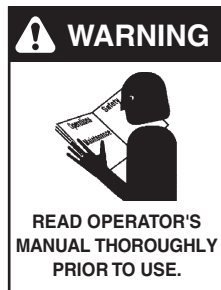
When ordering parts, please specify model and serial number. Use only identical replacement parts.

This machine is to be used only by trained operators.

UNPACKING

1. PM-1000
2. Operator's Manual

SAFETY INSTRUCTIONS



WARNING: To reduce the risk of injury, read operating instructions carefully before using.

AVERTISSEMENT: Pour réduire le risque de blessures, lire attentivement les instructions de fonctionnement avant l'utilisation.

1. Read the owner's manual thoroughly. Failure to follow instructions could cause malfunction of the unit and result in death, serious bodily injury and/or property damage.



DANGER: Wire the system for correct voltage. See "Electrical" section of this manual and motor nameplate.

DANGER: Raccorder le système au réseau électrique en respectant la tension. Consulter la section « Électricité » du présent manuel et la plaque

signalétique du moteur.

WARNING: Follow the wiring instructions in this manual when connecting the system to the power lines.

AVERTISSEMENT: Suivre les instructions de câblage dans le présent manuel au moment de raccorder le système aux lignes de transport d'électricité.

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

AVERTISSEMENT: Tout le câblage doit être effectué par un électricien qualifié.

WARNING: Meet the National Electrical Code and local codes for all wiring.

AVERTISSEMENT: Respecter le Code national de l'électricité et les codes locaux pour tous les câblages.

1. The installation of the unit must comply with local and/or national codes.

WARNING: Ground system before connecting to the power supply. "Use Copper Conductors only"

AVERTISSEMENT: Mettre le système à la masse avant de le raccorder à la source d'alimentation. Utiliser des conducteurs en cuivre seulement.

2. Connect only to a circuit that is protected by a ground fault circuit interrupter (GFCI). Do not spray water near electrical components.



3. Never make adjustments on the unit while it is in operation, except for those described in this manual.
4. Do not discharge gasoline or other volatile hydrocarbons into the PM-1000. This could cause a gas vapor build up under

IMPORTANT SAFETY INSTRUCTIONS



the lid which could become an explosive mixture.

5. Before servicing the unit, 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.

6. Protect from freezing and UV light.

7. Protect aeration lines from vehicle traffic and sharp objects.

8. When making repairs disconnect unit from electrical source.

9. The best insurance against an accident is precaution and knowledge of the equipment.

10. Water Maze is not liable for any modifications or the use of components not purchased from Water Maze.

11. The Ozone Generator will freeze, and must be located in a heated enclosure in cold climates.

12. The PM-1000 should be installed and started by an authorized Water Maze dealer.

13. The PM-1000 and its components must be protected from weather, i.e. wind, rain, direct sun, etc.

HOW THE BIO-SYSTEM WORKS

The PM-1000 is an industrial grade microbial treatment system, with modular components, that employs naturally occurring microbes to treat waste water with characteristics that include organic compounds (i.e., emulsified oils and hydrocarbons). A typical application may include treatment of wash water generated from equipment washing (i.e., washing golf course maintenance equipment, fork lift repair, truck wash etc.).

As compared to other water treatment technologies, microbial treatment is highly dependent on maintaining a healthy environment for the microbes that perform the job of digesting organic substances and converting them to carbon dioxide and water. Some of these life sustaining considerations are:

- pH of the water (should be between 6.0 and 9.0)
- water temperature (should be above 40°F/5°C and below 120°F/49°C)
- adequate nutrient & food supply within the water (consult with Water Maze) and

- adequate levels of dissolved oxygen (enough dissolved oxygen to overcome the consumption rate / oxygen demand).

In addition to the above considerations, the effluent water quality from a Bio-System will be subject to the concentration levels of the organic matter in the untreated water and the relative dwell time required for microbial digestion. Based on these factors, waste waters with consistent concentration levels of organic matter will be more predictable in terms of effluent water quality. Conversely, waste waters with fluctuating concentration levels of organic matter may vary in terms of effluent water quality.

IMPORTANT NOTE: Subject to the application and desired water quality requirements, processed water from a Bio-System may require additional post-treatment.

IMPORTANT NOTE: Recycled water quality is dependent upon many factors, including, but limited to the above considerations and should be tested to assure that the water quality meets the intended reuse.

IMPORTANT NOTE: Local regulations may limit what you can do with water that is discharged from the Bio-System or may require specific permits. Check with local authorities if you are unsure about the uses or disposition of the water discharged by the Bio-System. Regulations may also limit the use of a wash pad as a mix and load station.

WARNING: *The Bio-System is not designed to produce potable water. Do not use water from the Bio-System for drinking or washing humans or animals.*

AVERTISSEMENT: *Le Bio-System n'est pas conçu pour produire de l'eau potable.*

A typical Bio-System may be configured as a Treat & Discharge System, or as a Treat & Recycle System. In either case, a properly configured system may consist of one or more components (See Bio-System Component Identification pages). As in all properly designed water treatment systems, Water Maze highly recommends that appropriate pretreatment technologies be applied to the waste water for the purpose of enhancing the performance of the Bio-System. Some typical pretreatment technologies may include: oil-skimming to remove "free-oils", heavy solids removal; pH control; water temperature control; grass clipping removal; inorganic material removal (i.e., heavy metals); etc. The PM-1000 (for recycle applications) typically works as follows:

- The waste water collection pit is the primary digester that houses the microbial colony.

