



Pure-pH

Automated Neutralization System for
UltraSonic Lens Washer Effluent

Installation & Operating Manual
Rev. 4/11/2011



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NOTICE TO INSTALLER – PLEASE READ:

DO NOT.....DISCARD THIS MANUAL AFTER INSTALLATION. THIS MANUAL CONTAINS IMPORTANT OPERATION, MAINTENANCE AND PRECAUTIONARY INFORMATION. PLEASE PRESENT THIS MANUAL TO THE USER/OPERATOR/OWNER AFTER INSTALLATION.

IT IS STRONGLY ENCOURAGED THAT THIS MANUAL BE READ IN ITS ENTIRETY BEFORE INSTALLATION IS ATTEMPTED TO COMPLETE THE BEST POSSIBLE INSTALLATION.

INSTALLATION MUST CONFORM TO ALL LOCAL CODES AND REGULATIONS AS REQUIRED.

NOTICE TO USER/OPERATOR/OWNER – PLEASE READ:

PLEASE COMPLETE PRODUCT REGISTRATION CARD AND MAIL OR FAX TO MANUFACTURER.

PLEASE RETAIN THIS MANUAL FOR FUTURE REFERENCE FOR PARTS, MAINTENANCE OR TROUBLESHOOTING.

IT IS STRONGLY RECOMMENDED THAT ALL PERSONNEL IN THE DEPARTMENT RESPONSIBLE READ THE PRECAUTIONS, OPERATION AND MAINTENANCE SECTIONS OF THIS MANUAL.

WHEN OPERATING THE SYSTEM KEEP THE LID ON THE TANK. WHEN CHANGING NS5PWO CUBE WEAR APPROPRIATE PROTECTIVE CLOTHING AND EYE PROTECTION.

WARNING - DO NOT SUBSTITUTE NON-FORMULATED NEUTRALIZATION SOLUTION FOR NS5PWO. DANGEROUS CHEMICAL REACTIONS OR DAMAGE TO SYSTEM COMPONENTS COULD RESULT.

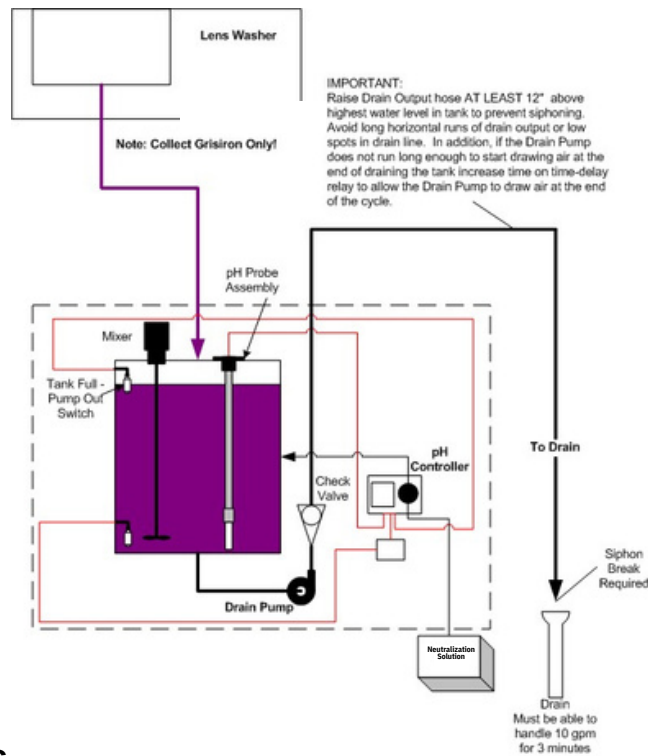
Overview

The Pure-pH is designed to automatically monitor and neutralize UltraSonic Lens Washer effluent to a user determined pH. When the pH of 8.5 is reached, the drain pump will initiate, pumping neutralized effluent to a drain.

