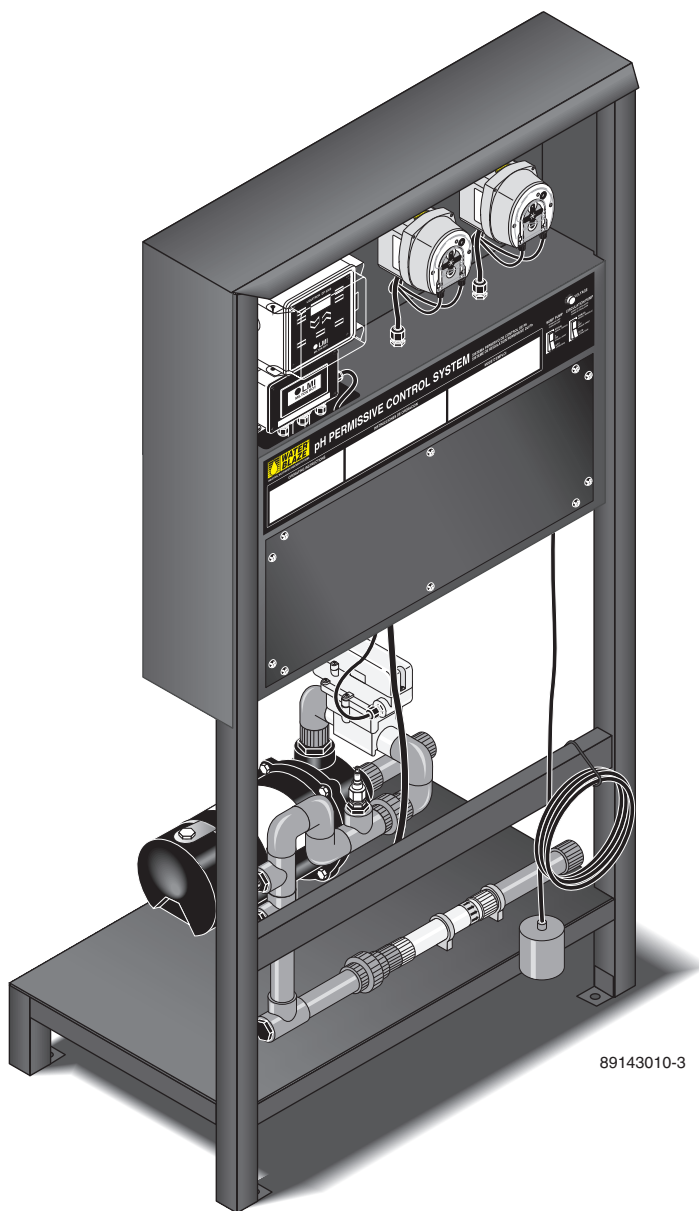


OPERATOR'S MANUAL

■ pH-3020



For technical assistance or the dealer nearest you consult our web page at
www.wmaze.com or call (800-562-4993) or (360) 833-2874

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Model Number

Serial Number

Date of Purchase

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

INTRODUCTION

Thank you for purchasing a *WATER MAZE*.

This manual covers the operation and maintenance of the *WATER MAZE* pH Permissive Control System. All information in this manual is based on the latest product information available at the time of printing.

WATER MAZE reserves the right to make changes at any time without incurring any obligation.

Owner/User Responsibility:

The owner and/or user must have an understanding of the manufacturer's operating instructions and warnings before using this *WATER MAZE* machine. 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.

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.

UNPACKING

pH Permissive Control System

Model 3020

Congratulations and thank you for ordering the *WATER MAZE* pH Permissive Control System. Carefully unpack your new equipment and check contents against packing slip. The pH Permissive Control System includes the following:

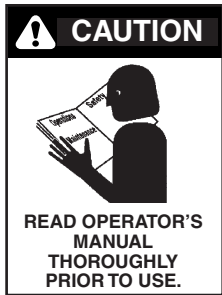
pH Permissive Control System on Stand

Box containing:

- pH Probe
- Peristaltic Pump Injectors
- Tubing
- Filters

If any part is missing. Please report it immediately to your *WATER MAZE* Dealer.

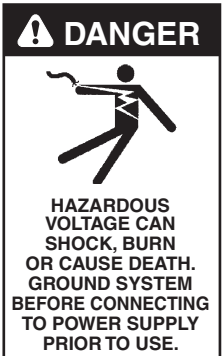
IMPORTANT SAFETY INFORMATION



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

ATTENTION: 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 a malfunction of the machine and result in death, serious bodily injury and/or property damage.



DANGER: Meet the National Electrical code and local codes for all wiring.

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

2. The installation of the machine must comply with local and/or national codes.

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

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

WARNING: Ground system before connecting to the power supply.

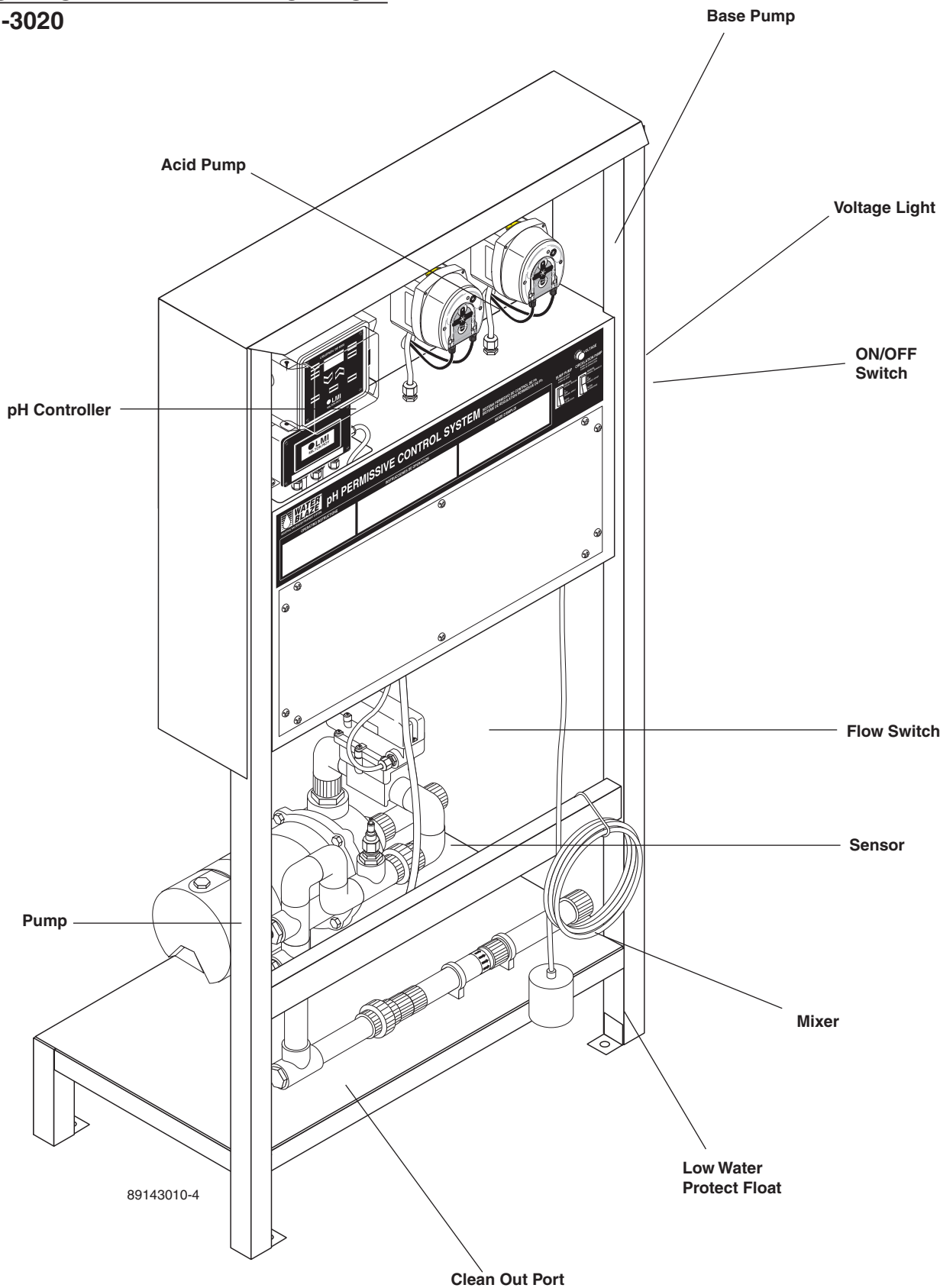
AVERTISSEMENT: Mettre le système à la masse avant de le raccorder à la source d'alimentation.

