

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.

Installation Guidelines and Operation of Ratio:Feeder® Series J Plus Injectors

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 8:30am to 4:30pm 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.

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

There is some information you should have available when you call. You should know the model and serial number of your control unit. Also, you should note the number of pumpers of each type, and their model numbers (found on the front brass flange below the stroke control shaft). We may not need all this information, but having it available at the start can sometimes save a lot of time and trouble.

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

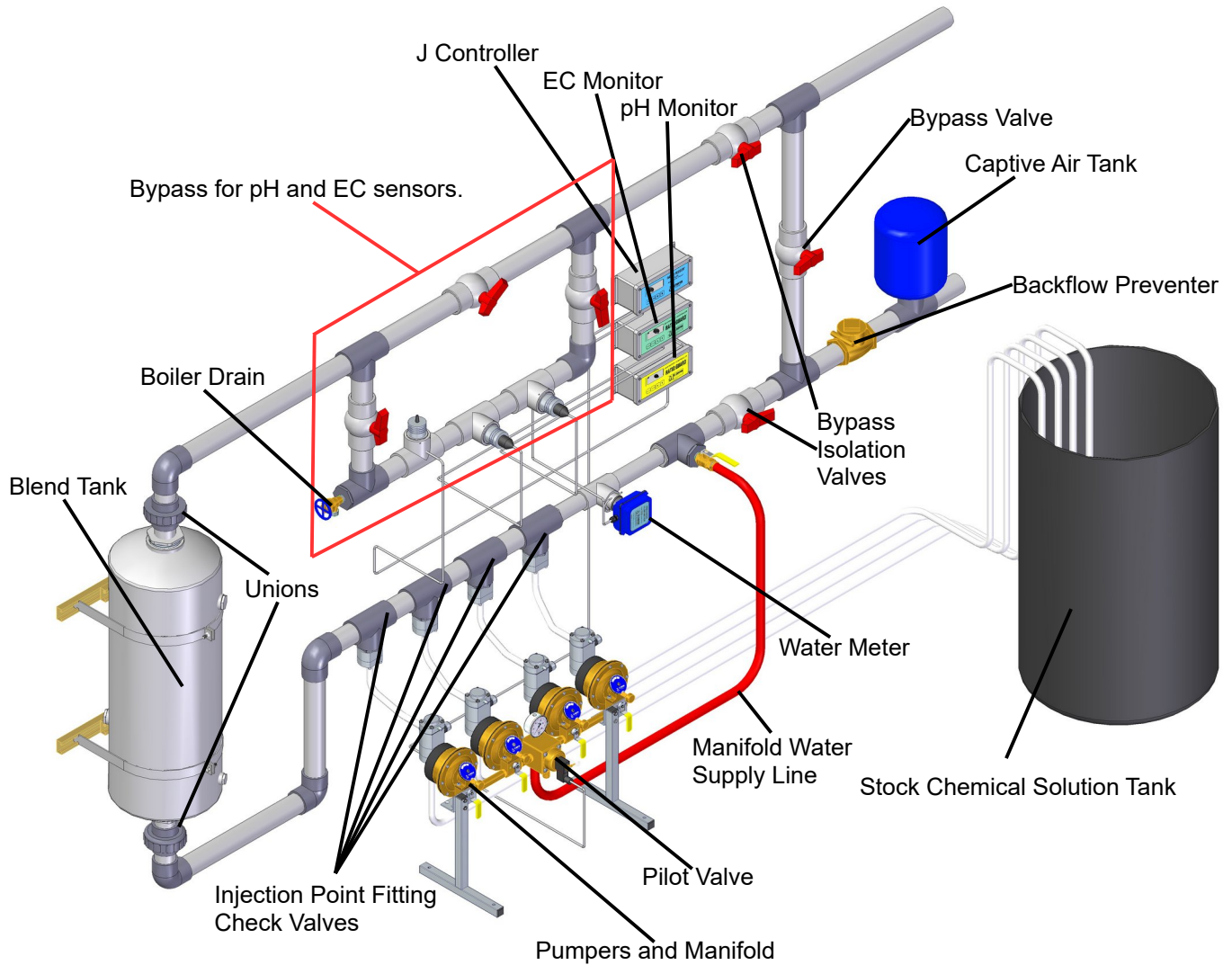
Before returning items for repair or credit, please fill out, print and enclose the Return Information Form, on our website at <http://heanderson.com/return.php>, with your return. Please ship items to:

