



High Pressure Humidity System

OPERATION & MAINTENANCE MANUAL

The **AMCO HIGH PRESSURE ATOMIZER SYSTEM** is a state-of-the-art, high-pressure, pump-fed, humidity system using the best in top quality nozzles, pumps, stainless steel tubing and fittings, digital controls and sensors to achieve and maintain your desired level of humidity for your industrial application.

WATER

The condition of your water is one of the items critical to your system's performance. Good filtration and water softening are two key areas to be observed. In some instances, due to high mineral content, a Reverse Osmosis water treatment unit is employed to give optimum water quality.

If using a Water Softener, it should be positioned before the stainless steel canister filter unit. The softener should be set at the installation site to regenerate the resin tanks at the prescribed usage of water and salt. The brine tank is to be kept well supplied with pelletized salt for water softeners.

While operating the system, the incoming water pressure through the softener, the two stage filter unit, and stainless steel canister filter unit **must be able to maintain a minimum of 20 PSI of pressure**. Inlet operating pressure should be set at 30 PSI. Make certain the incoming supply is able to maintain this pressure the entire time the pump unit is running. *If there is adequate incoming pressure and the gauge on the inlet water fails to maintain at least 20 PSI, the filter elements must then be changed due to clogging.* If the elements are not changed to allow proper passage of water to the pump, it will cause cavitation on the pump which will lead to premature wear on, and failure of, the pump.

All lines are to be flushed with water to rid them of metal particles and any impurities before operating the system.

PUMP UNIT

Pump Units are available with various flow capacities. All systems are custom sized with the right pump for the needed gallons per minute (GPM) on your system. Standard voltages are 208 VAC, 230 VAC and 460 VAC three phase. 575 VAC is available if necessary. Your order will specify all voltage requirements.



Maintenance on the pump unit's components should always be kept current.

1. Change pump crankcase oil initially after 50 hours of service and then every 500 hours thereafter. Use CAT oil #6100.
2. Change the High and Low Pressure Seals every 4500 hours or every 12-18 months.
3. Change the Valves in the pump manifold(s) every 2 years.

4. After 24 hours of continuous use, tighten motor belts(s) and periodically check for looseness or vibration.

CONTROL PANEL

The Control Panel for your system is pre-programmed to operate as soon as it is hooked into the system. All features on the controllers have been preset. There are many parameters that can be adjusted if necessary. All these are covered in the manual for the particular controller in the panel.

The panel stays in “Set Point” mode at all times, unless it has been “locked-out” in the control’s setup. You can adjust your targeted setpoint by simply pressing the  “UP” or  “DOWN” arrow. The bottom display shows the setpoint and the top display shows the actual percent RH reading.

NOZZLES

When installing the spray nozzles on the lines, the nozzle/wand assemblies are to be installed finger-tight plus 1/4 turn to “snug” them tight. They should be installed pointing up and out by bending the adjustable wand at approximately a 45 degree angle. ****THE PRESSURE DUCT NOZZLES ARE TO BE MOUNTED POINTING STRAIGHT DOWN.**The wand assembly(or Pressure Duct Nozzle) seals on an o-ring seat. If the wand assemblies are screwed in too tightly, the o-ring seat will compress and restrict the flow of water through the assembly. This will result in poor water passage through the nozzle orifice and improper spray patterns. It will also cause poor atomization, which results in heavy water droplets and wetting down of surrounding equipment and products.

Cleaning of the nozzles is best accomplished by using an ultrasonic parts bath/cleaner. Please call us for pricing on the ultrasonic units.

WARNING

If the system is not used for more than thirty (30) days it should be drained of all water. Before system is restarted, each line is to be flushed with water and purged of any particles, blockages or impurities in the system.

It is the customer’s responsibility to provide some means of security or manned personnel to monitor this system in the event that controls or system failure would result in the loss of or damage to persons, product or property.