3. Do not spray water near electrical components.
4. Never make adjustments on the machine while it is in operation except those prescribed in this manual.
5. Before servicing the machine, refer to the MSDS on all of the material identified in the waste stream. You must comply with all warnings and wear all protective clothing stated on the MSDS.
6. Be certain coupled hoses have been locked before operating.
7. Inlet water temperature must not exceed 104°F (40°C).
8. When making repairs disconnect machine 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. Components will freeze and must be located in a heated enclosure in cold climates.

COMPONENT IDENTIFICATION
pH-3020



HOW AUTOMATION WORKS

The **pH Sensor** is mounted on the recirculation line of the pH Permissive Control System. The sensor analyzes the water as it goes through the line and—operating like a miniature battery—it generates a small electronic signal which is amplified and analyzed by the controller for display on the readout meter and for activation of the chemical feeders.

The Sensor reads the pH of the water. The ideal pH range is 6.5 to 7.5. Below 6.5, the water is increasingly acidic. This causes eye irritation and corrosion of the equipment (HBG tank, pump, plumbing, etc.). Above 7.5, the water is too alkaline. This also causes eye irritation plus cloudiness and scaling. When the pH requirements are met the pH permissive system allows the waste stream to move forward to the HBG or other external device.

INSTALLATION

Location

1. The pH Permissive System must be installed on a level surface, preferably a concrete pad near the feed tank. In cold climates the pH Permissive System will freeze and should be located in a heated enclosure.
2. Fasten pH Permissive System's legs to the floor.
3. Connect at least a 1" inlet and outlet line to inlet and outlet of pump. We provide female slip fittings at the inlet and outlet. You will need to provide plumbing from the feed tank to the pH Permissive System.
4. A normally open (black) float is provided to protect the pump from sucking air. Position the float above the bulkhead in the feed tank that feeds the inlet side of the pump. When the float is in the down position there should be a couple inches of water above the top portion of the bulkhead.
5. Install chemical injectors into recycle line per drawings on page 12.
6. Install tubing from injectors to the acid and base pumps per instructions on page 10 and 11.
7. Install tubing and filters from the acid and base pumps to your chemical drums, per instructions on page 10.
8. Install sensor per instructions on page 6.

Auto-Fill Option 8.903-682.0 (see page 14-15)

1. Position the sump pump in the bottom of sump pit. Elevate on a stand or cinder blocks, 6" off the pit floor, to keep pump from sucking in rocks or other heavy material that may plug pump or plumbing.
2. Position the pump away from incoming water to help prevent cavitation.

3. Tie a rope or chain to the pump handle and bring out of the top of the pit for ease of pump removal. Do not lift pump by power cords or plumbing. Have a union installed on plumbing at the top of the pit. Position union so it can easily be reached and opened for pump removal.
4. Install plumbing to outlet of sump pump and run to the top of the feed tank. Plumbing not provided, except for 1-1/2" bulkhead going into tank. Leave room in the feed tank for shut-off float to arch and shut-off sump pump before feed tank overflows. Position inlet bulkhead from the sump pump on the opposite side of the feed tank from bulkhead feeding the pH Permissive system.
5. Install 1/2" bulkhead for shut-off float on feed tank. Position away from water coming from the sump pump to prevent interference of the float. Install float (See Electrical Instructions for proper float).
6. Install low water protect float (See Electrical Instructions for proper float) in sump pit, approximately 6 inches above the sump pump inlet when float is in the down position.

Holding Tank Option 8.903-681.0 (see pages 14-15)

1. Install drain per diagram on page 14-15.
2. Install bulkhead that will be accommodating inlet plumbing to mix pump about 1/2 way up the side of feed tank—just above the black portion of the tank.
3. Install the bulkhead for the N/O float (black) 8 inches above the bulkhead installed in step 2.
4. Install bulkhead from the outlet of the mix pump 12" from the top and opposite the bulkhead in step 2.

ELECTRICAL INSTRUCTIONS



DANGER: Keep water spray away from electrical wiring or fatal electric shock may occur.

DANGER: Garder le jet d'eau à l'écart de tout câblage électrique ou des chocs électriques mortels pourraient survenir.

Check for proper voltage. It is recommended that a Ground Fault Circuit Interrupter be installed. Before making electrical connections, make sure breaker is OFF and all codes, safety, lockout/tag out procedures are followed.

Review wiring diagram provided and refer to it during the following:

1. Remove the backside of control panel to access electrical.

2. Run 120 volt single phase to the pH Permissive Control System. Access hole provided underneath controls. Locate terminal strip inside electrical control panel and connect 120 volt power to terminals "1" and "N" ("1020" and "1030" on Auto-Fill Option #30-731). Connect ground wire to ground post.
3. Connect normally open float (black) switch from feed tank to terminal "4" and "5" on terminal strip ("1070" and "1071" on Auto-Fill Option #30-731).
4. Connect pH Permissive System to HBG as follows:
 - a. Connect two black 16 gauge wires to pH Permissive Control System. One wire connects to "2" and one wire connects to "3" on terminal strip. ("1550" and "1552" on 30-731 Auto-Fill Option).
 - b. Refer to HBG wiring diagram.
 - c. Remove wires from "9" on relay 2 (second relay from the left) of HBG and wire nut with wire from "2" ("1550" on Auto-Fill Option #30-731) of terminal strip off of the pH Permissive System.
 - d. Connect wire on "3" ("1552" on Auto-Fill Option #30-731) of pH Permissive Control System to "9" on relay 2 of HBG.
5. Connect pH Permissive System to a customer provided external device.
 - a. Connect two black 16 gauge wires to pH Permissive Control System. One wire connects to "2" and one wire connects to "3" on terminal strip. ("1550" and "1552" on 30-731 Auto-Fill Option).
 - b. "2" and "3" ("1550" and "1552" on Auto-Fill Option #30-761) on the pH Permissive System are "dry contacts" and need a separate 120 volt power supply with your external device.
6. Leave breaker OFF, follow Operating Instructions.

Auto-Fill Option Electrical Instructions:

1. In addition to the above electrical instructions, wire the sump pump to the control panel on the pH Permissive Control System. One wire will go to "1030" on terminal strip and one wire will go to "1141". The ground wire will go to terminal post.
2. The low water protect float (116-FS) for the sump pump is a normally open (Black) float and is wired into "1140" and "1160" on terminal strip.
3. The high level float (116A-FS) in the feed tank is a normally closed (Grey) float and is wired into the terminal strip "1141" and "1160".

Sensor

To avoid electrical interference with the sensor signal, keep the sensor cables away from high voltage lines,

electric motors, power transformers and other electrical equipment.

Make sure to connect the sensor to the female BNC connector on the controller cabinet. To connect the BC connectors, just push it in lightly and twist clockwise. Do the same in reverse for disconnecting. Connect the sensor cable and sensor in the same manner as above.

Mount the sensor on the recirculation line as shown on page 12. The sensor should be located on the top side of the tee.

Save the protection caps of the sensor for winterizing or storage of the sensor.

