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I & M Mark 56

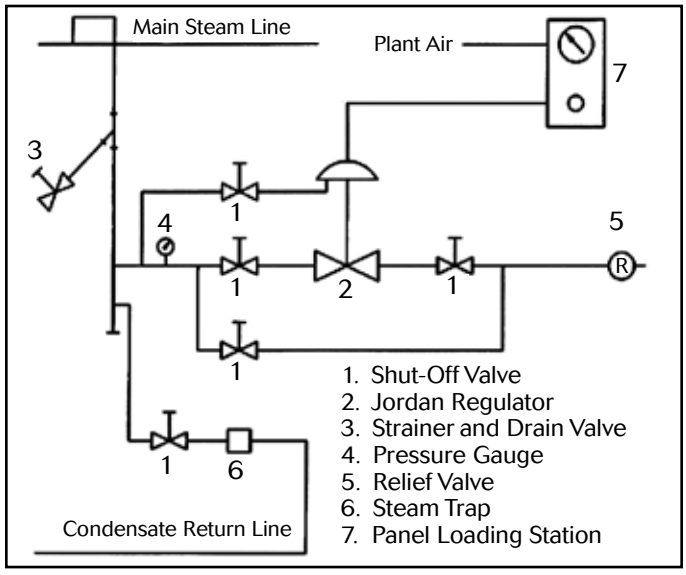
Installation & Maintenance Instructions for Mark 56 Air Loaded Back Pressure Regulators

Warning: Jordan Valve pressure regulators must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued operation may cause system failure or a general hazard. Before servicing any valve, disconnect, shut off, or bypass all pressurized fluid. Before disassembling a valve, be sure to release all spring tension.

Please read these instructions carefully!

Your Jordan Valve product will provide you with long, trouble-free service if it is correctly installed and maintained. Spending a few minutes now reading these instructions can save hours of trouble and downtime later. When making repairs, use only genuine Jordan Valve parts, available for immediate shipment from the factory.

Ideal Installation



1. Protect the regulator from grit, scale, thread chips and other foreign matter, by blowing out and thoroughly cleaning all pipe lines and piping components before the regulator is installed.
2. Shutoff valves, pressure gauges, and by-pass piping should be installed as indicated in the diagram above to provide easier adjustment, operation and testing.
3. When preparing threaded pipe connections, care should be exercised to prevent pipe sealing compound from getting into the pipe lines. Pipe sealing compound should be used sparingly, leaving the two lead threads clean.
4. A line strainer should be installed on the inlet side of the regulator to protect it from grit, scale, and other foreign matter. A 0.033″ perforated screen is usually suitable. Line strainers are available from Jordan Valve.
5. Install the regulator in the highest horizontal line of piping to provide drainage for inlet and outlet piping, to prevent water hammer, and to obtain faster regulation.
6. The flow arrow on the regulator body must be pointed in the direction of flow. The regulator may be installed in any direction, but damage to the seating surfaces may occur if installed in a vertical line with the flow upwards.
7. For best control, 3′0″ straight sections of pipe should be installed on either side of the regulator.
8. In hot vapor lines, upstream and downstream piping near the regulator should be insulated to minimize condensation.
9. Expand the outlet piping at least one pipe size if the controlled pressure (downstream) is 25 percent of the inlet pressure or less. A standard tapered expander connected to the outlet of the regulator is recommended.
10. Where surges are severe, a piping accumulator is recommended.

Control Line

Install a control line as follows:

1. Connect 3/8″ O.D. tubing to the fitting under the diaphragm.
2. Connect the other end in a straight run of pipe three to five feet upstream from the regulator.
3. DO NOT locate the control line tap in an elbow, swage, or other changes in configuration of the pipeline where turbulence or abnormal velocities may occur. DO NOT locate the control line tap in a vessel, such as a deaerator, located immediately upstream of the regulator. Locate the tap in the pipeline leading to the vessel.
4. The control line should be sloped away from the regulator.
5. Install a shutoff valve (not a needle valve) in the control line.
6. Install a pressure gauge in the control line or near the inlet of the regulator to aid in setting the valve.

