



## UNPACKING

Please open and inspect your package upon receipt. Your package was packed with great care and all the necessary packing materials to arrive to you undamaged. If you do find an item that is broken or damaged, you must contact the delivering carrier to report the claim.

# Solenoid Pump INSTRUCTIONS

## GETTING TECHNICAL ASSISTANCE

The H.E. Anderson Company is dedicated to assisting our customers with installation and use of our products. Our technical staff are available each weekday from 8:30 AM to 4:30 PM central time. You may call us toll free at **1-800-331-9620** from anywhere in the U.S.A. and Canada. If no one is available, we will promptly return your call. You may also contact us via e-mail at **info@heanderson.com**

**Before you call**, review this manual. You may find the answer to your question here. But if not, reviewing the manual will help us to help you.

If you need an additional owners manual for **any** H.E. Anderson Company product, please visit our website at <http://heanderson.com/manuals.php>.



## Safety Considerations

All pumps are tested for correct operation with water before shipment. When pumping solutions that are not compatible with water, disassemble the pump liquid end and dry all parts thoroughly before use. The pump liquid end includes the pump head, diaphragm, suction valve, discharge valve and seals.



Warning: Use extreme caution and use appropriate personal protection equipment (goggles, chemical suit, etc.) any time contact with chemical might occur.



Warning: Do not turn the stroke control knob on the pump unless the pump is pumping. Adjustment when the pump is off will cause damage to the pump.



Warning: Ensure the pump and controller are disconnected from power when making electrical connections and performing service.

## Installation

Model Designation	Capacity Per Stroke
SP-15	0.315 ml
SP-30	0.631 ml
SP-45	0.946 ml

Plumbing of the flow meter and tee(s) for the injection point fitting(s) should be completed before installing the pumper(s). See the *Installation Guidelines and Operation of Ratio:Feeder® Series J Plus Injectors* for installation details.

## Installation

### Location

Ensure the installation location has all the following:

- Allow easy access to pump
- Allows access to the suction and discharge valves for tubing connections

- Has access to 120VAC power outlet
- Close proximity to other injection components
- Protected from direct spray
- Within 10 feet of chemical stock tank

### Plumbing

#### Chemical Valves

- Install the suction valve into the bottom of the pump.
- Install the discharge valve in the top of the pump.

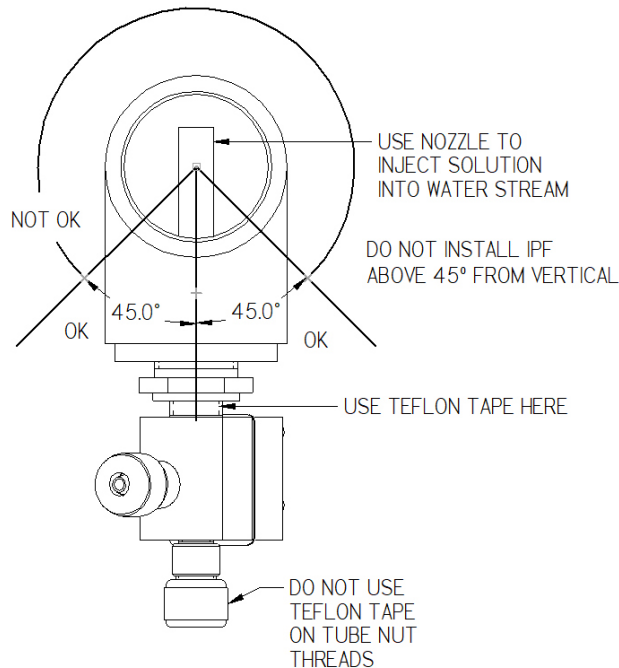


Illustration 1: Injection Point Fittings

#### Injection Point Fitting (IPF)

Your injection point fitting should be one of the types shown in Illustration 1. All serve as an injection point check valve, with the first two offering additional functions. Refer to the instruction sheet specific to your fitting for installation and additional information.

## Solenoid Pump Instructions



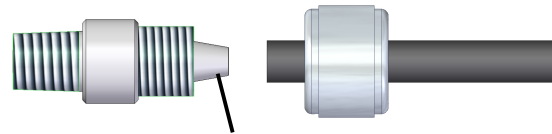
*Illustration 2: IPF Orientation*

Install the IPF into the water line. All IPFs use a 1/2" NPT male thread. Ensure the IPF is within 45° of vertical so chemical flows up into the line. On IPFs with the priming feature, make sure the vent drain is not pointed at the user to prevent accidental contact with chemicals.



