



# Hydro Gas Chlorination Systems

## Instruction Manual

*All HYDRO Chlorination systems are carefully designed and tested for years of safe, accurate field service. All HYDRO Chlorination systems are carefully tested prior to shipment. All HYDRO products are made of the finest materials. To ensure best operation, read these instructions carefully and completely and store them where all maintenance personnel will have access to them.*

### **Each chlorination system consists of the following:**

1. The vacuum regulator which mounts on the chlorine cylinder.
2. The ejector assembly mounts directly to the pipe line, storage tank, wet well, or to a solution line.
3. Standard accessories:
  - a. Cylinder wrench.
  - b. Twenty-five feet of appropriate polyethylene tubing for vacuum lines.
  - c. Ten lead gaskets for vacuum regulator to cylinder connection.
4. Additional parts available from any plumbing supply (or through HYDRO):
  - a. Pressure gauge.
  - b. Water shut off valve.
  - c. Y-type strainer.

The information contained in this manual was current at the time of printing. The most current versions of all Hydro Instruments manuals can be found on our website: [www.hydroinstruments.com](http://www.hydroinstruments.com)

# Hydro Gas Chlorination Systems

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### Hydro Instruments Gas Chlorination Equipment Torque Specifications

Item	Min. inch•lbs.	Max. inch•lbs.
Yoke Bolts	20	25
Body Bolts	20	25
Meter Block Bolts	20	25
Vacuum Fittings	15	20
Inlet Plug	10	15
Dummy Plug	7	10
Item	Min. foot•lbs.	Max. foot•lbs.
Yoke Half Dog	20	25

# SECTION I-A: SAFETY INFORMATION (150 LB. CYLINDERS)

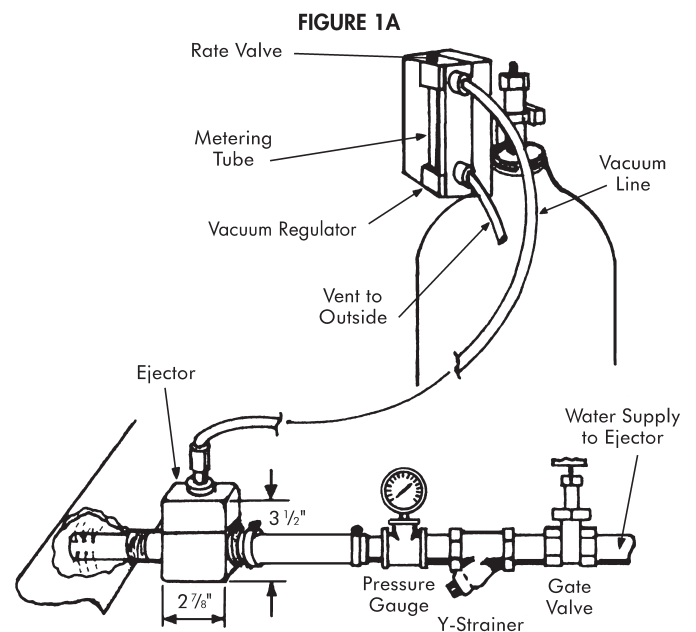
## ***TAKE CARE WITH CHLORINE!***

1. Always keep chlorine cylinders in an upright position with the valve cap tightened before moving full or empty cylinders. Cylinders should be moved with care.
2. A safety chain must be placed around the cylinder and secured to a wall. Spare full cylinders should also be secured carefully.
3. For best operation and safety, the **vacuum regulator and cylinders should be protected from the elements including direct sunlight.**
4. **Never** place heaters or heat lamps directly on a cylinder.
5. **Ammonia gas should NOT be stored or fed in the same room with chlorine.** Contact of the gases will result in an explosive mixture.

## ***IMPORTANT NOTE:***

***HYDRO does not recommend the use of chlorine gas manifolds.*** Manifolds contain pressurized chlorine gas thereby increasing the risk of a pressurized chlorine leak. ***HYDRO vacuum regulators are designed to mount directly onto the valve of chlorine and sulfur dioxide cylinders.*** ***Direct cylinder mounting is the easiest and safest configuration to operate and maintain.*** With this configuration, the chlorine gas flows under vacuum everywhere beyond the one pressure point at the chlorine cylinder valve.

*A typical HYDRO Model 500 series installation injecting chlorine into a pipe line using city water. The water supply to the ejector should be approximately twice the pressure of the chlorinated pipe line in order to create a sufficient vacuum at the ejector.*



# SECTION I-B: SAFETY INFORMATION (TON CYLINDERS)

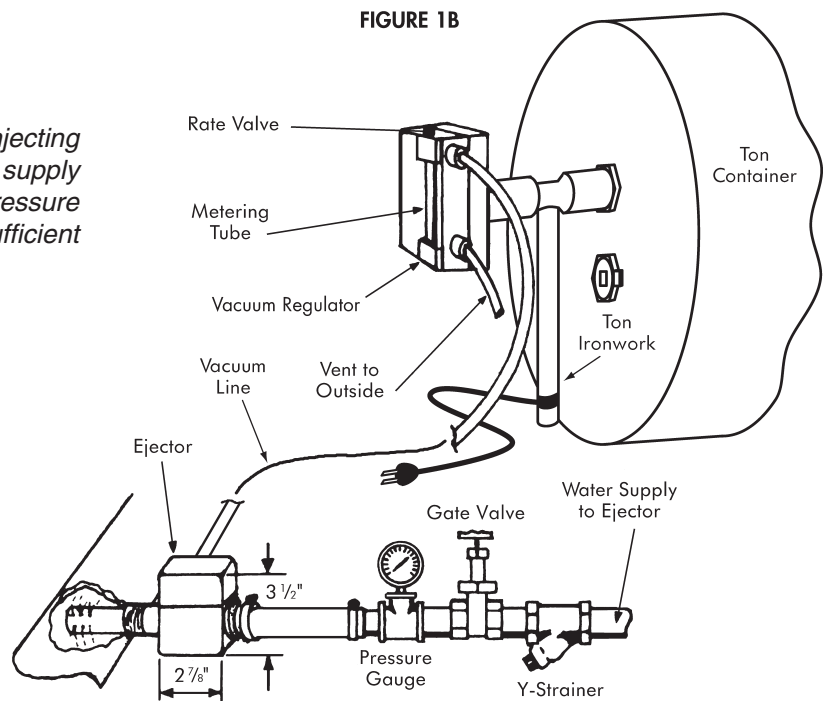
## ***TAKE CARE WITH CHLORINE!***

1. Valve protection covers must be on ton container valves **before they are ever moved**.
2. The ton container should be levelly placed on a pair of trunions.
3. Always place container so valves are at vertical position and use only the top valve which is the gas valve.  
**BOTTOM VALVE IS LIQUID—DO NOT USE.**
4. For best operation and safety, the ton container and vacuum regulator should be protected from the elements and direct sunlight.
5. **NEVER** apply heaters or heat lamps directly on a chlorine container.

## **IMPORTANT NOTE:**

**HYDRO does not recommend the use of chlorine gas manifolds.** Manifolds contain pressurized chlorine gas thereby increasing the risk of a pressurized chlorine leak. HYDRO vacuum regulators are designed to mount directly onto the valve of chlorine and sulfur dioxide cylinders. **Direct cylinder mounting** is the easiest and **safest** configuration to operate and maintain. With this configuration, the chlorine gas flows under vacuum everywhere beyond the one pressure point at the chlorine container valve.

A typical HYDRO Model 700 series installation injecting chlorine into a pipe line using city water. The water supply to the ejector should be approximately twice the pressure of the chlorinated pipe line in order to create a sufficient vacuum at the ejector.



## SECTION II: DESIGN AND INSTALLATION NOTES

1. The “**all vacuum**” system means that system will shut off at the cylinder valve, should the vacuum line be broken, if water is stopped for any reason, or if the vacuum regulator is physically damaged.
2. Choosing a **vacuum regulator feed capacity**:

VACUUM REGULATOR SIZE SHOULD BE ON MAXIMUM POSSIBLE FLOW.

*Imperial Units:*

$$\begin{array}{r} \text{GPM} \\ \text{Gallons Per Minute} \end{array} \times 0.012 \times \begin{array}{r} \text{(PPM) Dosage} \\ \text{Parts Per Million} \end{array} = \begin{array}{r} \text{PPD} \\ \text{Pounds Per Day (Cl}_2\text{)} \end{array}$$

Example: 600 GPM x 0.012 x 3 PPM = 21.6 PPD

In this example a HYDRO 50 PPD vacuum regulator would be adequate.

*Metric Units:*

$$\begin{array}{r} \text{LPM} \\ \text{Liters Per Minute} \end{array} \times 0.0599 \times \begin{array}{r} \text{(PPM) Dosage} \\ \text{Parts Per Million} \end{array} = \begin{array}{r} \text{GPH} \\ \text{Grams Per Hour (Cl}_2\text{)} \end{array}$$

3. **TOTAL BACK PRESSURE** is the pressure in the pipeline to be chlorinated plus the friction losses in the solution line between the ejector and the point of injection at the pipeline. Ejectors capable of operating with back pressures up to 300 Psig are available.
4. It is preferable that the ejector be located at the point of solution injection in order to eliminate the need for **solution lines**. Friction losses in the solution line will **increase the ejector back pressure**. Friction losses can be reduced by increasing the solution line internal diameter and limiting the number of flow restrictions and turns. Also, be sure that the solution line material is resistant to **the highly concentrated chlorine mixture**. **Avoid solution lines wherever possible.**
5. The only connection between the ejector and the vacuum regulator is the HYDRO specified black polyethylene tubing which carries the vacuum (originating at the ejector) to the vacuum regulator, allowing the system to operate. Up to 100 feet of polyethylene tubing between vacuum regulator and ejector is standard. For longer distances consult HYDRO.

## SECTION III: SYSTEM INSTALLATION

### (I) INSTALLATION OF HYDRO EJECTOR (Refer to Figure 1)

1. Installation of HYDRO EJECTOR:
  - a. Remove the diffuser from the ejector assembly and place two wraps of Teflon tape on diffuser threads.
  - b. **Do Not** install diffuser into pipe line when assembled with ejector.
  - c. Turn diffuser by hand into NPT threads of pipe line ( $\frac{3}{4}$ " or 1  $\frac{1}{4}$ " NPT). Place wrench on diffuser and tighten an additional **one half turn maximum**.
  - d. Reconnect diffuser to ejector making sure O-rings are on each side of nozzle and diffuser.
2. Testing of ejector. (*Note: The vacuum regulator should still be in the shipping case.*)
  - i. Piping hook up to ejector (Refer to Figure 1 and **Servicing Section in this Manual**).
    - a. Ejector should be installed down stream at a sufficient distance so that chlorinated water is not re-circulated through the booster pump.
    - b. On the water inlet side to the ejector nozzle the following should be installed: a water inlet valve, Y-strainer, and a pressure gauge.

- ii. Testing for sufficient pump pressure to operate ejector. Also checking that booster pump (if applicable) operating in the proper direction.

*Note 1: Ejector must have some back pressure to prevent jetting. (Jetting causes loss of vacuum)*

*Note 2: When chlorinating into a contact chamber a tee should be installed on the solution line with a vacuum breaker to prevent siphoning.*

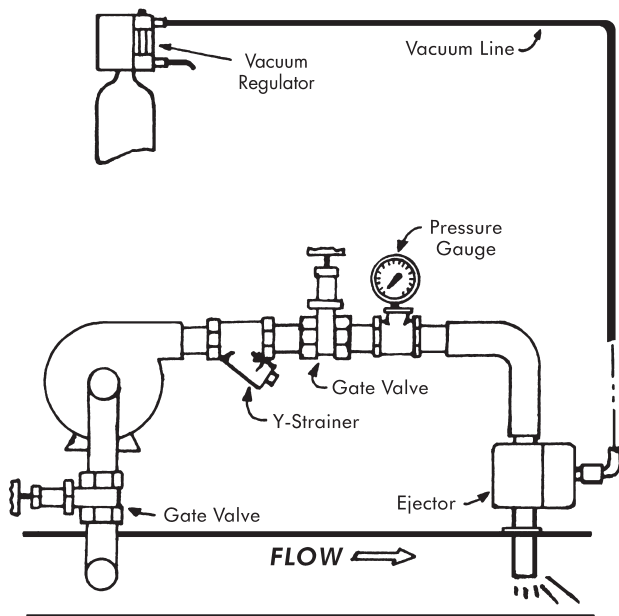
- a. If operating with city water pressure (no booster pump), open the water inlet valve to the ejector and feel for suction (with your finger) at the fitting on the top of the ejector.
- b. If using a booster pump, open the water inlet valve to the ejector and the pressure gauge should indicate a sufficient boost. (See ejector curves at the end of this manual.) If pump is operating in proper direction there should be a strong vacuum at the fitting on the top of the ejector. Feel for suction (with your finger) at the fitting on the top of the ejector.
- c. If the ejector has tested satisfactorily continue on to the next step (Mounting the Vacuum Regulator).

## (II-A) INSTALLATION OF HYDRO VACUUM REGULATOR (150 lbs. Cylinders)

**NOTE: The chlorine cylinder valve is CLOSED. Do not open the cylinder until instructed to do so.**

1. See that safety chain is secured around chlorine cylinder.
2. Remove the cylinder protection cap from the chlorine cylinder.
3. Examine the vacuum regulator for obvious damage.
4. Remove masking tape on the back of the vacuum regulator used for shipping purposes.
5. Place lead gasket over vacuum regulator inlet assembly.
6. While placing lead gasket on vacuum regulator see that the filter is installed in the inlet assembly. (This filter is necessary to remove particles that may cause the vacuum regulator to leak to vent.)
7. Mount vacuum regulator on cylinder valve being sure the yoke screw is backed out far enough for sufficient clearance. While tightening the yoke screw be certain that the lead gasket stays in place. Excessive tightening can damage gasket and/or yoke screw. **DO NOT USE EXCESSIVE FORCE.**

FIGURE 2A



*A typical HYDRO Model 500 series installation injecting chlorine into a pipe line using a centrifugal pump. Note the location of gate valves for easy Y-strainer cleaning and practical pump maintenance.*

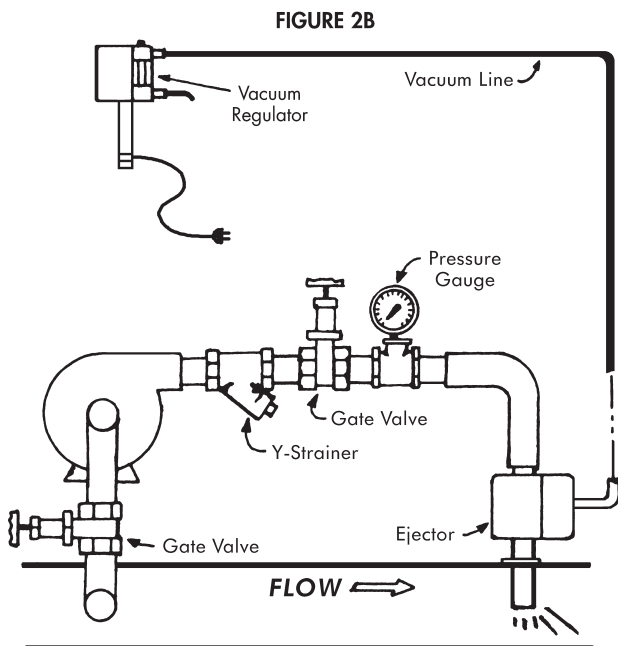
*NOTE: Pump suction should be 5 feet away from ejector injection point. On larger pipe diameters of 6 inches or greater a distance of 10 times the pipe diameter should be maintained so that chlorinated water is not recirculated through the booster pump.*

*NOTE: Pump suction and ejector must be from the side of pipeline, not from top of the main.*

## (II-B) INSTALLATION OF HYDRO VACUUM REGULATOR (Ton Cylinders)

**NOTE: The chlorine container valve is CLOSED. Do not open the valve until instructed to do so.**

1. After the chlorine container has been properly installed, remove the valve protector.
2. Chlorine container valves must be in the vertical position with one valve directly above the other.
3. Look at position of top valve. If it faces to or opens on left, a left hand vacuum regulator is required. Check the vacuum regulator to see if you have a left hand unit.
4. Prior to removing the valve cap covering the chlorine container valve outlet, make certain the valve is in the closed position. Proceed by removing the cap **slowly**.
5. Inspect for and remove any debris found on the chlorine container valve or on the outlet gasket surface. Do not use a screwdriver or sharp tool to clean.
6. Before mounting, remove all tags and tape from the vacuum regulator. **NOTE: Check that all bolts are tight.**
7. Loosen yoke half-dog until the valve plate can be pushed all the way back.
8. Place a **new** 1/16" gasket over chlorine inlet assembly. **Never** use any other type of gasket or re-use the same gasket.
9. Mount the vacuum regulator on container valve with yoke over the valve with the inlet and outlet properly aligned. Tighten the yoke screw while making certain the gasket has not fallen out. Excessive tightening can damage the gasket or yoke screw.
10. Place the support bracket, found on the vacuum regulator drip leg, over the lower valve.
11. Warm liquid drip leg by plugging in 25-watt heater. **This must be turned on 15 minutes before start-up.**



*A typical HYDRO basic installation injecting chlorine into a pipe line using a centrifugal pump. Note the location of gate valves for easy Y-strainer cleaning and practical pump maintenance.*

*NOTE: Pump suction should be 5 feet away from ejector injection point. On larger pipe diameters of 6 inches or greater a distance of 10 times the pipe diameter should be maintained so that chlorinated water is not recirculated through the booster pump.*

*NOTE: Pump suction and ejector must be from the side of pipeline, not from top of the main.*

## (III) CONNECTING VACUUM LINES BETWEEN VACUUM REGULATOR, EJECTOR AND VACUUM REGULATOR VENT TO OUTSIDE (Refer to Figures 1 and 2)

1. For units of 250 PPD (5 kg/hr) or less, the upper connector on right top of vacuum regulator is for vacuum line tubing to ejector. For 500 PPD (10 kg/hr) and above units, the lower connector on the right side of the back body is for the vacuum tubing to the ejector. (Allow enough vacuum tubing for changing cylinders.)
2. Connect vacuum tubing to second connector on the vacuum regulator and vent to safe area outside of building. (Place bug screen outside on end of vent tubing.)

**NOTE: Do Not** connect vent lines from two vacuum regulators to one common vent. You **must** run **separate** vent lines to the outside, when using multiple vacuum regulators.



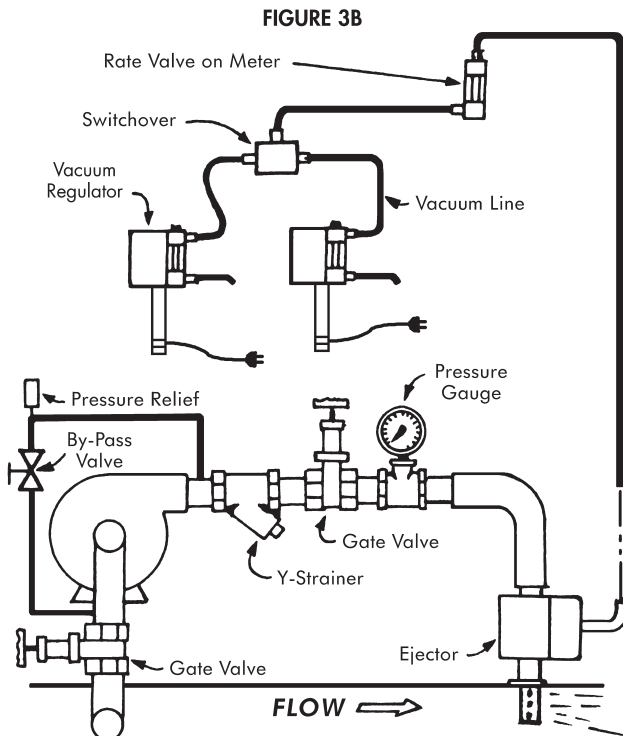
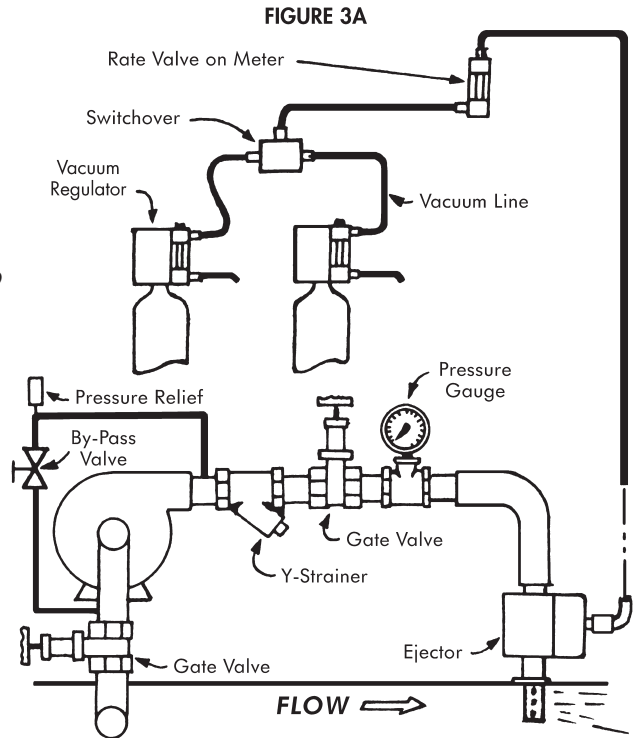
#### (IV) UNITS WITH SWITCHOVER MODULES AND/OR REMOTE METERS (Refer to Figure 3)

1. **Switchover modules:** (Gas flow is from bottom/side to top from one side only at a time)
  - a. Connect the two lines from the vacuum regulators to the side tube connectors.
  - b. Connect the single line out to the remote meter(s) to the top tube connector.
2. **Remote Meters:** (Gas flow is from bottom to top through the tube)
  - a. Connect the input line to the bottom tube connector.
  - b. Connect the output line to the top connector.