H.E. Anderson Company
2100 Anderson Drive












Installation Example

JP161-4 J Plus Injector with E-1S EC Monitor and P-2S pH Monitor



Warnings and Cautions

 <p>WARNING! Always appropriate protective equipment (goggles, protective clothing, respirator etc.) when working with chemicals and observe all relevant guidelines and laws.</p>	 <p>Set up your controller before starting up your system. Refer to the J Plus Controller manual. Controllers are often shipped with proper settings already entered.</p>
 <p>Store protective clothing and accessories in a location away from the injector so that they may be donned before approaching the equipment.</p>	 <p>Do not store chemicals in tanks where the level will be more than just a few feet above the discharge point of the pumps. If you have very large solution storage tanks you should use them to fill smaller “day tanks”. This will eliminate the chance of large quantities of chemicals draining into your watering system.</p>
 <p>WARNING! Water hammer destroys diaphragms. Damage caused by water hammer is not covered under warranty.</p>	 <p>WARNING! Never allow the unit to freeze! Damage due to freezing is not covered by the warranty.</p>
 <p>Never transfer the suction line of a feeder pumping a strong acid or alkali to a container of water. This can generate dangerous heat which may destroy your pumper and plumbing.</p>	 <p>IMPORTANT! The waste line must exit to atmospheric pressure and must not be elevated or restricted in any way.</p>
 <p>WARNING! Connecting the flow sensor incorrectly can damage the flow sensor electronics.</p>	

Installation Order of Components:

Install the components in the following order. They are ordered starting with the upstream direction. Only J System Components are included in this section.

1. Manifold water supply 'Tee' or saddle
2. Water Meter
3. Injection Point Fittings
4. Blend tank
5. Sensor loop (if applicable)

Installation Considerations:

- Install the injector system in a bypass. This allows the injector to be isolated for service while allowing the water line to continue to supply water.
- Ensure all water to be treated flows through the water meter. The injector system will not function properly if only part of the water flows through the water meter.
- Install unions on each side of the blend tank so the tank can be replaced or re-situated without completely redoing the plumbing.
- If the stock solution tank is large, install a smaller "day tank" to supply the injector. In case of a malfunction or leak the amount of chemical spilled will be reduced.
- Any on-off water valve should be installed downstream from the blending tank. This will insure that the system injection point will always be pressurized, making siphoning of chemical unlikely.
- Suction lines may be plumbed with rigid PVC piping for a neater installation.
- Read the specific installation guidelines for your exact water meter. Different types of water meters have different installation requirements.
- Check local codes for back-flow prevention requirements.
- Captive air tanks are recommended to reduce damage caused by water hammer.
- Injection point fittings can be installed up to 45° from vertical. See pumper manual for more information.
- The injector can be installed into several different pipe sizes. Consult a professional plumber or irrigation service to determine proper size for your application.

EC and pH Monitors

- Install EC and pH sensors in a three valve bypass loop so they can be isolated for service.
- In the bypass loop for pH and EC sensors, the sensors are installed below water line to ensure they are never dry and to reduce contact with air in lines.
- In the sensor bypass loop, partially close the main line valve so some water flows past the sensor.
- Install a boiler drain on the sensor bypass loop so samples can be taken and so pressure can be relieved when servicing sensors.
- NOTE: Do not let the pH probe become dry. If the pH probe is allowed to dry out it will be damaged and no longer function properly requiring replacement.

Location & Access

- The injector should be out of the way, yet accessible
- If your water supply is from a municipal or public water line, you should comply with local codes.
- If your watering system is connected to a public or potable water source, a backflow preventer should be installed so that no backward flow of treated water into potable supplies or public mains can occur. Contact your local water authority for approved devices and recommendations to insure that your installation meets their standards.
- Install the system neatly and with room for easy maintenance access.


Environment

- Freezing can cause expensive damage, even during storage if the measuring unit and pumps have not been properly drained.



- A drain should be available close to the manifold. The unit discharges approximately twice as much water as chemical pumped. The drain line should be kept short, or expanded to a larger size for runs longer than fifteen feet.
- It is recommended that the unit be installed indoors. The unit as well as plumbing fittings should be kept out of direct sunlight.