**Use only the black stiff tubing or reinforced tubing for the discharge line. Never use the flexible clear vinyl tubing on the discharge side of the pumper. It is not rated for discharge pressures or acid compatibility.**

The tubing should be long enough to reach without any sharp bends that might collapse into a kink. Once a proper length piece of tube has been cut, place a tube nut onto each end of the tube making sure the threads of the nut face the adapters. Press the tube onto the nipple of the adapter. While continuing to hold the tube onto the nipple of the adapter, tighten the tube nut onto the adapter with care not to cross-thread the nut.

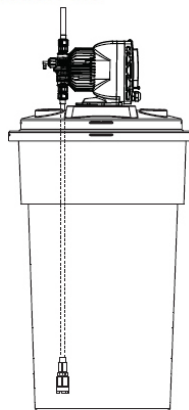


Tubing must slide over nipple

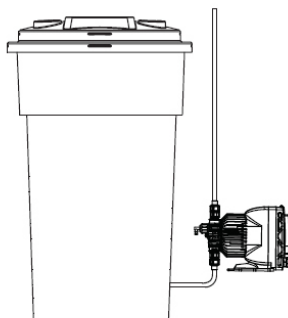


**It is important that the tubing slide over the nipple and remain there while the tube nut is tightened. If the tube is not covering the nipple the tube can be in danger of popping off when it is pressurized. Sometimes the tube**

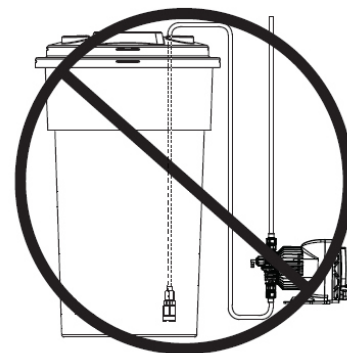
Suction lift



Flooded Suction



Not recommended



*Illustration 3: Suction Tubing*

### Tubing

Connect a cut-to-length piece of tubing between the discharge valve and the injection point fitting.

**must be flared using a flaring tool prior to installation.**

Place the concentrate tank into position and cut another piece of tubing to connect from the foot-

## Solenoid Pump Instructions

valve/strainer to the suction valve on the pumper. Do not install the foot-valve/strainer at this time. **Here, the clear vinyl tubing may be used when not feeding acids. This tubing is not suitable for acids.**

### Drain Tubes

The universal IPF and priming IPF each have a priming vent fitting. The vent is opened by unscrewing the knurled priming vent knob. This is done only to prime the pumper and to vent air from the discharge line. Never open the vent more than two turns, because once the air is gone, liquid will come out the vent (possibly with great force). For this reason the vent is made to attach a 3/8" O.D. drain tube. The priming IPF does not have a retaining nut for the vent tube. Route this tube to a suitable catch container.

The universal IPF also has a leakage drain. Liquid will come out this drain only when the internal diaphragm ruptures. Attach a tube to this drain and route the other end to a suitable catch container.



**Attaching tubes to these vents and drain is especially important when pumping hazardous chemicals such as acids.**

There is also a prime valve on the back of the solenoid pump. A drain line should be connected to this as well with the other end routed to a suitable container to collect any waste.

### Electricity and Wiring



**Warning! Disconnect power to the controller and pump before making any electrical connections.**

Solenoid pumps require 120VAC, 60hz, 0.6 amps, 0.066kw. Do not remove the grounding terminal on the plug.

### Model 'P' with J Advanced Controller

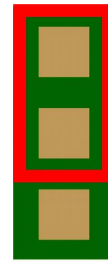
When connecting pump models 'SP-XXP' to the J advanced controller, the pump is connected to a pump output. 'P' models cannot be used with legacy J+ controllers.

First, choose an output to connect the pump and make sure the jumper is set to the 'Solenoid Pump' Position.

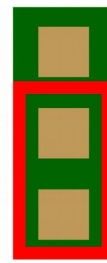


**Warning! Failure to properly set the jumper position will damage the solenoid pump and require factory**

**repair.**

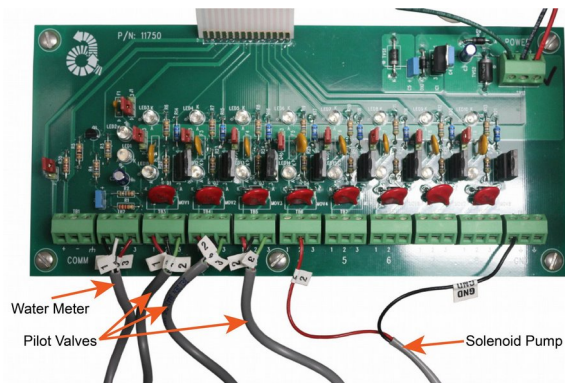


Pilot Valve



Solenoid Pump

Next, wire the red '2' wire from the solenoid pump to the #2 position on the proper output. Wire the black 'GND' wire to any of the positions on the 'GND' terminal block of the J Advanced output board. Refer to the J Advanced manual for configuring the pump output.