A typical HYDRO MODEL 502 SWITCHOVER System injecting chlorine into a pipeline using a turbine positive displacement pump. Pressure relief valve must discharge to a drain or outside of building. Note the by-pass piping from pump discharge through by-pass valve back to suction side of pump.

NOTE: By-pass valve must never be completely closed.

NOTE: Pump suction and ejector must be from the side of the pipeline, not from the top of the line.



A typical HYDRO SWITCHOVER System injecting chlorine into a pipeline using a turbine positive displacement pump. Pressure relief valve must discharge to a drain or outside of building. Note the by-pass piping from pump discharge through by-pass valve back to suction side of pump.

NOTE: By-pass valve must never be completely closed.

NOTE: Pump suction and ejector must be from the side of the pipeline, not from the top of the line.



## SECTION IV: CHLORINATION SYSTEM VACUUM TEST

1. **Do Not** open chlorine cylinder valve until vacuum test is satisfactorily completed.
  - a. Vacuum Test  
With the chlorine cylinder still closed, start the ejector booster pump and the meter tube ball should drop to the bottom within about ten seconds. If the ball continues to bounce there is either a leak at the lead gasket or a loose connection at the vacuum tube fittings or meter tube. (The tube fittings should be hand tight. It is not necessary to use pliers or a wrench on these fittings. If meter tube needs tightening, use a quarter and finger tighten inlet plug.) At this time the rate valve on the vacuum regulator should be open two or three turns.
  - b. If the ejector is operating properly (pulling sufficient vacuum) the red indicator on the front of the vacuum regulator should be showing.
  - c. Turn off water supply to ejector.
  - d. Wait 5 to 10 minutes with water supply off. The reset knob should turn freely all the way around and the indicator should continue to show red. (If red continues to show, the system is vacuum tight.)
  - e. If the system is vacuum tight proceed to the next step.
  - f. Disconnect vacuum tubing at top of vacuum regulator to allow air to enter the system. Reconnect tubing.
    - (1) Turn the reset on the front of the vacuum regulator and it should not show red.

## SECTION V: START UP OF CHLORINATION

*Material necessary:* A small plastic squeeze bottle (provided),  $\frac{1}{3}$  full of household ammonia, for detecting chlorine leaks. When ammonia fumes contact chlorine gas a visible white smoke-like gas is produced. (Wipe up any splashed liquid ammonia.)

1. Open chlorine cylinder valve  $\frac{1}{4}$  turn and **close immediately**.
2. Squeeze ammonia bottle (ammonia fumes, not liquid) at gasket and yoke assembly area and around rate valve bonnet: if no fumes appear the seals are tight and it is OK to proceed to the next step. (*NOTE: The fumes are best observed against a dark background.*)
3. Open chlorine cylinder valve  $\frac{1}{4}$  turn, leave open, and **recheck for chlorine leaks**. ( $\frac{1}{4}$  turn open of the cylinder valve is all that's required. The reason we specify  $\frac{1}{4}$  turn is that when you turn it off you know it should close with  $\frac{1}{4}$  turn. In an emergency you can shut it off quickly and safely. The wrench should always remain on the cylinder valve while cylinder valve is open.)
4. Turn on water supply or booster pump to ejector and set rate valve to desired flow rate. Read flow rate at center of ball on meter tube scale.
5. Rate valve is not a shut off valve: it is a flow rate control only. **To shut off chlorine feed close the chlorine cylinder valve.**

## SECTION VI: SHUT DOWN PROCEDURE

1. Close the chlorine cylinder valve while pump is still running.
2. Wait for ball to rest at bottom of meter tube and flag to show red.
3. Break vacuum by removing the tubing at the vacuum regulator and reattach. (Repeat at least 2 times for more complete removal of gas from the system.)
4. Shut down the water supply to the ejector.

This procedure of shut down must be followed before a vacuum regulator is removed from a cylinder.

*NOTE: After installing the vacuum regulator with a new lead gasket on the new cylinder, the vacuum tubing on the output fitting should be removed to allow air to enter the system and break the vacuum. **Not releasing vacuum and turning on cylinder will slam the diaphragm forward and could cause damage to the diaphragm assembly.** You can also break the vacuum by turning the rate valve out of the bonnet. Either way is acceptable.*

## SECTION VII: RATE VALVE OPERATION

After about 7 turns, the gas feed rate will experience approximately a 20% drop as an air passage is opened through the hole in the monel bonnet. Further turns will completely remove the rate valve from the flow meter tube, which will cause a loss of gas feed. (*See Appendix for servicing instructions.*)

The O-ring seal for the rate valve is locked in place under the valve bonnet and does not come out when the rate valve is pulled out of the bonnet.

*PREVENTATIVE MAINTENANCE NOTE: Rate valves that are not exercised frequently may experience a build up of a white powdery substance which precipitates out of the chlorine gas. In order to avoid this build up, which can cause the rate valve to become stuck in place, it is recommended that the rate valve be periodically exercised. See Appendix for rate valve maintenance instructions.*

## SECTION VIII: TROUBLESHOOTING

### (I) PRESSURIZED LEAKS

1. Pressurized chlorine leaks are a safety hazard to life and equipment and should be corrected immediately. When searching for this type of leak there are basic safety rules to follow.
  - a. Air breathing pack should be readily available and personnel should know how to use it properly.
  - b. Exhaust fan switch should be located near outside entrance with an additional alternate outside switch appropriately located.
  - c. Chlorine cylinder wrench should remain on the cylinder whenever cylinder is open.
  - d. Plastic squeeze bottle  $\frac{1}{3}$  full of household ammonia.
  - e. Buddy system used (two people capable of operating system).
2. If a leak is detected the following should be checked first:
  - a. The **lead gasket** between the chlorine cylinder valve and the vacuum regulator inlet assembly.
    - i. Tighten the half dog screw on the vacuum regulator yoke assembly which is used to secure the inlet assembly to the chlorine cylinder valve. (Do not use excessive force.)
    - ii. Always use a new lead gasket. It is recommended to obtain gaskets through HYDRO to be certain of size and quality.
  - b. **Chlorine cylinder valve packing.**
    - i. Tighten the cylinder valve with care, not excessively! Close the valve if problem persists and notify your chlorine supplier.
    - ii. If valve is the problem try to move cylinder with a high degree of safety to an outside location. (**Never** attempt to place cylinder in water as this will only increase the leak and the cylinder may float to the surface.)
  - c. Chlorine leaking out the vent due to **the inlet safety shut off valve** having dirt on the valve seat.
    - i. Close the **chlorine cylinder valve**.
    - ii. Wait until the metering ball drops to zero on the flow tube.
    - iii. Turn off water supply to ejector.
    - iv. Now remove the vacuum regulator from the cylinder valve provided that the red indicator is showing no chlorine pressure. (Red should be showing.)

- v. See Appendix for inlet safety shut off valve servicing instructions.
- vi. After servicing and remounting vacuum regulator with a new lead gasket, pull a vacuum test **before** you turn on the chlorine cylinder valve. *See “Chlorination System Vacuum Test” (Section IV).*

## (II) NO CHLORINE FEED

Possible causes:

1. No vacuum being produced by ejector.
  - a. Remove poly tubing from ejector fitting and place your finger on it; you should feel a suction.
  - b. If you feel no suction (vacuum) check in this order:
    - i. **Nozzle (See Appendix):** Turn off water supply and remove nozzle from ejector.
      - (1) It may be clogged with a stone or other foreign matter. Flush out or run pipe cleaner through only.
      - (2) If there is a build-up of rust, iron, or manganese, place the nozzle in a Muriatic acid for five minutes and rinse with water. If you see a black syrup substance you may find it necessary to clean the nozzle on a preventative maintenance schedule.
    - ii. **Inlet Water Supply.**
    - iii. Reduced city water pressure.
    - iv. Y strainer needs cleaning.
    - v. Booster pump cavitating (lost its prime).
    - vi. Booster pump insufficient boost due to wear or single phasing due to loss of one leg of power.
    - vii. Booster pump may have flooded suction.
  - b. If you feel no suction (vacuum) check in this order:
    - i. **Nozzle (See Appendix):** Turn off water supply and remove nozzle from ejector.
      - (1) It may be clogged with a stone or other foreign matter. Flush out or run pipe cleaner through only.
      - (2) If there is a build-up of rust, iron, or manganese, place the nozzle in a Muriatic acid for five minutes and rinse with water. If you see a black syrup substance you may find it necessary to clean the nozzle on a preventative maintenance schedule.
    - ii. **Inlet Water Supply.**
    - iii. Reduced city water pressure.
    - iv. Y strainer needs cleaning.
    - v. Booster pump cavitating (lost its prime).
    - vi. Booster pump insufficient boost due to wear or single phasing due to loss of one leg of power.
    - vii. Booster pump may have flooded suction.
2. Chlorine flow blocked at vacuum regulator inlet assembly.
  - a. The **Inlet filter could be clogged.**
3. **Out of Chlorine.**
  - a. The scale would read 150 lbs. lighter than when cylinder was new.
  - b. Flow ball would be at zero and RED indicated on front of vacuum regulator.

## (III) CHECK VALVE FAILURE (Water in flow tubes and vacuum lines)

1. Cause – Ejector check valve failure. Possible causes of ejector check valve failure:
  - a. Objects or material preventing closure of ejector check valve.
  - b. Failure of 3RS-203B O-ring.
  - c. Failure of SM-112 Rolling Diaphragm.
2. Corrective Action
  - a. Follow Section A-VI to repair ejector check valve.
  - b. Disassemble and dry vacuum regulator(s), remote meter(s), and switchover module.
  - c. Follow Section IV vacuum test procedure before startup of chlorination.

# APPENDIX: SERVICING THE HYDRO SYSTEM

HYDRO vacuum regulators require little service when operated according to instructions. The following are recommended maintenance instructions.

*NOTE: All HYDRO systems come with a three year limited warranty. Hydro does repair and refurbish used units. The repaired and retested units are shipped from Hydro within 48 hours of arrival at the factory with a one year warranty.*

Guidelines for Preventative Maintenance: See below for detailed instructions.

1. Service Rate Valves every 4 months. (See Section A-III)
2. Replace Rate Valve O-ring every 12 months. (See Section A-III)
3. Service Flow Meter (of vacuum regulators as well as remote meters) every 12 months. (See Section A-II)
4. Service Ejector every 12 months. (See Sections A-V and A-VI)
5. Replace vacuum tubing every 12-18 months.
6. Replace vacuum tubing fittings every 18-24 months.

**CAUTION:** *Use all recommended precautions when using chemicals of any kind, including goggles, gloves, face shields, etc.*

*After any of the listed repair procedures, it is necessary to go through the Start-Up including vacuum test again!*

## SECTION A-I: CLEANING THE SAFETY SHUT OFF VALVE AND SEAT

1. Remove the two screws holding the metal yoke plate to the vacuum regulator body.
2. Grasp the metal yoke and with a slight turning motion pull it out of the vacuum regulator body.
3. Remove the 3PS-214 O-Ring from the Seal Plug.
4. Remove the Inlet Filter Holder (and/or the filter) from the Seal Adapter.
5. Using a short flat head screwdriver and a pair of pliers unscrew the YM-100A Inlet Valve Stem from the YM-102A Vent Plug.

*NOTE: Protect the YM-102A Vent Plug from the pliers with a cloth or paper.*

*NOTE: This should be done with the Seal Plug installed in the Yoke Assembly unless the Yoke Assembly is being replaced.*

6. Now the YM-100A, YM-101A, YM-102A, YP-100, and YM-103 should all be removed and cleaned.

*NOTE: Especially clean the YM-100A in the region where it meets the YP-101A to form the seal. This surface should be polished as smooth as possible.*

7. Using a rod of 0.250" diameter, the YP-101A Inlet Valve Seat can be pressed out of the Seal Plug from the spring side. The YP-101A should be cleaned and carefully inspected for scratches or cuts especially where it is to seal with the YM-100A.

*NOTE: Sometimes the YP-101A will be cut or deformed such that it cannot seal. If you perform this service and the Vacuum Regulator is still leaking to vent, then the YP-101A should be replaced with a new one.*

8. Clean the Seal Plug thoroughly before reassembling the unit in the following order:
  - a. Lubricate O-Rings with Flurolube™ grease.
  - b. Insert the new or cleaned YP-101A with O-Ring 3RS-010.
  - c. Insert and retighten the YM-100A, YM-101A, YP-100, YM-103 and YM-102A as shown in the drawing.  
*NOTE: DO NOT USE EXCESSIVE FORCE IN TIGHTENING the YM-100A to the YM-102A. These threads can break if over-tightened.*
  - d. Insert a new Filter Cartridge.
  - e. Install a new 3PS-214 O-Ring on the Seal Plug.

## **SECTION A-II: SERVICING FLOW METER ASSEMBLY**

1. Close chlorine cylinder valve. Follow shut down procedures before performing repairs.
2. Wait for the ball to drop in the meter tube and for the vacuum regulator flag to show red.
3. Remove rate valve from bonnet. See Section A-III below for servicing rate valve and to remove bonnet and Rate Valve O-Ring.
3. Loosen the Inlet plug about 2 to 3 turns being careful not to let the meter tube fall as it becomes loose. Remove the meter tube, being careful not to lose the top and bottom stops or the meter tube ball.
4. If there is any buildup in the tube, remove the stops and ball and soak the tube in water with a cleaner like Lime Away or Muriatic Acid until the white material is sufficiently removed from inside the tube.  
*NOTE: Always follow safety precautions with Muriatic Acid and other cleaners.*
5. If the markings on the tube are faded, then go over the markings with a permanent marker and then wipe the excess on surface with a dry cloth.
6. If the meter gaskets have not been changed, they can be turned over. If the meter gaskets have been reused already then replace with new gaskets.
7. Remove the Inlet Plug completely from the Bottom Meter Block in order to change or re-grease O-Rings. Check O-Rings and if necessary replace them. Add some grease to the inside walls of the Meter Block where it contacts these O-Rings.
8. Replace the ball and stops in the tube and put the tube back into position securing it by tightening the Inlet Plug. **DO NOT OVERTIGHTEN.**

## **SECTION A-III: REPLACING RATE VALVE O-RING AND SERVICING RATE VALVE**

1. Close chlorine cylinder valve. Follow shut down procedures before performing repairs.
2. Wait for the ball to drop in the meter tube and for the vacuum regulator flag to show red.
3. Turn off water supply to ejector.
  - a. Remove the Rate Valve and clean thoroughly.
  - b. Place piece of tape or cloth around monel bonnet, grip firmly with pliers, and turn counterclockwise.
  - c. Under bonnet you just removed is the Rate Valve O-Ring. Remove and replace with new O-Ring, seating with the (clean) eraser side of a pencil.
  - d. Replace monel bonnet (turn snug) and install rate valve. **DO NOT OVERTIGHTEN** (can crack the block).

## SECTION A-IV: DISASSEMBLY OF VACUUM REGULATOR UNIT

1. Follow the usual shut down procedure carefully before removing any vacuum regulator from the gas bottle.
2. Follow Appendix Section I to remove the Yoke assembly from the vacuum regulator body.
3. Unscrew the body bolts from the Back Body.
4. Pull the Back Body directly away from the Front Body until they separate.
5. Carefully take the diaphragm assembly and pull it directly away from the Front Body (the two are pin connected by the guide pin).
6. To disassemble the diaphragm, grasp the front and rear plates and turn them apart (they are threaded together and may require use of a vice).
7. Inspect all O-Rings and replace if necessary.
8. Remove the Pin Guide (FB-104) by carefully pushing it from the face plate side of the Front Body. Be careful not to damage the center hole.
9. After inspection and replacement of parts or O-Rings, reassemble unit in reverse order.

*NOTE: DO NOT FORGET THE VENT SPRING (DM-100).*

## SECTION A-V: SERVICING EJECTOR NOZZLE

1. Follow the usual shut down procedure carefully before removing the black tubing from the Ejector.
2. Remove the Ejector unit from the pipe line.
3. Unscrew the Nozzle and Diffuser from one another.
4. For up to 100 PPD, the Nozzle is the longer piece. For 250 PPD and over, the Nozzle is the smaller piece.
5. Inspect for obvious damage and that it is not clogged with particles or any kind of deposit.  
*NOTE: Do not attempt to re-drill the hole in any way.*
6. If there is any kind of buildup (Iron, Calcium, etc.) in the Nozzle, soak it in a Muriatic Acid bath for at least 5 to 10 minutes or until it is clean.  
*NOTE: Always follow safety precautions with Muriatic Acid and other cleaners.*
7. It is recommended that the O-rings are replaced each time the Nozzle and Diffuser are disassembled for maintenance, especially when the O-rings are visibly deformed.
8. Reassemble the Ejector being careful to remember to use the Nozzle and Diffuser O-rings.

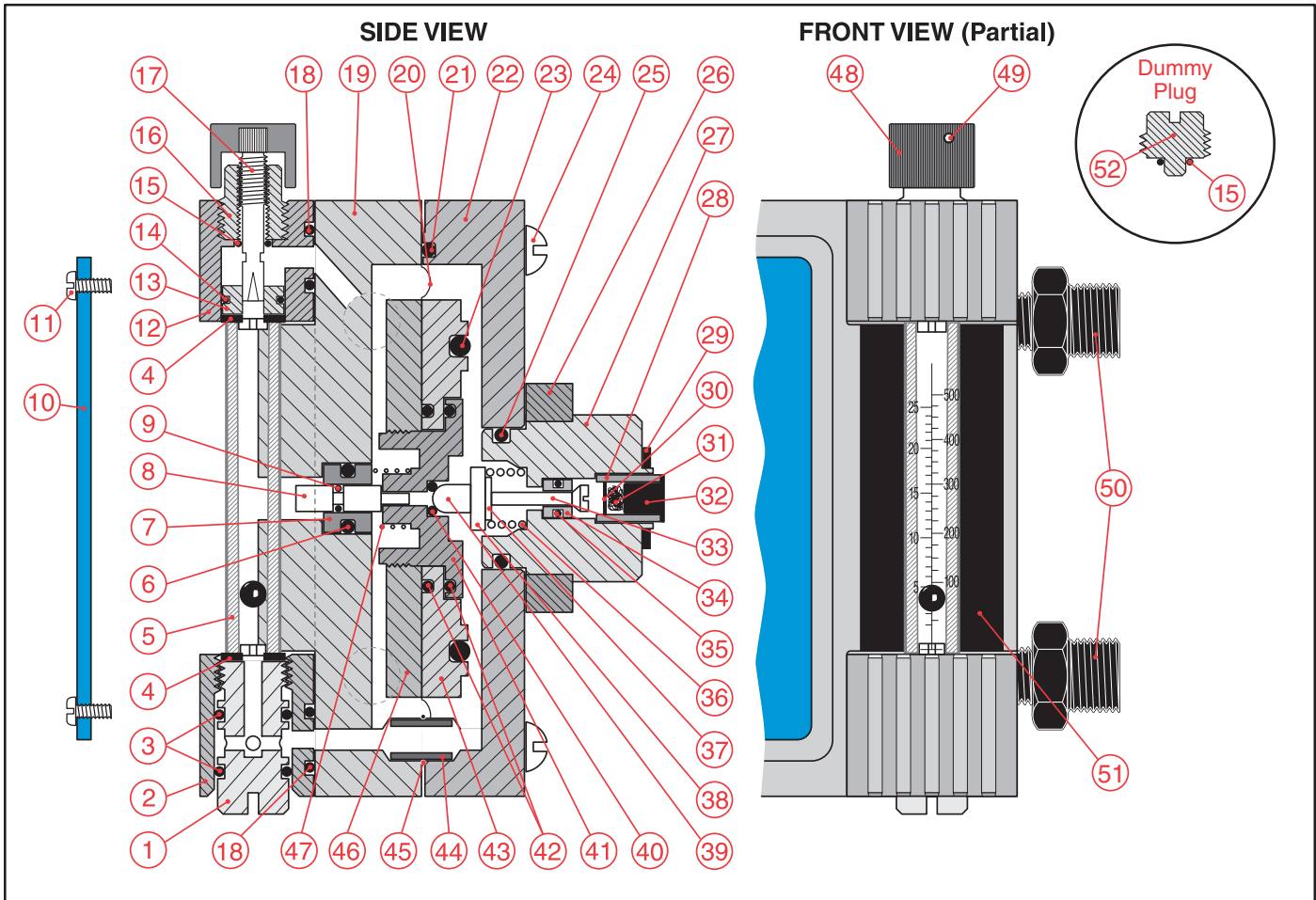
## SECTION A-VI: SERVICING EJECTOR CHECK VALVE ASSEMBLY

1. Follow the usual shut down procedure carefully before removing the black tubing from the Ejector.
2. Remove the Ejector unit from the pipe line.
3. Remove the four bolts holding the two body parts together.
4. Lift the Top Body away from the Bottom Body.
5. The 3RS-203B O-Ring should be replaced.
6. Inspect the SM-112 Diaphragm for damage (holes, cracking, etc.). If necessary, unscrew the diaphragm nut and bolt, preferably using a Spanner wrench and tongue and groove pliers. Use care not to snap the nut. The SM-112 should be replaced every 12 to 24 months.
7. The Spring holds a lifetime guarantee and should not need replacement.
8. Replace any parts necessary and reassemble.

