

ONYX VALVE CO MODEL DAC-PFO

Installation & Maintenance

OPERATION:

(01-10)

The Onyx series DAC-PFO pinch valve fails open on loss of air. This simple spring and air bag arrangement that drives a pair of pinch bars to close a rubber sleeve bubble tight. Positive opening tabs molded into the sleeve attached to the pinch bars insure complete opening.

When equipped with a positioner, the DAC valve is an efficient, reliable control valve. These actuators are designed and manufactured by Onyx Valve Co. They are available in two configurations: The PFO, which fails open, and the PFC, which fails closed.

The air bag actuator has no piston rings to wear, and no diaphragm, assuring the user high efficiency, low hysteresis and good sealing characteristics. Actuators are rated at 125 psi maximum supply air pressure.

SPRING ADJUSTMENT:

All Onyx pinch valves are tested to customer specifications before shipment. Unless otherwise specified, all valves are shipped assembled with all accessories piped, mounted, and calibrated. The spring tension is adjusted at the factory that requires no further adjustment.

STORAGE

Correct storage procedures extend valve life. The rubber sleeve in the valve is perishable. Ideal storage conditions are 50°F and 60% relative humidity.

1. Keep valves and spare sleeves as cool as possible. They can be stored in an unheated area, but allow maximum ventilation in storage areas subject to high ambient summer temperatures. Truck trailers and storage sheds become incredibly hot during summer months. Avoid such locations.
2. Avoid sunlight. Ultra-violet light accelerates the deterioration of rubber. Leave the valve in its box. If not feasible to box the valve, cover the sleeve with black plastic.
3. Avoid ozone. DO NOT STORE valve near active electrical equipment. If valve will be in storage for a long period, coat the face and inside the sleeve twice yearly with silicone spray or liquid.

INSTALLATION:

1. Safety considerations.
 - a) Leakage: Consider the possibility of flange leakage due to improper tightening of flange bolts. Pinch valves handle abrasive fluids; it may be reasonable to expect the sleeve to eventually wear out. Precautions should be taken where liquids may drip down onto

electrical equipment or plant personnel, and where combustible fluid may drain into a dangerous area.

- b) After shut down: Pinch valves can hold pressure in a system for a considerable length of time. Means should be provided to safely relieve this pressure and drain lines.
- Flanges:** Onyx pinch valves are designed to work with standard ANSI 125/150# (or 300#) **flat face** flanges. No gasket is required; the sleeve face *is* the gasket. Be careful when using Victaulic type flanges, as the grooving machine often leaves a sharp edge inside the flange. This sharp edge will cut the rubber valve sleeve causing premature sleeve failure. Make absolutely sure that the inside edges of mating flanges are filed or ground smooth. Valve flanges have through holes and are designed to have an ANSI hex (not heavy hex) nut behind the flange. Flange bolts must be inserted from the mating flange side.
 - Allow as long a straight run as possible into and out of throttling valves. A good rule of thumb is 10 to 20 pipe diameters up stream, and 3 to 5 pipe diameters down stream. (Refer to Fig. 1)
 - Locate the valve where it can be reached for service and sleeve replacement. Allow access by technicians who may have to calibrate automatic valves. If valve is operated with an auxiliary hand wheel, allow access to the hand wheel. Locate valve so that operators can see relevant gauges.