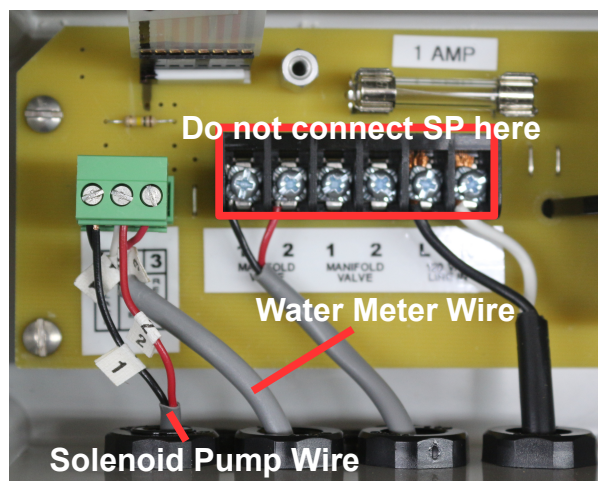
### Model 'M' with Legacy J+ Controller

When connecting pump models 'SP-XXM' to the J+ controller, the pump is connected to the water meter terminals and shares the pulse signal from the water meter with the J+ controller.

First, loosen the 3 connections on the water meter terminal block. On newer J+ models, the terminal block can be unplugged to ease making connections.

Next, make sure the water meter wires are inserted into the proper connectors on the terminal block. Make sure the numbers on the wires match the numbers on the terminal block. For the water meter wire, black connects to #1, white connects to #2 and red connects to #3.

## Solenoid Pump Instructions



Now insert the solenoid pump wires into the water meter terminal block. 2 wires will share 1 connection position. The black wire connects to the #1 connection and the red wire connects to the #2 connection. Tighten the connections and ensure that both the water meter wires and the solenoid pump wires are not loose.

After the pump has been properly wired to the controller, plug the pump into the power outlet and proceed to priming section.

### Priming

Place the foot valve/strainer into a container of the solution to be pumped, again following all applicable safety procedures for the chemical being pumped.

The priming valve located on the back of the pump should be opened to assist with priming the pump. If the pump is equipped with a universal or priming IPF, the priming valve on the IPF can be used instead of the valve on the pump.

Ensure that the stroke capacity knob on the pump is set to 100%.



Be careful to only adjust the stroke capacity knob when the pump is pumping. Damage will occur if the knob is adjusted while the pump is off.

Prime the pump by using the 'Prime' feature on the J+ Advanced controller. See the J+ Advanced manual for instructions. Continue the priming routine until solution can be seen flowing from the priming valve. Once solutions starts to run out the vent of the priming valve, close the priming valve and cease priming the pump.

These instructions should be repeated for each pump if multiple pumps are installed.

If the pump will not prime properly, check all the tubing connections for tight connections and repeat the priming process. If prime still cannot be achieved, consult factory support.



**WARNING!** When working with hazardous chemicals use extreme caution and carefully follow the handling instructions and safety procedures in the Material Safety Data Sheets. Use only the 04094 Universal IPF when feeding acid.

### START-UP

- Place the foot valve/strainer into the filled solution tank.
- If installing it as a bulkhead fitting, install it about 2 inches above the bottom of the tank, to prevent the strainer from becoming fouled by sediment which may collect on the bottom.
- Set the pumpers to the number on the dial calculated to give the desired feed. Fill your concentrate tanks and restart your feeder. It should now be operational. You may need to check, as done in the initial check-out, to be sure the pumpers are properly primed.
- Make sure the pump controller is properly configured by referring to the controller specific manual.
- Turn on flow to begin operation.

### MAINTENANCE

Normally the pump should require little maintenance. This, however, depends on the quality and cleanliness of the chemical being pumped.

Before any maintenance or service is performed, observe the following precautions:

- Disconnect the Solenoid Pump from power source.
- Drain chemical from discharge tubing.
- Disconnect discharge tubing from pump.
- If the Solenoid Pump is used in a flooded

suction application, remove foot valve from chemical container.

- Observe relevant safety protocols when handling parts which have been in contact with hazardous chemicals.