## SECTION A-VII: SERVICING SWITCHOVER MODULE

1. Follow the usual shut down procedure carefully before removing the black tubing from the Switchover.
2. Remove the four bolts on each side which hold on the End Caps (SM-107).
3. Remove the two diaphragm assemblies. Inspect for obvious damage.  
*NOTE: When replacing the SM-112 Diaphragm the side of the inside hole which is raised should be against the Diaphragm Nut which has a groove for this purpose.*
4. Inspect all O-Rings (especially the 3RS-203 O-Rings).
5. Check to make sure that the Pivot Arm assembly switches freely.
6. If not, remove the Top Block by unscrewing the four bolts which hold it to the Center Body.  
*NOTE: If you lay the Center Body with bracket holes down, the Top Cap fitting should be to the left.*
7. Remove the Pivot Arm assembly and inspect for obvious damage.
8. Inspect and replace any O-Rings before reassembling.
9. Be careful about orientation of the Top Cap and the Pivot Arm assembly when reassembling.  
***CAUTION: When replacing the Top Cap there will be compression of the YM-103 Spring and the Silver Spring Guide Pin (SM-105) will slide into the Spring Pivot (SM-103). If the Pin binds in the guide and you continue to tighten the bolts, the pin will be bent and will require replacement.***  
*NOTE: When replacing the Top Cap also be sure that the 3RS-023 O-Ring stays in place. The Top Cap will crush this O-Ring if tightened when the O-Ring is out of the groove and cause a leak.*
10. Reassemble the diaphragms and replace in the Center Body.  
*NOTE: Make sure that the diaphragm ears are aligned on the sides of the Pivot Arm to avoid interference.*
11. Replace the End Caps after all parts have been replaced.



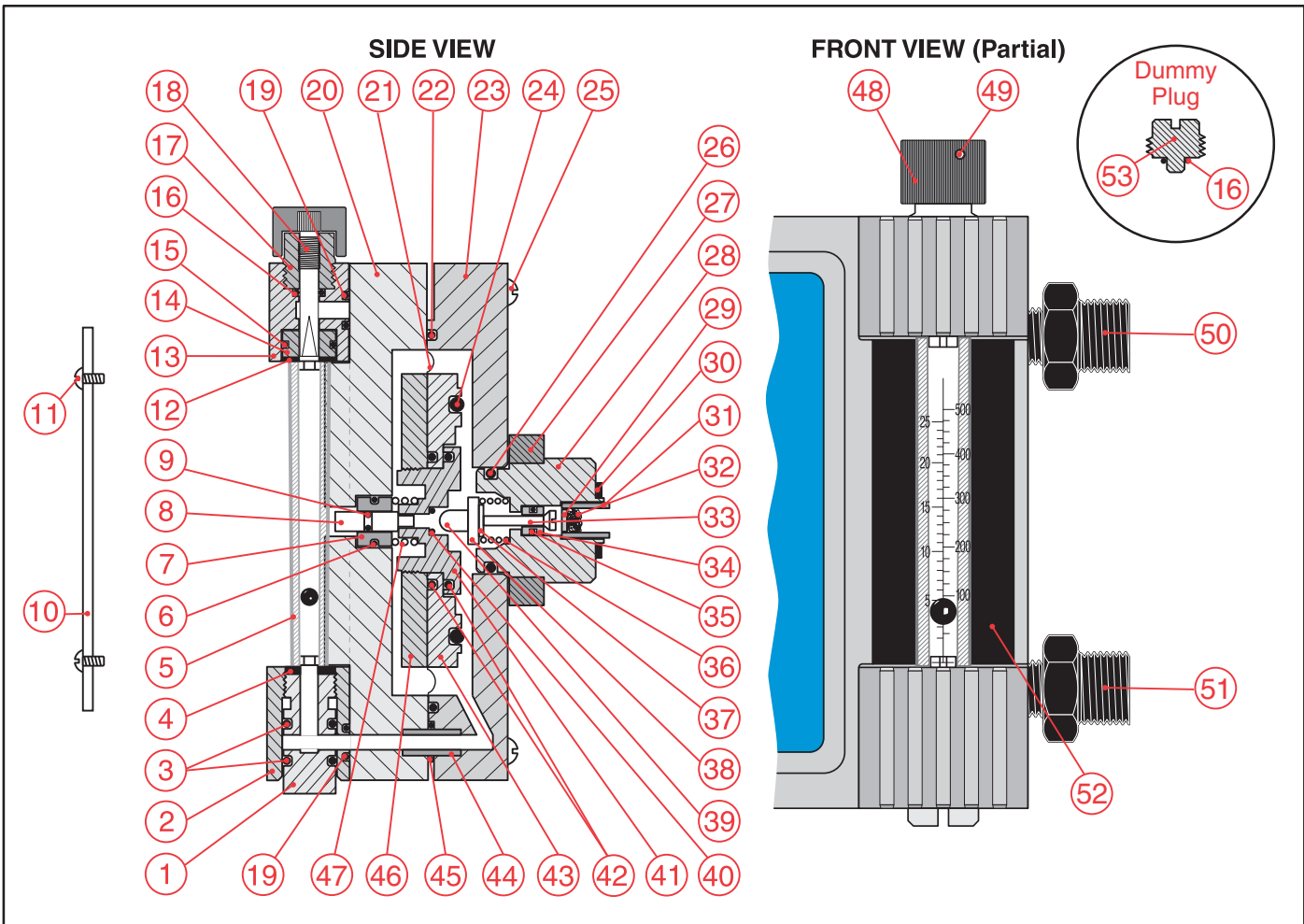



Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Inlet Plug	1	FM-101A	28	Filter Holder	1	KFH-300
2	Bottom Meter Block	1	FM-103	29	Lead Gasket	1	LG-100
3	O-Rings	2	3PS-112	30	Inlet Filter Screen	1	S-210
4	Meter Gaskets (4 & 10 PPD)	2	MG-001-010	31	Filter Material	1	TS-14-FO
4	Meter Gaskets (25 PPD)	2	MG-001-025	32	Teflon Filter	1	T-210
4	Meter Gaskets (50 & 100 PPD)	2	MG-001-100	33	Inlet Valve	1	YM-100A
5	Meter Tube (1.5 PPD)	1	MTB-11-0015	34	Inlet Valve Seat	1	YP-101A
5	Meter Tube (4 PPD)	1	MTB-11-004	35	O-Ring	1	3RS-010
5	Meter Tube (10 PPD)	1	MTB-11-010	36	Inlet Spring	1	YM-103
5	Meter Tube (25 PPD)	1	MTB-11-025	37	Bearing Washer	1	YM-101A
5	Meter Tube (50 PPD)	1	MTB-11-050	38	Spring Retainer	1	YP-100
5	Meter Tube (100 PPD)	1	MTB-11-100	39	Vent Plug	1	YM-102A
6	O-Ring	1	3RS-014	40	O-Ring	1	3RS-009
7	Pin Guide	1	FB-104	41	Diaphragm Vent Bolt	1	DP-102A
8	Guide Pin	1	DM-101A	42	O-Rings	2	3PS-029
9	O-Ring	1	3RS-006	43	Rear Diaphragm Plate	1	DP-101A
10	Cover Plate	1	FB-105-500	44	Tube Connector	1	FB-106
11	Cover Plate Screws (Nylon)	2	#6-32 x 5/16"	45	O-Ring	1	3RS-012
12	Top Meter Block	1	FM-100B	46	Front Diaphragm Plate	1	DP-100A
13	Rate Valve Seat	1	VT-104	47	Vent Spring	1	DM-100
14	O-Ring	1	3RS-012	48	Rate Valve Knob	1	RV-100A
15	O-Ring	1	3PS-106	49	Rate Valve Knob Set Screw	1	#5-40 x 1/4"
16	Valve Bonnet	1	VB-100C	50	Tubing Connector (3/8")	2	BKF-64
17	Rate Valve (10 PPD)	1	VP-103C-010	51	Meter Shield	1	MS-500
17	Rate Valve (100 PPD)	1	VP-103C-100	52	Dummy Plug	1	FM-104
18	O-Rings	2	3PS-110	*	Meter Block Screws (Monel)	4	#10-24 x 1"
19	Front Body	1	FB-100A	*	Yoke Screws (Monel)	2	1/4-20 x 1 3/4"
20	Double Diaphragm	1	DP-103	*	Flag & Knob	1	FB-101/102
21	O-Ring	1	3PS-156	*	Flag Pin	1	FB-103A
22	Back Body	1	BB-100A				
23	O-Ring	1	3PS-332				
24	Body Screws (Monel)	4	1/4-20 x 1 1/2"				
25	O-Ring	1	3PS-214				
26	Back Plate	1	YM-105A				
27	Seal Adapter	1	SAWS-US3				

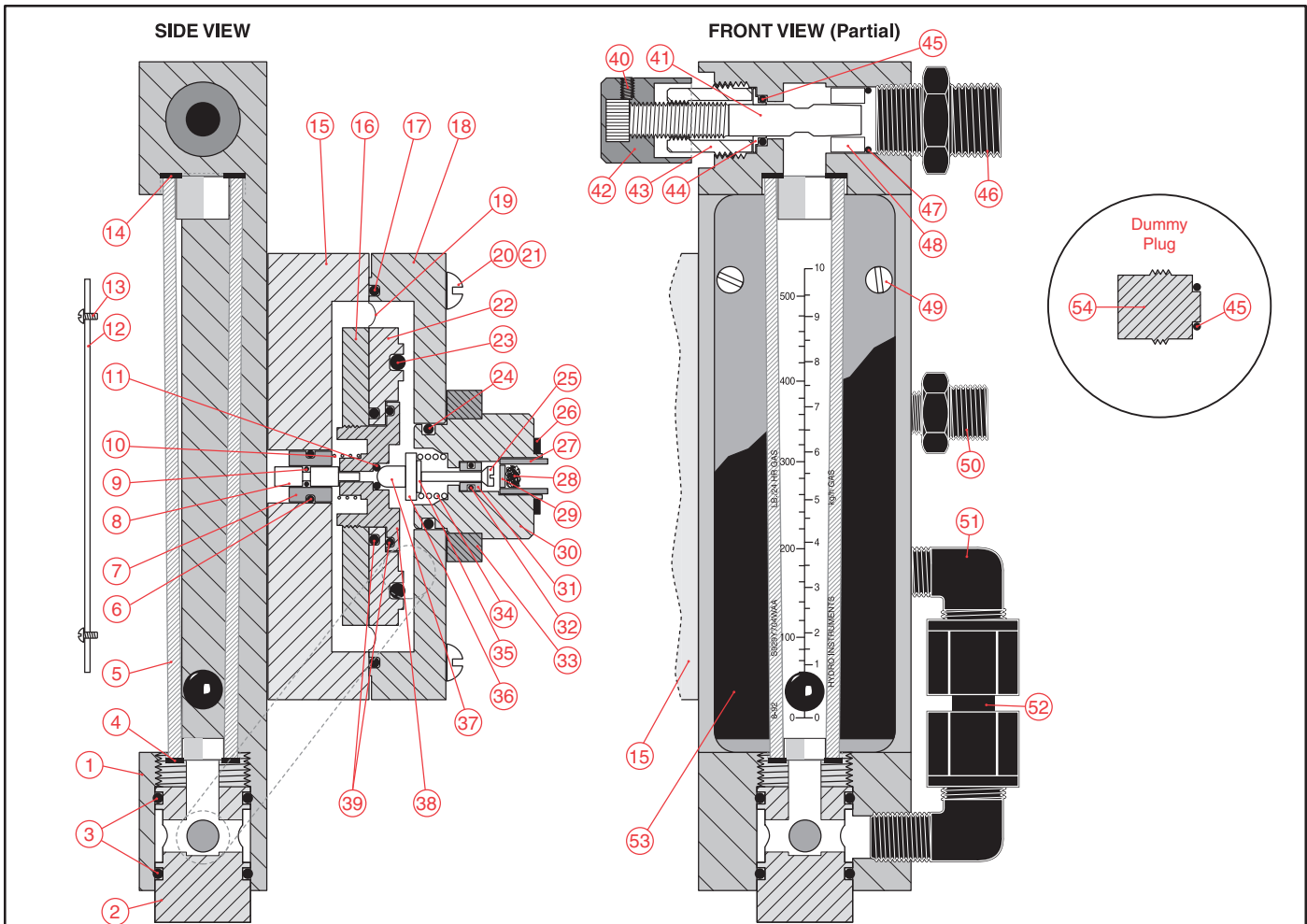
\* Not shown.

**hydro**  
INSTRUMENTS™  
**VACUUM REGULATOR**

Date: June 2012  
Scale: 65%  
Dwg. No. Series 500★



Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.	
1	Inlet Plug	1	FM-101A	33	Inlet Valve	1	YM-100A	
2	Bottom Meter Block	1	FM-203	34	Inlet Valve Seat	1	YP-101A	
3	O-Rings	2	3PS-112	35	O-Ring	1	3RS-010	
4	Bottom Meter Gasket	1	MG-200B	36	Inlet Spring	1	YM-103	
5	Flow Meter Tube (250 PPD)	1	MTB-11-200	37	Bearing Washer	1	YM-101A	
6	O-Ring	1	3RS-014	38	Spring Retainer	1	YP-100	
7	Pin Guide	1	FB-104	39	Vent Plug	1	YM-102A	
8	Guide Pin	1	DM-101A	40	O-Ring	1	3RS-009	
9	O-Ring	1	3RS-006	41	Diaphragm Vent Bolt	1	DP-102A	
10	Cover Plate	1	FB-105-200	42	O-Rings	2	3PS-029	
11	Cover Plate Screws (Nylon)	2	#6-32 x 5/16"	43	Rear Diaphragm Plate	1	DP-101A	
12	Top Meter Gasket	1	MG-200T	44	Tube Connector	1	FB-106	
13	Top Meter Block	1	FM-200B	45	O-Ring	1	3RS-012	
14	Rate Valve Seat	1	VT-204	46	Front Diaphragm Plate	1	DP-100A	
15	O-Ring	1	3RS-016	47	Vent Spring	1	DM-100	
16	O-Ring	1	3PS-106	48	Rate Valve Knob	1	RV-100A	
17	Valve Bonnet	1	VB-100C	49	Rate Valve Knob Set Screw	1	#5-40 x 1/4"	
18	Rate Valve (250 PPD)	1	VP-203C	50	Vacuum Tubing Connector	1	BKF-84	
19	O-Rings	2	3PS-110	51	Vent Tubing Connector	1	BKF-64	
20	Front Body	1	FB-100A	52	Meter Shield	1	MS-500	
21	Double Diaphragm	1	DP-103	53	Dummy Plug	1	FM-104	
22	O-Ring	1	3PS-156	*	Meter Block Screws (Monel)	4	#10-24 x 1"	
23	Back Body	1	BB-100A	*	Yoke Screws (Monel)	2	1/4 -20 x 1 3/4"	
24	O-Ring	1	3PS-332	*	Flag & Knob	1	FB-101/102	
25	Body Screws (Monel)	4	1/4 -20 x 1 1/2"	*	Flag Pin	1	FB-103A	
26	O-Ring	1	3PS-214	* Not shown.				
27	Back Plate	1	YM-105A	 <b>hydro</b> INSTRUMENTS™				
28	Seal Adapter	1	SAWS-US3				Date:	June 2012
29	Inlet Filter Screen	1	S-210				Scale:	N.T.S.
30	Lead Gasket	1	LG-100				Dwg. No.	Series W200★
31	Filter Holder	1	KFH-300					
32	Filter Material	1	TS-14-FO					

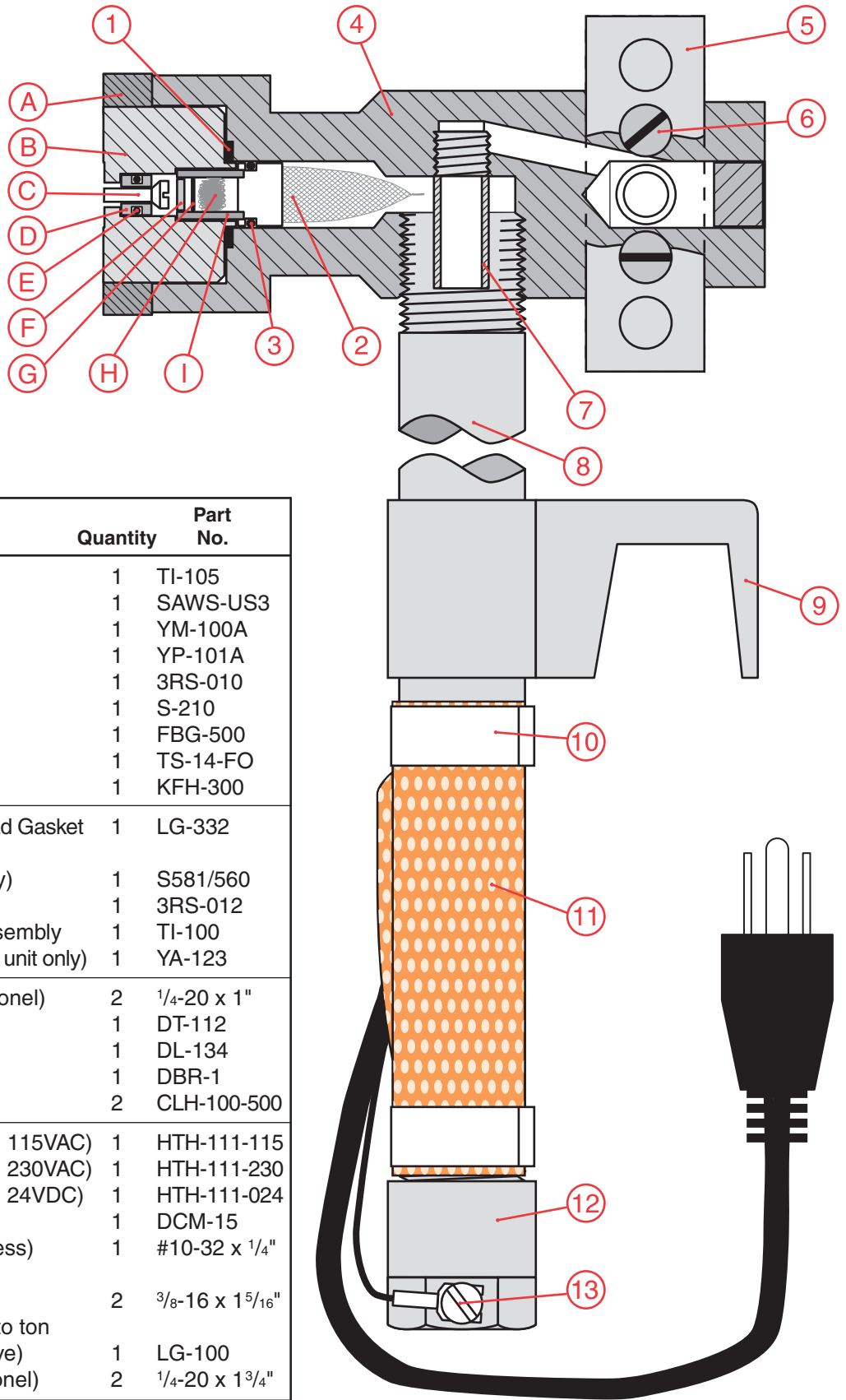


Note: See IW-1★ drawing for ironwork parts.

Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Flow Meter Body (3/8" NPT Inlet)	1	TFM-500-VR	32	O-Ring	1	3RS-010
2	Inlet Plug	1	IP-498	33	Back Plate	1	YM-105A
3	O-Rings	2	3RS-212	34	Inlet Spring	1	YM-103
4	Bottom Meter Gasket	1	G-162	35	Bearing Washer	1	YM-101A
5	Flow Meter Tube (500 PPD/10 Kg/h)	1	MT-678-500	36	Spring Retainer	1	YP-100
6	O-Ring	1	3RS-014	37	Vent Plug	1	YM-102A
7	Pin Guide	1	FB-104	38	Diaphragm Vent Bolt	1	DP-102A
8	Guide Pin	1	DM-101A	39	O-Rings	2	3PS-029
9	O-Ring	1	3RS-006	40	Rate Valve Knob Set Screw (stainless)	1	#6-32 x 1/4"
10	Vent Spring	1	DM-100	41	Rate Valve	1	SA495
11	O-Ring	1	3RS-009	42	Rate Valve Knob	1	S496
12	Face Plate (Series 700)	1	FB-105-700	43	Valve Bonnet	1	S493
13	Cover Plate Screws (Nylon)	2	#6-32 x 5/16"	44	Shaft Seal (PTFE)	1	SA-498
14	Top Meter Gasket	1	G-161	45	O-Ring	1	3RS-111
15	Front Body	1	FB-5A	46	5/8" x 1/2" Tubing Connector	1	BKF-108
16	Front Diaphragm Plate	1	DP-100A	47	O-Ring	1	3RS-114
17	O-Ring	1	3PS-156	48	Rear Valve Seat	1	S497
18	Back Body	1	BB-5A	49	Panel Screws (316SS)	4	#10-24 x 1/2"
19	Double Diaphragm	1	DP-103	50	Vent Fitting (3/8")	1	BKF-64
20	Body Screws (Monel)	4	1/4-20 x 1 1/2"	51	1/2" Tube x 3/8" NPT Male Elbow	2	BPE-86
*21	Back Plate Screws (Monel)	2	1/4-20 x 1 3/4"	52	500 PPD Tube Connector	1	FB-106-500
22	Rear Diaphragm Plate	1	DP-101A	53	Meter Shield	1	MS-700
23	O-Ring	1	3PS-332	54	Dummy Plug	1	DB-765
24	O-Ring	1	3PS-214	*	Flag & Knob	1	FB-101/102
25	Inlet Valve	1	YM-100A	*	Flag Pin	1	FB-103A
26	Lead Gasket	1	LG-100				
27	Filter Holder	1	KFH-300				
28	Filter Material	1	TS-14-FO				
29	Inlet Filter Screen	1	S-210				
30	Seal Adapter	1	SAWS-US3				
31	Inlet Valve Seat	1	YP-101A				

**hydro**  
INSTRUMENTS™  
**VACUUM REGULATOR**

Date: May 2013  
Scale: 49%  
Dwg. No. Series 750★



Item No.	Description	Quantity	Part No.
A*	Back Plate	1	TI-105
B*	Seal Adapter	1	SAWS-US3
C*	Inlet Valve	1	YM-100A
D*	Inlet Valve Seat	1	YP-101A
E*	O-Ring	1	3RS-010
F*	Inlet Filter Screen	1	S-210
G*	Filter Pad	1	FBG-500
H*	Filter Material	1	TS-14-FO
I*	Filter Holder	1	KFH-300
1	Ton Ironwork Inner Lead Gasket	1	LG-332
2	Filter Screen Holder and Screen (assembly)	1	S581/560
3	O-Ring	1	3RS-012
4✓	Ton Ironwork Inlet Assembly	1	TI-100
5	Yoke Assembly (for ton unit only)	1	YA-123
6	Screws for YA-123 (Monel)	2	1/4-20 x 1"
7✓	Drip Tube	1	DT-112
8✓	Monel Drip Leg	1	DL-134
9✓	Drip Leg Bracket	1	DBR-1
10	Heater Clamps	2	CLH-100-500
11	Drip Leg Heater (25W, 115VAC)	1	HTH-111-115
11	Drip Leg Heater (25W, 230VAC)	1	HTH-111-230
11	Drip Leg Heater (25W, 24VDC)	1	HTH-111-024
12✓	Drip Leg Cap	1	DCM-15
13	Ground Screw (stainless)	1	#10-32 x 1/4"
14†	Screws for TI-100 (Monel, hex head)	2	3/8-16 x 15/16"
15†	Lead Gasket (TI-100 to ton container cylinder valve)	1	LG-100
16†	Screws for TI-105 (Monel)	2	1/4-20 x 1 3/4"

\* Not part of ton ironwork; shown only as reference. (see chlorinator drawing)

† Not shown.

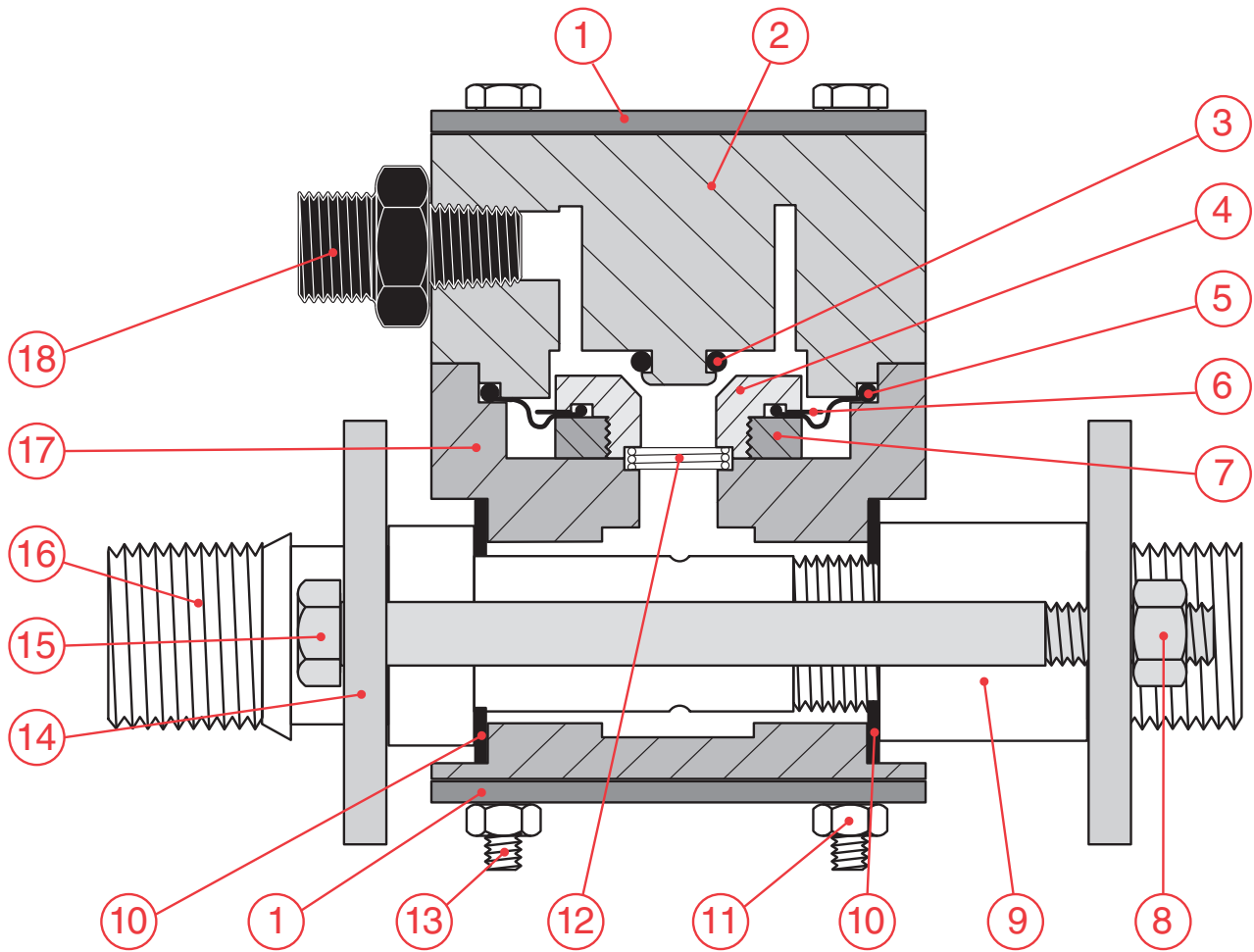
✓ Not sold separately.



Date: January 2013

Scale: 75%

Dwg. No. IW-1★



Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Body Armor Plates	2	EJB-51	11	Nut $\frac{5}{16}$ -18	4	N-56
2	Top Body (250 PPD)	1	E-550-250	12	Spring	1	S-145
3	O-Ring	1	3RS-203	13	Bolt $\frac{5}{16}$ -18 x 4 $\frac{1}{2}$ "	4	B-57
4	Check Assembly Bolt	1	E-553	14	Nozzle/Diffuser Brackets	2	EJB-100
5	Rolling Diaphragm	1	SM-112	15	Bolt $\frac{5}{16}$ -18 x 5"	2	B-60
6	Support Diaphragm	2	KY-1	16	Universal Nozzle (See Options Below)	1	*See Note
7	Check Assembly Nut	1	E-552	17	Bottom Body	1	E-551
8	Nut $\frac{5}{16}$ -18	2	N-56	18	$\frac{3}{8}$ " tube x $\frac{1}{4}$ " NPT Tubing Connector	1	BKF-64
9	Diffuser (Threaded)	1	E-1063				
10	O-Ring	2	OH-BUN-214				

**Items 1, 8, 14, and 15 are for High Pressure Ejector only.**

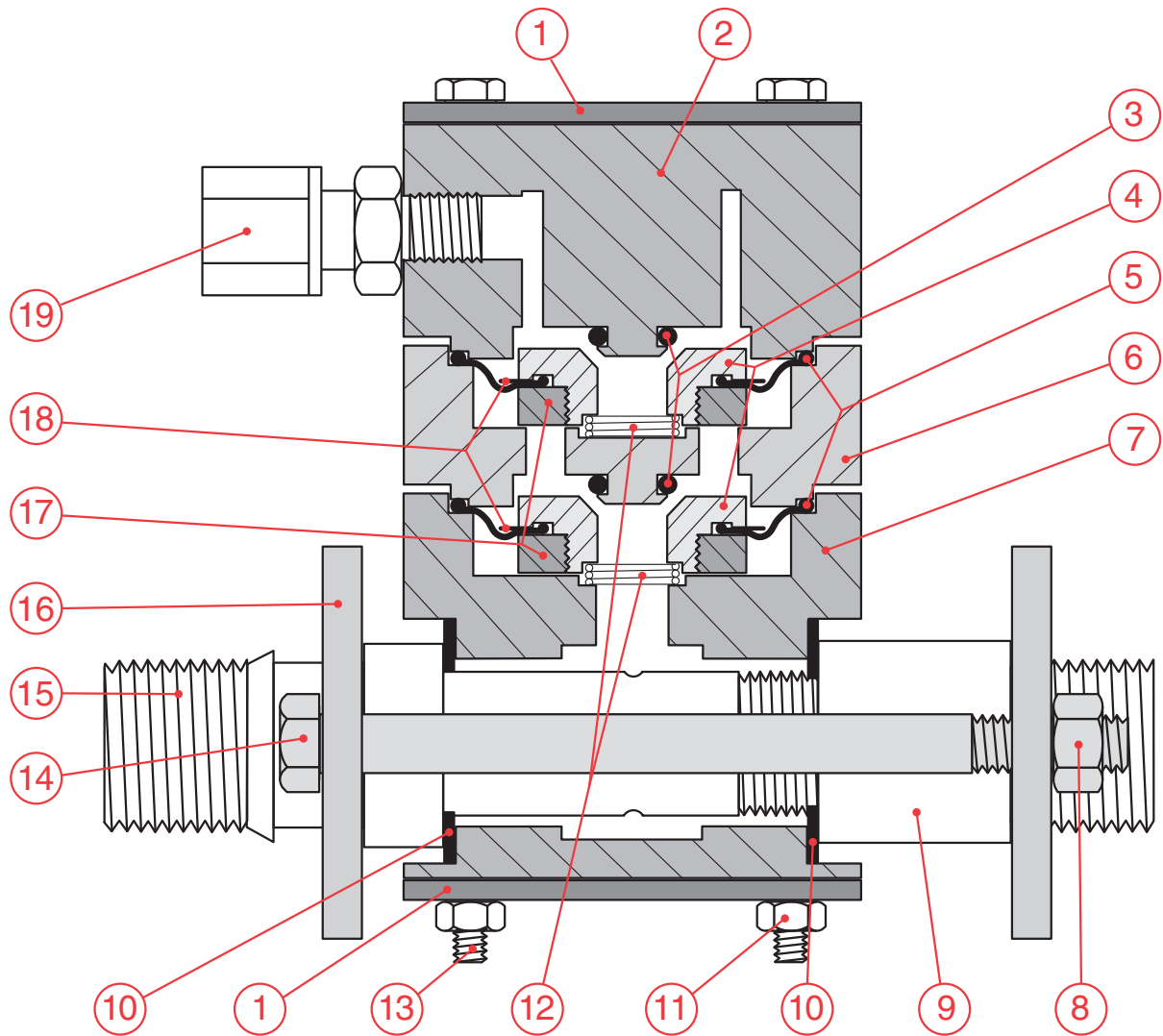
**Note:** For units using threaded nozzle and threaded diffuser, a union must be used on the nozzle side. On line pressure above 140 PSI, high pressure ejector must be used.

**\*Note:** Available Nozzles:  
 UN-102-099D (50 ppd max.)  
 UN-101-3 (50 ppd max.)  
 UN-102-140 (100 ppd max.)  
 UN-101-5 (100 ppd max.)  
 UN-101-2 (100 ppd max.)

**hydro**  
 INSTRUMENTS...  
**EJECTOR**

Date: August 2013  
 Scale: 90%  
 Dwg. No. EJ-1000





Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Body Armor Plates	2	EJB-51	11	Nut 5/16-18	4	N-56
2	Top Body (250 PPD)	1	E-550-250	12	Spring	2	S-145
3	O-Ring	2	3RS-203	13	Bolt 5/16-18 x 5 1/2"	4	B-56
4	Check Assembly Bolt	2	E-553	14	Bolt 5/16-18 x 5"	2	B-60
5	Rolling Diaphragm	2	SM-112	15	Diffuser (Threaded)	1	E-1063
6	Middle Body	1	E-554	16	Nozzle/Diffuser Brackets	2	EJB-100
7	Bottom Body	1	E-551	17	Check Assembly Nut	2	E-552
8	Nut 5/16-18	2	N-56	18	Support Diaphragm	4	KY-1
9	Universal Nozzle (See Options Below)	1	*See Note	19	3/8" tube x 1/4" NPT Tubing Connector	1	BKF-64
10	O-Ring	2	OH-BUN-214				

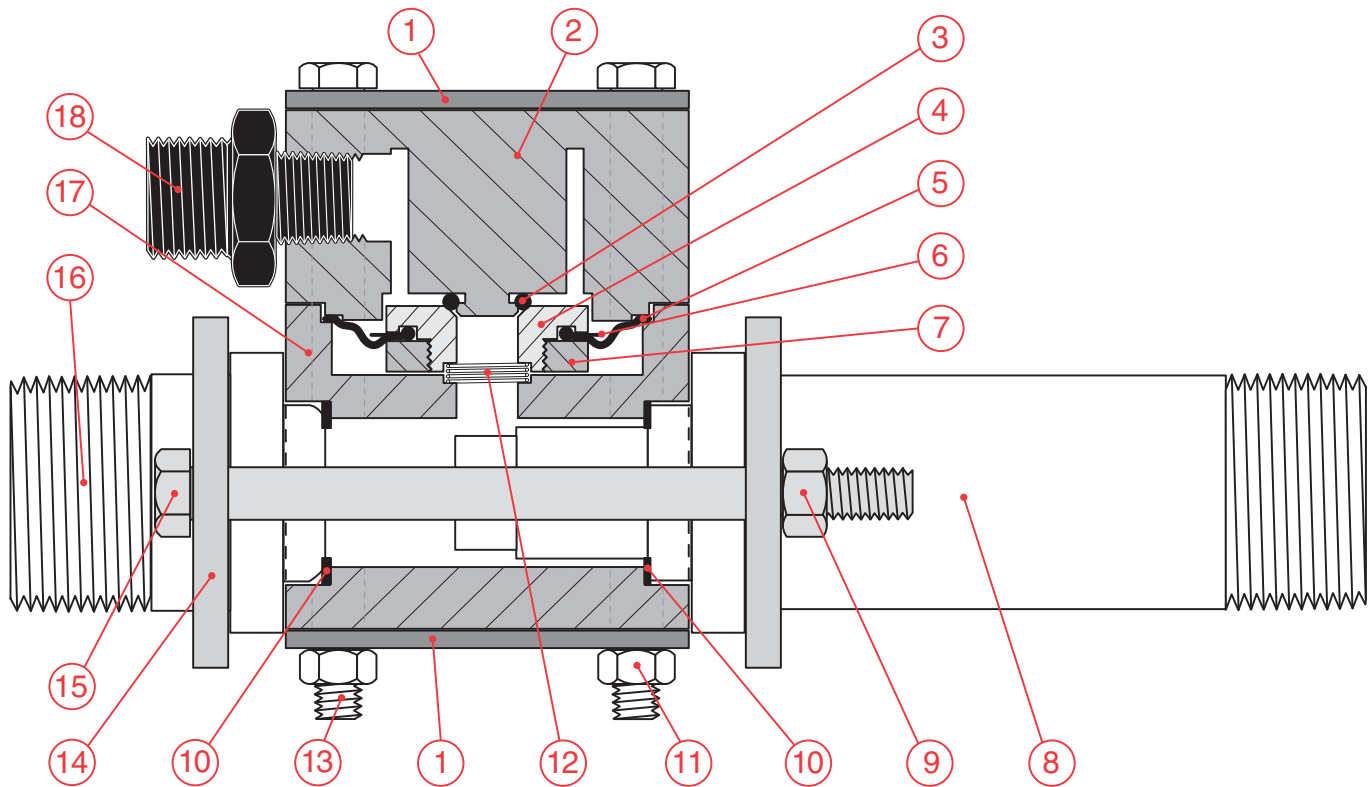
**Items 1, 8, 14, and 16 are for High Pressure Ejector only.**

**Note:** For units using threaded nozzle and threaded diffuser, a union must be used on the nozzle side. On line pressure above 140 PSI, high pressure ejector must be used.

**\*Note:** Available Nozzles:  
 UN-102-099D (50 ppd max.)  
 UN-101-3 (50 ppd max.)  
 UN-102-140 (100 ppd max.)  
 UN-101-5 (100 ppd max.)  
 UN-101-2 (100 ppd max.)



Date: August 2013  
 Scale: 85%  
 Dwg. No. EJ-1000DC



Item No.	Description	Quantity	Part No.
1	Body Armor Plates	2	EJB-51
2	Top Body	1	E-550-250
3	O-Ring	1	3RS-203
4	Check Assembly Bolt	1	E-553
5	Rolling Diaphragm	1	SM-112
6	Support Diaphragm	2	KY-1
7	Check Assembly Nut	1	E-552
8	Diffuser for 1 1/4" NPT (standard)	1	*EDT-380
9	Nut 3/8-16 (stainless)	2	N-58
10	O-Ring	2	OH-BUN-214
11	Nut 5/16-18 (stainless)	4	N-56
12	Spring	1	S-145
13	Bolt 5/16-18 x 4 1/2" (stainless)	4	B-57
14	Nozzle/Diffuser Brackets	2	EJB-425
15	Bolt 3/8-16 x 5" (stainless)	2	B-59
16	Nozzle	1	*EN-250
17	Bottom Body	1	E-551
18	1/2" tube x 1/4" NPT Tubing Connector	1	BKF-84

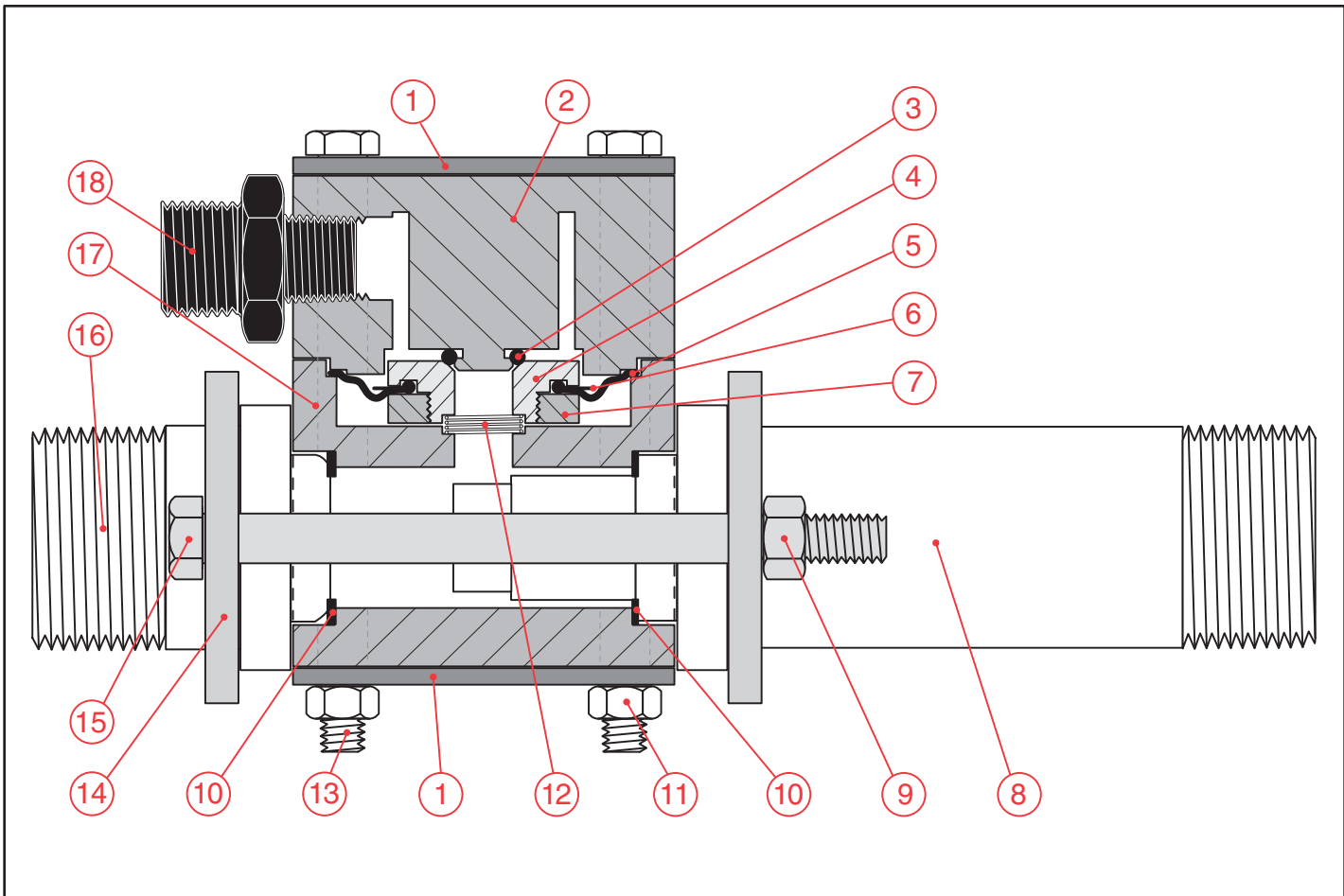
**Items 1 are for EJ-2000HP High Pressure Ejector only (Required for line pressures over 140 PSI).**

**\*Note:** Many different nozzle/throat combinations are available to work within given hydraulic conditions. The above sizes are supplied as standard equipment. Refer to nozzle sizing charts for correct sizing.