As shown on page 12, insert the sensor successively through:

- the compression fitting
- the o-ring
- the PVC tee

Slide the sensor assembly into the tee so that the tip of the sensor will be located approximately in the middle of the recirculation pipe. Tighten nut over sensor to secure.

Start the mix pump. (See Operating Instructions below.) Check for leaks around the sensors. If there is a leak, try tightening the compression fitting or add some silicone sealant.

OPERATING INSTRUCTIONS

Start Up

1. Make sure mix pump switch and the acid and base pumps are in the OFF position.
2. Turn breaker ON.
3. Voltage light will illuminate.
4. Push mix pump switch to auto position. (Hand mode bypasses float and should only be used for servicing.) Turn the acid and base pumps to the ON position.
5. If your holding tank has enough fluid to raise the normally open black float switch, the mix pump will turn on. If you don't have enough fluid to raise the float, the mix pump will not run. This protects the pump from sucking air.
6. The mix pump takes the fluid from the holding tank, runs fluid by the sensor and returns fluid back to the tank. The sensor reads the pH level of the fluid and sends a signal to the pH controller. The controller displays a digital display of the pH level of fluid.
7. If the pH of the fluid in the tank is within the set points of 6.5 and 7.5, no pH adjustment will need to take place. Neither the acid or base pump will run because no pH adjustment fluid is needed. The HBG or other external devices will be allowed to draw fluid

from the tank. The mix pump will continue to run and continue to sense the pH levels as long as enough fluid is present in the holding tank. (See step 5.)

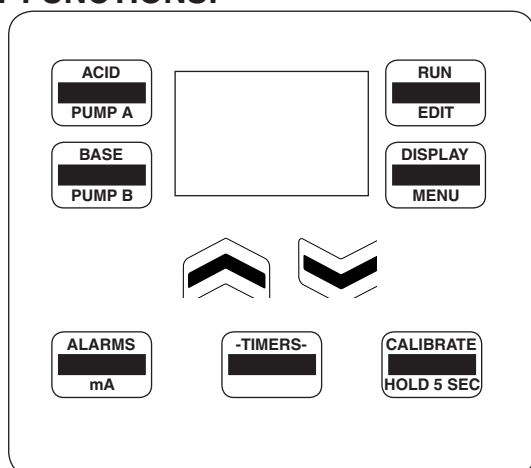
8. If the pH of the fluid in the holding tank is **not** within the set points of 6.5 and 7.5, pH adjustment **will** take place. Which chemical feed pump is turned on depends on whether the pH in the tank needs to be raised or lowered. The needed chemical feed pump will draw up the pH adjust chemical and inject it into the outlet plumbing of the mix pump. The pH adjustment in the tank should happen quickly. If adjustment takes longer than one (1) hour, the controller will lock out the system and give you an error code of E5 or E6. If this happens, shut off power to the machine. Check to see if you have chemical, if the chemical filter screen is plugged or the injector is plugged. Also check tubing for a blockage, kinks, leaks, etc. You may have to increase the speed on the effected pump (See page 9 and 10 for pump instructions.) and start at the beginning or step 1 of Operating Instructions. While this is happening, the HGB or other external devices will not be allowed to turn on until the pH set points are met.

DIGITAL pH CONTROLLER

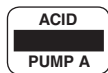
The pH controller is a microprocessor-based device that accepts the signal sent by the sensor. The pH controller then displays that signal digitally, and sends a signal to the feed pump telling it to turn on or off. The pH controller also sends a signal to the HBG, or other external device, telling it to turn on or off its method of drawing fluid. The controller is pre-programmed to maintain a pH level of 6.5 to 7.5. No additional programming is necessary. When the pH Permissive Control System is started up it is ready to go. Please call the factory before attempting any customizing of the pH controller.

pH Permissive Control System Keypad

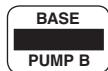
KEY FUNCTIONS:



This key is used to setup the control profile for the acid dosing pump. Holding this key for five (5) seconds will allow priming of Pump A. **Factory Set — Unless customizing or priming pump, don't touch this key.**



This key is used to setup the control profile for the base (alkali) dosing pump. Holding this key for five (5) seconds will allow priming of Pump B. **Factory Set — Unless customizing or priming pump, don't touch this key.**



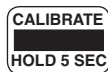
This key is used to program the high and low alarm points and hysteresis (ON/OFF mode). **Factory Set — Unless customizing, don't touch this key.**



This key is used to program 'run times' for Pumps A and B. This key also allows setting of the 'manual temperature' and the controller response rate Δ pH. **Factory Set — Unless customizing, don't touch this key.**



This key, when pressed, will display details of the last successful electrode calibration. (Holding this key for five (5) seconds will allow entry into a new calibration procedure. (See page 8 for calibration procedure.)



Pressing this key will cause the display to alternate showing various settings. (Holding the key for five (5) seconds will allow entry to the 'advanced features' menu. **Factory Set.**



This key is used for starting and stopping (run or edit) the pumps and changing set points in the controller. It changes the mode of the controller from 'RUN' to 'OFF'.



These keys are used to change values on the display.

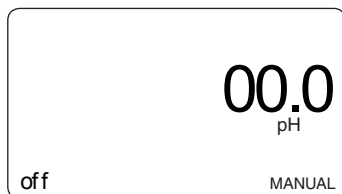


Simultaneously pressing these two (2) keys will lock the keypad to prevent casual tampering. Pressing them a second time will unlock the keypad. (Wait five (5) seconds between locking and unlocking).



DIGITAL DISPLAY SCREEN

The controller display screen will show a large digital reading of the attached tank's pH level. Every few seconds the display alternates, showing the pH reading and 'OFF'. (A small digital reading of 'RUN' or 'OFF' will appear in the lower left of the display screen.)



Tap the 'RUN/EDIT' key until 'RUN' is displayed in lower left corner of the display screen.

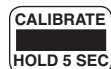


If the pH level drops below or rises above the set points either 'PUMP A', for acid pump, or 'PUMP B', for base pump, will begin to flash in the upper left corner of the display screen and the affected pump will turn on. Above the 'RUN' display, in the lower left corner, a timer will come on and start to time-out until the pH level is reached. (Refer to Operating Instructions on page 7, step 8.) Once the pH level is reached timer will stop and reset to zero.

CALIBRATION

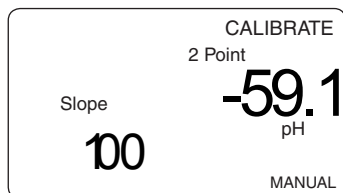
Viewing Last Calibration Data

Press the Calibrate/Hold 5 Sec key once.

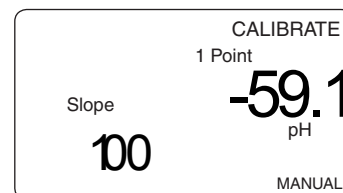


'CALIBRATE' will be visible in the upper right corner of the display screen. Also displayed will be the 'pH' and '°' (slope) of the previous calibration. The display will alternate between 'pH' and '°C'.

'2 Point' indicates that the previous calibration was a two-point calibration.



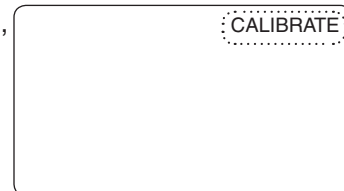
'1 Point' indicates the previous calibration was a one-point calibration.





Re-Calibrating

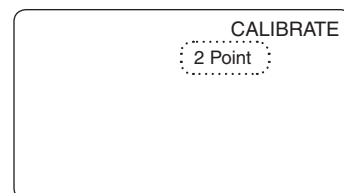
Calibration must take place weekly. For two-point calibration, the default settings are Buffer 1 = 7.00 pH and Buffer 2 = 4.00 pH.

1. Hold the 'CALIBRATE/HOLD 5 SEC' key down for five (5) seconds. 'CALIBRATE', on the display screen, will start flashing.