Safety

- Do not permit access by children or pets. Most chemicals used to treat water can be dangerous.
- Provide and use safety equipment such as goggles, gloves, aprons, or anything common sense or OSHA requires.
-  Store protective clothing and accessories in a location away from the injector so that they may be donned before approaching the equipment.
- Check with the manufacturer of the chemical for safety precautions for specific chemicals.
- Label chemicals and keep a supply of antidotes, neutralizing agents, and safety precautions handy. If feeding acid, keep some baking soda (powdered and solution) nearby.
- If feeding dangerous or corrosive chemicals, you should attach a drain line to the bleed valve on the injection point fitting (standard capacity pumpers) or VMC module (high capacity pumpers) which drains into a chemical resistant container.
- A chemical resistant container should be placed directly beneath the manifold and pumpers.
- Protect the injector from corrosive vapors with adequate ventilation. Corrosion can sometimes attack diaphragms from the back side, resulting in premature failure.

Water Hammer

- Water hammer can generate pressures up to 500 psi or more! This puts stress on the injector (and on your entire water system), but it is especially destructive to diaphragms.
- Water hammer can be a serious problem in installations with long pipe runs.
- Solenoid valves can cause water hammer.
- If water hammer could be a problem for your installation, install a suppressor such as an accumulator (captive air device) near your injector.

Water Quality

Solids in your water supply act as abrasives and will wear away the water measuring mechanism. If you have problems with solids, install a filter upstream of the injector and place pressure gauges before and after. You can use the difference in pressure readings to tell when the filter is plugged up.

Installation

1. Read and understand all the considerations and warning discussed in this guide.
2. Refer to the installation drawing in this guide for information in assembling your system. If you are unfamiliar with plumbing or working with the piping materials chosen, hire a professional plumber to do the installation.
3. **IMPORTANT!** Most plumbers are unfamiliar with our equipment and should be monitored to see that they are following our installation recommendations.
4. The injector can be installed into several different pipe sizes. Consult a professional plumber or irrigation service to determine proper size for your application.
5. The water line pipe size **DOES NOT** have to match the pipe size of the water meter. The water meter is often a smaller diameter than what is used in the rest of the irrigation system.
6. Plan the routing of the pipe for the injector system in advance.
7. Properly support all piping making sure there is not strain on any plumbing fittings.
8. Build or choose an appropriate place to house the injection system.
9. Begin at the upstream end and install all piping necessary for the injector system.
10. Start by installing a backflow preventer on the water supply line.
11. Next install a captive air tank.

12. Install appropriately sized 'tee' for bypass.
13. Install one of the valves which isolates the injector.
14. Install 'tee' which supplies water to the manifold.
15. Before installing the meter, flush the system to remove metal flakes and other debris from the plumbing. You should also flush the line that supplies the pilot valve/manifold before connecting it to the valve.
16. Install water meter. Make sure to read specific manual for your water meter. Different meters have different installation requirements. All manuals can be found on the H.E. Anderson website.
17. NOTE: Strain on the water meter can interfere with operation and lead to water meter failure. Adjust the piping to make sure no additional forces are acting on the water meter.
18. Install the appropriate number of 'tees' for injection point fittings. Consider future expansion possibilities when choosing how many 'tees' to install. It is easy to plug a tee but hard to install an extra at a later time.
19. Install blend tank with unions on either side. Make sure blend tank is properly secured to the floor, wall or other suitable structure.
20. Install 'tee' for probe bypass loop is applicable.
21. Note: probe bypass loop does not have to be the same diameter pipe as the main water line. Not all water must flow through probe bypass loop.
22. Install probe bypass valve and another tee making sure to leave enough room in between for probe tees.
23. Install valves to isolate probe loop below tees.
24. Install elbow, tee and probe tees in probe loop.
25. Install boiler drain in probe loop.
26. Install downstream injector isolation valve.
27. Install injector isolation valve and tee to compete injector bypass.
28. Install manifold close to injection point fittings. Properly bolt manifold to floor or wall.
29. NOTE: See manifold manual for complete information on installing the manifold.
30. Install injection point fittings into tees on water line.
31. Flush water line before proceeding. The probe loop can be closed off if probes are not installed.
32. Do not connect the supply line to the pilot valve/manifold before flushing the system.
33. Install pumpers on manifold. Be sure to include gasket between pumpers and manifold.
34. NOTE: See pumper manual for complete information on installing the pumpers.
35. Connect manifold supply from tee to manifold.
36. NOTE: Wait to install the manifold drain line until after the manifold is verified to work properly.
37. Supply water to system and check for leaks. Fix all leaks promptly to keep water off injection system and to keep area around injector neat and easy to work around.
38. NOTE: Install probes after water has been supplied to the system. The pH probe cannot be left dry. The pH probe will be damaged and must be replaced if it is allowed to dry out.