Date: August 2013  
 Scale: 73%  
 Dwg. No. EJ-2000





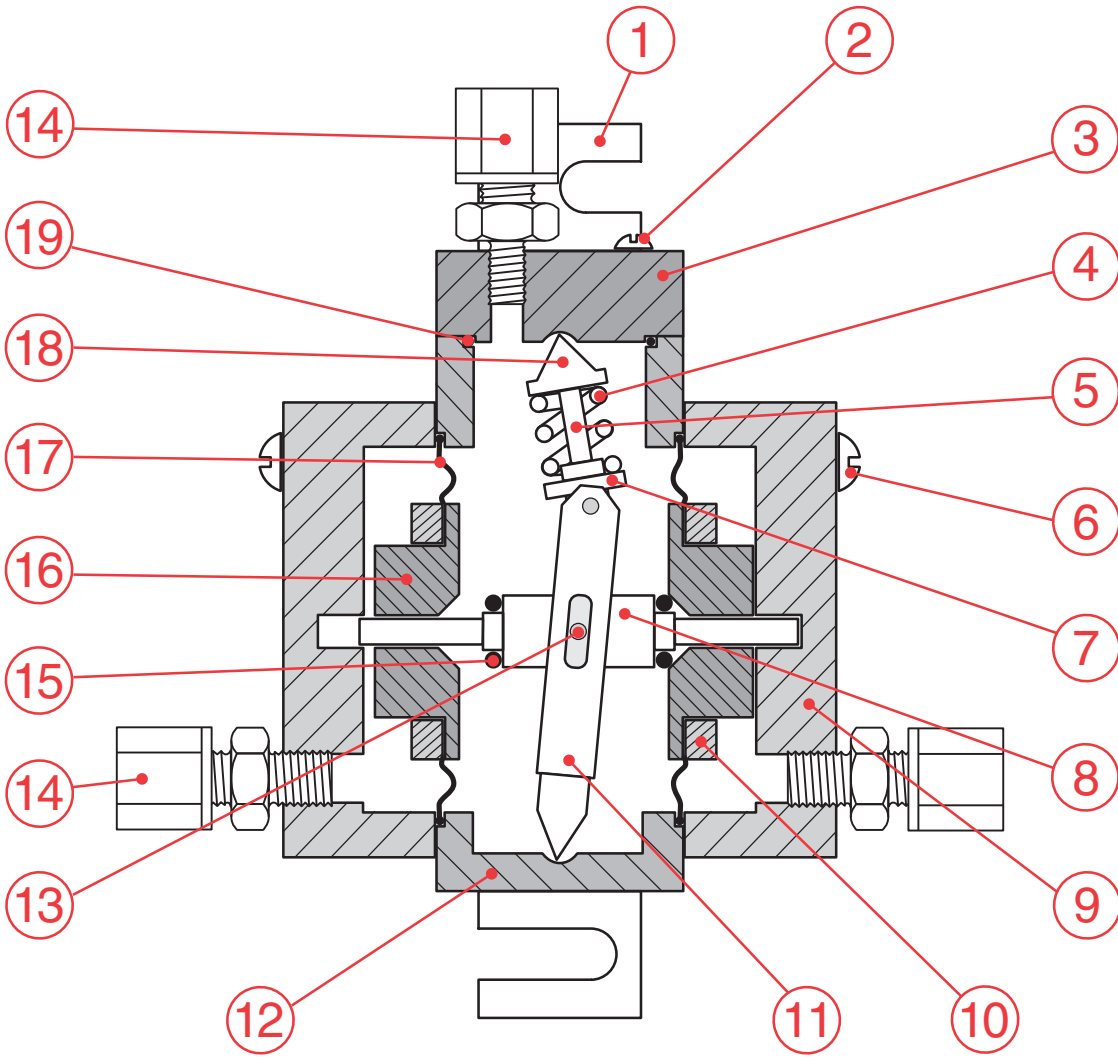
Item No.	Description	Quantity	Part No.
1	Body Armor Plates	2	EJB-50
2	Top Body	1	E-550-500
3	O-Ring	1	3RS-203
4	Check Assembly Bolt	1	E-553
5	Rolling Diaphragm	1	SM-112
6	Support Diaphragm	2	KY-1
7	Check Assembly Nut	1	E-552
8	Diffuser for 1 1/4" NPT (standard)	1	*EDT-560
9	Nut 3/8"-16	2	N-58
10	O-Ring	2	OH-BUN-214
11	Nut 5/16"-18 (stainless)	4	N-56
12	Spring	1	S-145
13	Bolt 5/16"-18 x 4 1/2" (stainless)	4	B-57
14	Nozzle/Diffuser Brackets	2	EJB-425
15	Bolt 3/8"-18 x 5" (stainless)	2	B-59
16	Nozzle	1	*EN-296
17	Bottom Body	1	E-551
18	5/8" tube x 1/2" NPT Tubing Connector	1	BKF-108

**Items 1 are for EJ-5000HP High Pressure Ejector only (Required for line pressures over 140 PSI).**

**\*Note:** Many different nozzle/throat combinations are available to work within given hydraulic conditions. The above sizes are supplied as standard equipment. Refer to nozzle sizing charts for correct sizing.



Date: August 2013  
 Scale: 73%  
 Dwg. No. EJ-5000



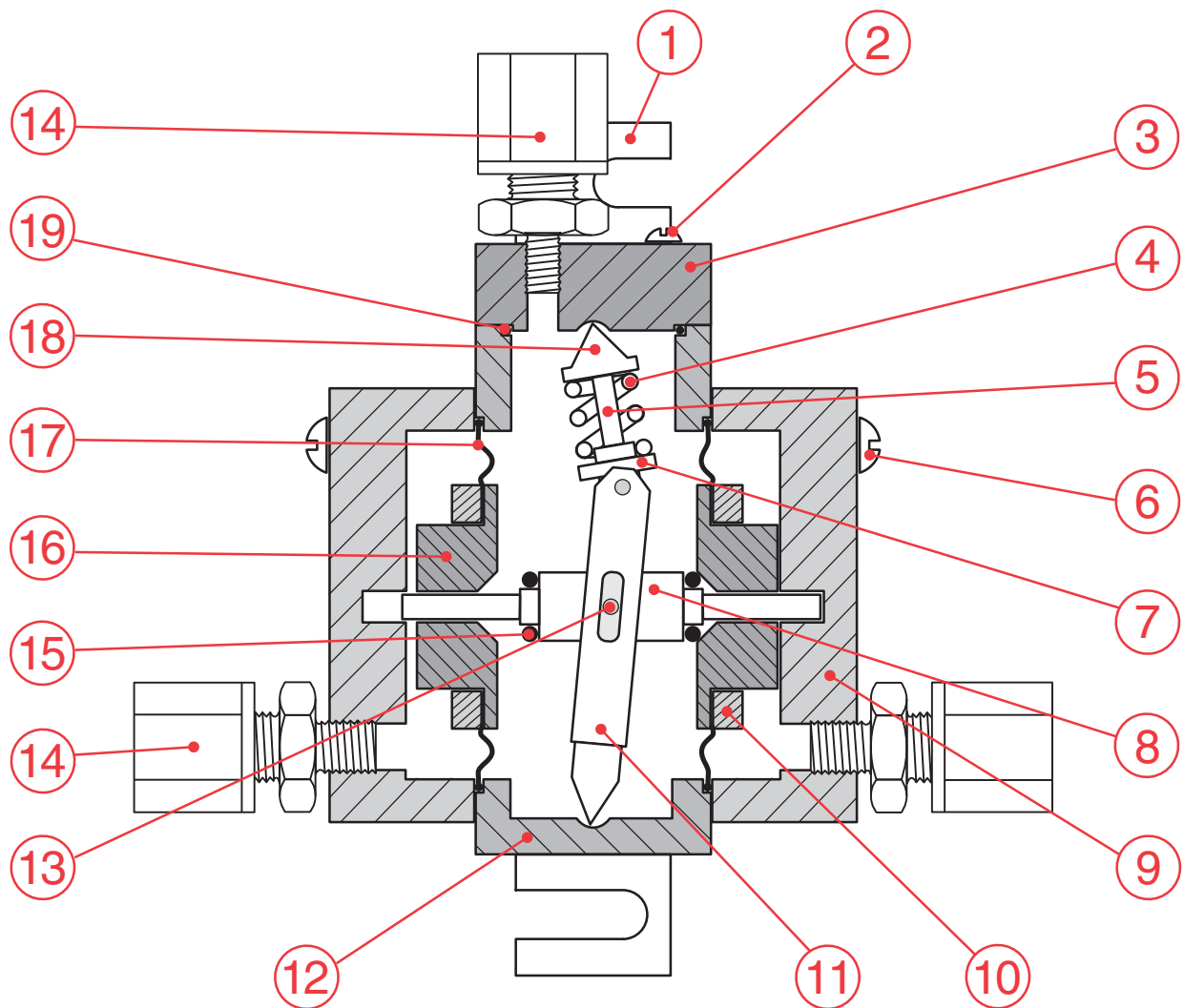
Item No.	Description	Quantity	Part No.
1	Mounting Bracket	1	SM-109
2	#10-24 x 1" Top Cap screws (Monel)	4	#10-24 x 1"
3	Top Cap	1	SM-106-250
4	Spring	1	YM-103-HC
5	Spring Guide Pin	1	SM-105
6	1/4-20 x 1 1/2" End Cap screws (Monel)	8	1/4-20 x 1 1/2"
7	Spring Pivot	1	SM-103
8	Valve Plug	1	SM-100
9	End Cap	2	SM-107-250
10	Diaphragm Nut	2	SM-111
11	Pivot Arm	1	SM-102
12	Center Body	1	SM-108
13	Hinge Pin	2	SM-101
14	3/8" tube x 1/4" NPT Tubing Connector	3	BKF-64
15	O-Ring	2	3RS-203
16	Diaphragm Bolt	2	SM-110
17	Rolling Diaphragm	2	SM-112
18	Spring Pin Guide	1	SM-104
19	O-Ring	1	3RS-023

**Note:** Items #7, 8, 11, and 13 sold only as an assembly with silver pins installed as part SM-Assembly.

**Specify PPD when ordering.**

**hydro**  
INSTRUMENTS<sub>LLC</sub>  
**SWITCHOVER MODULE**

Date: June 2012  
Scale: N.T.S.  
Dwg. No. SP-100



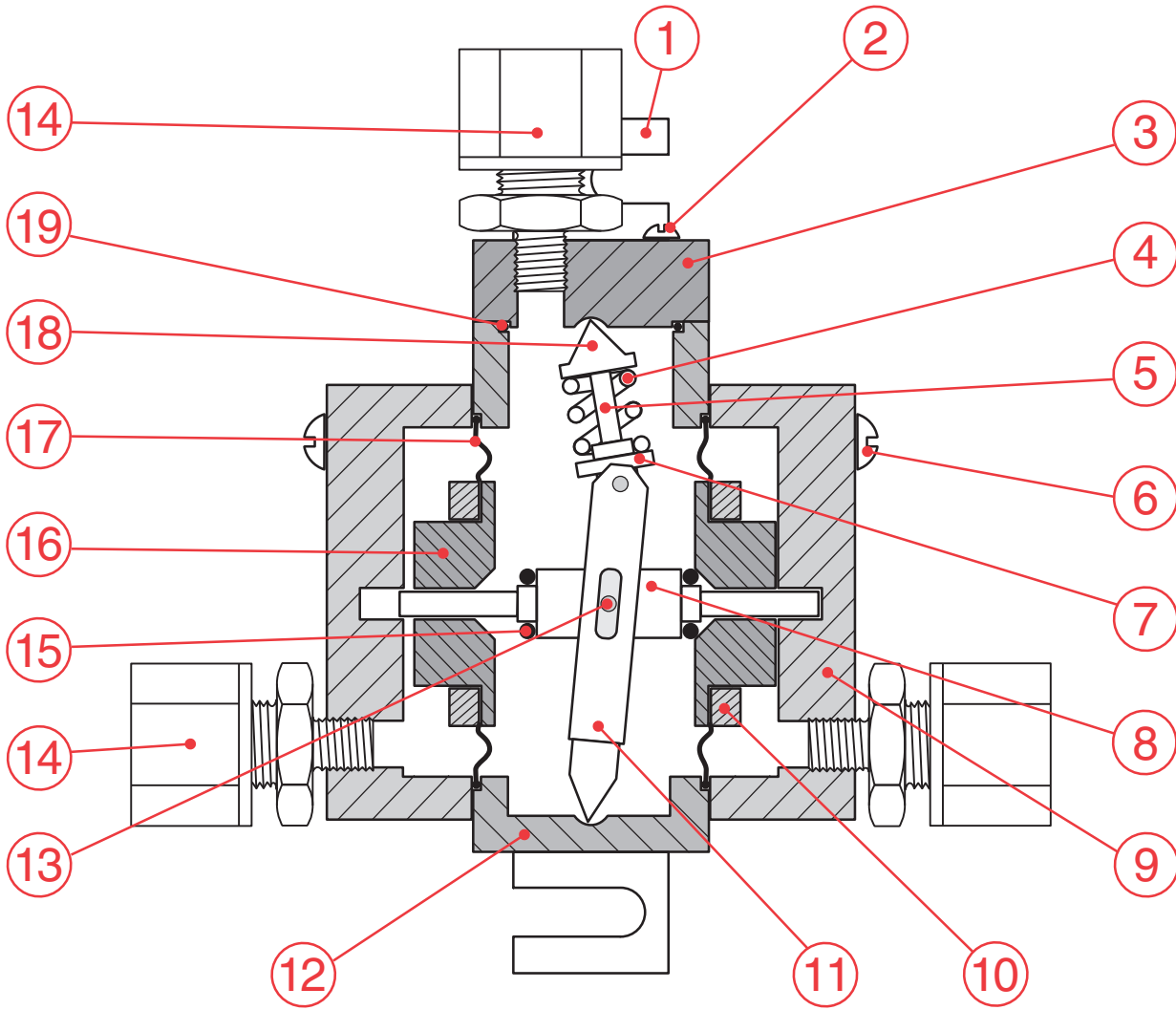
Item No.	Description	Quantity	Part No.
1	Mounting Bracket	1	SM-109
2	#10-24 x 1" Top Cap screws (Monel)	4	#10-24 x 1"
3	Top Cap	1	SM-106-250
4	Spring	1	YM-103-HC
5	Spring Guide Pin	1	SM-105
6	1/4-20 x 1 1/2" End Cap screws (Monel)	8	1/4-20 x 1 1/2"
7	Spring Pivot	1	SM-103
8	Valve Plug	1	SM-100
9	End Cap	2	SM-107-250
10	Diaphragm Nut	2	SM-111
11	Pivot Arm	1	SM-102
12	Center Body	1	SM-108
13	Hinge Pin	2	SM-101
14	1/2" tube x 1/4" NPT Tubing Connector	3	BKF-84
15	O-Ring	2	3RS-203
16	Diaphragm Bolt	2	SM-110
17	Rolling Diaphragm	2	SM-112
18	Spring Pin Guide	1	SM-104
19	O-Ring	1	3RS-023

**Note:** Items #7, 8, 11, and 13 sold only as an assembly with silver pins installed as part SM-Assembly.

**Specify PPD when ordering.**



Date: June 2012  
Scale: N.T.S.  
Dwg. No. SP-200



Item No.	Description	Quantity	Part No.
1	Mounting Bracket	1	SM-109
2	#10-24 x 1" Top Cap screws (Monel)	4	#10-24 x 1"
3	Top Cap	1	SM-106-500
4	Spring	1	YM-103-HC
5	Spring Guide Pin	1	SM-105
6	1/4-20 x 1 1/2" End Cap screws (Monel)	8	1/4-20 x 1 1/2"
7	Spring Pivot	1	SM-103
8	Valve Plug	1	SM-100
9	End Cap	2	SM-107-500
10	Diaphragm Nut	2	SM-111
11	Pivot Arm	1	SM-102
12	Center Body	1	SM-108
13	Hinge Pin	2	SM-101
14	5/8" tube x 1/2" NPT Tubing Connector	3	BKF-108
15	O-Ring	2	3RS-203
16	Diaphragm Bolt	2	SM-110
17	Rolling Diaphragm	2	SM-112
18	Spring Pin Guide	1	SM-104
19	O-Ring	1	3RS-023

**Note:** Items #7, 8, 11, and 13 sold only as an assembly with silver pins installed as SM-Assembly.

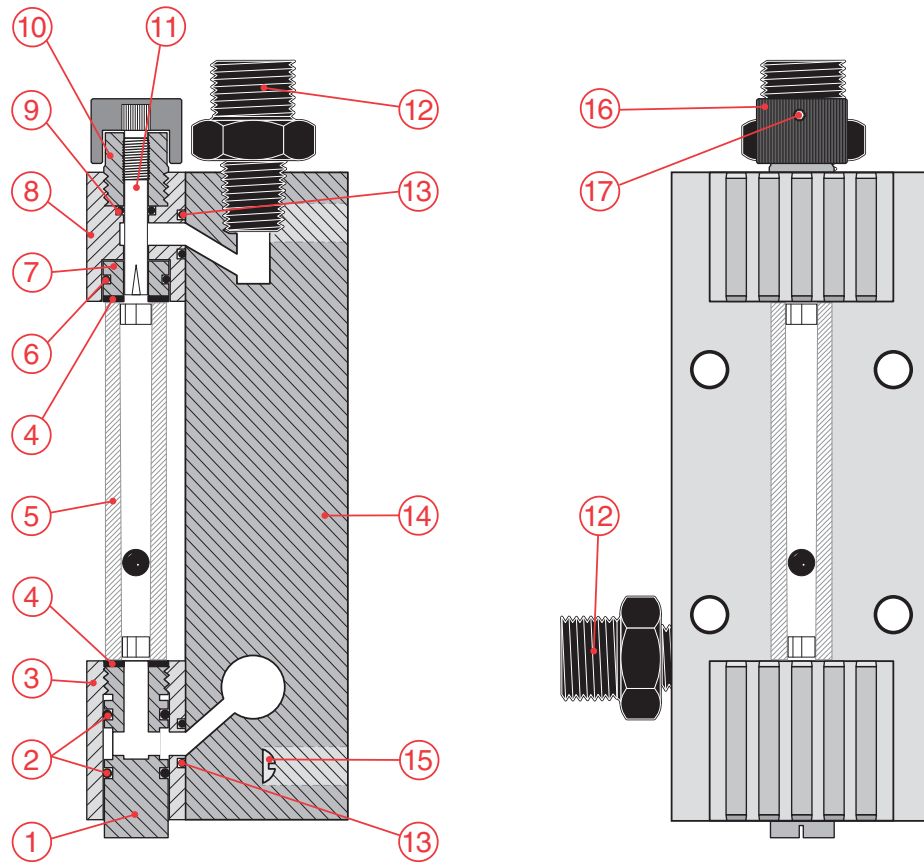
**Specify PPD when ordering.**

**hydro**  
INSTRUMENTS<sub>LLC</sub>  
**SWITCHOVER MODULE**

Date: June 2012  
Scale: N.T.S.  
Dwg. No. SP-500

**SIDE VIEW**

**FRONT VIEW**



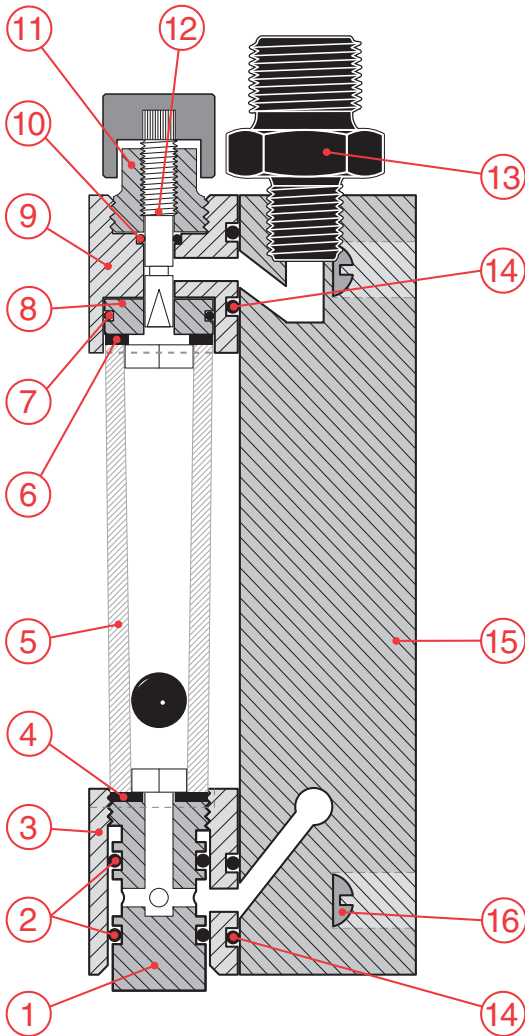
Item No.	Description	Quantity	Part No.
1	Inlet Plug	1	FM-101A
2	O-Ring	2	3PS-112
3	Bottom Meter Block	1	FM-103
4	Meter Gaskets (4 & 10 PPD)	2	MG-001-010
4	Meter Gaskets (25 PPD)	2	MG-001-025
4	Meter Gaskets (50 & 100 PPD)	2	MG-001-100
5	Meter Tube (1.5 PPD)	1	MTB-11-0015
5	Meter Tube (4 PPD)	1	MTB-11-004
5	Meter Tube (10 PPD)	1	MTB-11-010
5	Meter Tube (25 PPD)	1	MTB-11-025
5	Meter Tube (50 PPD)	1	MTB-11-050
5	Meter Tube (100 PPD)	1	MTB-11-100
6	O-Ring	1	3RS-012
7	Rate Valve Seat	1	VT-104
8	Top Meter Block	1	FM-100B
9	O-Ring	1	3PS-106
10	Valve Bonnet	1	VB-100C
11	Rate Valve (10 PPD)	1	VP-103C-010
11	Rate Valve (100 PPD)	1	VP-103C-100
12	3/8" Tubing x 1/4" NPT Tubing Connector	2	BKF-64
13	O-Ring	2	3PS-110
14	Back Body	1	RM-1-250
15	Remote Meter Block Screws (Monel)	4	#10-24 x 1-1/4"
16	Rate Valve Knob	1	RV-100A
17	Rate Valve Knob Set Screw	1	#5-40 x 1/4"