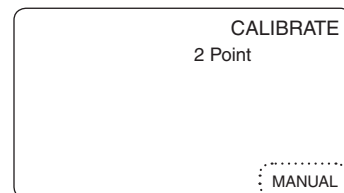
2. Press the 'CALIBRATE/HOLD 5 SEC' key again.

'2 point' will start flashing. The  or  key can be used to toggle between '1 point' and '2 point'. Display should be set to '2 point'.





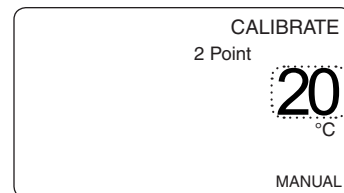
3. Press the 'CALIBRATE/HOLD 5 SEC' key again.

'MANUAL', in the lower right corner will begin to flash. The  or  key can be used to toggle between 'MANUAL' and 'ACT'. Display should be set to 'MANUAL'.





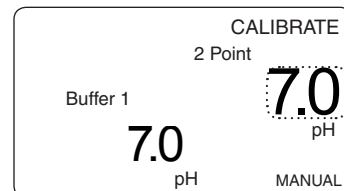
4. Press the 'CALIBRATE/HOLD 5 SEC' key again.

Temperature will begin to flash. Use the   keys to program desired buffer solution temperature.

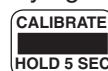



5. Press the 'CALIBRATE/HOLD 5 SEC' key again.

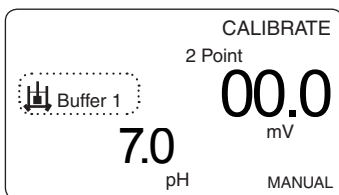
The 'Buffer 1' value will start flashing. Use the   keys to program 'Buffer 1' pH (or leave at 7.0).





6. Press the key again.

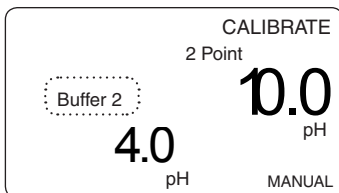


The  symbol will prompt you to put the probe in 'Buffer 1'. Wait for the mV value to settle.




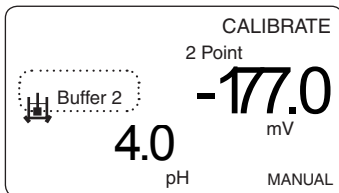
7. Press  the key again.

This will accept the first calibration value and will display the 'Buffer 2' pH. Use the   keys to program 'Buffer 2' to 4.0 pH.



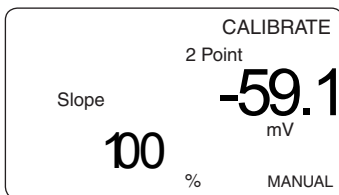
8. Press  the key again.

The  symbol will prompt you to put the probe in 'Buffer 2'. Wait for the mV value to settle.



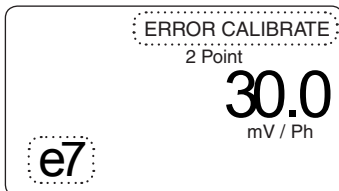
9. Press the  key again.

This will accept the second calibration value and will display the mV/pH (and the '%' Slope) result of the calibration.



10. Press the  key again to accept this calibration and exit calibration mode. Press any other key to abort calibration

If the calibration is unsuccessful (slope < 70% or offset < ± 30 mV) an 'ERROR CALIBRATE' and 'E7' are displayed; the calibration should be repeated or else the controller reverts to using the 'last successful' calibration performed.



A slope of less than 70% indicates a dirty/faulty probe or contaminated buffer. (Refer to page 20 for other error messages.)

FEED RATE ADJUSTMENT

Even though the controller is designed to automatically maintain the proper chemical levels, there may be some underfeeding or overfeeding if the feed rates are set too low or high. This is due to the lag time between the beginning of chemical feeding and the sensing of those chemicals by the sensors after recirculation through the unit and the tank.

If the chemical levels tends to be systematically on the high side, you should reduce the feed rate of the chemical feed pump. This is done by removing the enclosure cap on the front of the pump and turning the screw counter-clockwise to slow the pump down. If the chemical level is too low or takes longer than one (1) hour to adjust, raise pump speed up by turning screw clockwise.

SENSOR MAINTENANCE

To test the sensor, carefully add a very small amount of white vinegar or a dilute acid solution to the water and test the probes. The pH reading should go down. If not, clean or replace the sensor.

Cleaning The pH Sensor

The cleaning of the pH sensor must be done on a weekly maintenance schedule if used in a moderate to heavy oil and dirt load; on a monthly maintenance schedule if used in a low oil and dirt level.

To clean the sensor, do the following:

- Loosen the sensor from the compression tee. With a Q-Tip and any household degreaser (i.e. 409) spray and wipe the sensor probe clean. Rinse with clean water. Dip the probes into a 5% hydrochloric acid solution (muriatic acid). This solution is effective for solubilizing hard water deposits that may occur on the probe.

WINTERIZING AND SHIPPING

NOTICE: For winterizing and shipping, always keep the sensor above freezing temperature. Make sure to place the plastic cap on the tip of the sensor and to add a few drops of water inside the cap to prevent the sensor from drying out. Shipping and storing a sensor without plastic cap will void its warranty.

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"

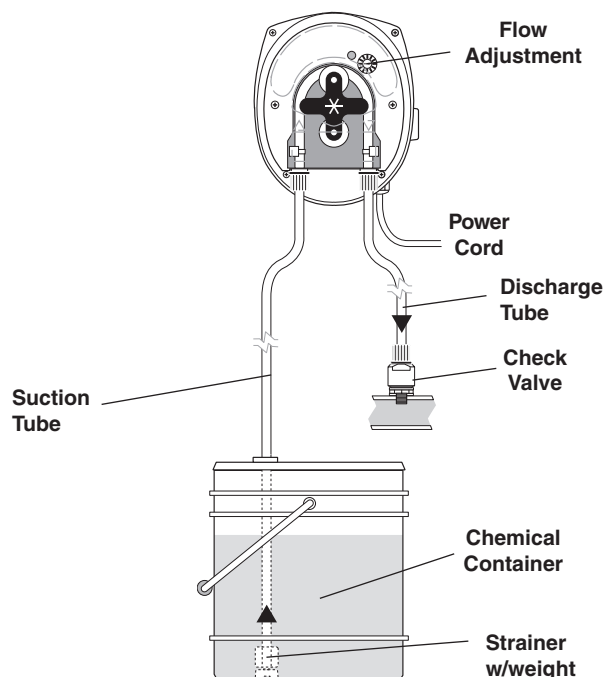
Standard Accessories Provided with Pump:

- Squeeze Tubing Assembly
- Check Valve
- Strainer w/weight
- Bulkhead fitting w/elbow

Electrical Rating:

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

Maximum System Pressure: 45 PSI

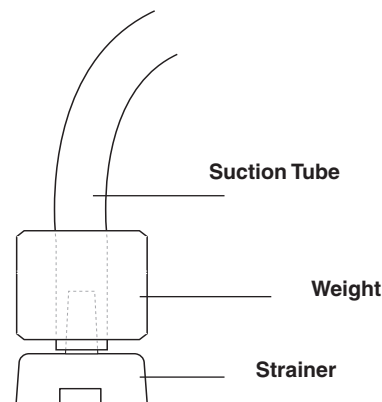


INSTALLATION

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.