The following procedures can prevent many potential problems:

- The pumper should be inspected at regular intervals for proper operation and leaks.
- Check the suction and discharge valves for cleanliness, chemical attack, and scale build-up.
- At some time the elastomer parts (O-rings and diaphragms) will have to be replaced. Replacement diaphragms, check valves and o-rings are available for repairs.
- Periodically shut off the water and remove and inspect the injection point fitting. Reaction of the chemical being injected with the chemicals already in the water can sometimes cause scale to form. This can restrict or even completely stop chemical flow. If scale is found, clean it off thoroughly and establish a regular schedule for checking the fittings.
- Check to be sure all pumpers are properly primed after completing these checks and putting the feeder back into service.

## STORAGE

If a feeder will not be used for a long period:

- Remove it from service.
- Flush the pumper and chemical check valves with water, or other suitable cleansing solution, either by pumping water through the unit (**if not feeding acid**) before removing it or by rinsing these parts after removal.
- Tape the valve openings closed while still wet. This will protect the seals and prevent insects from plugging up the openings.



**Protect the entire system from freezing temperatures. Our warranty does not cover freeze damage.**

## Problems With Chemicals

Some chemicals may not be compatible with the pumper diaphragm. You should check compatibility of a chemical with the diaphragm material before pumping. Because we do not have control of what chemicals you pump, we do not warrant diaphragms or plastic heads against chemical attack.

Some chemicals can attack the diaphragm or head, causing it to stick to the head. When this happens it will not pump.

Changing chemicals without flushing the head can sometimes cause a chemical reaction which can damage the diaphragm, plastic head, or fittings.

Wettable powders sometimes cake up inside the head. This reduces the pumping capacity. If your unit does not appear to pump as much as it should, check the calibration. You may need to remove and clean the plastic head.

## Problems With Diaphragms

The most common problem with pumpers other than faulty check valves is a ruptured diaphragm. A ruptured diaphragm will cause drainage out the drain hole in the bottom of the cylinder.



**It is very important that you replace a ruptured chemical side diaphragm immediately. If you do not, the chemical will attack other components in the pump causing them to fail also.**

The spring and other parts in the cylinder can also be affected. Prompt attention can save added expensive repairs.

## Changing the Chemical Side Diaphragm



**Use precautions when dangerous chemicals are being pumped; here you should remove the chemical check valves and wash the pump head to remove any remaining chemical. Use baking soda to neutralize acid**

- Remove the four screws attaching the liquid end to pump body.
- Remove the liquid end from the pump

## Solenoid Pump Instructions

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body.

- Unscrew the diaphragm from the pump shaft in a counter-clockwise direction. Be careful that diaphragm support ring does not fall out.
- Do not allow sharp or abrasive objects to come in contact with pump parts.
- Inspect end of shaft to assure that threads are in good condition. Replace shaft bellows if necessary. No further disassembly is recommended.
- Screw new diaphragm onto pump shaft until it bottoms out on shoulder of shaft. It is not necessary to tighten further.
- Replace liquid end. Make sure that screws are evenly tightened.
- Reconnect plumbing and power. Prime the pump.

- Unplug the pump and ensure it is disconnected from power.
- Disconnect suction tubing from pump.
- Unscrew fitting from pump head.
- Remove check valve from suction fitting and replace.
- Remove O-ring from cavity in fluid end.
- Remove check valve from suction side pump and replace.
- Install new O-ring in cavity of fluid end.
- Replace valve fitting with check valve in fluid end.
- Replace fluid end. Make sure that screws are evenly tightened.
- Reconnect plumbing and power. Prime the pump.

### Servicing the Chemical Valves



**CAUTION!** *If the suction line exits your chemical tank through a bulkhead fitting the tank should be empty before servicing the chemical fittings.*



**WARNING!** *Chemical fittings and tubing contain chemicals. Spillage and leakage will occur when disconnecting fittings. OBSERVE PROPER PRECAUTIONS FOR THE*

#### **CHEMICALS BEING PUMPED!**

If you have an Anderson injection point fitting (Illustration 1) you may service the suction and discharge check valves and Foot Valve/Bulkhead/Flush Fitting, with the system under pressure, but you should turn off the water flow through the feeder.

To service the injection point fitting, or if there is a failure of an injection point fitting, you must remove pressure from the system (shut off the water upstream of the unit).