**hydro**  
INSTRUMENTS<sub>LLC</sub>

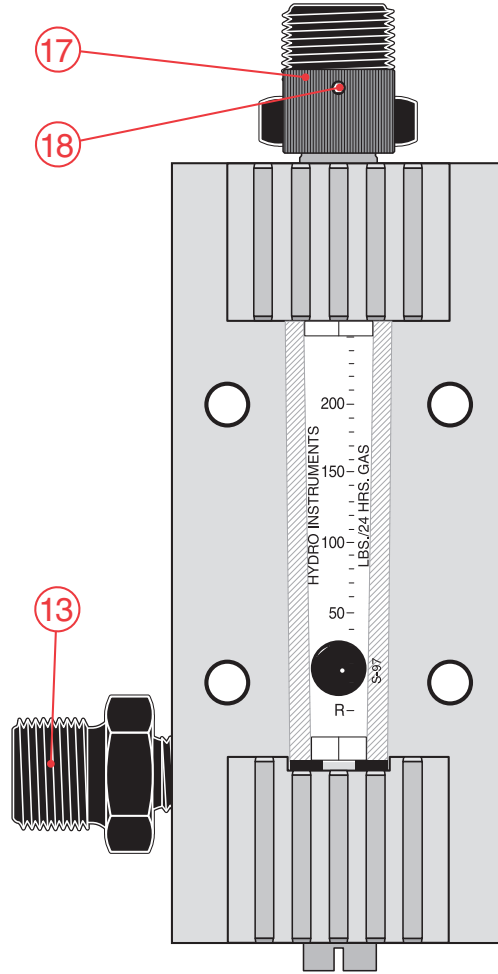
**100 PPD REMOTE METER**

Date: June 2012  
 Scale: 70%  
 Dwg. No. RM-401

### SIDE VIEW



### FRONT VIEW



Item No.	Description	Quantity	Part No.
1	Inlet Plug	1	FM-101A
2	O-Rings	2	3PS-112
3	Bottom Meter Block	1	FM-203
4	Bottom Meter Gasket (250 PPD)*	1	MG-200B
5	Meter Tube (250 PPD)	1	MTB-11-200
6	Top Meter Gasket (250 PPD)	1	MG-200T
7	O-Ring	1	3RS-016
8	Rate Valve Seat (Teflon)	1	VT-204
9	Top Meter Block	1	FM-200B
10	O-Ring	1	3PS-106
11	Valve Bonnet	1	VB-100C
12	Rate Valve (250 PPD)	1	VP-203C
13	1/2" Tubing x 1/4" NPT Tube Connector	2	BKF-84
14	O-Rings	2	3PS-110
15	Back Body	1	RM-1-250
16	Remote Meter Block Screws (Monel)	4	#10-24 x 1 1/4"
17	Rate Valve Knob	1	RV-100A
18	Rate Valve Knob Set Screw	1	#5-40 x 1/4"

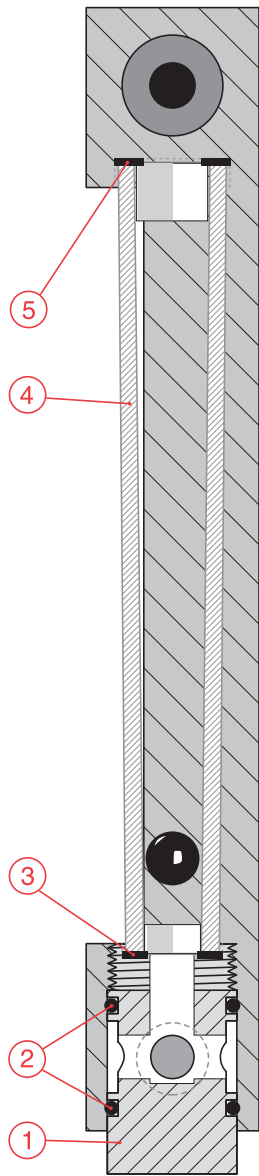
\*Bottom meter gasket MG-200B is the same as part MG-001-100.



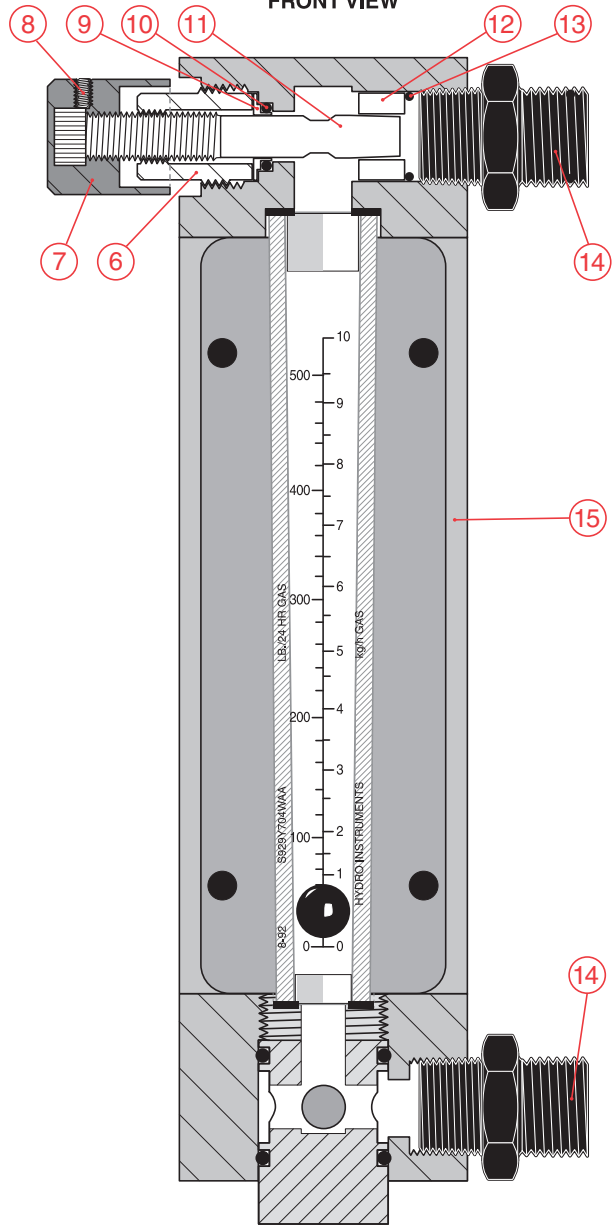
**250 PPD REMOTE METER**


Date:	June 2012
Scale:	80%
Dwg. No.	RM-200

SIDE VIEW



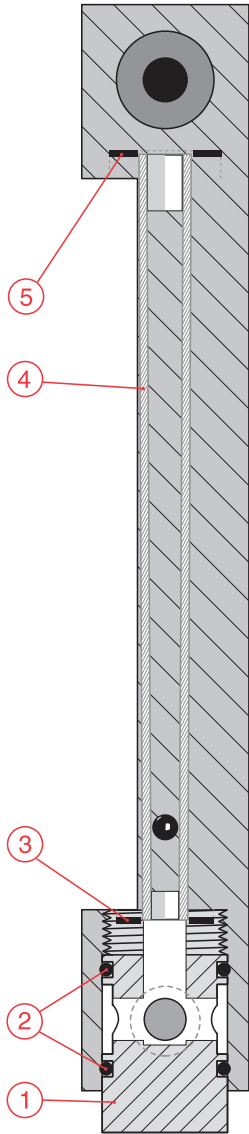
FRONT VIEW



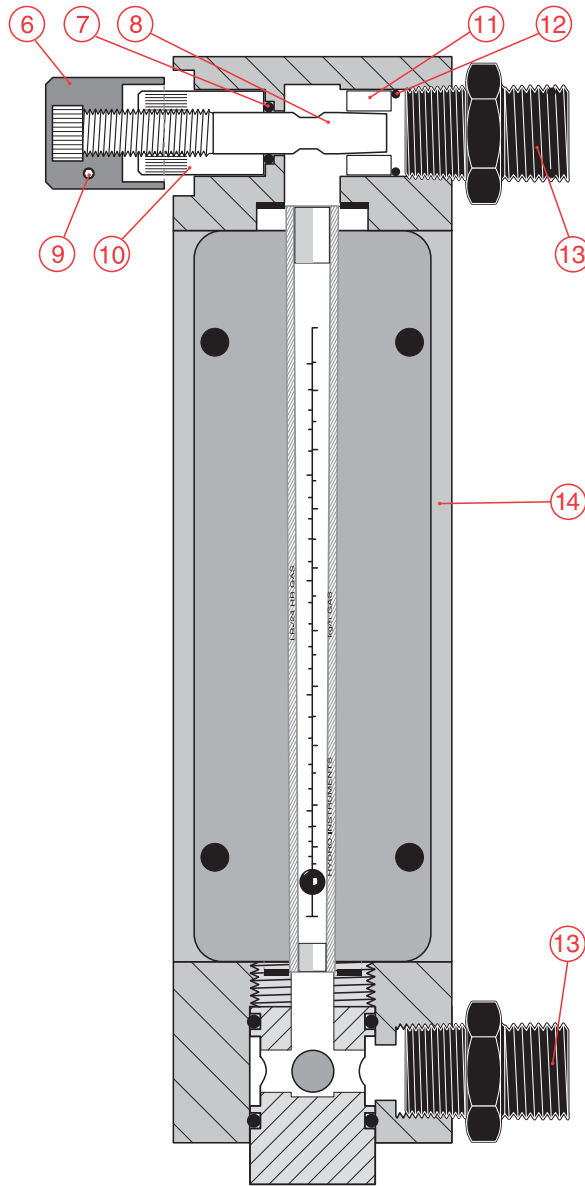
Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Inlet Plug	1	IP-498	9	Shaft Seal (PTFE)	1	SA-498
2	O-Rings	2	3RS-212	10	O-Ring	1	3PS-111
3	Bottom Meter Gasket	1	G-162	11	Rate Valve (600 PPD max)	1	SA-495
4	Flow Meter Tube (300 PPD/6 kg/hr)	1	MT-678-300	12	Rate Valve Seat	1	S-497
4	Flow Meter Tube (400 PPD/8 kg/hr)	1	MT-678-400	13	O-Ring	1	3RS-114
4	Flow Meter Tube (500 PPD/10 kg/hr)	1	MT-678-500	14	5/8" Tube x 1/2" NPT Tube Connector	2	BKF-108
4	Flow Meter Tube (600 PPD/12 kg/hr)	1	MT-678-600	15	Meter Body (1/2" NPT Ports)	1	TFM-500
5	Top Meter Gasket	1	G-161	 <p>Date: May 2013 Scale: 60% Dwg. No. RM-701</p>			
6	Rate Valve Bonnet	1	S-493				
7	Rate Valve Knob	1	S-496				
8	Rate Valve Knob Set Screw (stainless)	1	#6-32 x 1/4"				



SIDE VIEW



FRONT VIEW



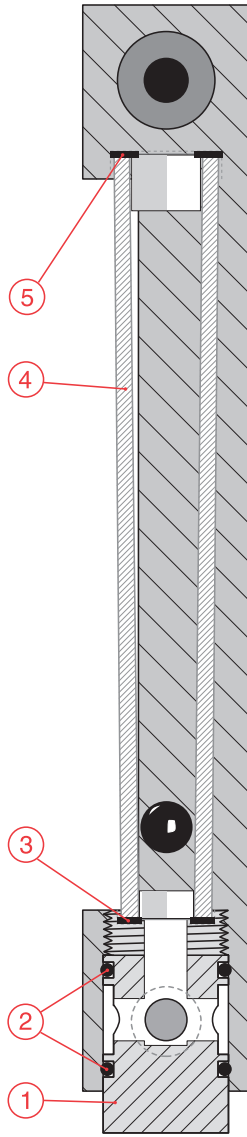
Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Inlet Plug	1	IP-498	9	Rate Valve Knob Set Screw (stainless)	1	#6-32 x 1/4"
2	O-Rings	2	3RS-212	10	Rate Valve Bonnet	1	S-493
3	Bottom Meter Gasket	1	GAH-VIT-83B	11	Rate Valve Seat	1	S-497
4	6" Meter Tube, 10 PPD	1	MTH-129-010	12	O-Ring	1	3RS-114
4	6" Meter Tube, 25 PPD	1	MTH-129-025	13	3/8" Tube x 1/4" NPT Tube Connector	2	BKF-64
4	6" Meter Tube, 50 PPD	1	MTH-129-050	14	Meter Body (1/2" NPT Ports)	1	TFM-500
4	6" Meter Tube, 100 PPD	1	MTH-129-100				
5	Top Meter Gasket	1	GAH-VIT-83T	*	1/2" x 1/4" PVC Reducing Bushings	2	839-072
6	Rate Valve Knob	1	S-496		* Not shown.		
7	O-Ring	1	3RS-203				
8	Rate Valve (10 PPD max)	1	SA-495-010				
8	Rate Valve (100 PPD max)	1	SA-495-100				



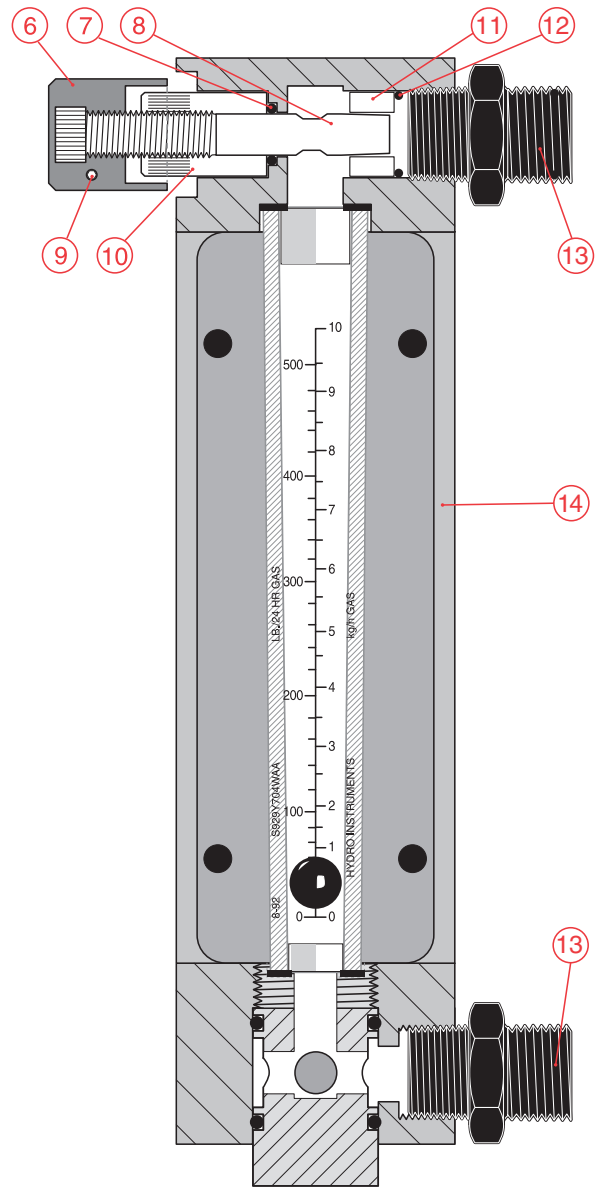
 Date: May 2013  
 Scale: 60%  
 Dwg. No. RM-701-100

**100 PPD REMOTE METER**

SIDE VIEW



FRONT VIEW



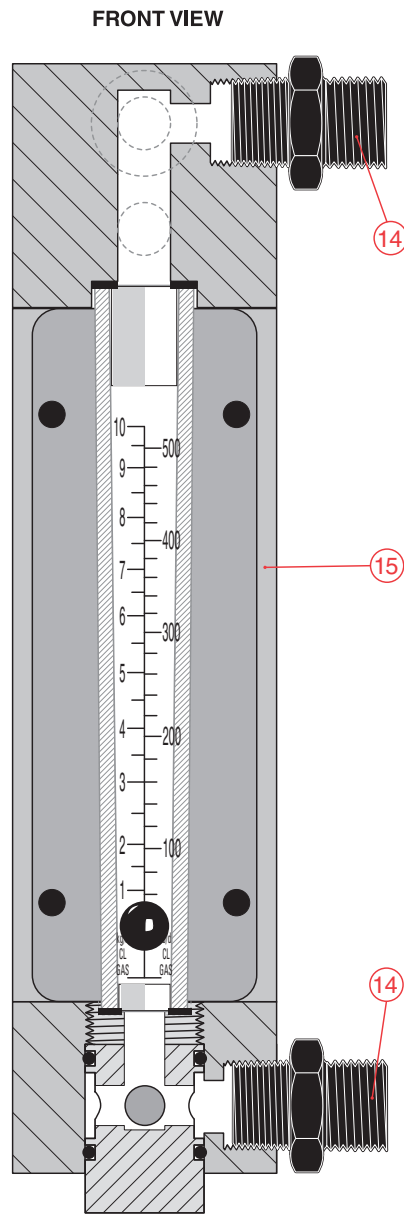
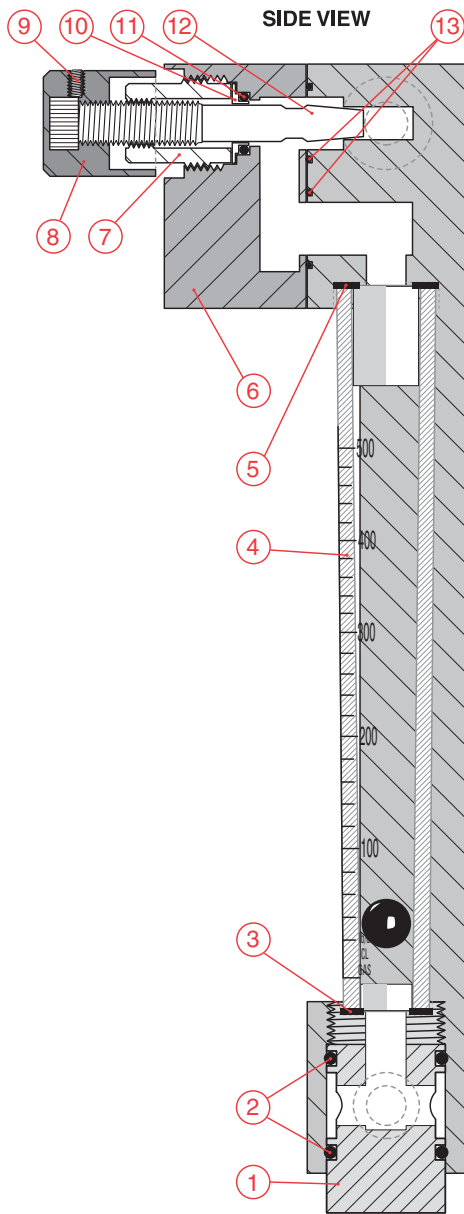
Item No.	Description	Quantity	Part No.
1	Inlet Plug	1	IP-498
2	O-Rings	2	3RS-212
3	Bottom Meter Gasket	1	G-162
4	Flow Meter Tube (200 PPD/4 Kg/h)	1	MT-678-200
4	Flow Meter Tube (250 PPD/5 Kg/h)	1	MT-678-250
5	Top Meter Gasket	1	G-161
6	Rate Valve Knob	1	S-496
7	O-Ring	1	3RS-203
8	Rate Valve (300 PPD max)	1	SA-495-250
9	Rate Valve Knob Set Screw (stainless)	1	#6-32 x 1/4"
10	Rate Valve Bonnet	1	S-493
11	Rate Valve Seat	1	S-497
12	O-Ring	1	3RS-114
13	1/2" Tube x 1/4" NPT Tubing Connector	2	BKF-84
14	Meter Body (1/2" NPT Ports)	1	TFM-500
*	1/2" x 1/4" PVC Reducing Bushing	2	839-072


\* Not shown.