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



3. **CONNECT SUCTION TUBING TO STRAINER:**

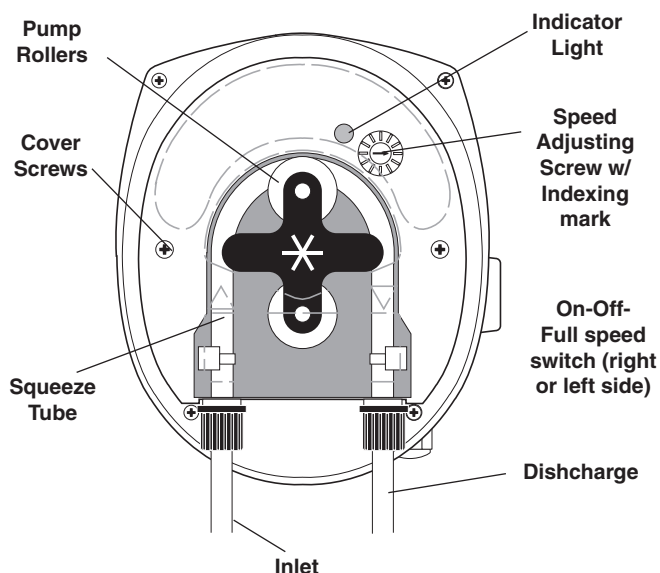
Install strainer so it's off the bottom of the chemical container. Cut the suction tubing to the length needed. Put weight on tubing. Push strainer end into tubing.

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

FILLING 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.

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 fitting.
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.*

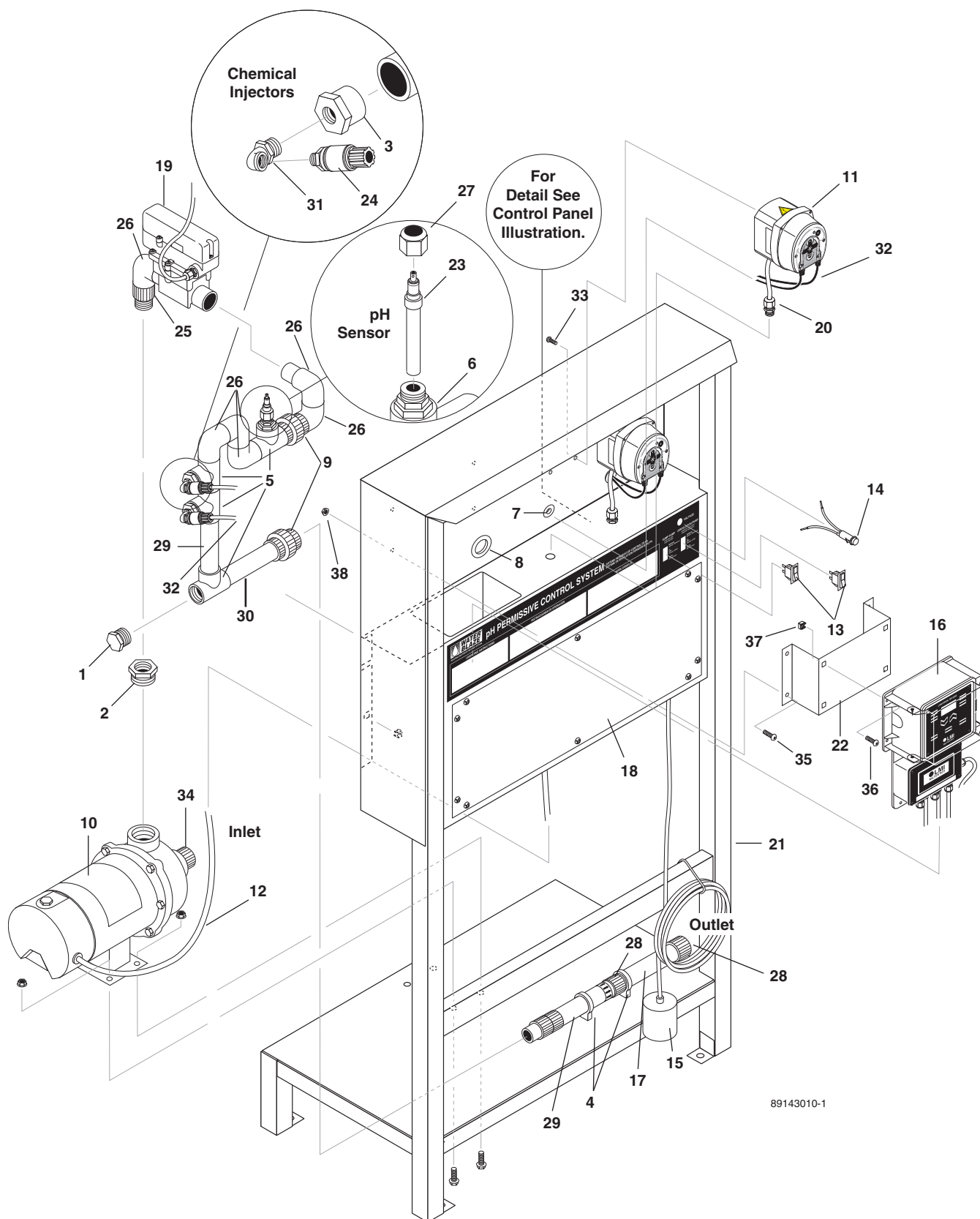
INSPECT FOR LEAKAGE:

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.

pH-3020 EXPLODED VIEW



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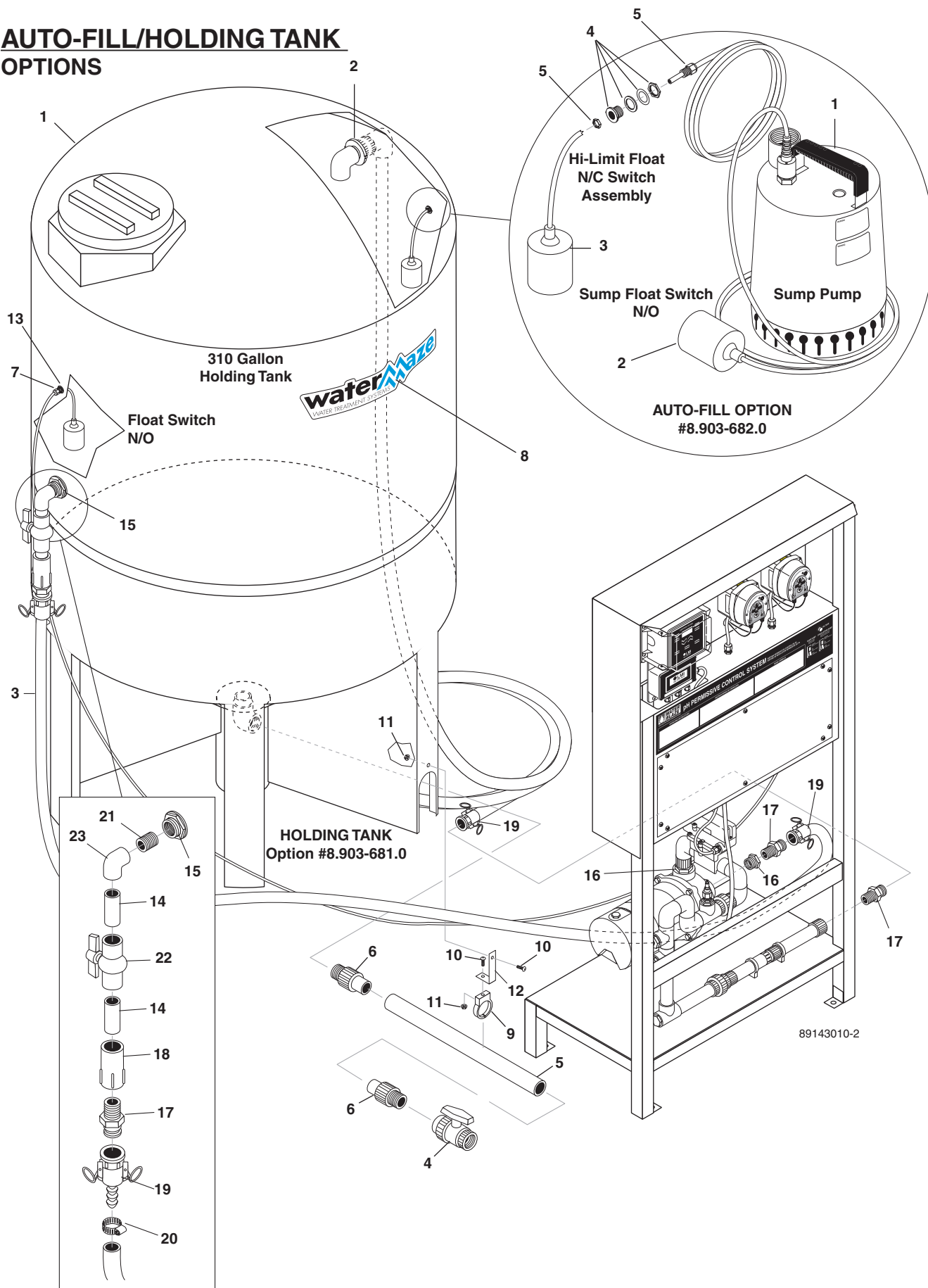
**pH-3020
PARTS LIST**