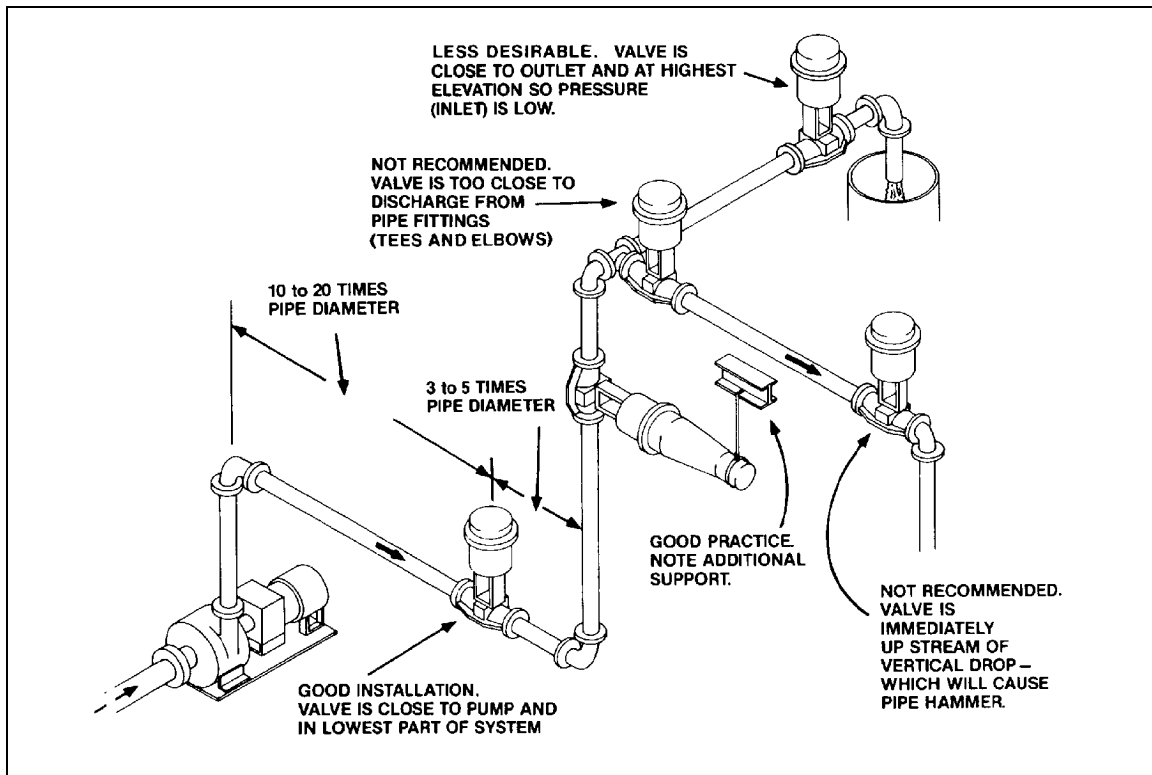


fig 1

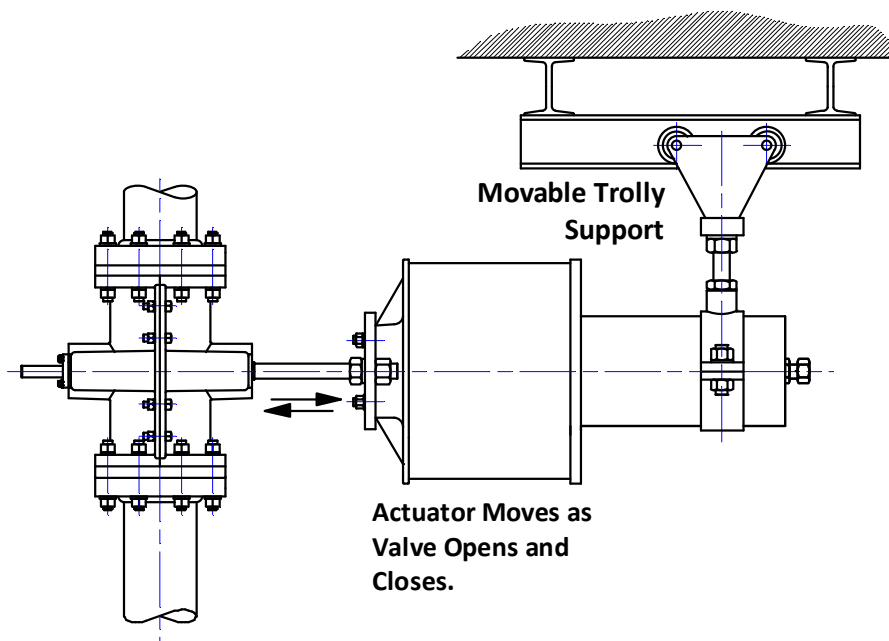
5. Be sure pipeline is clean. Foreign material left in the pipeline can damage valves. Clean the mating flanges of adjacent pipe. Remove any old gasket material.
6. Inspect the valve before installation. Report any shipping damage before installation. **DO NOT INSTALL A VALVE KNOWN TO HAVE BEEN DAMAGED IN SHIPMENT.** Check inside the valve sleeve to make sure no foreign objects are present.
7. Pinch valves can be installed in any position with flow in either direction. On the model DAC pinch valve, *the actuator moves as the valve operates.* Actuator travel equals half nominal valve size, e.g.: on a 4" valve, the actuator moves 2 inches.