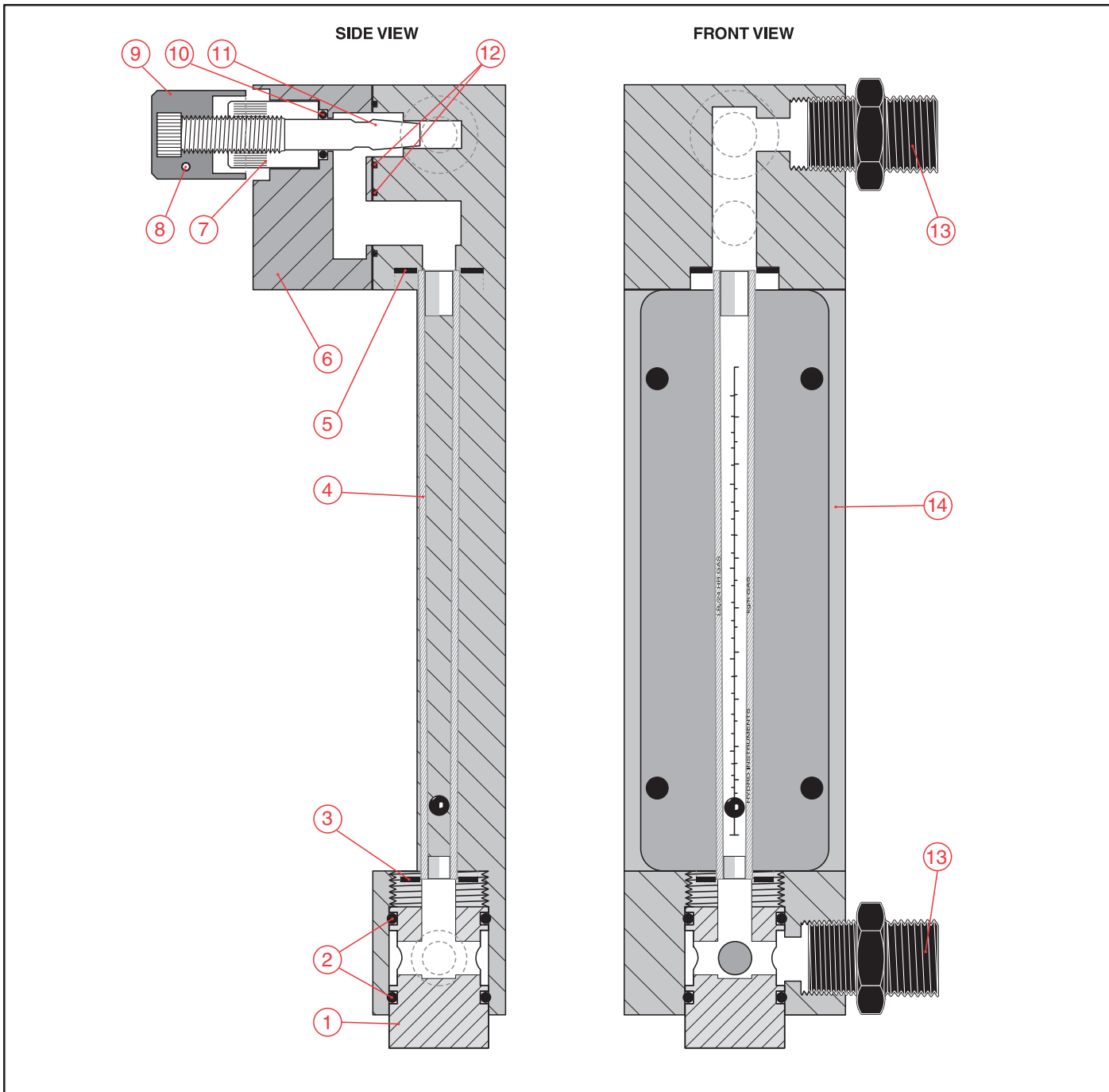
**hydro**  
INSTRUMENTS™

**250 PPD REMOTE METER**


Date: July 2012  
Scale: 60%  
Dwg. No. RM-701-250



Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.		
1	Inlet Plug	1	IP-498	10	Shaft Seal (PTFE)	1	SA-498		
2	O-Rings	2	3RS-212	11	O-Ring	1	3PS-111		
3	Bottom Meter Gasket	1	G-162	12	Rate Valve (600 PPD max)	1	SA-495		
4	Flow Meter Tube (300 PPD/6 kg/hr)	1	MT-678-300	13	O-Ring	2	3RS-016		
4	Flow Meter Tube (400 PPD/8 kg/hr)	1	MT-678-400	14	5/8" Tube x 1/2" NPT Tube Connector	2	BKF-108		
4	Flow Meter Tube (500 PPD/10 kg/hr)	1	MT-678-500	15	Meter Body (1/2" NPT Ports)	1	TFM-501		
4	Flow Meter Tube (600 PPD/12 kg/hr)	1	MT-678-600	*	Remote Meter Block Screws (Monel)	2	#10-24 x 1 1/4"		
5	Top Meter Gasket	1	G-161	* Not shown.					
6	Top Meter Block	1	TMB-501	 <b>UP TO 600 PPD / 12 kg/hr</b> <b>REMOTE METER</b>					
7	Rate Valve Bonnet	1	S-493					Date:	May 2013
8	Rate Valve Knob	1	S-496					Scale:	55%
9	Rate Valve Knob Set Screw (stainless)	1	#6-32 x 1/4"					Dwg. No.	RM-702

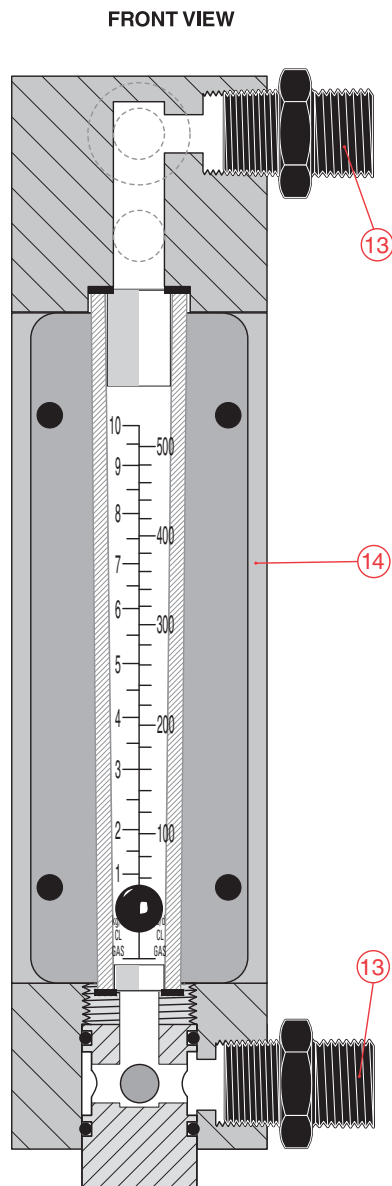
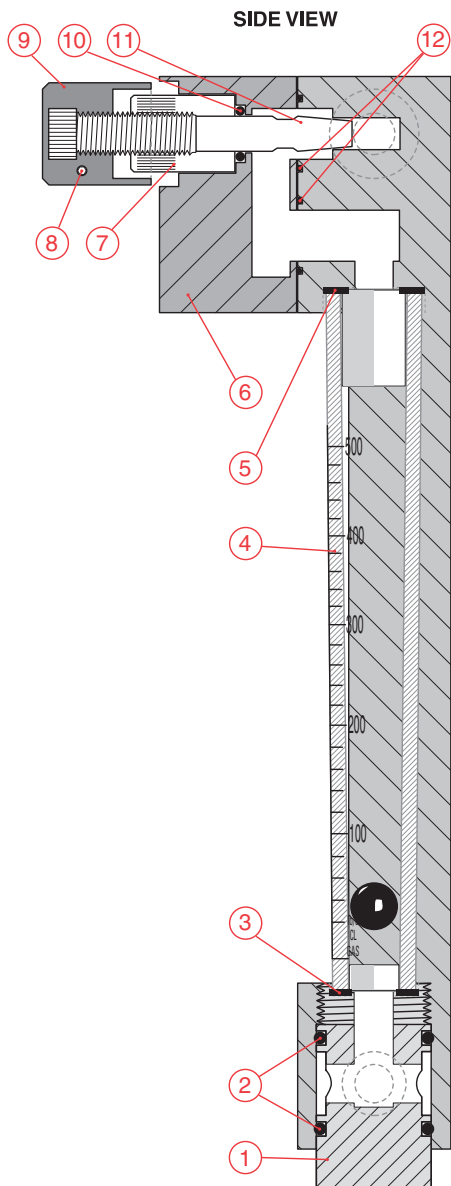


Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.
1	Inlet Plug	1	IP-498	9	Rate Valve Knob	1	S-496
2	O-Rings	2	3RS-212	10	O-Ring	1	3RS-203
3	Bottom Meter Gasket	1	GAH-VIT-83B	11	Rate Valve (10 PPD max)	1	SA-495-010
4	6" Meter Tube, 10 PPD	1	MTH-129-010	11	Rate Valve (100 PPD max)	1	SA-495-100
4	6" Meter Tube, 25 PPD	1	MTH-129-025	12	O-Ring	2	3RS-016
4	6" Meter Tube, 50 PPD	1	MTH-129-050	13	3/8" Tube x 1/4" NPT Tube Connector	2	BKF-64
4	6" Meter Tube, 100 PPD	1	MTH-129-100	14	Meter Body	1	TFM-501
5	Top Meter Gasket	1	GAH-VIT-83T	*	Remote Meter Block Screws (Monel)	2	#10-24 x 1 1/4"
6	Top Meter Block	1	TMB-501	*	1/2" x 1/4" PVC Reducing Bushing	2	839-072
7	Rate Valve Bonnet	1	S-493				
8	Rate Valve Knob Set Screw (stainless)	1	#6-32 x 1/4"				



Date: May 2013  
 Scale: 60%  
 Dwg. No. RM-702-100

**100 PPD REMOTE METER**

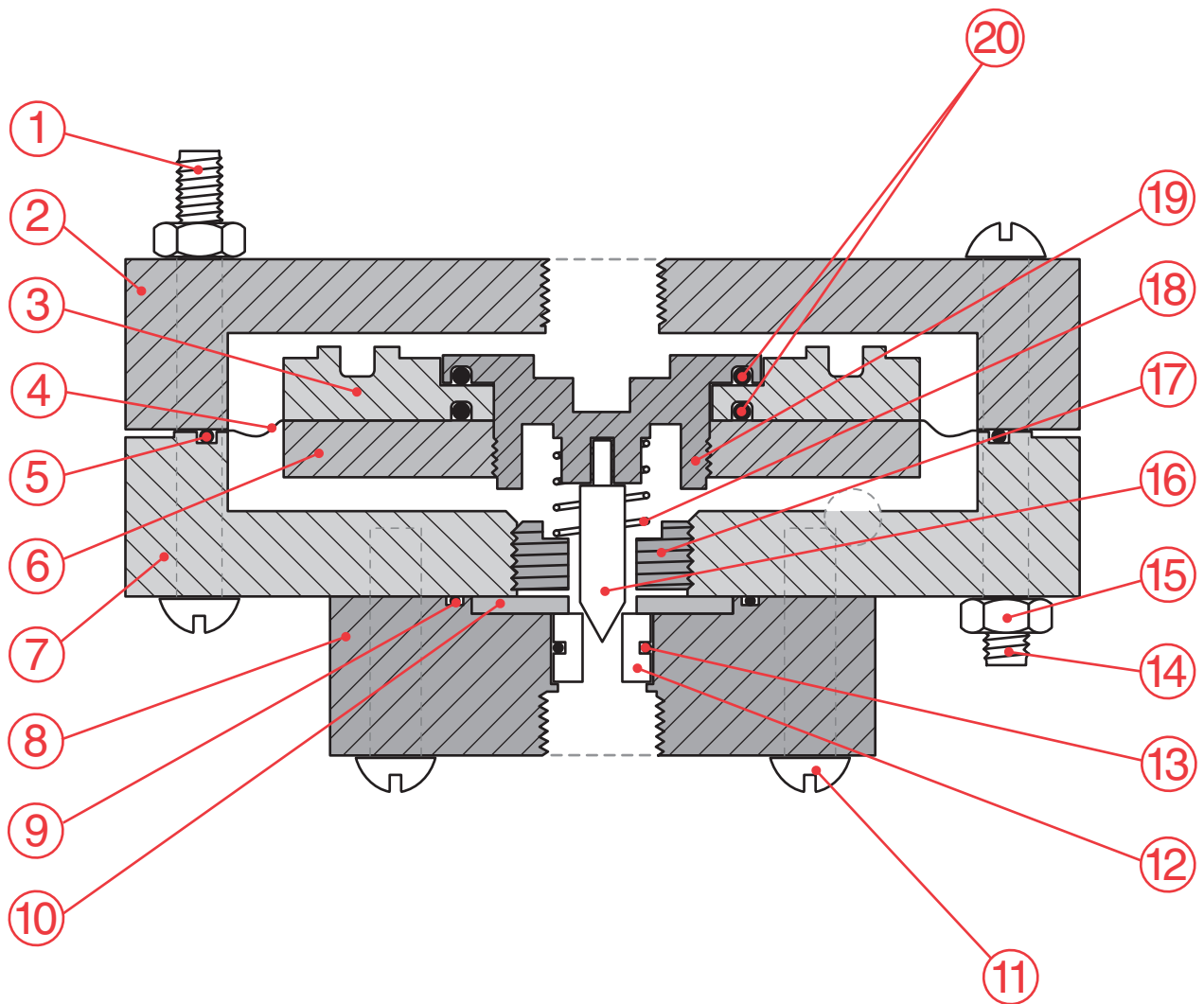



Item No.	Description	Quantity	Part No.
1	Inlet Plug	1	IP-498
2	O-Rings	2	3RS-212
3	Bottom Meter Gasket	1	G-162
4	Flow Meter Tube (200 PPD/4 Kg/h)	1	MT-678-200
4	Flow Meter Tube (250 PPD/5 Kg/h)	1	MT-678-250
5	Top Meter Gasket	1	G-161
6	Top Meter Block	1	TMB-501
7	Rate Valve Bonnet	1	S-493
8	Rate Valve Knob Set Screw (stainless)	1	#6-32 x 1/4"
9	Rate Valve Knob	1	S-496
10	O-Ring	1	3RS-203
11	Rate Valve (300 PPD max)	1	SA-495-250
12	O-Ring	2	3RS-016
13	1/2" Tube x 1/4" NPT Tubing Connector	2	BKF-84
14	Meter Body (1/2" NPT Ports)	1	TFM-501
*	Remote Meter Block Screws (Monel)	2	#10-24 x 1 1/4"
*	1/2" x 1/4" PVC Reducing Bushing	2	839-072

\* Not shown.

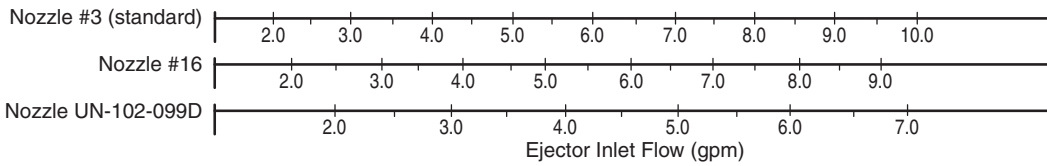
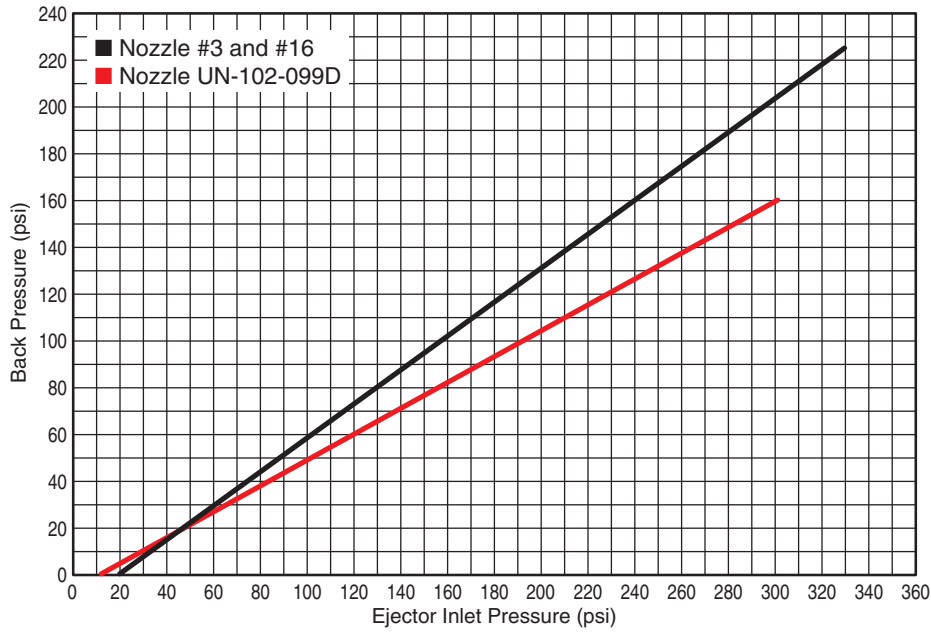


**250 PPD REMOTE METER**      Date: July 2012  
 Scale: 55%  
 Dwg. No. RM-702-250

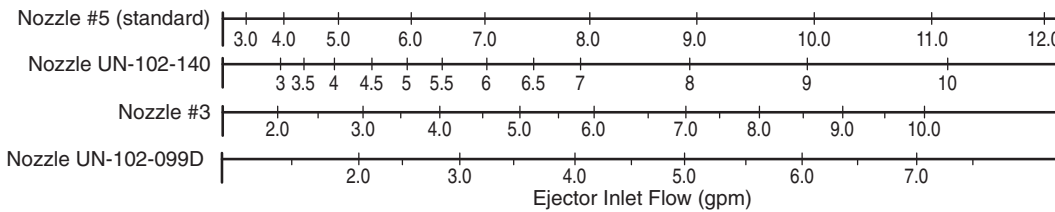
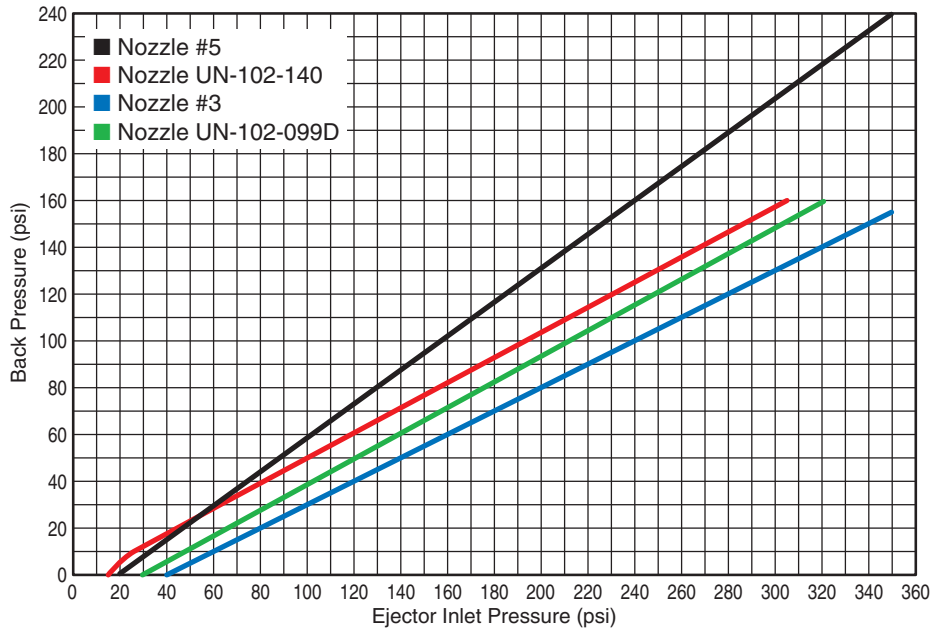