AMERICAN MOISTENING COMPANY

HIGH PRESSURE ATOMIZER SYSTEM

INSTALLATION INSTRUCTIONS

ELECTRICAL INSTALLATION

1. Install electrical wiring to the main control panel.
220, 230, 240 Three Phase
or
440,460, 480 Three Phase to top of motor starter inside control panel. Then extend wires to the motor.
*If your motor is 575 VAC or on a Single Phase system, wire the starter accordingly.
2. A separate 120 VAC line is also needed to terminals marked Ground, L1, and N on the terminal strip inside the panel.
3. The Main Water Solenoid Valve [inlet valve] is to be attached to terminals marked 3, N, and Ground.

4. **If using Solenoid Valves for Zone and Dump:**

Zone 1 and Dump 1 valves both connect to terminals marked 5 and N. One valve is normally open and one normally closed so that energizing both from the same terminals will cause proper actuation of the zone. If operating more than one zone, Zone 2 and Dump 2 will connect to terminals marked 6 and N. Zone 3 and Dump 3 will connect to terminals marked 7 and N. More zones would also connect in progressive order. If your system is a one zone system and only has one Dump valve and no Zone valve, connect the Dump valve to terminals marked 5 and N.

5. **If using Motorized Ball Valves for Zone and Dump:**

If using 2-Way Motorized Valves, Zone 1 valve connects to terminals marked 11, N, 21, and Ground. Connect terminal #11 in the Control Panel to terminal #1 in the valve actuator. Connect terminal #21 in the Control Panel to terminal #3 in the valve actuator. Connect a neutral wire from N in the Control Panel to terminal #10 in the valve actuator. Connect a ground wire from a ground terminal in the Control Panel to a ground lug on the terminal strip in the valve actuator.

If using 2-Way Motorized Valves, Dump 1 valve connects to terminals marked 31, N, 41, and Ground. Connect terminal #31 in the Control Panel to terminal #1 in the valve actuator. Connect terminal #41 in the Control Panel to terminal #3 in the valve actuator. Connect a neutral wire from

N in the Control Panel to terminal #10 in the valve actuator. Connect a ground wire from a ground terminal in the Control Panel to a ground lug on the terminal strip in the valve actuator.

If using 3-Way Motorized Valves, for Zone 1, connect terminal #11 in the Control Panel to terminal #1 on the valve. Connect terminal #21 in the Control Panel to terminal #5 on the valve. Connect the neutral from the Control Panel to terminal #10 on the valve. Connect the ground from the Control Panel to the ground terminal in the valve. Zone 2, Zone 3, and so on will connect in progressive order.

For multiple zones the valves will hook in progressive order to terminals marked 12, 22, 32, 42, N, and Ground for Zone and Dump 2 and 13, 23, 33, 43, N, and Ground for Zone and Dump 3 and so on.

Any additional wires on the motorized zone and dump valves are reserved for indicator lights and are not used in this application. Please secure them properly.

6. The Low Pressure Switches connect to terminals marked 100 and 101 in the Normally Closed position. Do not use the wires for the normally open connection. Secure them properly.
7. The Humidity Sensors will connect to terminals marked A1 and + for Zone 1 (A1 is negative and + is positive); A2 and + for Zone 2; A3 and + for Zone 3 and so on.

Make sure the wires are connected properly to the terminals in the Humidity Sensor. If the positive and negative terminals are not connected correctly, the panel will not be able to recognize the signal coming from the Sensor. The panel will indicate on the controller that there is a problem with the Sensor.

ALWAYS use shielded cable for making connections between the Control Panel and the Humidity Sensor. This will ensure better communication between the Humidity Sensor and the Control Panel.

NOTE: All wiring to and from system components to comply with national electric codes. Also check your local, county and state requirements.

HARDWARE INSTALLATION

HANGERS AND TUBING

1. This is a high pressure, pump-fed atomizer system.
2. Determine the height at which you wish to hang the feed lines and supply lines from the ceiling.

*Minimum recommended height for the **High Pressure** system is **14 ft.** off the floor.

Wetting-down of machinery and floor surfaces is likely at heights below 14 ft.

*The **Pressure Duct** system may be suspended lower than 14 ft.