If the valve is installed with stem horizontal, outboard support is required.

You must provide an outboard support with sufficient travel to accommodate the actuator travel.

An optional mounting kit is available from the factory for horizontal mounting. This kit includes the top-mounted trolley assembly and bottom-mounted roller support shown in *fig 2*.

- i) Do not install valve next to a source of extreme heat.



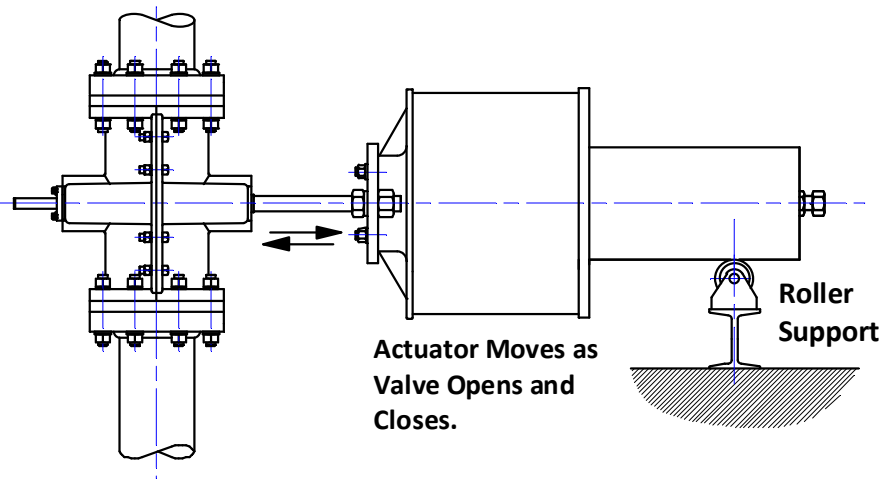
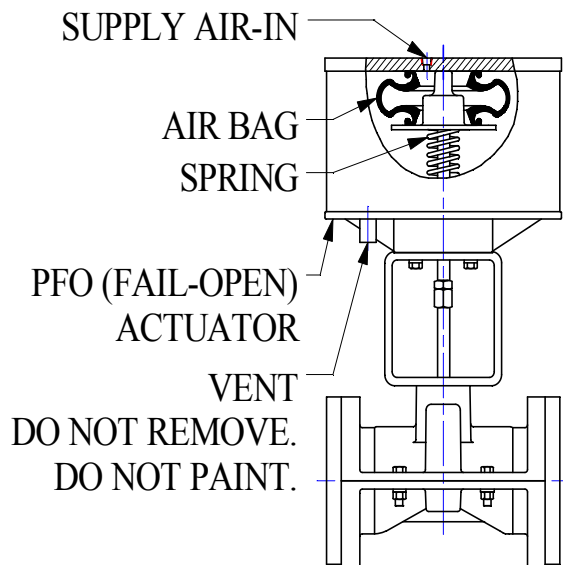


fig 2

8. Close valve prior to installation. Make sure adjacent pipe is properly aligned. Adjacent pipe must have sufficient travel to insert valve and draw tight to compress sleeve faces; valve will not stretch. Add an expansion joint if necessary to obtain required free play. Make certain adjacent pipe has sufficient free play to allow removal and reinstallation of the valve. (Flange gaskets are not required, but may be used for spacers if necessary.)
 - ii) Coat faces of valve sleeve with silicone lubricant to facilitate installation and later removal of the valve and to preserve the resiliency of the rubber.
9. Bolt valve into pipe line. Snug up the bolts gently in a criss cross pattern. It may be necessary to retighten bolts later after the rubber has taken set.
10. IMPORTANT - INSTALL SUFFICIENT PIPE SUPPORTS TO ISOLATE VALVE BODY FROM EXCESSIVE FORCES.