ITEM	PART NO.	DESCRIPTION	QTY.
1	8.706-397.0	Plug, 3/4" MT, SCH 80 PVC	1
2	8.706-404.0	Bushing, 1-1/2" x 1" MT x FT, PVC 80	1
3	8.749-858.0	Adapter, PVC 1" S x 1/2" FT	2
4	8.706-421.0	Hanger, Pipe, 1-1/2" Click #47	2
5	8.706-430.0	Tee, 1" S x S, PVC 80	4
6	8.706-447.0	Adapter, 1", 3/4" S x FIPT, PVC 80	2
7	9.802-064.0	Grommet, Rubber, Nozzle Holder	2
8	9.802-065.0	Grommet, 1-5/16 Rubber, Drum Cleaner, MB2802	1
9	8.706-597.0	Union, 1", S x S, PVC 80	2
10	8.917-759.0	Pump, 3/4HP, 115V, 1Ph	1
11	8.749-855.0	Pump, Peristaltic, 8-45 gpd	2
12	9.802-436.0	Cord, SERV, SEO, 10/3 Ft. Coleman	16 ft
13	8.716-052.0	Switch, Curvette ON-OFF-ON/RC911RB-B-0-N	2
14	9.802-455.0	Light, Indicator, Green 125V	1
15	8.716-142.0	Switch, Float, N/O, .20PMDWOP, 1003825 (Black)	1
16	8.716-999.0	Controller, PH LMI, DP5000-1A-0	1
17	8.717-003.0	Mixer, TAHStatic, 05-021	1
18	8.921-708.0	Cover, Panel	1
19	8.716-137.0	Switch, Flow, 1" PVC, Model 225	1

ITEM	PART NO.	DESCRIPTION	QTY.
20	9.802-514.0	Strain Relief, STRT, LQ TITE 3231 Small	14
21	8.913-227.0	Stand, Welded Assembly, pH System	1
22	8.913-230.0	Bracket, Controller Mount, pH Stand	1
23	8.717-001.0	▲ Probe Cable, 10"	1
	8.717-000.0	Probe, Sensor EX, pH	1
24	8.749-860.0	Check Valve, PVC, 1/8" MT	2
25	8.706-409.0	Adapter, 1" MT x S	1
26	8.706-373.0	Elbow, 1" S x S	6
27	8.717-002.0	Probe, Mounting Gland	1
28	8.706-409.0	Adapter, 1" MT x S	2
	8.706-405.0	▲ Bushing, 1-1/4" x 1"	2
29	8.706-366.0	Pipe, 1", PVC 80	1 ft
30	8.706-361.0	Pipe, 1", PVC Clear	3 ft
31	8.749-861.0	Bulkhead, PVC, 3/8", w/Elbow (remove nut and washers)	2
32	8.749-857.0	Tubing, 1/4", PE, Black	12 ft
33	8.718-941.0	Screw, # 10 x 5/8", Tek	4
34	8.750-270.0	Fitting, Compression, 1-1/2"	1
35	9.802-765.0	Screw, 1/4-20 X 1/2", BH Black	4
36	9.802-759.0	Screw, 10/32" x 1/2" BHSOC BLK	4
37	9.802-791.0	Nut, Cage, 10/32" X 16 GA	4
38	8.718-817.0	Nut, 1/4-20, Whiz Loc Flange, SS	4

▲ Not Shown

AUTO-FILL/HOLDING TANK OPTIONS



**HOLDING TANK OPTION #89036810
PARTS LIST**

ITEM	PART NO.	DESCRIPTION	QTY.	ITEM	PART NO.	DESCRIPTION	QTY.
1	8.719-173.0	Tank, 310 Gallon CONE BTM. w/Stand	1	14	8.706-366.0	Pipe, 1", PVC SCH 80 2.5" Long	2
2	8.706-490.0	Bulkhead, 1-1/2" POLYPRO	1	15	8.706-484.0	Bulkhead, 1", Polypro	2
3	8.711-811.0	Hose, 1", Gray Spiralite, /Ft.	30ft	16	8.706-404.0	Bushing, 1.5" x 1" MT x FT PVC 80	2
4	8.707-349.0	Valve, 2" Single Union Ball	1	17	8.706-707.0	Adapter, 1" MT x 1" MT CAML	3
5	8.706-583.0	Pipe, 2" Gray, PVC 80	19"	18	8.706-444.0	Adapter, Female, 1" Slip x FT PVC 80	1
6	8.706-451.0	Adapter, 2" Slip x MT PVC 801	2	19	8.706-709.0	Coupler, 1" FT x 1" Hose Barb CAMLO	3
7	9.802-514.0	Strain Relief, STRT, LQ TITE 3231 Small	1	20	9.803-629.0	Clamp, Screw 9/16" W 1-1/2" OD, SS	2
8	8.900-803.0	Label, Water Maze, Logo Small	1	21	8.706-439.0	Nipple, 1" PVC 80, Close	1
9	8.706-487.0	Hanger, 2", Click #59 Pipe	1	22	8.706-359.0	Valve, 1"S PVC 80 S x S Mold In Place BA	1
10	8.718-812.0	Screw, 10/32 x 3/4" BH SOC SS	2	23	8.706-378.0	Elbow, 1" Slip x FPT PVC 80 90°	1
11	9.802-695.0	Nut, 10/32" Keps	2				
12	8.919-049.0	Bracket, Pipe Hanger	1				
13	8.750-743.0	Bulkhead, 1/2" Polypro	1				

**AUTO-FILL OPTION #89036820
PARTS LIST**

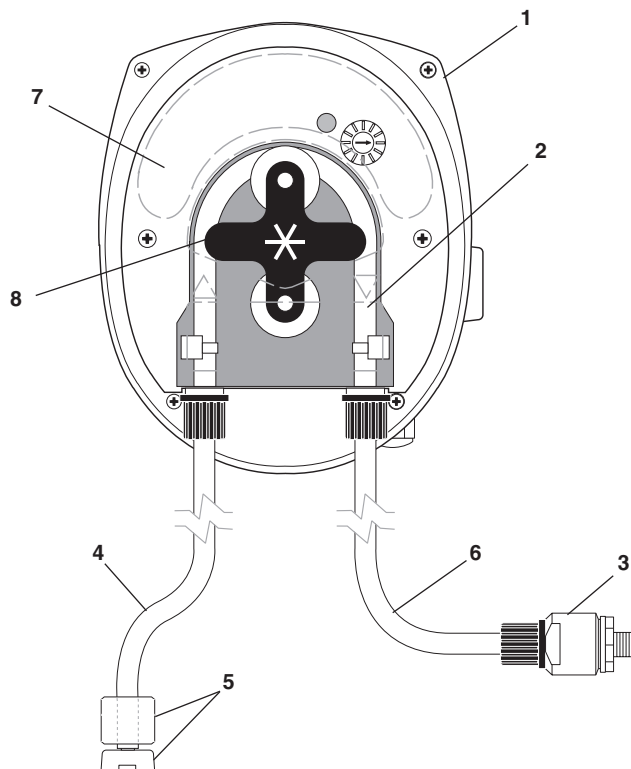
ITEM	PART NO.	DESCRIPTION	QTY.
1	8.715-364.0	Pump, Grundfos 1/2 HP Sump SS, AP-12, 120V	1
2	8.716-142.0	Switch, Float, N/O, .20 PMDWOP, #1003825 (Black)	1
3	8.716-143.0	Switch, Float, N/C, #1003826 (Gray)	1
4	8.750-743.0	Bulkhead, 1/2" Polypro	1
5	9.802-514.0	Strain Relief, STRT, LQ TITE 3231 Small	1