Item No.	Description	Quantity	Part No.	Item No.	Description	Quantity	Part No.	
1	Monel Screws	2	1/4-20 x 2 3/4"	14	Monel Screws	4	1/4-20 x 2 1/4"	
2	Front Body (1/4" NPT Port)	1	DP-FB1	15	Hex Nuts	6	1/4-20	
3	Back Diaphragm Plate	1	DP-101A	16	Rate Valve (PVDF)	1	DP-SRV	
4	Diaphragm	2	DP-103	17	Adjustment Screw	1	DP-AS1	
5	O-Ring	1	3PS-156	18	Spring (Hastelloy C-276)	1	YM-103-HC	
6	Front Diaphragm Plate	1	DP-100A	19	Diaphragm Vent Plug	1	DPR-B-1	
7	Back Body (3/8" NPT Port)	1	DP-BB1-500	20	O-Rings	2	3PS-029	
8	Back Body Cap (3/8" NPT Port)	1	DP-BBC-500	*	Mounting Bracket	1	DPMB-1	
9	O-Ring	1	3PS-030	* Not shown.				
10	Seal Disc	1	DP-SD-1	 <b>D.P. REGULATOR</b>			Date:	August 2013
11	Monel Screws	4	1/4-20 x 1 1/4"				Scale:	100%
12	Rate Valve Seat	1	DPVS-1				Dwg. No.:	DPR
13	O-Ring	1	3RS-012					

## NOZZLE SIZING CHART (10 PPD / 200 gr/hr)



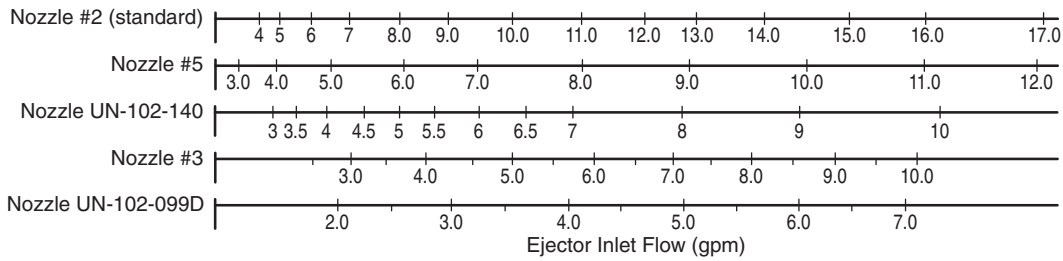
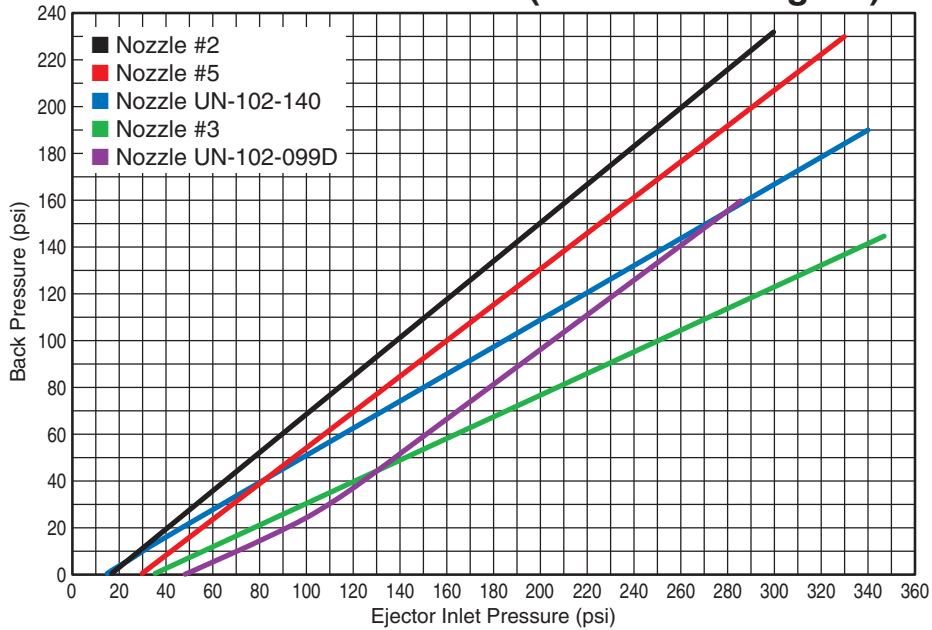
## NOZZLE SIZING CHART (25 PPD / 500 gr/hr)



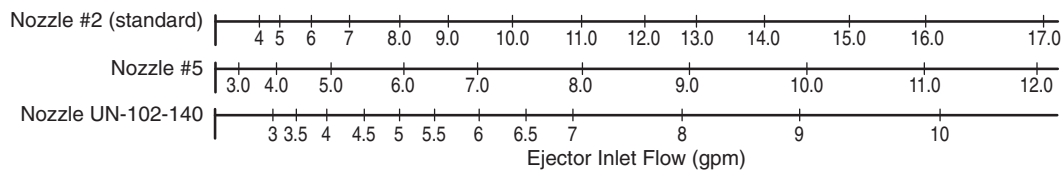
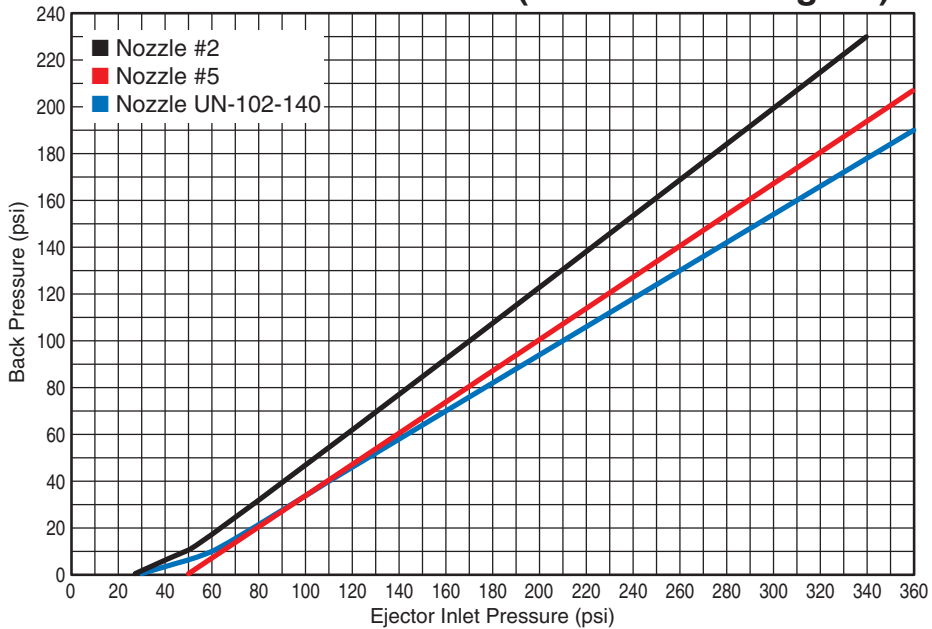
**Note:** Pressure combinations that plot below the line for any given nozzle are acceptable for operating that nozzle at the stated chemical feed rate for that chart. Pressure combinations that fall above the line for any given nozzle are not acceptable.



## NOZZLE SIZING CHART (50 PPD / 1000 gr/hr)

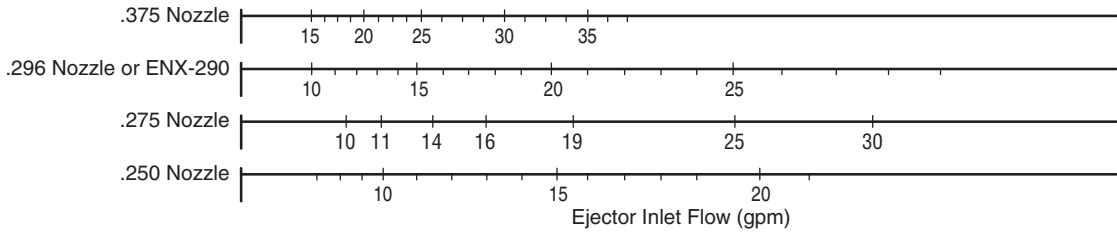
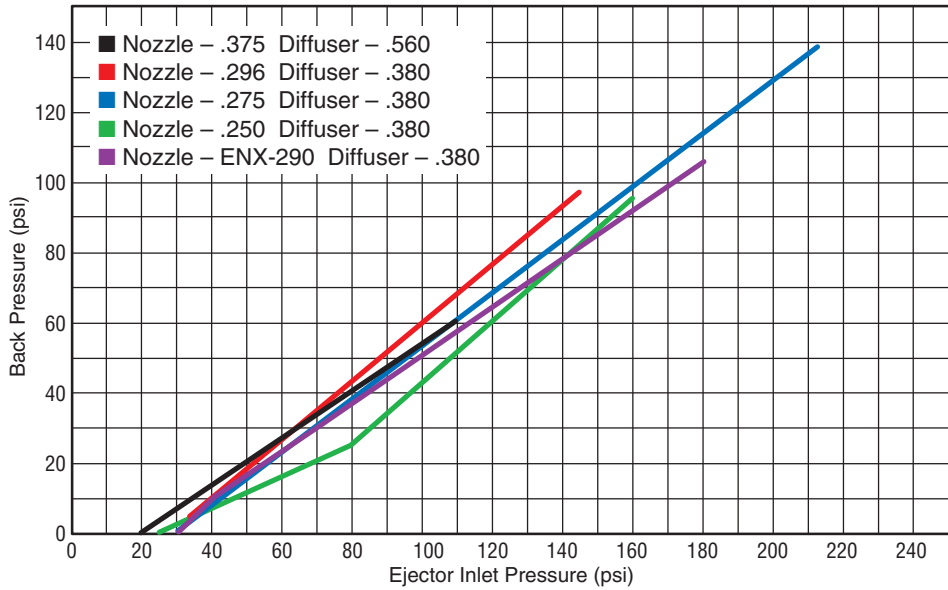


## NOZZLE SIZING CHART (100 PPD / 2000 gr/hr)

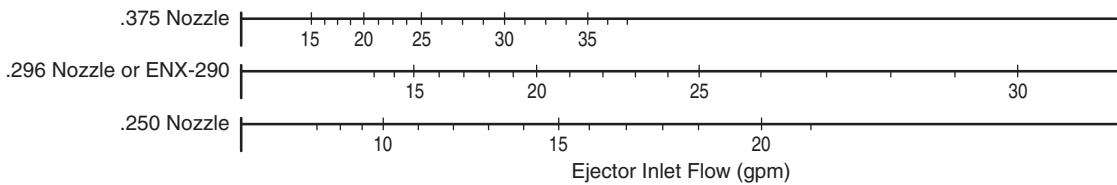
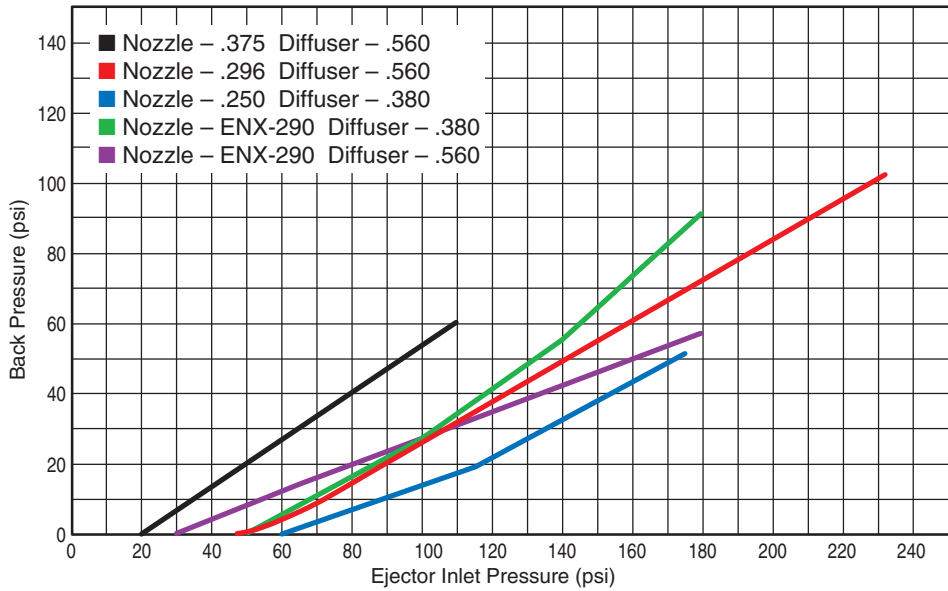


**Note:** Pressure combinations that plot below the line for any given nozzle are acceptable for operating that nozzle at the stated chemical feed rate for that chart. Pressure combinations that fall above the line for any given nozzle are not acceptable.

## NOZZLE SIZING CHART (250 PPD / 5 kg/hr)



## NOZZLE SIZING CHART (500 PPD / 10 kg/hr)



**Note:** Pressure combinations that plot below the line for any given nozzle are acceptable for operating that nozzle at the stated chemical feed rate for that chart. Pressure combinations that fall above the line for any given nozzle are not acceptable.

NS-250-500-HGCS Rev. 3/13/13

# Nozzle Tables

## 10 PPD (200 gr/hr)

Nozzle >	3		16		UN-102-099D	
Ejector Backpressure	Standard PSI @ GPM		PSI @ GPM		PSI @ GPM	
0	20	1.9	18	1.5	12	1.2
10	32	2.2	33	2.0	29	1.5
20	48	2.7	48	2.4	47	1.9
30	60	3.0	60	2.7	65	2.3
40	75	3.5	75	3.1	83	2.6
50	89	3.9	90	3.6	101	3.0
60	102	4.3	103	3.9	120	3.4
70	116	4.7	116	4.3	138	3.8
80	130	5.1	130	4.7	156	4.1
90	143	5.5	145	5.1	174	4.5
100	157	5.9	156	5.4	192	4.9
110	170	6.3	171	5.8	210	5.2
120	185	6.7	185	6.2	228	5.6
130	198	7.0	198	6.6	246	6.0
140	213	7.5	213	7.0	264	6.3
150	227	7.9	227	7.4	282	6.7
160	240	8.3	240	7.7	301	7.1

## 25 PPD (500 gr/hr)

Nozzle >	5		UN-102-140		3		UN-102-099D	
Ejector Backpressure	Standard PSI @ GPM		PSI @ GPM		PSI @ GPM		PSI @ GPM	
0	20	3.7	15	2.5	40	2.5	30	1.5
10	33	4.3	26	3.0	60	3.0	47	1.9
20	47	4.9	45	3.8	80	3.6	65	2.3
30	61	5.3	63	4.5	100	4.2	84	2.6
40	74	5.8	82	5.2	120	4.8	102	3.0
50	88	6.2	101	5.7	140	5.4	120	3.4
60	102	6.7	119	6.3	160	5.9	139	3.8
70	115	7.1	138	6.6	180	6.5	157	4.1
80	130	7.4	156	7.0	200	7.1	175	4.5
90	143	7.7	175	7.4	220	7.7	193	4.9
100	157	8.0	194	7.9	240	8.3	212	5.3
110	170	8.3	212	8.3	260	8.8	230	5.6
120	185	8.7	231	8.7	280	9.4	248	6.0
130	198	8.9	249	9.0	300	10.0	267	6.4
140	212	9.2	268	9.4	-	-	285	6.8
150	226	9.5	287	9.6	-	-	303	7.1
160	240	9.8	305	9.9	-	-	321	7.5

# Nozzle Tables

## 50 PPD (1 Kg/hr)

Nozzle >	2		5		UN-102-140		3		UN-102-099D	
Ejector Backpressure	Standard PSI @ GPM		PSI @ GPM		PSI @ GPM		PSI @ GPM		PSI @ GPM	
0	16	4.0	30	4.3	15	2.8	35	2.3	48	1.9
10	25	5.0	43	4.8	28	3.5	55	2.9	70	2.4
20	40	5.8	55	5.1	48	4.1	75	3.5	92	2.8
30	50	6.3	69	5.4	64	4.5	95	4.1	110	3.2
40	65	7.1	81	6.0	82	5.3	120	4.8	124	3.5
50	80	8.0	95	6.6	100	5.7	141	5.4	137	3.7
60	90	8.6	109	6.8	120	6.3	162	6.0	151	4.0
70	105	9.1	120	7.2	132	6.5	183	6.6	164	4.3
80	115	9.6	134	7.6	150	6.9	205	7.3	178	4.6
90	127	10.0	147	7.8	170	7.4	226	7.9	191	4.8
100	139	10.4	160	8.1	185	7.8	247	8.5	205	5.1
110	152	10.8	173	8.4	202	8.2	268	9.1	218	5.4
120	165	11.3	188	8.7	221	8.5	290	9.8	232	5.7
130	176	11.8	200	9.0	239	8.8	-	-	245	5.9
140	189	12.2	213	9.2	255	9.1	-	-	259	6.2
150	200	12.7	226	9.5	273	9.4	-	-	272	6.5
160	216	13.3	240	9.8	290	9.7	-	-	286	6.8

## 100 PPD (2 Kg/hr)

Nozzle >	2		5		UN-102-140	
Ejector Backpressure	Standard PSI @ GPM		PSI @ GPM		PSI @ GPM	
0	25	5.0	50	5.1	30	3.3
10	50	6.7	65	5.4	59	4.3
20	65	7.3	80	6.1	79	5.0
30	75	8.0	95	6.5	95	5.6
40	89	8.6	110	7.0	110	6.0
50	104	9.0	125	7.2	126	6.4
60	118	9.3	139	7.4	145	6.9
70	131	9.9	155	7.9	160	7.2
80	142	10.5	170	8.3	180	7.5
90	155	11.0	185	8.7	195	7.9
100	170	11.5	200	9.0	210	8.2
110	180	11.9	213	9.3	229	8.5
120	194	12.7	228	9.5	243	8.9
130	208	13.2	244	9.9	260	9.2
140	222	13.7	260	10.2	279	9.5
150	235	14.2	275	10.4	295	9.8
160	250	14.5	291	10.8	310	10.0

# Nozzle Tables

## 250 PPD (5 Kg/hr)

Nozzle >	0.375		0.296		ENX-290		0.275		0.250	
Throat >	0.560		0.380		0.380		0.380		0.380	
Ejector Backpressure	PSI @ GPM		PSI @ GPM		PSI @ GPM		Standard PSI @ GPM		PSI @ GPM	
0	20	15.0	-	-	30	11.5	30	10.0	25	7.5
10	35	20.0	40	13.2	39	13.0	42	12.0	48	10.8
20	50	25.0	52	15.0	55	15.7	55	14.0	69	12.5
30	65	28.0	65	16.7	69	17.5	70	16.0	85	14.5
40	80	32.0	77	18.2	84	19.4	82	18.0	98	15.8
50	95	34.0	87	19.7	97	20.9	95	19.0	108	17.0
60	110	38.0	100	21.0	113	22.3	110	21.5	120	18.0
70	-	-	113	22.3	127	23.5	122	23.5	130	19.0
80	-	-	125	23.3	142	25.5	135	24.0	143	19.6
90	-	-	137	24.5	157	26.2	150	26.0	155	20.3
100	-	-	148	25.4	172	27.3	162	27.5	-	-
110	-	-	160	26.3	-	-	175	29.0	-	-
120	-	-	172	27.0	-	-	189	31.0	-	-
130	-	-	183	27.8	-	-	201	33.0	-	-
140	-	-	196	28.7	-	-	213	35.0	-	-
150	-	-	208	29.4	-	-	-	-	-	-
160	-	-	217	30.0	-	-	-	-	-	-

## 500 PPD (10 Kg/hr)

Nozzle >	0.375		0.296		ENX-290		ENX-290		0.250	
Throat >	0.560		0.560		0.560		0.380		0.380	
Ejector Backpressure	PSI @ GPM		Standard PSI @ GPM		PSI @ GPM		PSI @ GPM		PSI @ GPM	
0	20	15.0	48	14.5	30	11.0	50	15.0	60	12.0
10	35	20.0	72	18.3	52	15.5	67	17.5	90	15.0
20	50	24.9	90	20.6	80	19.3	85	20.0	117	17.5
30	64	27.2	105	22.2	107	22.4	104	22.1	135	19.3
40	80	31.0	123	24.2	132	25.3	118	23.6	154	20.5
50	96	34.0	140	25.5	160	26.5	132	25.1	172	22.0
60	110	37.0	160	26.7	-	-	145	25.8	-	-
70	-	-	175	27.4	-	-	157	26.5	-	-
80	-	-	192	28.5	-	-	168	27.0	-	-
90	-	-	210	29.2	-	-	179	27.7	-	-
100	-	-	229	30.5	-	-	-	-	-	-