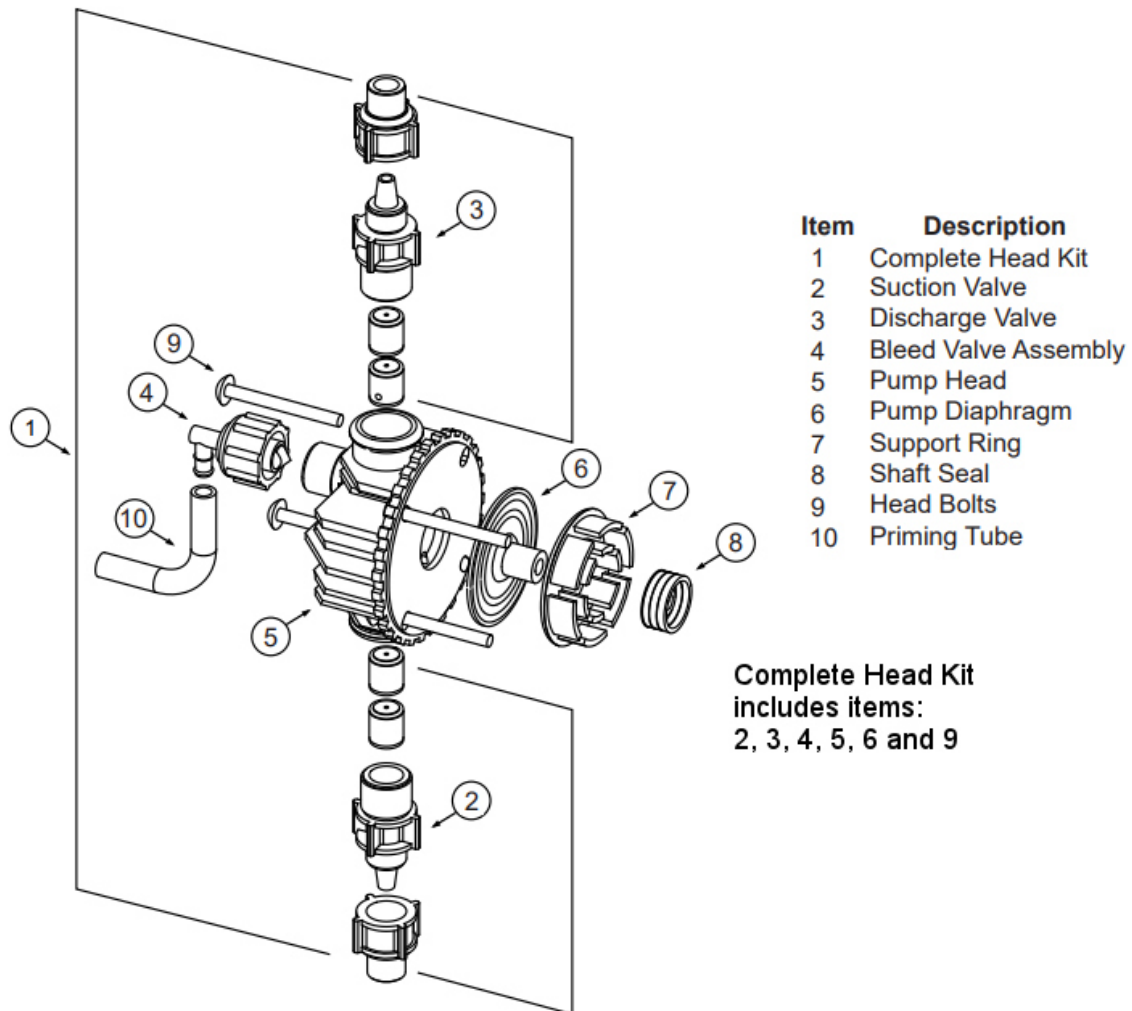
Refer to the specific manual for servicing H.E. Anderson IPFs available at <http://www.heanderson.com/manuals.php>.

### Replacing Suction and Discharge Valves

Notes:

- Tighten pump head screws after pump's initial week of operation.

## Solenoid Pump Instructions



Other replacement and repair parts:

04094 - IPF 1/2" Universal-Complete

06892 - Tubing Bulk 3/8 OD Black (for acid)

06909 - Tubing Bulk 3/8 OD Clear

17087 - Suction Pipe 2 piece x 33"



## Solenoid Pump Instructions

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### Specifications

Specifications						
Model	SP-15P-VCP	SP30P-VCP	SP-45P-VC	SP-15M-VCP	SP-30M-VCP	SP-45M-VCP
Max. Injection Rate	15 GPD	30 GPD	45 GPD	15 GPD	30 GPD	45 GPD
Pressure Rating	150 psi	110 psi	75 psi	150 psi	110 psi	75 psi
Max. Stroke Rate	125 strokes per minute					
Diaphragm	Teflon					
Embedded Controller	No	No	No	Yes	Yes	Yes
Ambient Temp Range	33° to 120° F					
Water Temp Range	33° to 120° F					
Power	120 VAC 50/60 Hz – 0.35 Amps					