Start-Up Procedure

With the inlet, outlet and bypass shutoff valves closed, and no pressure in the downstream line:

1. Fully open the control line shutoff valve.
2. Fully open the outlet shutoff valve.
3. Slowly open the inlet valve just enough to start flow through the regulator. Observe the upstream pressure gauge. Increase the air-loading pressure slowly to gradually close the regulator.
4. Do not fully open the inlet valve until you are sure that the regulator has control of the system. Usually, the handwheel on the inlet valve will turn freely when this point is reached.
5. To change the controlled pressure, adjust the loading pressure supplied to the top of the diaphragm.

Trouble Shooting

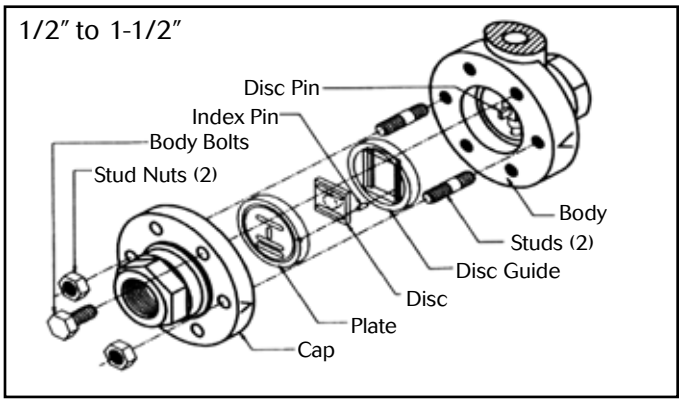
Erratic Control

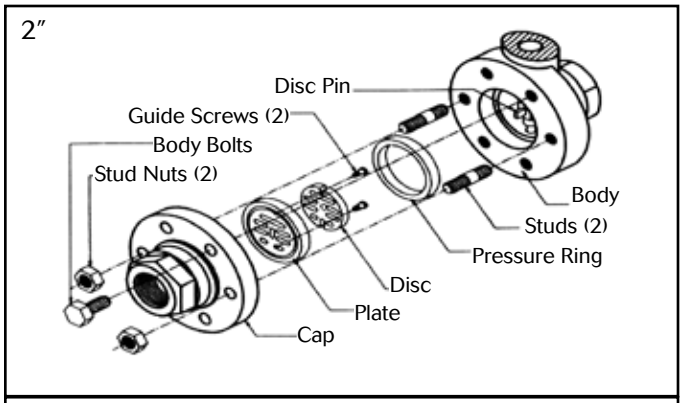
- Oversizing causes cycling and hunting, and reduces the rangeability of the regulator. Check sizing calculations to be sure that you have the proper size valve.
- Steam traps downstream may need attention and could be causing erratic control.
- Safety valve may be jammed open, disrupting the system. Repair as necessary.
- Excessive foreign matter on seats can cause erratic operation. Clean them as outlined under **Valve Seats**.
- Valve stroke may be out of adjustment. Readjust stroke.
- Valve disc may not be moving freely. Check disc guide clearance, and clearance of the stem to the bushings.

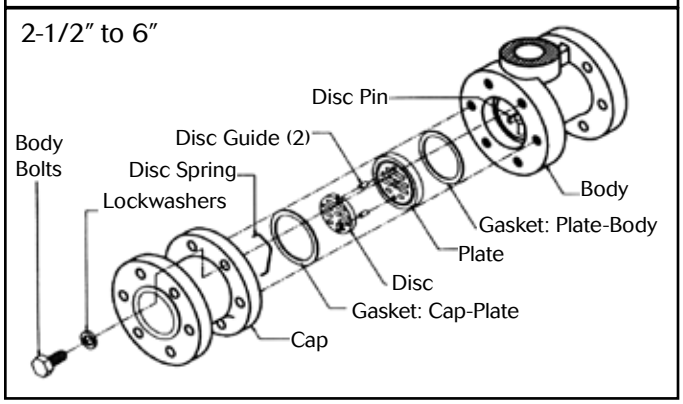
Will Not Operate

- Diaphragm may be ruptured and need replacement.