The system incorporates a 30 gallon tank, recirculation mixer, pH controller, chemical dosing pump, drain pump, pump-out relay. The Pure-pH continuously monitors the pH and neutralizes only as needed. Spent Alkaline Solution is collected via the Washer tank overflow drain and is collected in the Pure-pH tank. The recirculation mixer motor runs at all times to mix the spent Alkaline Solution effluent and Neutralization Solution (NS5PWO). As the pH rises in the tank the pH controller actuates the dosing pump to add the NS5PWO. When the tank is full (high level float is raised) and the pH is between 6.5 and 8.0 the drain pump is actuated and the 30g. tank is emptied to drain. When the tank is emptied, the whole process starts over.



**Pure-pH
Flow Diagram**



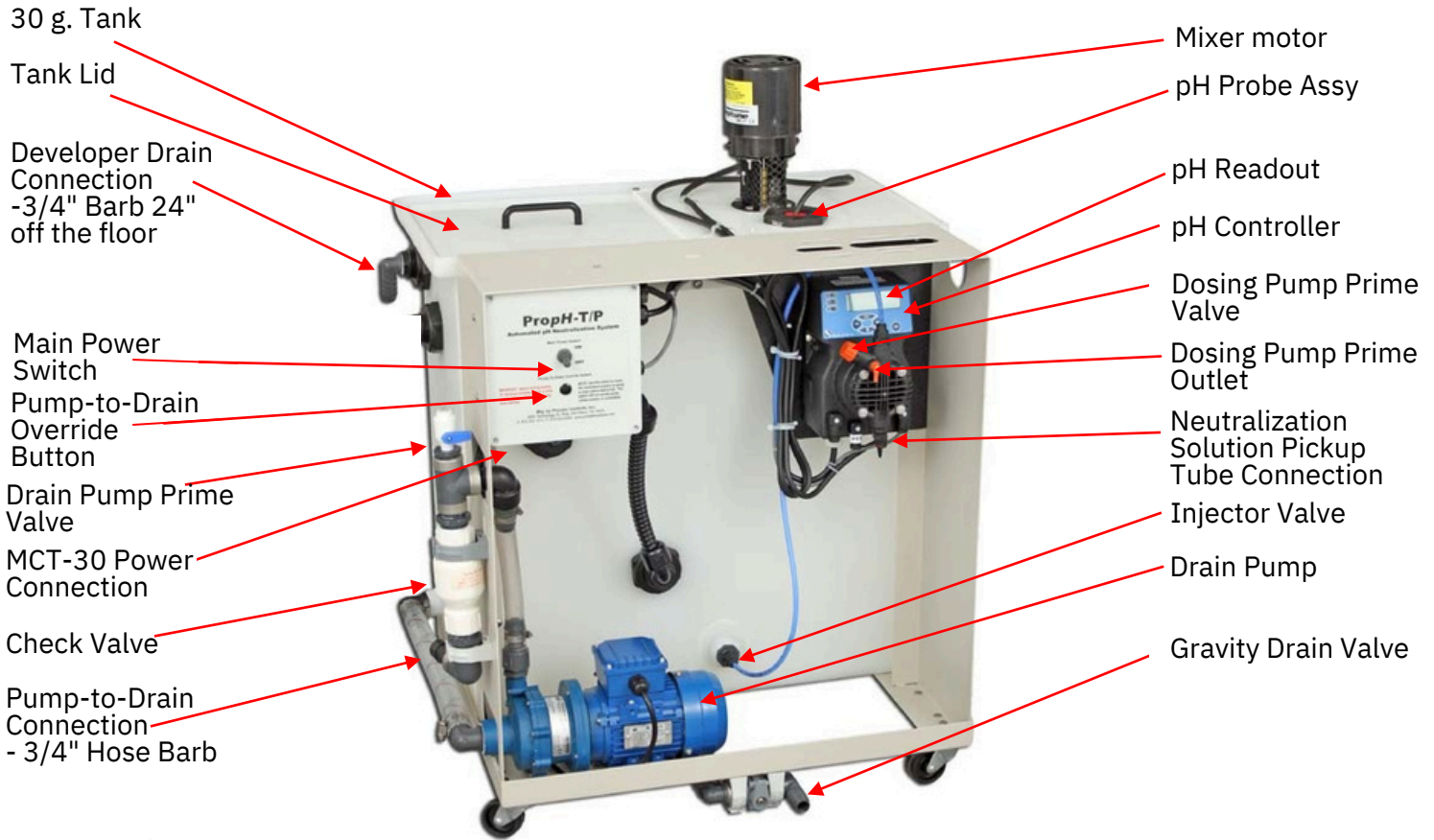
Important Precautions

- The Pure-pH is not a waste treatment system. The intended purpose of this product is to neutralize spent UltraSonic Lens Washer solutions.
- Read all instructions before operating the system.
- Remove the protective cover from the pH probe in the 30 gallon tank before operation.
- Always connect Safety Overflow Fitting to drain or container.
- Drain Pump must be primed to pump neutralized solution to drain.
- Use only the recommended and Pure Water Works approved Neutralization Solution.
- Drain Pump flow is very high. Securely anchor the drain line and utilize a drain with sufficient flow capability. 3" drain minimum.
- Installation must conform to all local codes and regulations.
- Contact your local chemistry representative and/or local water/sewer authority for information about your local requirements.
- Avoid long horizontal runs or low spots in drain line. Secure drain line to drain pipe and allow an air gap for siphon break.
- **DRAIN PUMP FLOW RATES ARE VERY HIGH, DRAIN MUST HANDLE 10 GPM FOR 3-4 MINUTES.**

Specifications

Voltage Requirements:	115VAC 60Hz 9amps
Processor Developer Drain Connection:	¾" I.D. Hose Barb