- The two feed pumps introduce microbes and nutrients into the collection pit to circulate water. Pin-type timers allows the operator to control the frequency and duration of injection.
- During the timed injection, an air pump provides oxygen rich aeration to the collection pit to stimulate growth of the microbe colony.
- On a routine basis (once each day) microbes and nutrients are automatically injected into the collection pit. This is done to assure that the microbe population is maintained at maximum levels.
- Dissolved oxygen is maintained using a unique delivery system.

CONSUMABLES

Microbes and Nutrients

BioStax 1800: Liquid Bacteria Concentrate

Part # 8.718-919.0 Biostax, 1800, 8oz. vials, 2 part mix, part A & B. It is an environmentally friendly, non-toxic and non-pathogenic liquid concentrate. Controls odor, reduces oils and greases, other hydrocarbons, animal fats and vegetable oils. Two 8 oz. bottle makes 5 gals.

BioStax 100: Hawaiian Blend Liquid Bacteria Concentrate

Part # 8.718-917.0 comes in an 8 oz. bottle and works the same as BioStax 1800 except that it is for use in Hawaii. One 8 oz. bottle makes 5 gallons.

Bio Nutrient: Powder Bacteria Nutrient Source

Part # 8.718-916.0 comes in an 8 oz. bottle and easily mixes in water to make 5 gallons. It is introduced into the Bio-System along with the bacteria to enhance the growth and effectiveness of the biology.

OPERATING ENVIRONMENT

The PM-1000 is designed to work in a wide variety of operating conditions. In normal operating environments, the Bio-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 (5-49°C)

Treatable WasteWater contaminated with hydrocarbons and organic material.

Water pH 6.0 - 9.0

Cold Weather

Protect the Bio-System from damage that can occur when freezing water expands. Freezing water may cause tubing leading from the collection pit to your

PM-1000 to burst. Plus, the microbes in the BioStax 1800 may not survive if they are frozen.

Drain all external hoses if a prolonged hard freeze is expected.

In order to restart your Bio-System, you will need to reinoculate your system with BioStax 1800 at start-up. The recommended amount of BioStax 1800 for start-up is five 8 oz. bottle sets, part A & B, for a Bio-System system. Contact *WATER MAZE* for specific instructions to restart your Bio-System.

Hot Weather

Your Bio-System may encounter minor problems, such as a slight increase in odor, when operating in extremely hot temperatures in excess of 100°F/38°C. If odor is a problem, add water to the system on a daily basis by running tap water into the collection pit.

OPERATING TIPS

Your Bio-System is extremely simple to operate. Simply wash your equipment or vehicles as you would normally.

- In extremely dirty environments, you may want to “pre-clean” your equipment with air or with a brush, and deposit grass or dirt into a designated dumpster or to a collection area.
- Use hose end sprayers with automatic shutoffs when washing equipment so as to not exceed the peak capacity your Bio-System can process.
- Perform the daily, weekly and monthly service as described on the maintenance pages.

INSTALLATION INSTRUCTIONS

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

Installation Instructions

1. Placing the Bio-System

Place the Bio-System on a level concrete pad similar to what is shown on the Installation Views and the Installation and Piping Diagrams.

2. Plumbing the System

Connect feed line and aeration tubing following the Installation and Piping diagrams. **NOTE:** Plumbing may vary depending on placement of equipment.

3. Wiring the System

Before beginning work refer to Safety Instructions in front portion of manual. Confirm that there is a

120V electrical power source connected to the control box.

- a. Connect wiring as shown on Electrical Connection Diagram.

4. Microbe and Nutrient Injection

- a. Mix microbes and nutrient in separate five gallon containers supplied.
- b. Install tubing to pumps and insert into collection pit as shown in diagram.

5. Set Timers

There are two timers in your control panel enclosure that need to be set. Open control box door to set timers. Timers are 24 hour and each pin represents half an hour. **NOTE:** Always remove electrical power from control panel prior to opening the door. Rotate each timer until the hour at the center of the dial meets the actual time of day (a.m. or p.m.). After each timer is set for the time of day, proceed to instructions below to set timers to actuate equipment.

a. Air Pump: Pull Several Pins

The air pump controls the amount of time the pump operates. The pump provides aeration to the pit or tank. Pulling pins will allow for automatic aeration. During the times cleaning takes place pull every other pin. During off hours pull 4 pins, 1 pin in, 4 pins out, 1 pin in and continue through all off hours. If you have high BOD loading the air may need to be longer, check with the factory for instructions.

b. Microbe / Nutrient Timer: Pull 3 Pins

This timer determines the amount of microbes and nutrients that are added to the collection pit **The microbe / nutrient timer should be set to inject during system non-use hours.** Pulling a pin on this timer will cause the Microbe and Nutrient pump to operate automatically when their hand switches are on.

Installation Checklist

- ☐ Is all tubing connected as shown on the Installation and Piping Diagrams?
- ☐ Is electrical wiring connected as shown on the Electrical Connection Diagram?
- ☐ Are air lines connected as shown on the Air Connection Diagram?
- ☐ Is the voltage correct?