3. Determine how the system will be suspended from the ceiling. Use 1/4"-20 threaded rod. Make sure the rod hanger matches the type of ceiling rafter that you plan to hang from.
4. Determine the length to cut the threaded rod. Notice also any pitch in the ceiling. Since the water lines are under pressure, it is possible, though not always desirable aesthetically and practically, to follow a roof pitch while hanging the tubing lines. However, keep in mind that when installing the "Dump Valves" (covered later in this manual) they are to be installed slightly above the system level so that when they open and dump the pressure on the zone, the entire zone is not drained of its water. The Dump Valve is there only to vent Pressure, not drain the system. Therefore, if a roof pitch is followed and the Dump Valve is installed in its usual place, and if the far ends of the feed lines are suspended higher than the Dump Valve, the water, which always seeks the lowest point, will be drained from the system each time the zone is turned off. This will cause a delay in the pump building pressure each time that particular zone is turned on because it will have to refill the zone with water each time it turns on. **** AVOID FOLLOWING THE ROOF PITCH. DO NOT FOLLOW A ROOF PITCH AT ALL IF YOU ARE INSTALLING A PRESSURE DUCT SYSTEM. IT MUST BE SUSPENDED LEVEL.** (However, the drain line should have a slight pitch back toward the main drain to allow the water to fully drain out of the lines.)
5. Do not suspend lines on which nozzles are mounted below the "system level". This will cause nozzles on those lines to drip water.
6. When hanging the feed-lines, (the lines on which the nozzles are to be mounted on), the nozzles are to be positioned pointing straight up. When the nozzles are screwed into the fittings they can then be positioned at approximately a 45 degree angle by bending the adjustable wand. ****PRESSURE DUCT NOZZLES ARE TO BE POINTED STRAIGHT DOWN. THE PRESSURE DUCT HOUSING IS THEN HUNG FROM THE STAINLESS STEEL LINE DIRECTLY UNDER AND COVERING THE IMPINGEMENT NOZZLE. THE HOUSING IS FASTENED**

ONTO THE TUBING WITH PLASTIC CLIC HANGERS MOUNTED ON THE HOUSING.

7. Hangers should be spaced no more than **5 ft.** apart on High Pressure systems and no more than **4 ft.** apart on Pressure Duct systems.
8. While hanging the tubing, make certain all hangers are securely fastened both on the tubing and at the ceiling.
9. All tube fittings connecting the tubing together are to be installed and tightened to the tube fitting manufacturer's specifications.
10. If a **Pressure Duct** system is being installed, the 1 1/2" Sch. 40 PVC drain line will run in conjunction with the 1/2" S.S. tubing that the nozzles are mounted on. It will hang on the bottom of the Pressure Duct housing assembly, which is suspended from the 1/2" S.S. tubing at each nozzle. This should be piped to a storm drain, floor drain, or an outside vent.

PUMP UNIT

1. The Pump Unit should be mounted in a location that is accessible for maintenance and in an area that is close to a water supply source and drain lines.
2. The motor voltage must be brought into the motor on a separate circuit other than the circuit that will supply the controls voltage. **DO NOT** pull the control voltage off the motor voltage line. These two circuits must be kept isolated.
3. A junction box should be mounted within 5 ft. of the Pump Unit for quick access to turning the power to the pump motor off or on, especially in case of emergency. All electrical wiring and connections are to comply with all applicable electric codes. It is the customer's responsibility to be knowledgeable of these codes and to see that they are enforced.

WATER FILTER UNITS

1. The stainless steel Water Filter Unit is to be mounted within a few feet of the Pump Unit's inlet.

2. Connect the incoming water supply line to the Water Filter Unit first. *(If your system is using a Water Softener Unit, the incoming water should first go into the Water Softener Unit and then to the Water Filter. Place the Water Softener in the same area near the Water Filter Unit and the Pump Unit).* **DO NOT USE GALVANIZED OR IRON PIPE. Use PVC pipe.**
3. Now, using the AMCO supplied flexible inlet hose, connect the Water Filter Unit to the Pump Unit.