11. This is a single acting actuator.

It has a sintered metal breather vent on the bottom. Actuator cannot operate properly if this vent is not functional.

12. **Do not paint the breather fitting!**

MAINTENANCE

1. Visually inspect valve periodically.
2. Lubricate valve once a year.

Coat stem (#7) and guide rods (#23) at every bearing point with grease. If valve is in a dusty environment, grease may cause dust to stick to the stem; use light oil.

3. If valve is in a critical application, it may be advisable to order and stock a spare rubber sleeve.

SLEEVE REPLACEMENT

WARNING: Before attempting to disassemble the valve housing the stem must be in the retracted position. Failure to retract the stem could result in equipment damage and/or serious personal injury.

1. Relieve process pressure and drain process line.
2. Disconnect air and electric lines. Label and record connections so the valve can be reconnected in the same manner.
3. Remove valve from process line.
4. Disconnect any accessories attached to the stem or coupling.

5. Keep the valve in the open position.

Disassemble valve bonnet assembly (#2) by removing bonnet bolts, nuts, and washers (#2A, 2B, 2C).

6. Separate upper and lower bonnet halves (#2).
7. Remove positive opening tabs from lower pinch bar (#10) by removing bolts, nuts and washers (#8A, 8B, 8C).
8. Remove the lower pinch bar by removing hex nuts (#23A) from the guide rods (#23).

After the lower pinch bar is removed, use a temporary air line to slowly fill the actuator. This will push the upper pinch bar down to extract the sleeve.

9. Remove the valve stem (#7) by loosening the coupling jam nut (#13A) and coupling (#13). Valve stem threads are left handed, so you have to turn the coupling and jam nut the 'wrong' way to loosen them.
10. If sleeve (#1) is provided with positive opening tabs (integrally molded tabs bolted to the pinch bar), follow steps 'a' through 'e' below. If no positive opening tabs are provided, then proceed directly to step 11.



- a) Remove bolts, nuts and washers that secure the positive opening tabs to the pinch bar (#8A, 8B, 8C). The sleeve (#1) is now free from the pinch bar (#9 & 10). Discard old sleeve. Prepare new sleeve for installation.
- b) Punch holes through the positive opening tabs using a gasket or pliers type punch. The diameter of the holes in tabs should be approximately equal to hole diameter in pinch bar.
- c) Positive opening tab holes must be punched in proper alignment with respect to the flange face holes, or there will be hell to pay when you reinstall the valve.

It is very difficult to twist the rubber sleeve into position to align these holes later.

- d) Replace tab bolts, nuts and washers (#8A, 8B & 8C). Use flat washers on every hole. If you replace bolts (#8A), cut or grind flush with nut (#8C) so bolts do not puncture sleeve in closed position.
- e) Trim the tabs even with the top surface of the pinch bar.



11. Coat the stem (#7) where it passes through the bearing with a light application of grease or machine oil.
12. Reinsert the valve stem (#7), and replace jam nut and coupling (#13, 13A). Make sure the pinch bar is in the bonnet track.
13. Insert new sleeve and reattach the lower pinch bar. (You will have to reapply pressure to the actuator to do this.) Replace the nuts on the guide rods.
14. Replace the lower bonnet. Apply a coat of bonnet seal to the mating flanges of the bonnet halves. Bonnets are matched and must be oriented as they were originally or guide rods will not line up properly.

Replace bonnet hardware (#2A, 2B & 2C).

15. Replace any accessories that were previously removed. Tighten all fittings and gauges.
16. Reinstall valve in process line.
17. Reconnect air lines.