Pump to Drain Connection:	1" Hose Barb to 3" Drain.
Safety Overflow Connection:	1" Hose Barb
Dimensions:	29" Wide x 22" Deep x 28" High

Getting To Know the Pure-pH



Preparation

Determine the best location for the Pure-pH. Many users place the unit behind the UltraSonic Lens Washer. This minimizes space required and keeps the interface hoses as short as possible. Avoid looping drain hoses when connecting to the Washer. This will cause air locks and prevent the Lens Washer from draining freely. A drain and power supply need to be in close proximity to the Pure-pH. A floor drain is sufficient for the drain.

A length of 3/4" i.d. tubing is included to interface with the Lens Washer tank drain.

IMPORTANT: In cases

where the Lens Washer tank is larger than 25 gallons or the drain connection is lower than 24" it may be necessary to include a Transfer Tank that collects the spent Alkaline Solution at floor level then pumps it into the Pure-pH. Typically, this is the only modification needed on the Lens Washer.

Installation

1. Choose a location for installation that is flat and level, near a 115VAC standard electrical outlet. Since the unit is on casters it does not necessarily need to be next to the Lens Washer; however, next to the Lens Washer, near a drain and water supply would be most convenient.
2. **REMOVE THE PROTECTIVE COVER FROM THE BOTTOM OF THE pH PROBE (Keep the cover for future use).** The system is shipped with the cover on the probe to keep the pH sensing bulb in a buffer solution. Note: It may be necessary to loosen the black bulkhead fitting at the top of the tank to create enough clearance to remove the protective cover. The black bulkhead fitting is reverse threaded, therefore, turn the nut clockwise as you look from the bottom to loosen. **CAUTION: THE BUFFER SOLUTION IS**



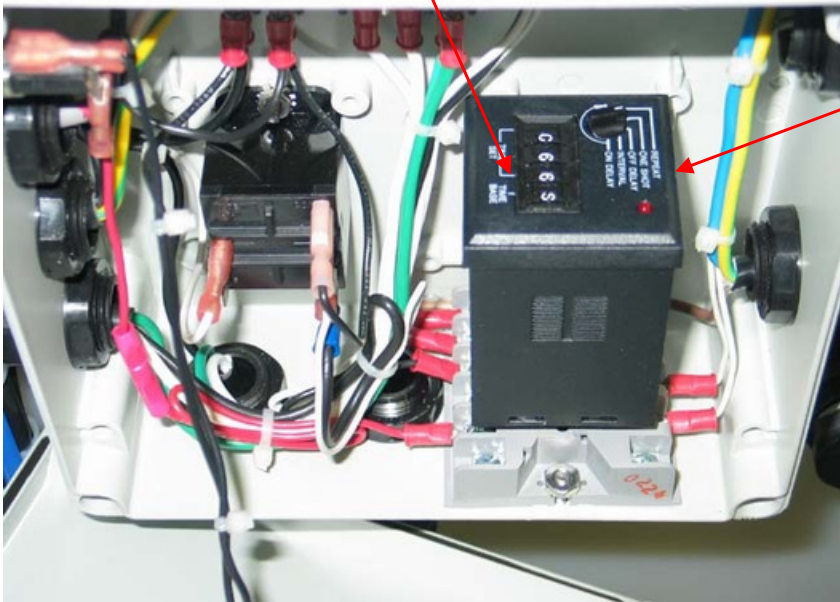
CORROSIVE AND CARE SHOULD BE EXERCISED IN REMOVING. PROTECTIVE GLOVES AND EYEWEAR IS RECOMMENDED.