ZONE VALVE MANIFOLD UNIT

1. The Zone Valve Manifold Unit should be mounted within a few feet of the Pump Unit. The hose to connect the two is 5 ft. long.
2. Using the 5 ft. high pressure hose, connect the Pump Unit to the Zone Valve Manifold. Next, run the hard tubing from each Zone Valve up to where it ties in to the tubing for each zone. (*If only operating a single-zone system, the high pressure hose will extend to tubing that leads up to the system level hanging in the ceiling.)

DUMP VALVES

1. Every zone on each system has to have a way to give a quick pressure drop when it shuts off to avoid dripping from the nozzles.* Therefore, when using 2-way motorized ball valves or 2-way solenoid Zone and Dump valves, there is to be **one Dump Valve** mounted for **each zone** on the **High Pressure** system, even if it is only a single zone system. *However, there are no Dump Valves used on the Pressure Duct systems. *If using 3-way motorized ball valves, a third port on the valve body acts as the “dump” port/valve and is piped off to a drain.
2. As the tubing is ran from the Zone Valve Manifold Unit, (or directly from the Pump Unit) at the point the tubing turns to go out to each zone, if used, a Dump Valve is to be mounted. This is usually mounted at system level in close proximity above the pump unit. After the Dump Valves are mounted, the drain line (either 3/8” or 1/2” tubing) is bent at 90 degrees down into an oversized drain line (i.e. 1” PVC) provided by the customer.

3. It is important to leave an air gap at the point the Dump Valve drain line extends into the oversized drain line provided by the customer. The air gap is there to ensure that a siphoning effect is not created, thus draining all the water from the zone.
4. Make certain the Dump Valves are mounted just slightly above system level.
5. Be sure that all connections are made properly and securely.
6. If using, 3-way motorized ball valves, the “dump” port must be piped via ½” SS tubing up to the ceiling slightly above system level and terminated into the same oversized drain pipe. This is done in similar manner as the “dump” valves described above.

CONTROL PANEL

1. Mount the Control Panel in the same area with the Pump Unit to enable easy access for wiring to the Pump Unit and all valves and switches.
2. There must be a separate voltage supply of 120 VAC (unless other voltage specified) brought into the Control Panel. **DO NOT** pull the control voltage off the line going to the pump motor. These two circuits **must** be kept isolated in order to be able to operate the controls circuit without having to operate the pump motor in times of maintenance or emergency.
3. All wiring to the Pump Unit and all valves, switches, and sensors is to be done according to the system’s accompanying electrical diagrams and must meet all applicable electric codes. It is the customer’s responsibility to be knowledgeable of such codes and to see that they are enforced.

HUMIDITY SENSOR

1. A Humidity Sensor should be mounted in each zone that you are going to humidify. It is to be placed in the middle of the zone at a height from 6 to 8 feet from the floor. It’s best to keep it high enough to avoid contact with machinery and people in the workplace. No adjustments should have to be made on this unit, so it is best kept out of reach of people, but not higher than the system itself.
2. The positive and negative terminals on the sensor are to be wired correctly to the Control Panel. If not, the sensor will not show a reading.

3. Use only “shielded” cable to run between the Control Panel and the Humidity Sensors. Make sure the grounded shield is connected properly. This is a 4-20 milli-amp DC signal being used. Shielded cable helps guard against RF signal interference.

STARTUP

Before attempting to start the system, make certain all tubing and plumbing connections are made correctly. Re-check all electrical connections for proper voltages and wiring.

The system **must** be flushed with water to purge the lines before normal operation of the system. The following instructions are to be observed.

Be sure the motor voltage for the pump motor is turned off at the junction box before proceeding with these instructions.

1. Open all manual valves on the **incoming** water line. If manual valves are mounted prior to the filter unit, be sure they are fully open.
2. If there are high-pressure manual ball valves mounted on individual lines on the pressurized side of the pump, close off all these valves except one. All the lines must be purged individually. Choose the line you wish to start with and close off all the rest. It is best to start with the line(s) farthest from the pump unit. *If there are no high-pressure manual ball valves mounted on each line, choose the line farthest from the pump unit to start with. Then, work back toward the pump unit, purging each line as you go.
3. After choosing a line, take the end cap off the line. Using an adapter fitting, attach a garden hose to the end of the line. Run the other end of the garden hose to a floor drain, storm drain, or an outside drain. If a garden hose or drain is not available, use a large catch container to hold under the line to catch the water as it drains. If draining the lines under pressure, the water comes out with much force and in large quantities. Be prepared to stop the pump suddenly to avoid overflowing the catch container.