START-UP

1. Make sure that equipment is level.
2. Turn on the fresh water inlet hose.
3. Fill the collection pit with water and check that the water level does not drop. This would indicate that the sump pit is not sealed.

4. Connect Electrical Power to Control Panel: 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 to the power supply. ***WARNING: All wiring must be connected by a qualified electrician.***

AVERTISSEMENT: Tout le câblage doit être effectué par un électricien qualifié.

5. Control Panel Switches:

There are two hand switches located on the front of the control box. Turn on both switches. Turning on these switches will allow the entire system to operate in an automatic mode. Normally switches are left on. The following is the functional description of these switches.

a. Aerator Hand Switch

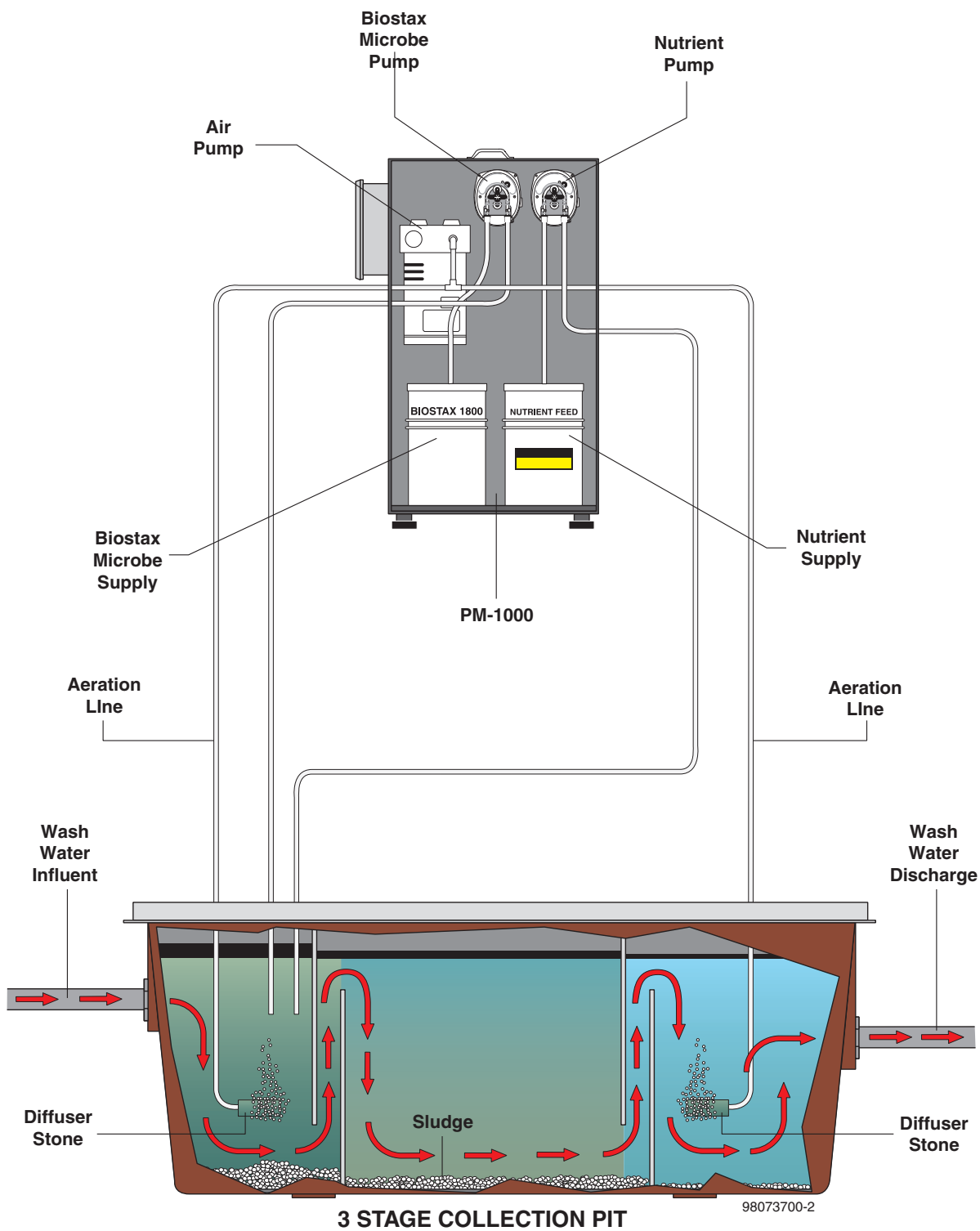
The aerator (air pump) provides dissolved oxygen for bio-digestion of waste products by microbial action. Turning this switch off may cause an unhealthy environment for the microbes.

d. Nutrient/Microbe Pump

Turn "ON" the nutrient/microbe pump switch. The pump is on timer control and will not operate if switch is in the "off" position. Feed adjustment must be at the Number 4 Knotch setting. Refer to Metering Pump Operation. To fill lines with nutrient solution press the switch to full speed. Release the switch when the lines are full.

6. Look over the entire machine for leaks. The machine was hydrostatically tested at the factory but may have been damaged in shipment.