DIMENSIONS, WEIGHTS & ELECTRICAL								
MODEL	HP	VOLTS	PHASE	AMPS	SHIPPING WEIGHT	SHIPPING CARTON L x W x H	PACKING VOL. Cu. Ft.	MAX. WATER TEMP.
AP12	.5 (.37 kw)	115	1	8	24 lbs. (10.9 kg)	7-3/4" x 7-3/4" x 12-3/4" (19.69 x 19.69 x 32.39 cm)	0.5 (.014 cu. m)	131°F (55°)

Performance Table

Model	5 Ft. 1.52 m	10 Ft. 3.05 m	15 Ft. 4.57 m	20 Ft. 6.10 m	25 Ft. 7.62 m
AP-12	72 gpm (272 lpm)	64 gpm (242 lpm)	56 gpm (212 lpm)	44 gpm (166 lpm)	30 gpm (113 lpm)

METERING PUMP AND PARTS LIST

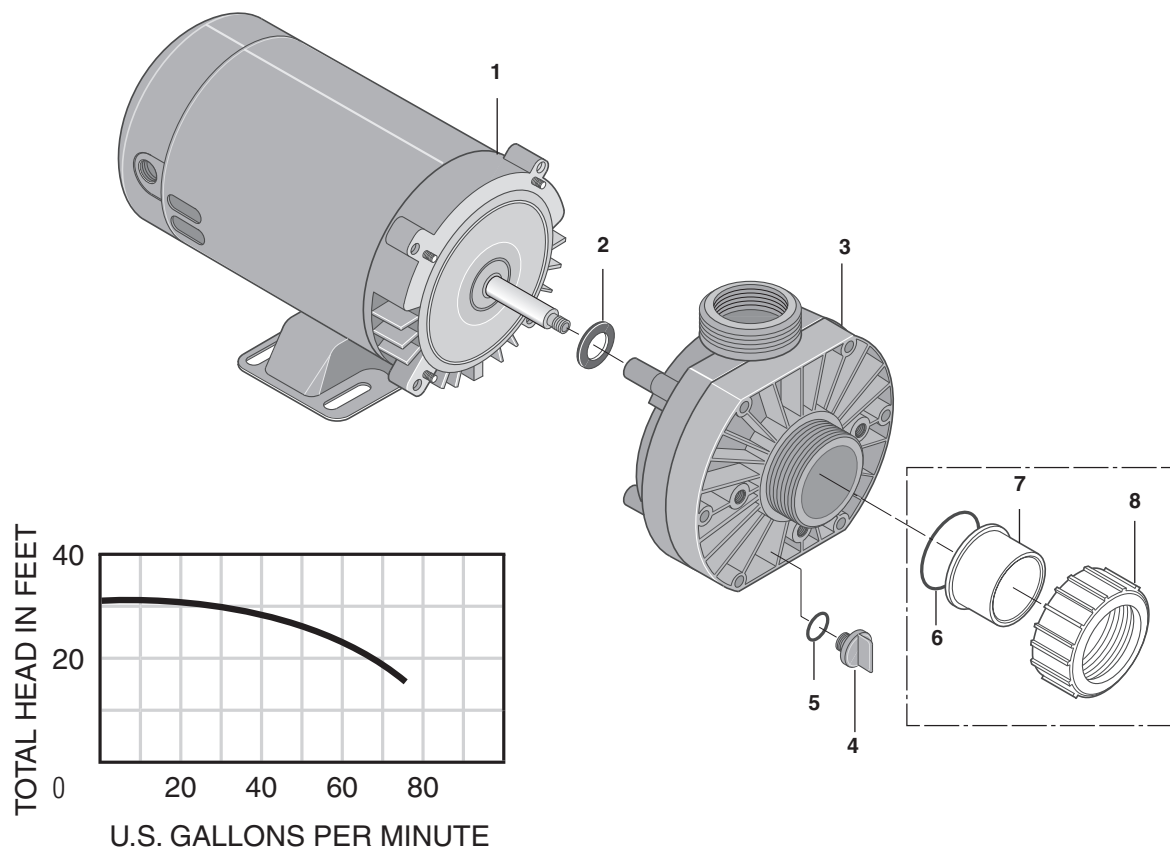


ITEM	PART NO.	DESCRIPTION	QTY
1	8.749-855.0	Pump, Peristaltic, PR-7, 8-45 gpd	1
	8.749-856.0	Pump, Peristaltic, PRS-1, 1-7 gpd	1
2	8.749-862.0	Tube, Squeeze, Santoprene, PR-7, * 8-45 gpd	1
	8.749-864.0	Tube, Squeeze, Santoprene, PRS-1, * 1-7 gpd	1
3	8.749-860.0	Check Valve, PVC	1
4	8.749-857.0	Tubing, 1/4", PE, Black	AR
5	8.749-863.0	Strainer, w/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, PRS-1	1