Electrical Connections

1. NOTE: Make wiring connections after plumbing is complete.
2. Refer to the manual Series J Plus Pumper Controllers for the terminal locations. The flow sensor and valve outputs should be connected before wiring the power connections.
3. WARNING! Connecting the flow sensor incorrectly can damage the flow sensor electronics.
4. The terminals on the flow sensor terminal block are labeled 1, 2, & 3, both on the terminal board and on the sensor cable. Be certain to match numbers when connecting these wires. If you need a longer cable, use the color coding to be sure that these connections are correct.
5. The manifold valve terminals are numbered on the 4-output terminal block. On the 2-output model, valve #1 is on the left side.
6. NOTE: On 2-output models the sensor terminal block is detachable which makes connecting the cable much easier.

Setting the Controllers

Set up the controller before starting up the system. Refer to the J Plus Controller manual.




Initial Check-Out

1. With the water off, apply power to the electronic controller. After a few seconds the display should indicate OFF.
2. Turn the water on slowly and let all lines and blend tank fill with water. Intermittent discharges of water from the waste line should be observed.
3. Turn off the water to stop the injector.
4. Once the manifold is confirmed to be working properly, install the drain line from the manifold to the drain. Make sure the line does not increase in elevation and does not contain and kinks or sharp bends that could restrict flow.

Start-Up

1. Install the suction strainer / foot valves in the solution concentrate tanks. If installing as a bulkhead fitting, install about 2" above the bottom of the tank to prevent the injector from drawing in sediment which may collect on the bottom of the tank. Connect the suction lines from the chemical container to the lower connection of the valve modules.
2. Connect the discharge lines between the valve module and injection point fittings. Set dials on the pumpers to the number calculated to give the desired feed.
3. Fill your concentrate tanks and restart your injector.
4. Prime pumps by following instructions in controller manual.
5. NOTE: Watch out for leaks, especially when pumping acid. Fix all leaks immediately to avoid chemical spills and to keep injector and area clean and safe.
6. Injector system should now be operational.

Maintenance

- The meter and electronic controller portion of your injector system normally require no maintenance. There is no reason to disturb these components except to service them when a problem arises.
- See the pumper manual for information on maintaining your pumpers and fittings.
- The chemical concentrate solution should be kept clean, fresh and thoroughly mixed.
- Your solution tank should be covered, but must be vented with a small vent hole to atmosphere. Otherwise the injector will draw a vacuum on the solution container and quit functioning properly.
- Periodically clean the solution container. To prevent loss of prime, transfer the suction line of the injector to another container of the same solution during cleaning. Use caution appropriate to the chemical.
-  Never transfer the suction line of a feeder pumping a strong acid or alkali to a container of water. This can generate dangerous heat which may destroy your pumper and plumbing.

Storage

- If an injector will not be used for a long period, you should remove it from service.
- Flush the pumper and chemical valves, either by pumping water through the unit (if not feeding acid, see below) before removing it or by rinsing after removal.
- Tape the valve openings closed while still wet. This protects the seals and prevents insects from plugging the openings.
- Drain the unit completely to prevent damage by freezing water still inside.

Trouble Shooting

If you suspect there may be a problem with your unit please read the following section carefully. DO NOT DISASSEMBLE ANY PART OF YOUR SYSTEM until you have determined the exact problem, and then do it carefully, according to instructions. Many small and easily corrected problems are greatly aggravated by not heeding this warning. Table 4 in the *Series J Plus Pumper Controllers* manual gives some common problems and tells how to correct them. Call the factory if you have questions about what you need to do.

There are two basic categories of problems; pumper problems and control problems. If you are getting flow indication and regular cycles of waste water from the pilot valve you can be virtually certain the controller and pilot valve are working properly. Table 1 in the *Pilot Valve & Manifolds* manual gives some possible conditions along with probable causes and suggested action. If you cannot determine the problem, call our factory at the



number listed in the front of this manual.

Checking the Meter Sensor


You have probably already observed the red LED indicators mounted on the sensor circuit board which is housed in the clear housing atop the water meter. Checking these can quickly pinpoint some problems.

- The power LED will be lit whenever power to the controller is on and properly functioning (it displays and responds to key presses). If not lit, there is a problem with the sensor board or, more likely, with the cable between meter and controller.
- The second LED should light with each pulse from the sensor. It should be blinking whenever water is flowing. If this is not happening, refer to the instructions for your meter for more information.