PM-1000 INSTALLATION AND PLUMBING DIAGRAM



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"

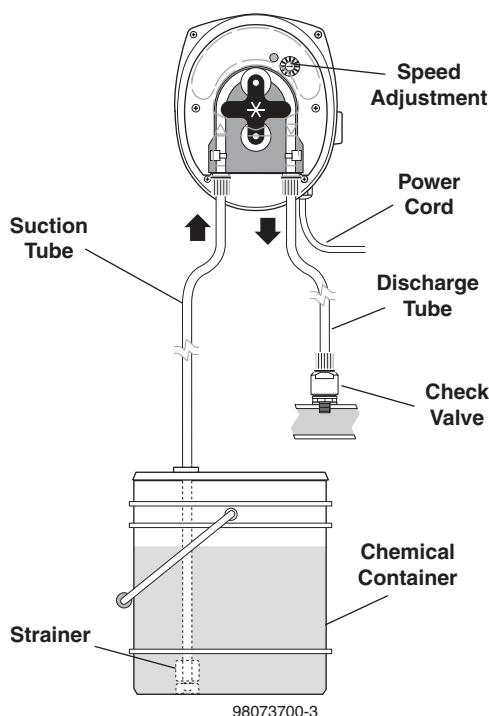
Standard Accessories Provided with Pump:

- 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

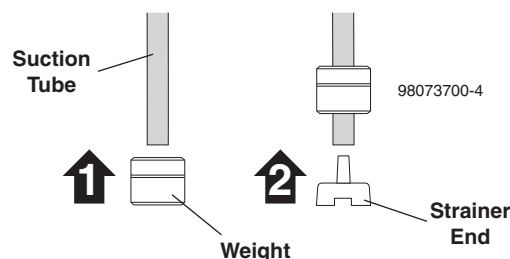


INSTALLATION

- 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.

- 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.



- 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.

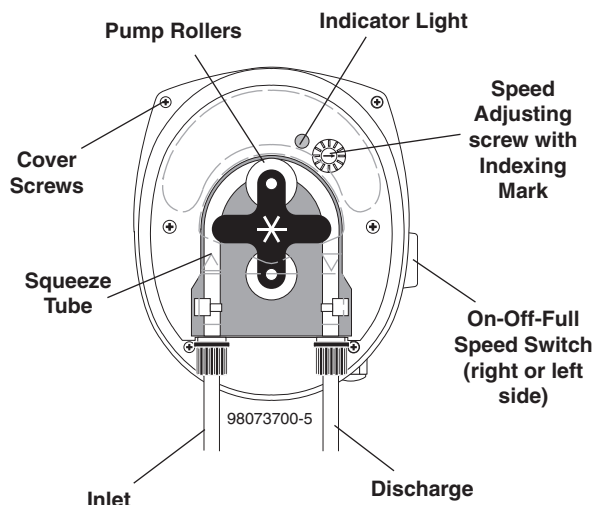
METERING PUMP OPERATION

If not already done, put the end of the suction tubing into the containers 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 FEED CHEMICALS WITHOUT CONSULTING YOUR CHEMICAL FEEDER DEALER OR CHEMICAL SUPPLIER.

DANGER: Ne pas tenter d'alimenter des produits chimiques sans d'abord consulter le concessionnaire d'alimentation en produits chimiques ou le fournisseur de produits chimiques.



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

ATTENTION: Porter des gants de protection, des lunettes étanches et d'autres protections adéquates pour les risques chimiques.

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

1. Remove tubing from the supply buckets.
2. Run pump until all fluid is removed from the tubing.

FILLING THE NUTRIENT/MICROBE: To avoid running out, follow a regular schedule of monitoring supply. Also inspect and clean the strainer by flushing with a compatible liquid, as needed.

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

REPLACING 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.

ATTENTION: NE PAS DESSERRER LE PALIER DE TROU CENTRAL DANS LA PLAQUE DU COUVERCLE.

CAUTION: 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.

ATTENTION: Un tube en plastique clair ou transparent devrait être remplacé au moins tous les trois mois s'il est exposé au soleil. Remplacer le tube une fois par année si le dispositif d'alimentation est installé à l'intérieur.

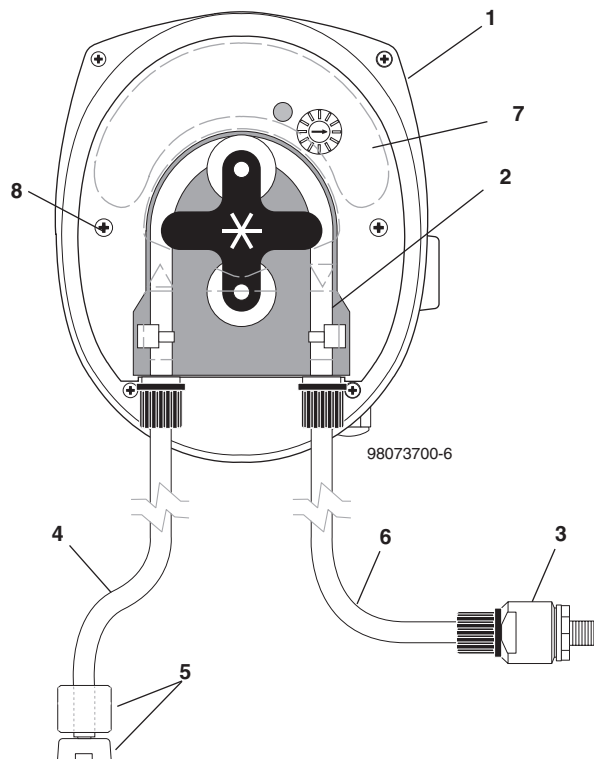
INSPECT FOR LEAKAGE:

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	8.749-855.0	Pump, Peristaltic, PR-7, 8-45 gpd	1
	8.749-856.0	Pump, Peristaltic, PRS-1, 1-7 gpd	1
2	8.749-862.0	Tube, Squeeze, Stantoprene, PR-7, * 8-45 gpd	1
	8.749-864.0	Tube, Squeeze, Stantoprene, PRS-1,* 1-7	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, Strainer, w/welght	1
6	8.711-737.0	Tubing, 1/8", ID, Norprene	AR
7	8.751-801.0	Faceplate, PRS-1/PR-7	1
8	8.751-375.0	Roller Assembly, PR-7	1
	8.751-376.0	Roller Assembly, PR-7	1

* Alternative tubing materials are available

PM-1000 MAINTENANCE

DAILY MAINTENANCE

To keep your Bio-System in peak performance you need to perform minimal daily maintenance. This service is best performed each morning before using the wash area..

- ☐ Check and clean catch basin and trench.
- ☐ Empty the debris dumpster.
- ☐ Wash down front and back of hydro-screen, preferably with a pressure washer.

WEEKLY MAINTENANCE

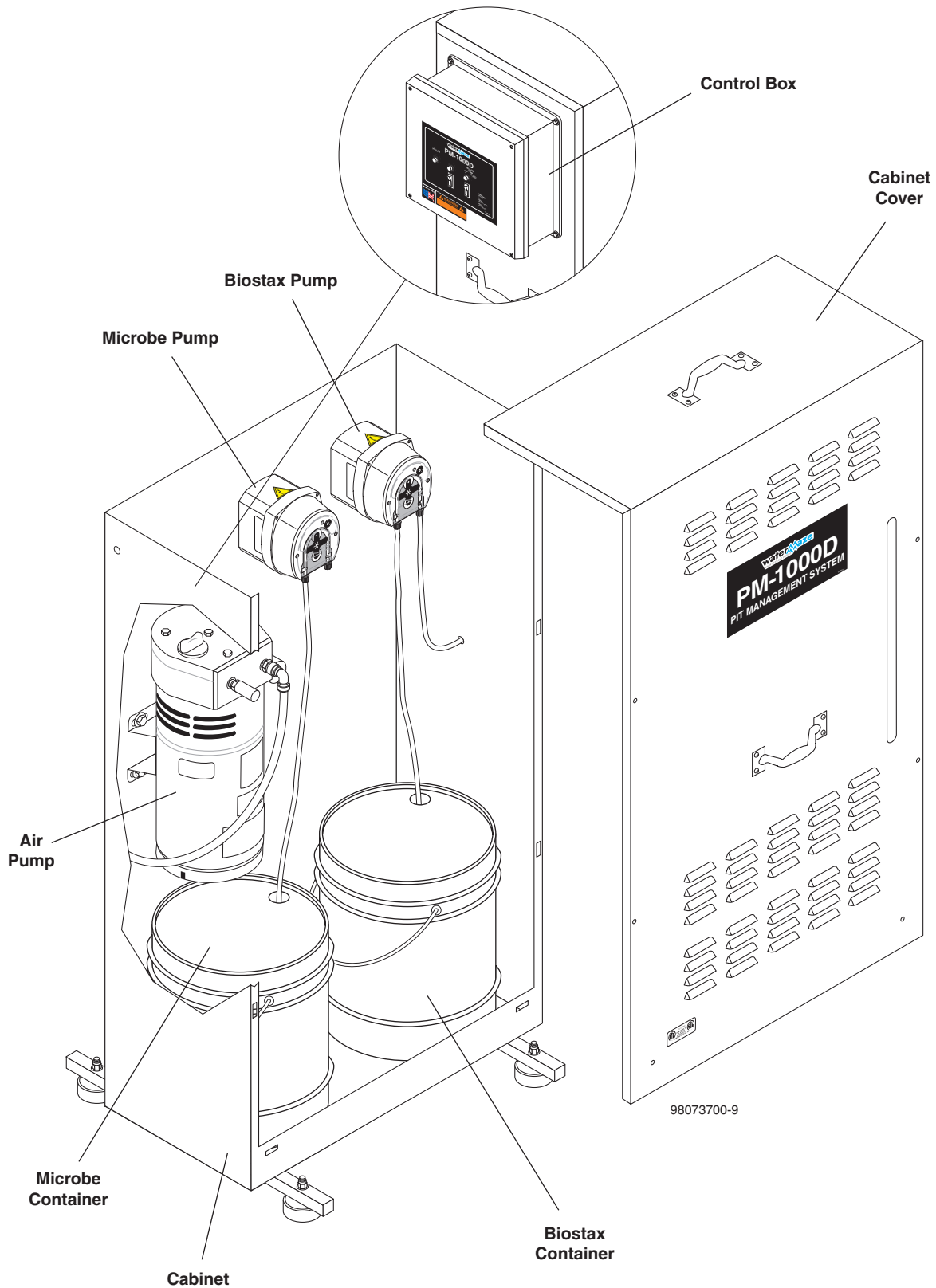
- ☐ Check that purge drain valves work properly.
- ☐ Check that timers are set properly.