Also, make sure the garden hose, if using one, is securely attached. This activity is best accomplished by at least two people.

4. Disconnect terminals #100 and #101 from the terminal strip inside the Control Panel. This de-activates the Low Pressure Switch's timer and allows the system to stay on while operating under the minimum 850-PSI system pressure. **Normal operating pressure is 1000 PSI and the system should not operate at pressures less than 1000 PSI under normal operating activities.** Terminals #100 and #101 must be re-connected after flushing all lines and before operating the system normally.
5. Turn the Control Panel for the system on. Also, if your system is larger than a single zone system, turn the switch on for the zone you will be working in. The Off-On switches are located on the front of the Control Panel. On the controller for each zone, the top readout is the "Actual" humidity level and the bottom readout is the "Setpoint" humidity level. If the "Actual" humidity reading is lower than the "Setpoint" reading, the system will automatically come on. For this reason, it is best to keep the motor voltage turned off at the junction box until the proper reading is determined. After the system and/or zone is turned on, use the up and down arrows to adjust the setpoint for each zone. This will allow you to turn the system on and off without turning the switches off.
6. Now that the system is up and ready to flush the lines, and now that at least one line is connected to a drain hose or catch container, adjust the "Setpoint" up on the controller for the zone you will be working in until that zone is activated, which in turn opens the incoming Main Water Solenoid Valve and allows water to flow through the pump and on to the zone. If flushing the lines under high pressure, the pump motor voltage must now be turned on. **Flush each line for a minimum of 20 minutes.** If you desire to flush the lines under incoming tap water pressure, leave the motor voltage off. *Do not operate the pump at pressures lower than normal for any considerable length of time. The only exception is during flushing of the lines, and this must be done as conservatively as possible. Operating the pump without proper water pressure will cause cavitation, which will damage the pump.*
7. Flush each line for 20 minutes, working your way back toward the Pump Unit. Always put the cap back on securely after flushing each line.

8. After flushing all lines and securing all end caps, **turn the Control Panel off** and re-connect the Low Pressure Switches to terminals #100 and #101.
9. Now, turn on the power for the pump motor voltage, so that, when the system is turned on to operate, the pump motor will come on.
10. Now that all lines are flushed, and all electrical connections are made properly and securely, the system is ready to operate at 1000 PSI.

OPERATION

1. All electrical connections must be made properly before operating the system.
2. All lines must be flushed before operating the system normally.
3. Turn the Control Panel on. Turn on each “Zone” if the system is more than a single zone system.
4. On each zone, adjust the “Setpoint” level by depressing the “Up” or “Down” buttons. Set the level at your desired amount. The Control Panel stays in “Setpoint” mode at all times unless de-activated by someone in the controller’s set-up.
5. As the system comes on and builds pressure, the nozzles will spray a fine mist.
6. The timer in the Control Panel is set for 30 seconds. If the pump does not build a minimum of 850 PSI pressure within that time, or if the pressure drops below 850 PSI while the system is operating and does not rebuild pressure within that time, the system will shut down. **It will not reset itself.** You must manually turn the Control Panel off and then back on to reset the system. This is a safety feature to keep the system from running in the event of a water line break.
7. Now that the system is running, check for leaks at the fittings. Make sure the pressure on the system is set at 1000 PSI. Make pressure adjustments at the Pressure Regulator.
8. The system will now operate each zone automatically.

PUMP MAINTENANCE

1. Change crankcase oil initially after 50 hours of service and then every 500 hours thereafter. Use CAT oil only.
2. Change the High and Low Pressure Seals every 4500 hours or every 12 or 18 months.
3. Change the Valves in the manifold(s) every 2 years.
4. Change filters in the inlet Water Filter Unit as needed or when inlet pressure will not maintain at least 20PSI.
5. After 24 hours of continuous use, tighten motor belt and periodically check belt for looseness or vibration.