Valve Seats







Disassemby (All Sizes)

The sliding gate valve seat is the key to the excellent control and tight shutoff provided by a Jordan valve. Maintaining these seats in good condition is critical to valve performance, so care in handling is imperative. NEVER USE METALLIC OBJECTS IN REMOVING THE SEATS. Improper handling can result in leakage and poor control.

1. Close the shutoff valve on each side of the valve, and remove the valve from the line.
2. Note scribed "<" on the side of the *body* and *cap* for 1/2" - 2" sizes. Secure the *body* in a vise. Remove the *body bolts* and *stud nuts* and lift the *cap* straight up.
3. Before removing, note the *locating pin* that aligns the *plate* with the *disc guide* on 1/2" to 1-1/2" sizes. This pin should be on the same side as the "<" on the *body* and *cap*. Remove the *plate* and *disc* (on 2" valves, the disc will be attached to the *plate*, and the screws should now be removed to separate the two parts; on 2-1/2" - 6" valves, place the *body* on its side to remove the *plate*). Place the *disc* on the bench with lapped surfaces facing up. Protect the lapped surfaces on both sides of the *disc guide*.

It is important that the *disc pin* is not rotated when disassembling, cleaning, or reassembling, since this affects the stroke adjustment.

4. Lightly tap on the *body* to remove the *disc guide* (2" valve uses a *pressure ring* instead of a disc guide). Invert the *body*, let the disc guide drop out into

your hand, and place it on the bench with lapped surface facing up.

5. Clean all parts, including *body* and *cap*, with solvent. Place a piece of 4/0 polishing cloth or jewelers cloth on a smooth, flat surface such as a surface plate, and polish the lapped seating surfaces of the *disc, plate and disc guide* using a "figure 8" motion. If the parts are scarred, do not attempt to relap them, but return them to the factory for repair or replacement. If the seats are not scarred deeply, they can be repaired at a nominal cost.
6. The vertical sections of the *disc guide* (on 1/2" to 1-1/2" sizes) serve as guides for the *disc* while stroking. A 0.005" feeler gauge should be used to check for clearance between this surface, and the side of the *disc*. If the clearance is less, clean the guide surfaces in the *disc guide* with a fine file.

Reassemby

Sizes 1/2" to 1-1/2"

1. Place the *disc guide* in the *body* bore with the *index pin* on the same side as the "<" on the *body*
2. Place the *disc* in the aperture of the *disc guide* with the arrow pointing to the *index pin* and engage the *index pin*.
3. In placing the *plate* in the *body*, notice that the index pin hole in the lapped surface of the *plate* engages the *index pin* of the *disc guide*.
4. Align the ">" on the *cap* with the "<" on the *body* and place the *cap* over the two *studs* in the *body*.
5. Install the *nuts* to the two *studs* and proceed to Stroke Adjustment to check the orifice alignment of the *seats*. Next, torque the *body bolts* as outlined under Torque Procedure.

2" Size

1. Place the *disc* on the *plate* and replace the *guide screws*. Tighten the screws but do not allow them to bind the *disc* against the *plate*.
2. Install the *pressure ring* and *disc* and *plate assembly* in the *body* so that the *disc pin* engages the *disc*, and the *plate* is seated firmly in the *body*.
3. Place a straight edge across the body bolt holes on the horizontal center line of the valve (perpendicular to the valve movement). Gently rotate the *disc* and *plate assembly* until the edges of the orifice slots are parallel to the straight edge.
4. Remove the straight edge and reinstall the *cap*, being careful not to rotate the *disc* and *plate assembly*.
5. Proceed to Stroke Adjustment to check the orifice alignment of the *seats* and then torque the *body bolts* as outlined under Torque Procedure on the back page.