ACTUATOR REMOVAL

1. Exhaust air pressure from actuator to retract stem.
2. Remove bolts (#11A) and lock washers (#11B).
3. Loosen coupling jam nut (#13A) and remove coupling (#13).

NOTE: Valve stems have left hand threads. Turn jam nut and coupling the 'wrong' way to remove.

ACTUATOR INSTALLATION

1. Thread jam nut (#13A) onto valve stem (#7).
2. Lower actuator stem (#20) through yoke (#11) and sandwich the coupling (#13) between the actuator stem and valve stem. Engage both stems simultaneously. Turn coupling clockwise until stems are drawn against each other.
3. Turn jam nut (#13A) clockwise to lock coupling.
4. Replace actuator bolts and lock washers (#11A, 11B).

PFO AIR BAG REPLACEMENT

1. Turn off and disconnect air supply.
2. Remove tie rods (#16).
3. Remove actuator top (#17). Air bag assembly will come out as a unit. Turn actuator top and air bag assembly upside down on work surface.
4. Remove spring cap (#19) from air bag (#18) by loosening bolts, nuts, and lock washers (#19A, 19B, 19C). Leave actuator stem (#20) attached to the spring cap.
5. Remove air bag (#18) from actuator top (#17) by loosening bolts, nuts, and lock washers (#18A, 18B, 18C).
6. Discard old air bag.
7. Inspect actuator bearing (#14A). Replace if worn.
8. Attach spring cap (#19) to new air bag (#18), using bolts, nuts, and lock washers (#19A, 19B, 19C).
9. Attach new air bag assembly (#18) to actuator top (#14) using bolts, nuts, and lock washers (#18A, 18B, 18C).
10. Flip the air bag and top assembly upside right. Insert stem (#20) through the actuator bottom (#14).
11. Replace tie rods (#16) through the actuator assembly, and use them to pull the actuator top down into place.

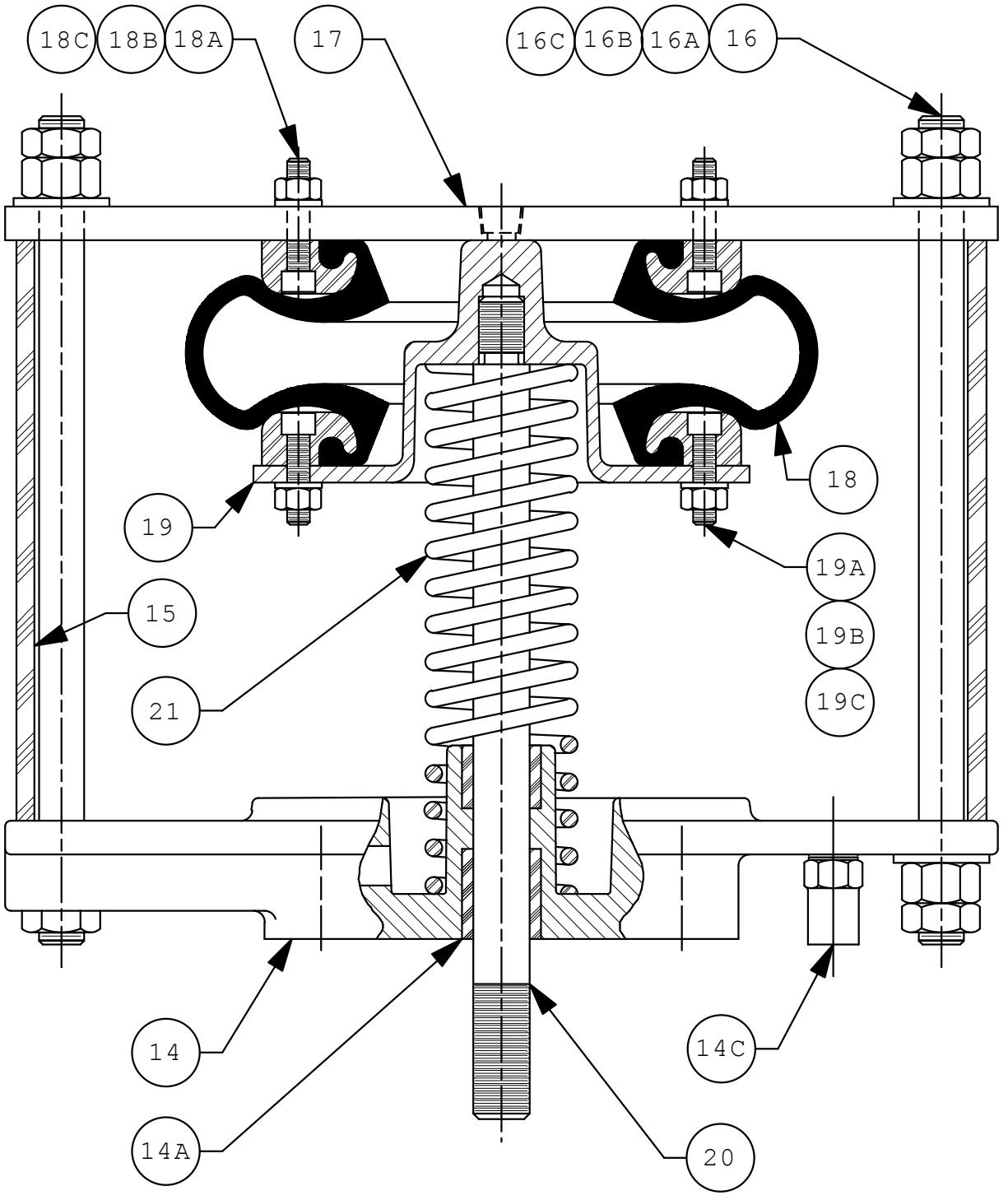
Attach hex nuts (#16B) and jam nuts (# 16C).