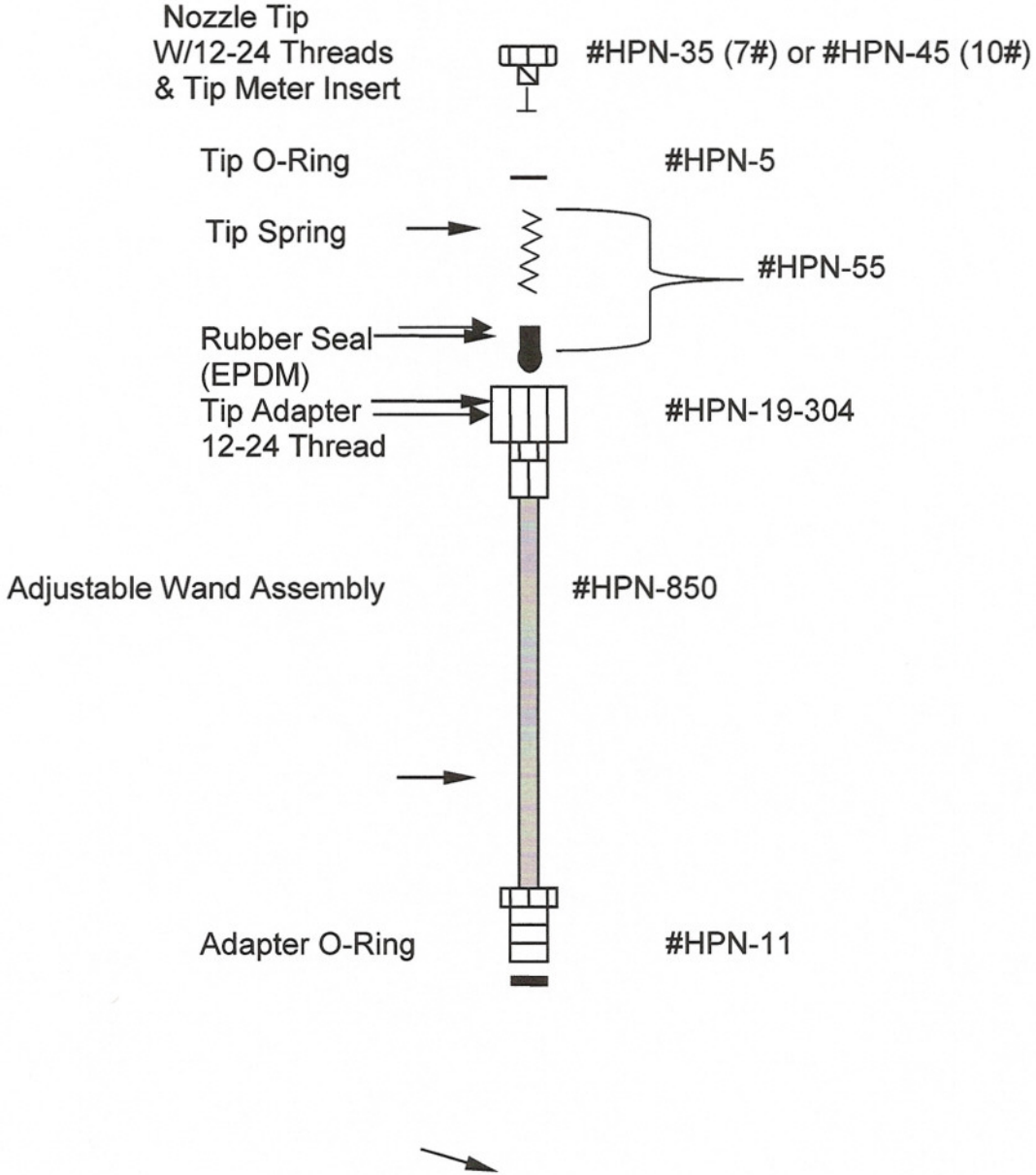
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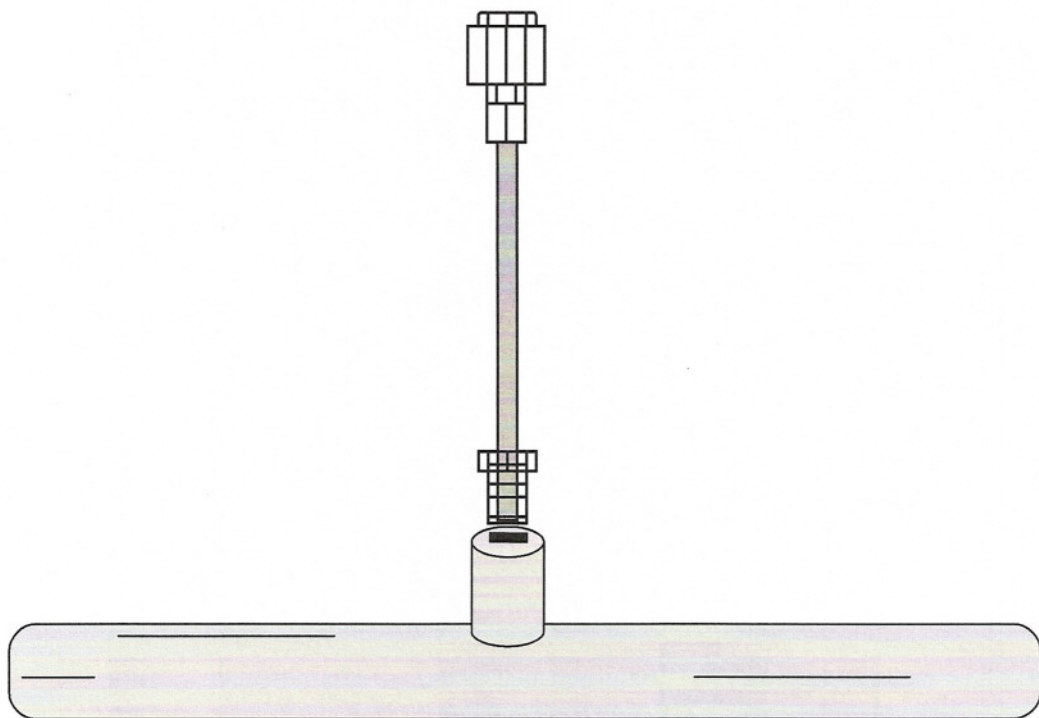
IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE SOME MEANS OF SECURITY OR MANNED PERSONNEL TO MONITOR THIS SYSTEM IN THE EVENT THAT CONTROLS OR SYSTEM FAILURE WOULD RESULT IN LOSS OF, OR DAMAGE TO, PERSONS, PRODUCT OR PROPERTY.