2-1/2" through 6" Sizes

1. Place the *plate* in the *body* so the *disc pin* protrudes through the center slot in the *plate*. The marking "TOP DIRECT" on the back of the *plate* must be toward the *diaphragm*. Use new *seat gaskets*.
2. Place the *disc* on the *disc guides* in the *plate*, engaging the *disc pin* arm protruding through the center of the *plate*. The arrow on the *disc* must point away from the *diaphragm*.
3. Install the *cap* to the *body* using only two *body bolts* 180° apart. Be sure the *disc spring* is installed in the center web of the *cap* and install the *cap* with the center web parallel to the *stem*. Use a new *seat gasket*.
4. With no air pressure applied to the *upper diaphragm case*, apply 20 psi minimum air pressure to the 3/8 NPT sensing line hole under the *diaphragm* and check the orifice alignment of the *disc and plate*. The orifices should be fully open and in perfect alignment. If they are not, proceed to Stroke Adjustment before torqueing the *body bolts* per Torque Procedure on the back page.

Diaphragm Replacement

Disassemby

1. In removing the *diaphragm*, first remove the *disc* and *plate* as previously covered under Valve Seats.
2. Remove the *upper diaphragm* case.
3. Hold the *disc pin* with an open end wrench and remove the *diaphragm assembly* by rotating counterclockwise. The *diaphragm assembly* consists of the *upper diaphragm plate*, *diaphragm*, and *lower diaphragm plate*.
4. If the *diaphragm* must be replaced:
   - 1/4" - 2" sizes — secure the *upper diaphragm plate* in the vise. A face spanner wrench should be used to remove the *lower diaphragm plate* from the assembly. If a face spanner wrench is not available, use a punch and hammer, but make certain to remove all burrs prior to reassembly.
   - 2-1/2" - 6" sizes — secure the *lower diaphragm plate* in the vise. Use a wrench on the hex of the *upper diaphragm plate* and turn counterclockwise to remove. If the packing needs to be replaced, follow these procedures:
     a) Remove *packing bolts, packing flange,* and *packing follower*.
     b) Remove the *packing*. The *packing* may have a tendency to stick in the packing cavity if the valve has been in service for some time. Movement of the *stem* may help.
     c) The *packing retainer* and *spring* may be removed if needed.
     d) Be certain that all packing material has been removed. Check the *stem* for scratches and replace if necessary. If the *stem* must be replaced, remove the *seats* as shown in Valve Seats.
     e) Replace the *packing*. Refer to the drawing for proper orientation of the *packing*.
     f) Insert the *packing follower*, place the *pack-*

ing flange over the *packing follower* and insert the *packing bolts*. Pull the *bolts* down, one turn each, alternating from one to the other until the *packing follower* is snug against the *body* and the *packing flange* is parallel to the *body* surface.

5. Remove the *diaphragm* and replace with a new one in reverse order. Tighten. For elastomer diaphragms, clean (degrease) threads and apply one drop of Loctite #290. Thread the parts together and tighten 1/8 to 1/4 turn. Proceed to Stroke Adjustment.

Stem and Disc Pin Replacement

1. Remove the *disc* and *plate*, following the procedures outlined under Valve Seats.
2. Remove the *diaphragm* as outlined under Diaphragm Replacement.
3. Holding the *disc pin* assembly with an open end wrench, loosen the *stem locknut*. The *stem* can now be unscrewed from the *disc pin* and removed.
4. Remove the *disc pin* and *locknut*.
5. Check the condition of and clean all parts. Clean the *stem guide* bushing in the *body* and replace defective parts.
6. Reassemble in reverse order. Follow the procedures outlined under Stroke Adjustment.

Stroke Adjustment

Note: the valve adjustment is determined by how far the diaphragm assembly is screwed onto the stem.