MONTHLY MAINTENANCE

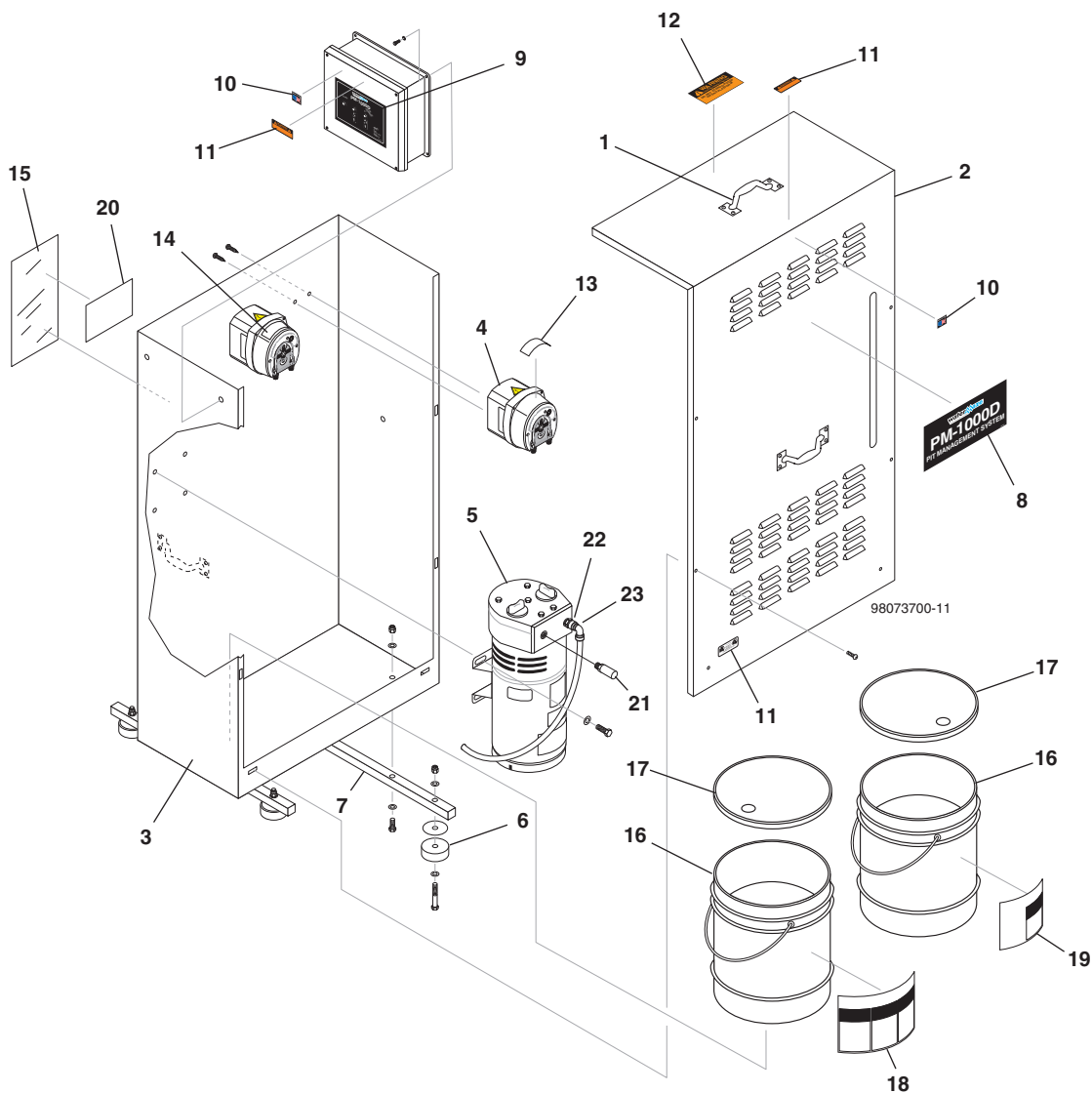
Monthly maintenance for the Bio-System and replenishment of BioStax 1800 is required. Schedule a regular day and time each month to perform the maintenance. Record your maintenance in the monthly log to provide a record in the event of an inspection.

- ☐ Replenish BioStax 1800.
- ☐ Replenish BioNutrient.
- ☐ Check the automatic microbe dispenser pump and make sure the tubing is not cracked or worn. Replace tubing if required (every 6-12 months). Clean screen in tubing going in microbe bucket.
- ☐ Visually inspect external hoses and fittings.
- ☐ Confirm pressure switch setting on transfer pump.