3. Remove the white plastic cap on the Neutralization Solution cubetainer. (Read MSDS and utilize protective eyewear and gloves.) The neutralizing solution is corrosive to metals and should be handled with great care.
4. Replace the cap with the Neutralizer Pick-Up Tubing/Cap Assembly. Save cap for future use.
5. Cut the tubing to the length needed to reach the inlet of the chemical feed pump. Keep the tubing as short as possible and avoid looping the tubing. This will facilitate dosing pump priming.
6. Remove black tubing nut and the red protective cover on the chemical dosing pump inlet. Slide nut on to the tubing and push tubing on to the chemical dosing pump inlet barb, slide tubing nut up to barb and hand-tighten. Do not use a wrench.
7. Connect the $\frac{3}{4}$ " i.d. hose to the $\frac{3}{4}$ " hose barb on the left side of the tank and clamp. Connect the other end to the Lens Washer Tank overflow drain connection and clamp.
8. Connect the 1" i.d. hose to the Pump-to-Drain Outlet -1" hose barb and clamp. Securely connect the other end of the 1" hose to a minimum 3" drain. **WARNING: PUMP-OUT RATES ARE VERY HIGH, FAILURE TO SECURELY FASTEN HOSE TO DRAIN MAY CAUSE HOSE TO PUSH OUT OF DRAIN. IMPORTANT: TO HELP PREVENT SIPHONING LOOP THE DRAIN HOSE UP ABOVE THE TANK HEIGHT THEN DOWN TO THE DRAIN. USE AN AIRGAP IF POSSIBLE OR REQUIRED BY LAW.**
9. Connect the Safety Overflow Connection on right side of tank to drain or suitable container for catching overflow. This is not normally used but prevents overflow in case of component failure.
10. Check that the main power switch is in the "Off" position. Plug unit into standard 115VAC 15amp outlet.
11. **IMPORTANT: Check that the Drain Pump Priming Valve and the Gravity Drain Valve are CLOSED.**



OPERATION

1. Turn on the main power switch. The mixer motor will not run until the bottom float switch is raised.
2. Start washing lens. As lens are washed the Pure-pH will fill with Alkaline Solution. As the Alkaline Solution overflows in the Washer down the drain the lines will fill and eventually drain into the Pure-pH.
3. As the pH rises the controller will actuate the dosing pump. It may be necessary to prime the dosing pump on initial start up and when changing cubes.
4. Prime dosing pump when it is running by opening the round orange knob on the dosing pump head and catching the solution that comes out the orange hose barb. **CAUTION: THIS KNOB IS FRAGILE AND DOES NOT REQUIRE A HIGH TORQUE TO SHUT OFF OR OPEN.**
5. The pH controller constantly monitors the pH and will only add Neutralization Solution as needed. **NOTE: If the pH goes to 5 the controller signals an alarm.**
6. Prime the Drain Pump by opening the blue handle on the white valve until fluid comes out. Use a beaker to catch fluid.
7. When the level in the tank is high enough to trip the top float switch the Drain Pump will actuate and drain the tank. As the level drops in the tank the tap-water float will drop allowing fresh water in. This flow rate will be less than the pump-to-drain flow rate. **NOTE: The drain pump will not actuate unless the pH is between 6.5 and 8.0 AND the high level float is in the up position indicating that the tank is full.**
8. **IMPORTANT!** To maximize pH probe life and minimize maintenance actuate the “Pump-to-Drain Over-ride Switch” (located just below the Main Power Switch located on the front cover of the control box) at the end of the workday and workweek to avoid leaving neutralized Alkaline Solution in the tank for an extended period of time. Ideally, fresh water should be the only liquid left in the tank during periods of no processing.
9. When the timer (factory set to 85 seconds) times out the Drain Pump will turn off.