**AMERICAN MOISTENING COMPANY
SWIRLJET NOZZLE**

#HPNC-35 & #HPNC-45 Assemblies Complete
(w/12-24 threaded tips)

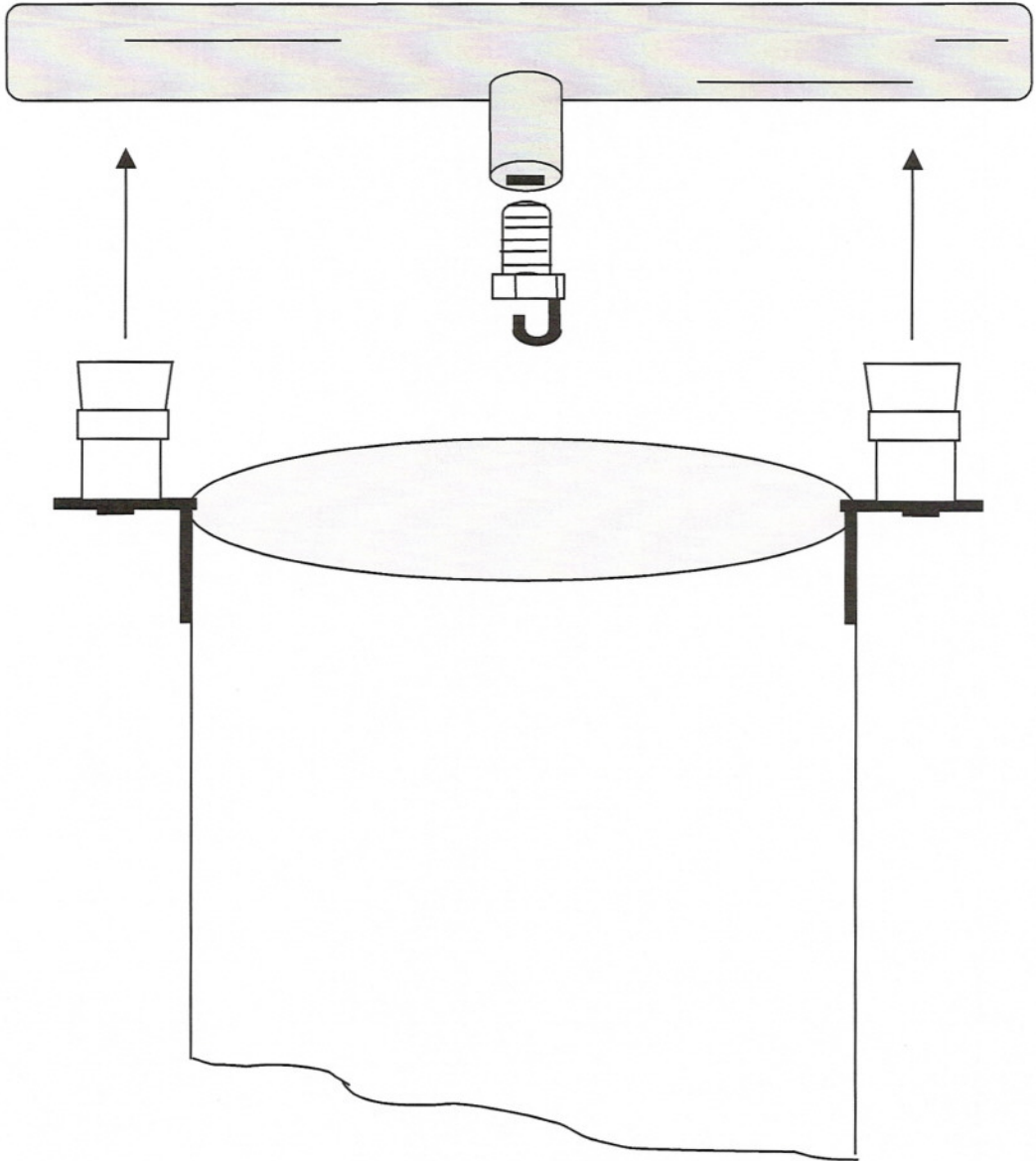


High Pressure Nozzle Assembly Installation



The nozzle assembly seals on an o-ring that is inserted into the adapter fitting. The adapter fitting is soldered or welded onto the stainless steel lines. Screw the nozzle assembly in until you feel the fitting meet up with the o-ring. At this point, you only need to slightly “snug” the fitting tight with your fingers about $\frac{1}{4}$ turn. You may not have to use any wrenches to install the nozzle assemblies. But, if necessary to use a wrench, pay close attention to the point when the adapter fitting seals on the o-ring. If the nozzle assembly is over-tightened, it will cause the o-ring to close and seal off. This will result in the nozzle’s failure to spray.

Pressure Duct Nozzle Installation



The Pressure Duct nozzle seals on an o-ring that is inserted into the adapter fitting. The adapter fitting is soldered or welded onto the stainless steel lines. Screw the nozzle assembly in until you feel the fitting meet up with the o-ring. At this point, you only need to slightly “snug” the fitting tight with your fingers about $\frac{1}{4}$ turn. You may not have to use any wrenches to install the nozzle assemblies. But, if necessary to use a wrench, pay close attention to the point when the adapter fitting seals on the o-ring. If the nozzle assembly is over-tightened, it will cause the o-ring to close and seal off. This will result in the nozzle's failure to spray.