COMPONENT IDENTIFICATION



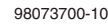
PM-1000 CABINET ASSEMBLY EXPLODED VIEW



PM-1000 CABINET ASSEMBLY PARTS LIST

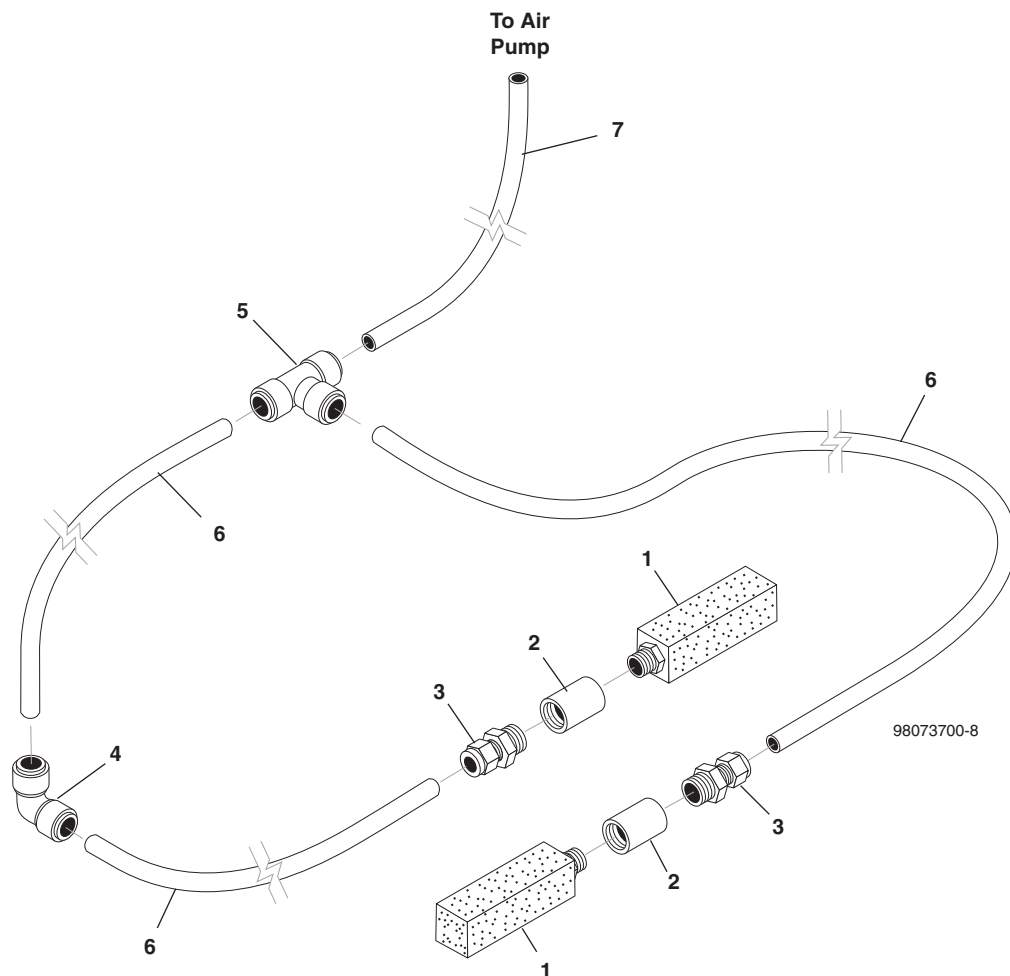
ITEM	PART NO.	DESCRIPTION	QTY
1	8.706-648.0	Handle	4
2	8.913-347.0	Cabinet Cover	1
3	8.913-350.0	Cabinet	1
4	8.749-856.0	Pump, Peristaltic	2
5	8.719-188.0	Pump, Air 1/4 HP	1
6	9.802-066.0	Pad	4
7	8.913-348.0	Foot Bar	2
8	8.900-847.0	Label, PM-1000	1
9	8.758-708.0	Label, PM-1000 Control Panel	1
10	8.758-428.0	Label, Assembled In USA	2
11	8.758-331.0	Label, Disconnect Power Supply	2

ITEM	PART NO.	DESCRIPTION	QTY
12	8.758-369.0	Label CLP Warning Do Not Stand Or Step	1
13	8.758-698.0	Label Water Maze Nutrient Pump	1
14	8.758-697.0	Label Water Maze Microbe Pump	1
15	8.758-330.0	Label Clear Lexan 4.30" x 5.50"	1
16	8.711-943.0	Pail, 6 Gal	2
17	8.711-944.0	Lid, Pail	2
18	8.758-639.0	Label, Bio Stax 1800 5 Gallon	1
19	8.758-629.0	Label, Water Maze Bionutrient	1
20	8.758-332.0	Label Assembled In USA Indoor Use	1



ITEM PART NO.				DESCRIPTION				QTY			
1	8.716-272.0	Box, Electrical	1	11	8.758-705.0	Label, Air Pump Timer	1	12	8.758-778.0	Label, Microbe Pump Timer	1
2	9.802-455.0	Light, Green	3	13	8.758-327.0	Label, Ground Symbol	1	14	8.716-402.0	Bridge, Electrical	4
3	8.716-052.0	Switch, Curvette	2	15	9.804-595.0	End Bracket	2	16	8.716-399.0	End Cover, Entrelec, 11836816 P-ON	2
4	9.802-514.0	Strain Relief	5	17	9.802-525.0	Locknut, 1/2"	4	18	8.920-278.0	Plate, Mount, Control Panel	1
5	8.706-648.0	Handle	4	19	8.758-392.0	Label Use Copper Conductors Only	1				
6	8.716-253.0	Timer, 24 Hour	2								
7	8.716-460.0	Grounding Lug	1								
8	9.802-457.0	Din Rain, 35 mm	1								
9	8.716-398.0	Terminal Block, Blue	4								
10	8.716-396.0	Terminal Block, Grey	4								