Pumper and Diaphragm Problems

See your pumper manual(s) for information on servicing your pumps.

Requirements for Proper Operation

- Minimum line pressure of 30 psig, measured on the downstream side of the injector. If you do not have a pressure reading of 30 pounds at the pressure gauge on top of the unit, then you do not have enough pressure. If the water is flowing out to an open tank or onto the ground, there will probably not be sufficient back pressure to meet the 30 psig requirement even if there is much greater pressure (e.g. 50 psig) on the inlet. This is the most common cause of erratic operation. In this situation you should install a valve and pressure gauge downstream from the unit. Close the valve until the gauge reads 30 psi or greater.
- The flow rate should be within the range of your flow meter. (See Table 1 in your meter manual for flow range information).
- The pumpers should not exceed 35 strokes per minute. Running the injector system faster than 35 strokes per minute can result in premature failure of pumpers. Pumpers also might not have enough time to completely fill with solution between strokes causing incorrect injection rates.
- The manifold discharge line and any tubing attached must open to "daylight" and go directly to a drain. Do not obstruct or elevate the line at any point. If a long line is needed, it should be expanded to a larger size. Put an air vent or gap between the primary and the extended line.
- Too much chemical feed is usually not caused by a malfunction. It is usually due to siphoning or gravity flow of chemical through the feeder during periods of zero pressure on the system. The system shutoff valve should be downstream of the system to maintain pressure at all times and the chemical level in storage tanks should not be above the injection point fitting.
-  Do not store chemicals in tanks where the level will be more than just a few feet above the discharge point of the pumpers. If you have very large solution storage tanks you should use them to fill smaller "day tanks". This will eliminate the chance of large quantities of chemicals draining into your watering system.

RATIO:FEEDER® LIMITED WARRANTY

WHAT IS COVERED

The H.E. Anderson Company of Muskogee, Oklahoma, will make any necessary repairs and/or replace any parts of any Ratio:Feeder® product made necessary because of defects in materials or workmanship for fifteen months from date of manufacture. Warranty repairs and/or replacements will be performed without charge to the owner by H.E. Anderson Company within a reasonable time after prepaid delivery of the defective product to the H.E. Anderson Company, 2100 Anderson Drive, Muskogee, Oklahoma 74403.

WHAT IS NOT COVERED

This warranty specifically excludes failure of any parts or materials caused by chemical attack or damage caused by operation above rated capacity or pressure. Further, this warranty does not cover wear or failure caused by sand or other foreign materials which may be found in water that is passed through our products, or damage caused by freezing or exposure to water temperatures above 60°C (140°F).

This warranty does not cover damage caused by failure to follow prescribed installation instructions and limitations issued by H.E. Anderson Company. In addition, this warranty does not cover service adjustments, repairs, or replacements caused by misuse, negligence, alteration, accident, or lack of specified maintenance. This warranty does not cover damage to electronics from water, voltage spikes, or lightning strikes.

This warranty does not cover components used by, but not manufactured by H.E. Anderson Company, in the manufacture of our products except to the extent of said component manufacturer's warranty.

This warranty specifically excludes liability for consequential damages or for charges for labor or expense in making repairs or adjustments, or losses of time or inconvenience.

This warranty gives you specific legal rights and you may also have other legal rights which may vary from state to state. H.E. Anderson Company does not authorize any person to create for it any other obligation or liability in connection with these products. ANY IMPLIED WARRANTY APPLICABLE TO THESE PRODUCTS IS LIMITED TO THE DURATION OF THIS WARRANTY. H.E. Anderson Company shall not be liable for consequential damages resulting from breach of this written warranty.

NOTE: Some states do not allow limitation on how long an implied warranty will last or the exclusion of limitations of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

WHAT TO DO IF THERE IS A QUESTION REGARDING WARRANTY

1. Promptly notify the consumer adviser at H.E. Anderson Company by telephone at 800-331-9620 or 918-687-4426.
2. Confirm the report in writing (or via FAX at 918-682-3342) to the H.E. Anderson Company, stating the circumstances surrounding the problem.

PURCHASER'S OBLIGATION

3. Purchaser must give H.E. Anderson Company immediate written notice on discovery of defect.
4. Purchaser must pay for shipment of the defective product to the H.E. Anderson Company, 2100 Anderson Drive, Muskogee, Oklahoma 74403.