Important:

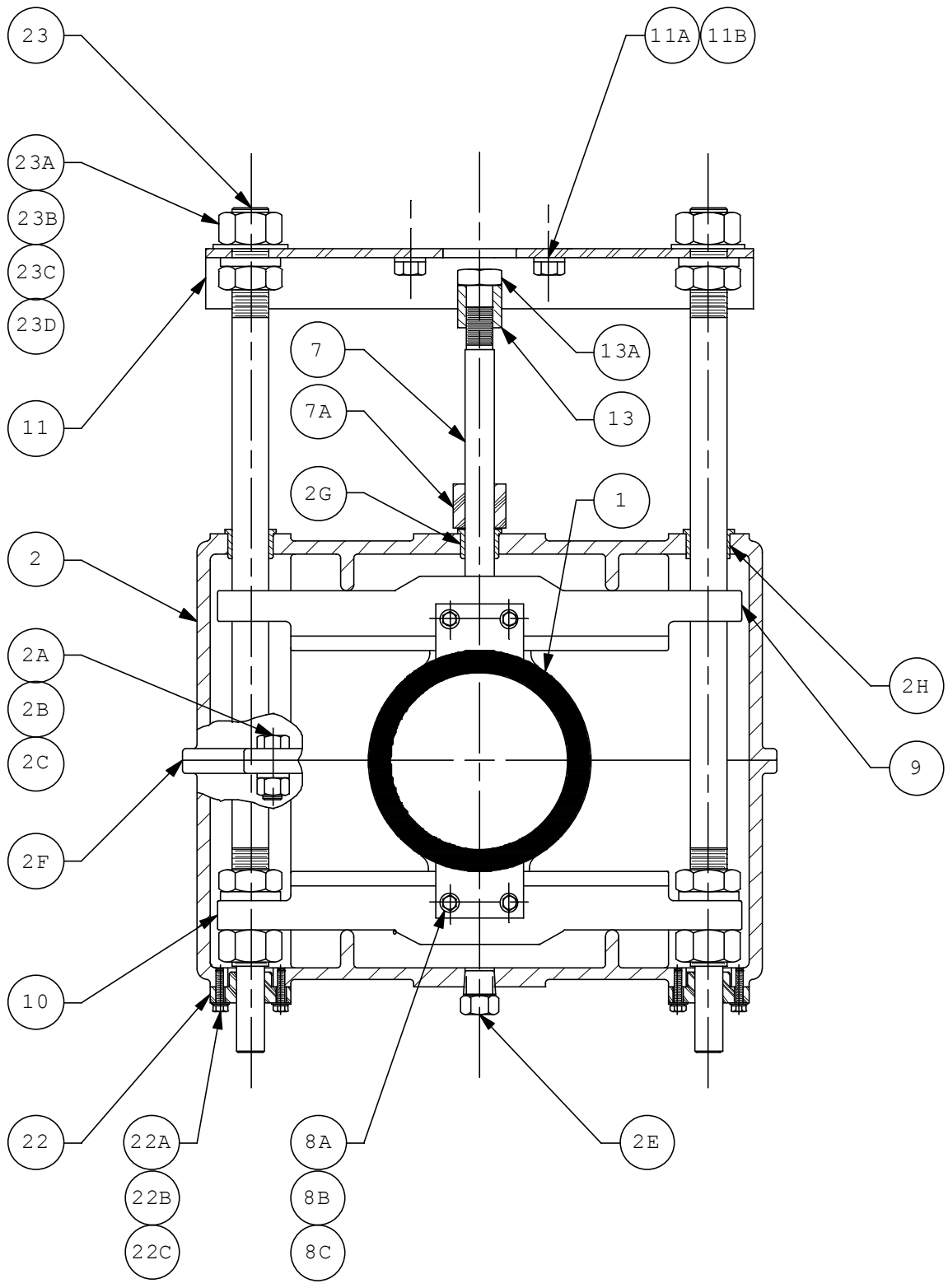
- Hex nuts first!
- Do not over-tighten. **Max torque = 5 ft-lb!**
- Then the thin jam nuts go on.
- Use two wrenches to counter tighten jam nuts against the hex nuts. Tighten the hex nuts and jam nuts against each other to 40 ft-lb. Do not tension the tie rods during this operation.