DIFFUSER STONE ASSEMBLY EXPLODED VIEW PARTS LIST

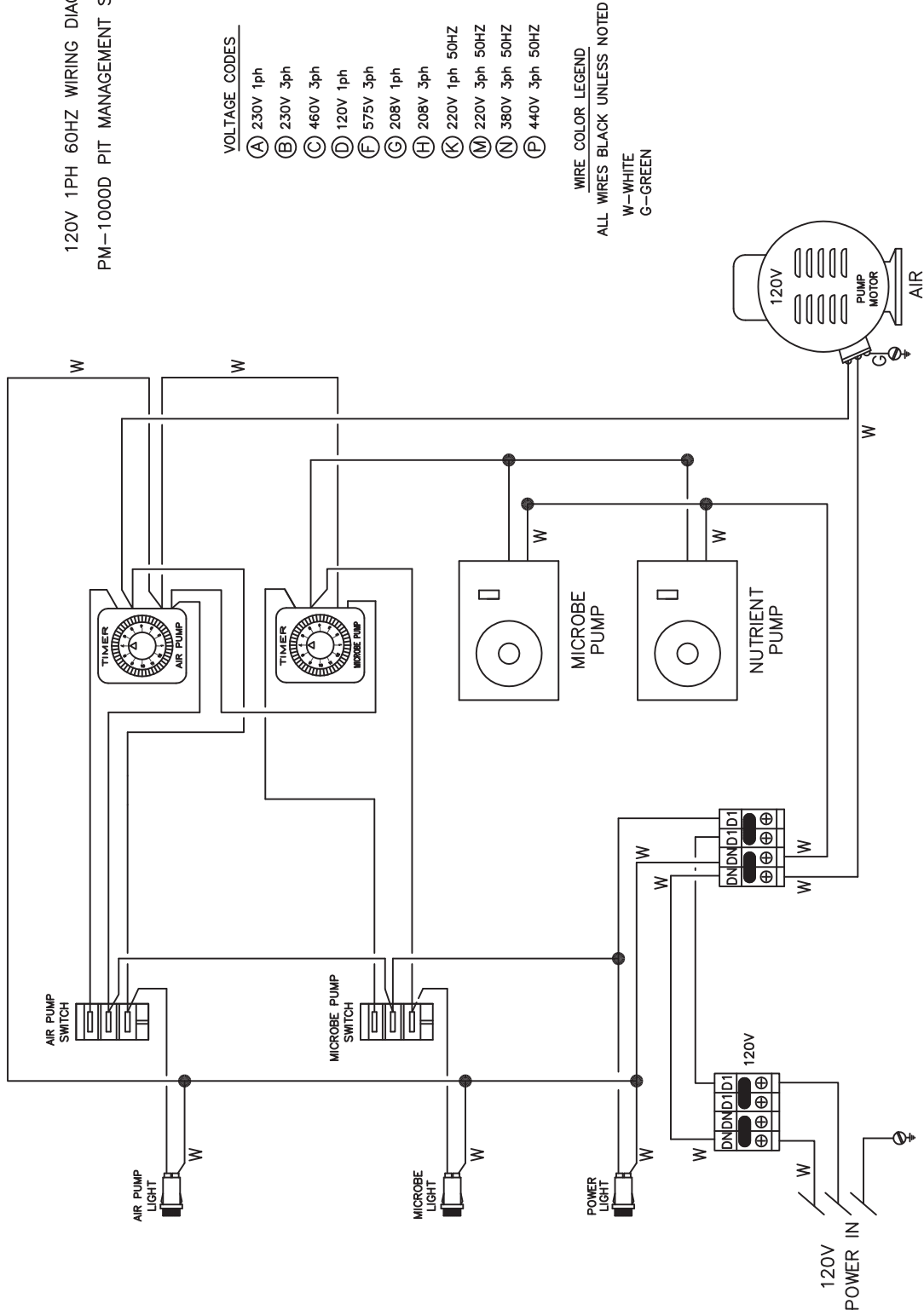


DIFFUSER STONE PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	8.712-417.0	Diffuser Stone, 6-1/2" NPT SS	2
2	8.706-027.0	Coupler, 1/2" SS	2
3	8.706-291.0	Fitting, Compression, 1/2" MPT x 3/8"	2
4	8.707-325.0	Elbow, Reducing, Water Stax	1
5	8.707-330.0	Tee, 1/2" x 1/4"	1
6	8.711-731.0	Tubing, 1/4" ID	20ft
7	8.777-732.0	Tubing, 1/2" OD x 3/8" IN	20ft

PM-1000 WIRING DIAGRAM

120V 1PH 60HZ WIRING DIAGRAM
PM-1000D PIT MANAGEMENT SYSTEM





WARRANTY

ACCESSORIES AND PARTS WARRANTY

LIMITED MINIMUM 90 DAY WARRANTY

We warrant to the original consumer that each new part and accessory sold by Watermaze will be free from manufacturing defects in materials or workmanship in normal service for the duration specified by the original component manufacturer with a 90 day minimum from date of purchase, provided it is installed properly and the equipment is maintained in accordance with Watermaze instructions and manuals. Components manufactured by Watermaze such as frames, and handles have a 2 year warranty from date of purchase.

Our obligation under this warranty is expressly limited as to the replacement or repair, at our option, at Watermaze Camas, Washington 98607, or at a service facility designated by us, for such part or parts as inspection shall disclose to have been defective.

EXCLUSIONS:

This warranty does not apply to defects caused by casualty or unreasonable use, including faulty repairs by others and failure to provide reasonable and necessary maintenance.

LIMITATION OF LIABILITY

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