Time Delay Relay – Multi Function CNM5
Function Knob set to “One Shot”
Time Factory Set to: 85 S (85 seconds)

If you pump the water up to a drain or your water pressure is low, it may be necessary to increase the time the drain pump is on. Simply increase 1-2 seconds at a time until bottom level reaches the bottom.

Additional Notes:

The pH Controller and probe are calibrated for high pH readings. However, at very high readings, this kind of probe will typically read low. At 10.5 or lower the readings will be very accurate.

The pH probe can be easily removed at the bulkhead fitting at the top of the tank without disassembling the extension pipe. This facilitates the cleaning of the probe. Ideally, it is best to keep the probe submerged in solution instead of draining the tank empty and leaving the probe out in the open air. If the system is to be shut down for an extended time, rinse the probe with distilled or RO water and replace the protective cover. Before replacing the cover, pour a teaspoon of neutral pH buffer in the cap, this will prolong the life of the probe.

If the pH goes below 5 the controller will signal an alarm and cause will need to be determined. To correct this condition simply add some spent Alkaline Solution to tank to raise the pH to the set-point and the pump will start operation.

pH CONTROLLER

All of the Pure-pH units are calibrated at the factory so that typically no field calibration is necessary. The controller is set to pump NS5PWO Neutralization Solution (low pH or “acid”). The pH set-point is factory set at 8.0 with a hysteresis of 0.50. The pH set-point is the pH that the controller will neutralize to. When the pH reaches 8.0 the Drain Pump is actuated, pumping neutralized solution out of the Pure-pH tank and on to the drain. When the pH reaches set-point (7.5-8.0) the dosing pump turns off. The Drain Pump will continue to pump out until the pH increases or the relay times out. The pH controller arms a relay that arms the drain pump time-delay relay when the pH falls in the window of 6.5 and 8.0.



Calibration

Set-Points

Set-Point and Set-Point 2 are factory set at a pH of 8.0 and 7.0 and the Set-Point should not be changed unless Set-Point 2 is also changed. This should only be done by a trained technician or with detailed instructions.

pH

When calibrating the controller it is necessary to use two buffer solutions at pH 7 and pH 10. Pour a small amount of each buffer solution into clean plastic or glass beakers. (Do not reuse the buffers, discard after calibrating a probe to a controller).

1. Loosen the bulkhead fitting on the pH probe extension pipe inside the tank to allow for raising and lowering the probe.
2. To enter the calibration menu from measuring mode, press OK button, then the + button, on display CALIB. will flash, press OK button again to confirm and POINT 1 will appear on the display.
3. Thoroughly clean and rinse the electrode in distilled water. Dip the pH probe into the beaker with a pH 7 buffer solution.
4. After a few seconds adjust the POINT 1 value using the + and - buttons until the display shows a value of 7.00 and press OK. POINT 2 with a value will appear on the display
5. Rinse the pH probe in distilled water.
6. Dip the pH probe in the pH 10 buffer solution.
7. After a few seconds adjust the POINT 2 value using the + and - buttons until the display shows a pH value of 10.00 and press OK to save the data
8. Push ESC to go back to measuring mode.



pH Probe

The pH probe in the Pure-pH is designed to handle the very high pH, conductivity of Alkaline Solution. Other pH probes are poisoned by the solution very quickly. This probe will last significantly longer and tolerate more abuse than the typical pH probe. However, all pH probes will eventually fail in this application. Lifetime will vary based on usage and keeping the probe measuring surface wet and clean. Do not allow the probe to air dry with residual Alkaline Solution on it. This will greatly reduce the life of the probe. It is not uncommon to have to recalibrate the controller as the physiochemical characteristics of the probe change.