* Alternative tubing materials are available

Pump

Part # 8.917-759.0



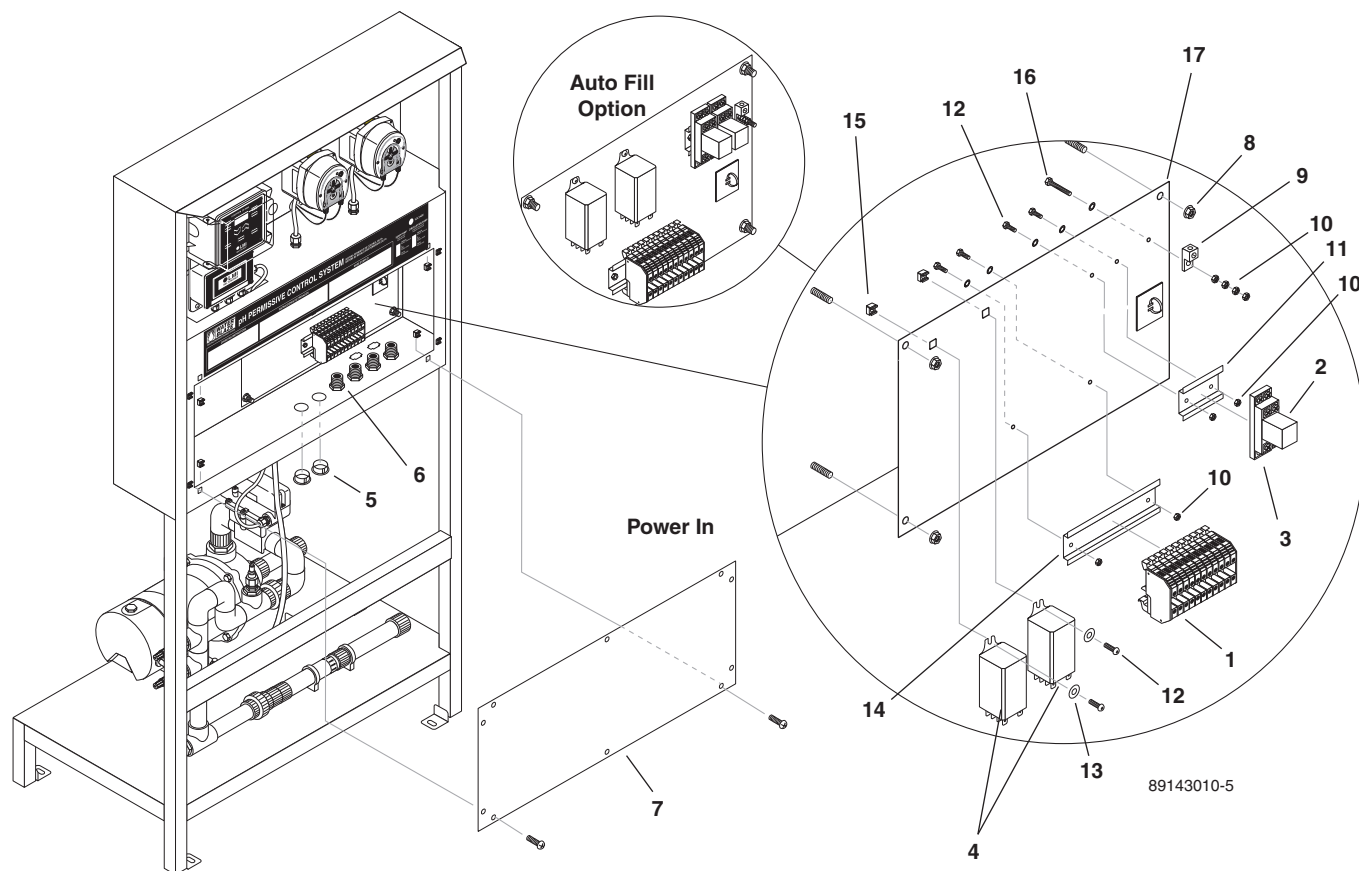
ITEM	PART NO.	DESCRIPTION	QTY
1	8.726-025.0	Motor, 3/4 HP, 115V	1
2	NA	Slinger	1
3	8.726-024.0	Pump, 3/4 HP, Wet End	1
4	NA	Drain Plug	1
5	NA	O-Ring, Drain Plug	1

ITEM	PART NO.	DESCRIPTION	QTY
6	NA	O-Ring	1
7	NA	Adapter, Union	1
8	NA	Collar, Union	1
Kit:			
6-8	8.750-270.0	Fitting, Compression, 1-1/2" Slip	

HP	Volts	Phase	Size		Running Amps	Max. Pressure	Max. Water Temp.
			Inlet	Outlet			
3/4	115V	1	1-1/2" FPT/ 1-1/2" MBT	1-1/2" FPT/ 1-1/2" MBT	10.0	40 PSI	104°F/40°

ELECTRICAL

CAUTION: DISCONNECT ALL LIVE POWER AT THE SOURCE BEFORE WORKING ON THE ELECTRICAL SYSTEM.



ITEM	PART #	DESCRIPTION	QTY
1	8.716-396.0	Block, Terminal	9
	8.716-398.0	▲ Block Terminal, Blue	2
	8.716-399.0	▲ End Cover	1
	8.716-401.0	▲ Partition Plates	2
	8.716-402.0	▲ Bridge, Fixed	1
	9.804-609.0	▲ Marker, Blank	1
2	9.802-468.0	Relay, 120V, RH2B-UL-AC120	1
3	9.802-467.0	Base, Relay, SH2B-05, IDEC	1
4	8.716-264.0	Relay, SKY MFG, 120V # SKHT-1X	2
5	9.802-105.0	Plug, 7/8", Hole	2
6	9.802-514.0	Strain Relief, STRT, LQ TITE 3231, Small	14
7	8.921-708.0	Cover, Panel	1
8	8.718-871.0	Nut, .50 ID, Push Flat	4
9	8.716-460.0	Terminal, Grounding Lug, LAMA6-14-Q	1

ITEM	PART #	DESCRIPTION	QTY
10	9.802-695.0	Nut, 10/32" KEPS	8
11	9.802-457.0	Din Rail,35MM	2"
12	9.802-759.0	Screw, 10/32" x 1/2" BHSOC BLK	8
13	8.718-968.0	Washer, 10 X SAE ZN	4
14	9.802-457.0	Din Rail,35MM	4"
15	9.802-791.0	Nut, Cage, 10/32" X 16 GA	4
16	9.802-762.0	Screw, 10/32" x 1-1/4" RH, SL, BLK	1
17	8.913-229.0	Stand Off, PH Stand	1

▲ Not Shown

TROUBLESHOOTING

ACID OR BASE PUMP NOT TURNING ON

PROBLEM	POSSIBLE CAUSE	SOLUTION
NO VOLTAGE LIGHT	Breaker not on	Turn breaker on.
	GFCI tripped	Reset.
	Bad lamp	Replace.
MIX PUMP WON'T TURN ON	Switch not in auto position	Put switch in auto position.
	Float in feed tank is in down position	Fill tank.
	No voltage to pump	Check continuity through mix pump switch.
	Thermal protect on motor tripped	Let motor cool.
SUMP PUMP WON'T TURN ON	Switch not in auto position	Put switch in auto position.
	Low water float in pit is in the down position	Fill pit.
	Is upper shut-off float in feed tank in the upper position	Drain tank.
ACID OR BASE PUMP NOT TURNING ON	Pump switch off	Turn on.
	pH within 6.5 - 7.5	Desired range. Pumps not required to be on.
	Mix Pump not on	See above Mix Pump troubleshooting.
	Bad Idec relay	Replace relay.
	Fuse in pump blower	Replace fuse.
	Flow switch not activated with pump on	Jumper #1 and #2 on controller terminal TB4.

ERROR MESSAGES

Turn System off to clear error message.

E1	E1 = LOW LEVEL SWITCH	E5	E5 = PUMP B 'LOCKOUT'
E2	E2 = FLOW SWITCH	E6	E6 = PUMP A 'LOCKOUT'
E3	E3 = ALARM 1: LOW pH (PUMP B)	e7	E7 = CALIBRATION ERROR - Probe is out of Manufacturer's Limits
E4	E4 = ALARM 2: LOW pH (PUMP A)	E9	E9 = FAULTY or DISCONNECTED PROBE

PREVENTATIVE MAINTENANCE

MAINTENANCE SCHEDULE	
Check plumbing for leaks.	Check Daily
Check chemical tubing for leaks and deterioration.	Check Daily
Drain cone bottom on tank.	Drain Daily
Clean and calibrate probe.*	Maintain Weekly
Suction out pit.*	Maintain Monthly
Clean sump pump and float.*	Clean Monthly
Check and clean chemical strainers.*	Maintain Monthly

**NOTE: This is a guide. Depending on your wash load, these items may have to be done more or less often.*



WATER MAZE LIMITED NEW PRODUCT WARRANTY WASH-WATER SYSTEMS

WHAT THIS WARRANTY COVERS

All *WATER MAZE* wash-water systems are warranted by *WATER MAZE* 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.

NON-WARRANTY REPLACEMENT PARTS:

These parts, excluding normal wear items as described below, will be warranted for the duration specified by the original component manufacturer. O-rings and leaks at glued fittings are covered the first time on original start-up only.

WHAT THIS WARRANTY DOES NOT COVER

This warranty does not cover the following items:

1. Normal wear items, such as mechanical seals, filters, gaskets, O-rings, check valves, filtering media, ozone bulbs. O-rings and leaks at glued fittings are covered the 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, chemical deterioration (oxidation, chloride or fluoride corrosion).
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. Death of microbes (Biostax 900 & 100) from lack of refrigeration after received and stored.

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. **THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR THE PARTICULAR PURPOSE, INCLUDING QUALITY OF WATER TREATMENT.** *WATER MAZE* does not authorize any other party, including authorized *WATER MAZE* Dealers, 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.

WATER MAZE

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