1/2″ - 2″ sizes

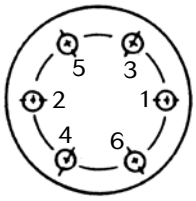
1. With the *upper diaphragm* case off and seats out of the body, hold the disc pin with an open end wrench and screw the *diaphragm assembly* onto the stem all the way, and then back off two turns initially.
2. Place the *disc guide*, *disc* and *plate* in the *body*, as outlined under Valve Seats.
3. Install the *upper diaphragm* case with only two bolts 180° apart, and tighten these bolts.
4. Carefully use a tool to pry up on the *disc pin* from upstream side of *body*. Stroke the *stem* upward until the *upper diaphragm* late stops against the *upper diaphragm case*.
5. The orifices should be fully open and in perfect alignment. If they are not, remove the *upper diaphragm* case and rotate the *diaphragm assembly* counterclockwise to lower the disc, or clockwise to raise the *disc*. Repeat steps 3,4 & 5 until the seats are in perfect alignment.
6. Install all the *bolts* in the *upper diaphragm* case and torque as outlined under **Torque Procedure** on the back page.

2-1/2″ to 6″ sizes

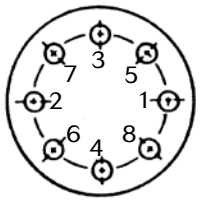
1. With the *upper diaphragm* case off and the seats out of the *body*, loosen the *stem locknut* and move the *disc pin* to the center of the threaded section of the stem.
2. Hold the *stem* lightly with pliers and thread the *diaphragm* assembly approximately four turns onto the *stem*. Center the *disc pin* in the body waterway and tighten *stem locknut*.
3. Place the *plate* in the *body* as outlined under **Valve Seats**, but temporarily install the *disc* on the *disc pin* with the arrow pointing towards the *diaphragm*.
4. Hold the parts so they don't fall out, and push down on the *diaphragm assembly* until it bottoms out in the *body*.
5. The orifices should be fully open and in perfect alignment. If they are not, rotate the *diaphragm assembly* counterclockwise to lower the *disc*, or clockwise to raise the *disc*, until the *seats* are in perfect alignment.
6. After the *seats* are aligned, remove the *disc* and turn it 180° and reinstall with the arrow pointing away from the *diaphragm*. The *seats* are now fully closed with overlap.
7. Install the *upper diaphragm* case and torque the *bolts* as outlined under **Torque Procedure**.

Caution: do not rotate the upper diaphragm case on the diaphragm before installing the bolts because this will change the stroke adjustment.

Torque Procedures



6 bolts
(or multiples)



8 bolts
(or multiples)

1. Install all bolts hand-tight.
2. Torque the bolts in order of the bolt pattern to a value equal to ¼ of the recommended torque value.
3. Re-torque each bolt to the recommended value using the same bolt pattern as shown.

Torque for Bolts Connecting Cap to Body (in. - lbs.) (1/2″ - 2″)

Valve Size	Valve Body Material	
	Bronze	Ductile Iron, Carbon Steel, or Stainless Steel
1/2″ through 2″	140	200

Torque for Diaphragm Case Bolts

Valve Size	Torque (in. - lbs.)
1/2″ through 2″	200

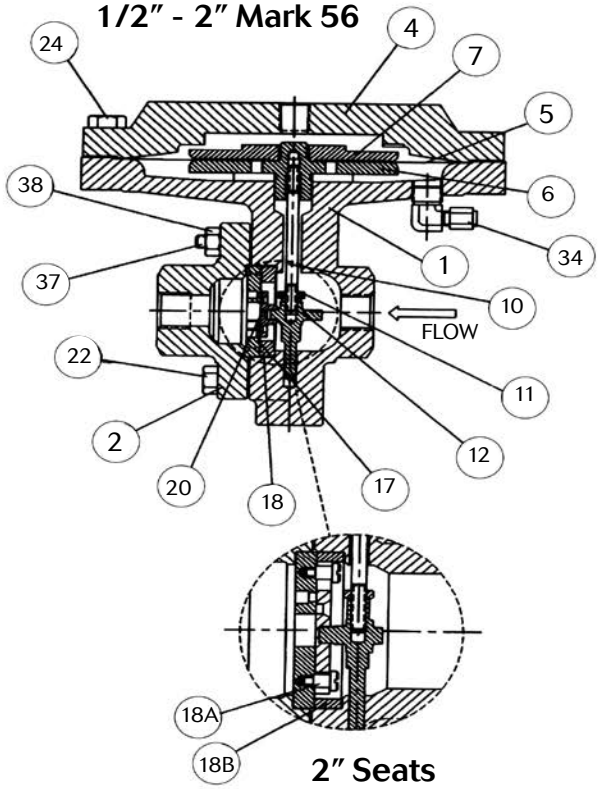
Torque for Bolts (ft. - lbs.) (2-1/2″ - 6″)