12. Reconnect air line.
13. Valve should now be ready for service.

ITEM	NOMENCLATURE
14	ACTUATOR BOTTOM
14A	BEARING, ACTUATOR BOTTOM
14C	EXHAUST FILTER
15	ACTUATOR COVER TUBE
16	ACTUATOR TIE ROD
16A	WASHER, TIE ROD
16B	NUT, TIE ROD
16C	JAM NUT, TIE ROD
17	ACTUATOR TOP
18	AIR BAG
18A	SCREW, AIR BAG
18B	LOCK WASHER, AIR BAG
18C	NUT, AIR BAG
19	ACTUATOR SPRING CAP
19A	SCREW, AIR BAG
19B	LOCK WASHER, AIR BAG
19C	NUT, AIR BAG
20	ACTUATOR STEM
21	SPRING



ITEM	NOMENCLATURE
1	SLEEVE
2	BONNET ASSEMBLY
2A	BOLT, BONNET
2B	LOCK WASHER, BONNET
2C	NUT, BONNET
2E	PLUG, BONNET
2F	SEALANT, BONNET
2G	BEARING, BONNET - STEM
2H	BEARING, BONNET - GUIDE ROD
7	STEM, VALVE
7A	MECHANICAL STOP, VALVE
8A	BOLT, POF
8B	WASHER, POF
8C	NUT, POF
9	UPPER PINCH BAR
10	LOWER PINCH BAR
11	YOKE
11A	BOLT, YOKE - ACTUATOR
11B	LOCK WASHER, YOKE - ACTUATOR
13	COUPLING
13A	JAM NUT, COUPLING - STEM
22	ALIGNMENT BEARING
22A	BOLT, ALIGNMENT BEARING
22B	WASHER, ALIGNMENT BEARING
22C	LOCK WASHER, ALIGNMENT BEARING
23	GUIDE ROD
23A	NUT, GUIDE ROD
23B	WASHER, GUIDE ROD
23C	LOCK WASHER, GUIDE ROD
23D	JAM NUT, GUIDE ROD



Questions?

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