To Clean the pH probe – A build up of Alkaline Solution will cause the pH probe to have slow response to pH changes. If the pH dosing overshoots and you get low pH readings it is a good indication that the alkaline solution has built up on the pH sensor glass and will need to be cleaned off. It may be necessary to use Muriatic Acid (common acid available at Home Depot, Lowes or Pool Supply Stores for cleaning concrete) at full strength. Remove pH probe assembly from tank if the tank is full of solution. Fill a polyethylene or polypropylene beaker or similar container with 5-6 ozs. of the Muriatic Acid (Never use metal cans). Place the pH probe in the beaker so that the bottom 1-2” is completely submerged and let soak for one (1) hour.

WARNING – MURIATIC ACID IS A STRONG ACID AND PROPER PROTECTIVE GLOVES AND SAFETY GLASSES ARE ABSOLUTELY REQUIRED. ALWAYS PRACTICE PROPER HANDLING OF CHEMICALS AND USE IN WELL-VENTILATED AREAS. FOLLOW INSTRUCTIONS ON LABEL FOR PROPER HANDLING AND DISPOSAL OF MURIATIC ACID.

After one hour of soaking remove the probe and rinse off with water. If coating is loosened and not completely removed try removing the buildup with a piece of Scotch-Brite. Then re-soak in acid for another 30 minutes.

Check pH probe response time. When placing pH probe in fresh Alkaline Solution the pH reading should immediately go to 12-13. If it takes more than one minute it will be necessary to soak the probe overnight or replace it.

Adjustments

Time-Delay Relay – The large relay has thumbwheels to adjust pump out time. They are set at the factory but may need adjustment in the field based on water pressure and distance to drain. Generally the time is set at 85 seconds. The ideal time is based on how long it takes to pump all of the neutralized solution to drain and allowing some time to flush with fresh water.

pH Setpoint – Some incoming tapwater will have a high pH causing the controller to trigger adding acid. Since the tap water does not have a high solids content the pH of the water will drop very quickly. It may be necessary to raise the pH setpoints (factory set at 8.5 and 7.0) to prevent a low pH condition. See pH controller detail above.

Maintenance -The Pure-pH is shipped complete with one cube of Neutralization Solution (part number NS5PWO). The Neutralization Solution is the only consumable used to neutralize the plate chemistry and will need to be replenished. It typically requires 5-10% to neutralize to 8.0.

Monthly – Gently clean Alkaline Solution build-up off of the bottom of pH probe with soft brush or non-scratching Scotch-Brite. Do NOT scrape porous glass bulb with sharp objects or blades. Trigger the drain pump by lifting top level switch and allow to drain. As level reaches bottom turn off water supply so that water does not refill. Remove any Alkaline Solution that has collected at the bottom of the tank. If the pH controller responds slowly to pH changes it is an indication that the probe is coated with a build-up. Clean with Scotch-Brite or soak for several minutes in Muriatic Acid and then rinse thoroughly. **ALWAYS WEAR THE APPROPRIATE SAFETY WEAR WHEN CLEANING AND SERVICING THE Pure-pH.**

Yearly – Check pH probe Calibration. The pH probe on the Pro is a very rugged and reliable instrument and typically does not need to be recalibrated. However, it is good to check calibration yearly. Obtain pH calibration buffers for a pH of 7 and for a pH of 10 from a local lab supply or from Hach at www.hach.com. Part number 2283549 for the pH 7 buffer and 2283640 for the pH 10 buffer. Refer to operation manual for calibration procedure.

High Water Float Switch - Triggers
Drain Pump when pH is within range.

Low Water Float Switch - Turns off
Mixing Motor.

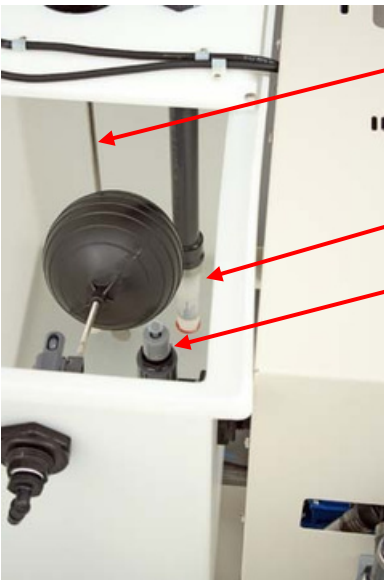
Processor Drain Connection $\frac{3}{4}$ " Hose