Recommended Bolt Torque	
Body to Cap	90 ft./lbs.
Diaphragm Case	85 ft./lbs.

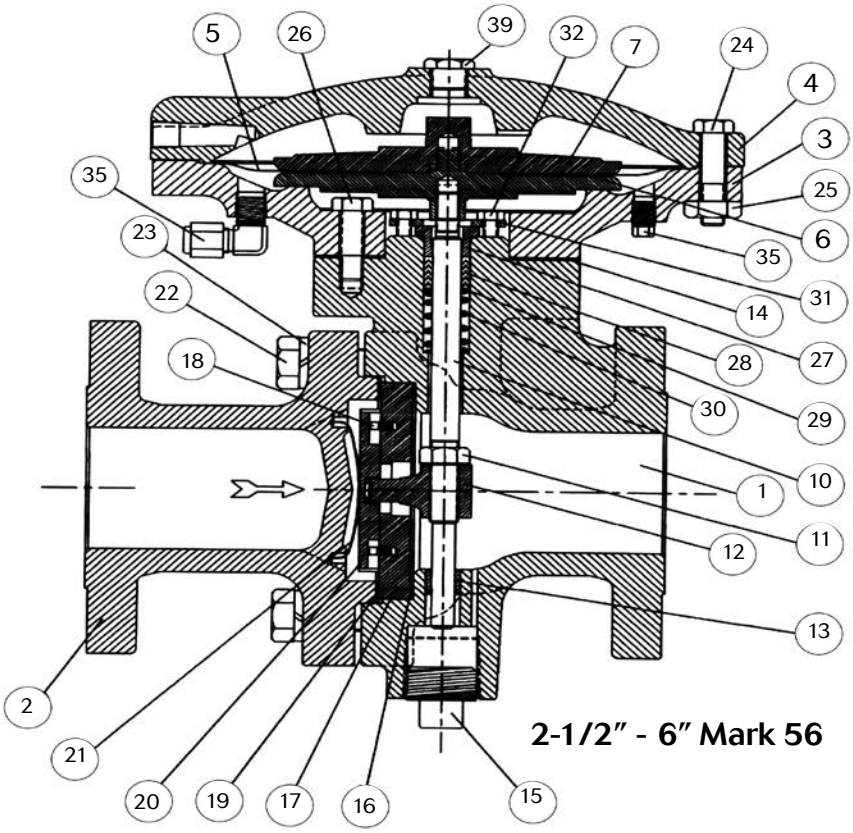
Illustration and Parts List

Item	Description
1	Body
2	Cap
3	Lower Case
4	Upper Case
*5	Diaphragm
6	Lower Diaphragm Plate
7	Upper Diaphragm Plate
10	Stem
11	Stem Locknut
12	Disc Pin
13	Stem Guide Bushing
14	Gasket (Lower Case Body)
15	Pipe Plug
*16	Gasket (Plate-Body)
*17	Plate
*18	Disc Guide
*19	Gasket (Cap-Plate)
*20	Disc
*21	Disc Spring
22	Cap Screw
23	Lockwasher
24	Bolt
25	Nut
26	Cap Screw
27	Packing Follower
*28	Packing
29	Packing Washer
30	Packing Spring
31	Packing Flange
32	Packing Bolts
35	1/4" NPT Pipe Plug
39	1/2" NPT Pipe Plug
*	Recommended Spare Parts

1/2" - 2" Mark 56



2" Seats



2-1/2" - 6" Mark 56

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