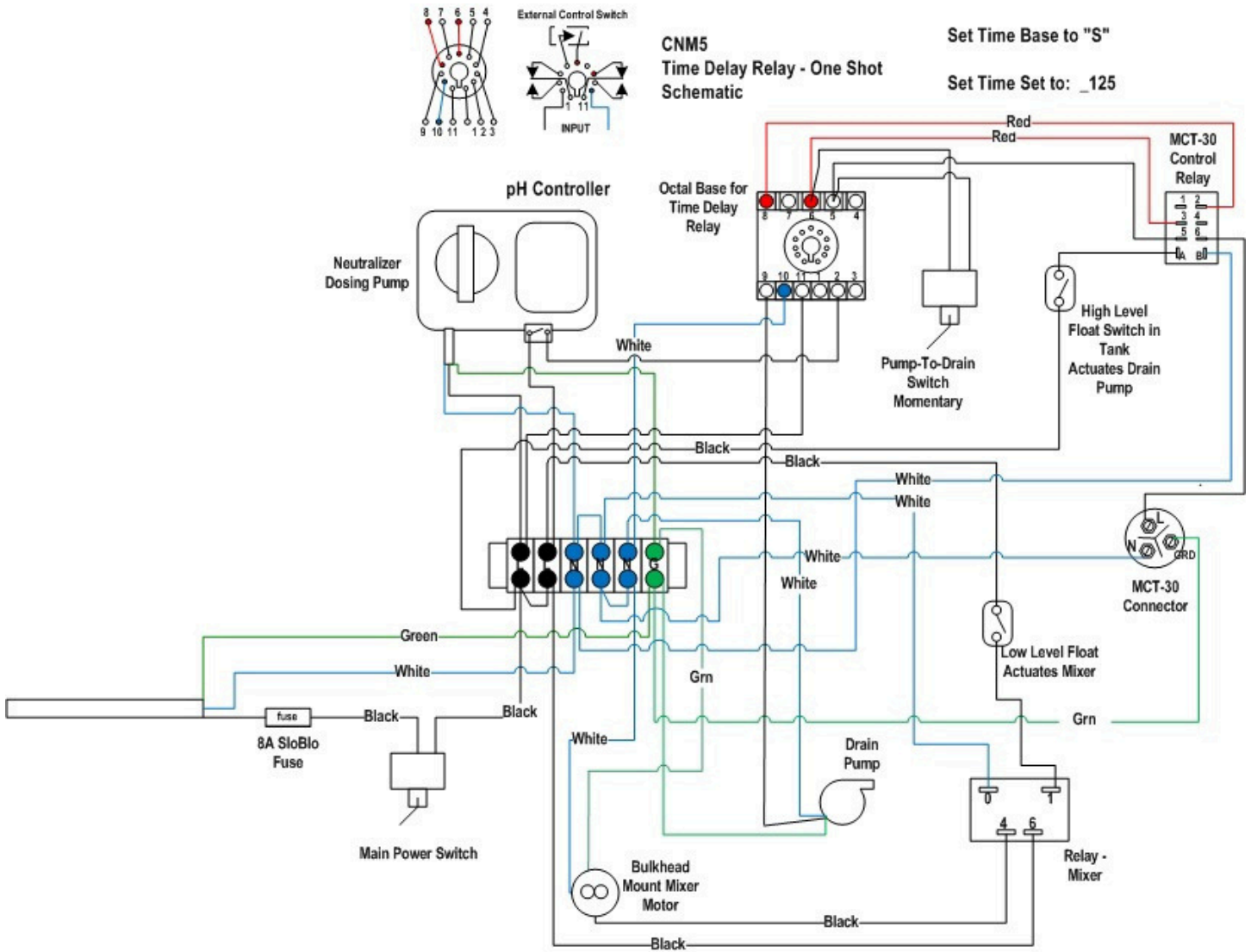
Mixing Prop Shaft

pH Probe

High Level Float
Switch



Pure-pH Electrical Schematic



The Pure-pH is manufactured for:

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