



# JORDAN VALVE

3170 Wasson Road • Cincinnati, OH 45209 USA  
Phone 513-533-5600 • Fax 513-871-0105  
info@richardsind.com • www.jordanvalve.com

## I & M Mark 52

### Installation & Maintenance Instructions for Mark 52 Piloted Back Pressure Regulators

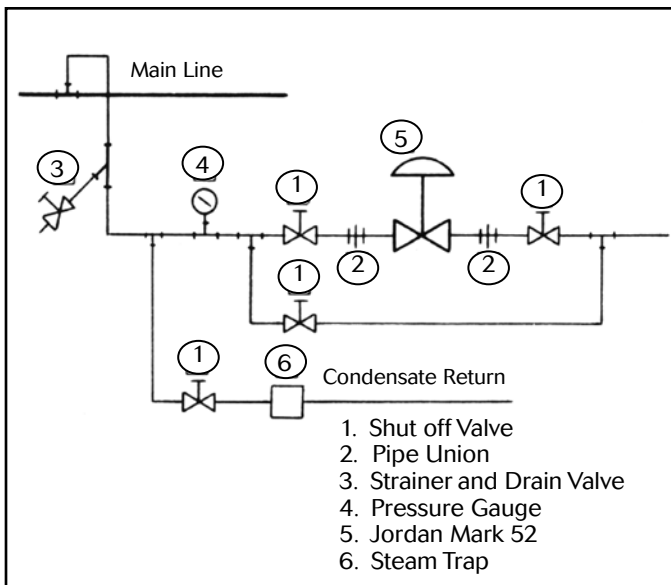
**Warning:** Jordan Valve Pressure Regulators must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued 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.

This pilot operated regulator was designed to handle your more critical inlet pressure or relief applications. It will accurately control pressure to 100% of its rated flow capacity with only the slightest deviation from the set point. This is comparable to controller operated accuracy, and on most critical applications should be considered before costly, more refined instruments. It is designed to handle a wide range of control pressures.

### Ideal Installation



1. To protect the regulator from grit, scale, thread chips and other foreign matter, all pipe lines and piping components should be blown out and thoroughly cleaned before the regulator is installed.
2. Shut-off valves, pressure gauges and by-pass piping

3. should be installed as indicated in the diagram to provide easier adjustment, operation and testing.
3. In 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. Jordan uses, and recommends, Seyco #2415 thread sealer Teflon ribbon.
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 vertically or horizontally without affecting its operation.
7. For best control, 3' 0" straight sections of pipe should be installed on either side of the regulator.
8. To minimize condensation in hot vapor lines, upstream and downstream piping near the regulator should be insulated.
9. If possible, install a relief valve upstream from the regulator. Seat at 15 psi above the control point of the regulator.
10. Expand the outlet piping at least one pipe size if the downstream pressure is 25 percent of the inlet pressure or less. A standard tapered expander connected to the outlet of the regulator is recommended.
11. Where surges are severe, a piping accumulator is recommended.

### Operation

The main valve and the pilot are normally closed. The inlet pressure passes through the inlet pilot tubing beneath the pilot diaphragm. As the force of the adjusting spring is overcome, the pilot valve opens allowing the inlet pressure to enter the chamber above the main diaphragm, opening the main valve. When the set point is

reached, the adjusting spring overcomes the force of the pressure beneath the pilot diaphragm and the pilot and main valves close.

---

## Start-Up Procedure

---

With the inlet and outlet shut-off valves closed:

1. Throttle the bypass valve so that the pressure to be controlled is maintained near the set point.
2. Slowly open the inlet shut-off valve.
3. Open the outlet shut-off valve.
4. Slowly close the bypass valve, but do not close it fully until you are certain that the regulator has control of the system.
5. To change the controlled pressure, turn the adjusting screw clockwise to increase pressure, counter-clockwise to decrease pressure.
6. Body and cap bolts should be retightened per torque procedures after valve reaches operating temperature.

---

## Maintenance

---

**CAUTION: Be sure that there is not pressure in the valve before loosening any fittings or joints. The following steps are recommended:**

1. Close the inlet shut-off valve.
2. Release the compression of the adjusting spring by turning the handwheel counter-clockwise until free. (This allows the pilot valve to open and release the pressure on the inlet of the valve.)
3. Allow pressure to bleed off downstream from the regulator.
4. Close the outlet shut-off valve.

---

## Valve Seats

---

The seats of Jordan regulators are lapped to light band flatness. Maintaining such tolerances is of paramount importance for your assurance of excellent control and dead end shut-off. **DO NOT** use metallic objects in removing the seats. Care in handling is imperative.

### A. DISASSEMBLY

1. Close the shut-off valve on each side of the regulator.
2. Remove the regulator from the line.
3. Note the scribe marking  $\times$  on the side of the valve body (15) and cap (7). Secure the outlet body hex in a vise. Remove the cap screws (11) and lift the cap straight up. Please note that there is an index pin secured in the cap (7). This index pin is on the same side as the scribe marking  $\times$  on the valve cap and body and it positions the valve plate

in the body.

4. Before removing check the valve disc (8) for a stamped arrow. This arrow points to the scribe marking  $\times$  and the index pin hole in the valve plate. Since the disc can be rotated 180° in some sizes without affecting the stroke adjustment, there may be no arrow on the valve disc. Remove the valve disc and place on bench with the lapped surface up.
5. Lightly tapping on the valve body is usually sufficient to loosen a stuck plate (10) or disc guide (9). Invert the body so that the seat set will drop into your hand.

### IMPROPER HANDLING OF THE SEATS WILL RESULT IN LEAKAGE OR IMPROPER CONTROL.

6. Clean out all parts of the body and cap with solvent. The valve disc and plate may then be cleaned. Place a piece of 4/0 polishing paper or jeweler's cloth on a smooth, flat surface such as a surface plate and polish the lapped surfaces with a "figure eight" motion. If parts are scarred, do not attempt to re-lap them, but return them to the factory for repair or replacement. If seats are not scarred deeply they can be refinished several times at minimum cost.
7. The vertical milled portions of the valve cap serve as a guide for the disc while stroking. A 0.0005 feeler gauge should be used to check the clearance between the valve disc and disc guides. To do so, place the valve disc in the cap disc guides with the lapped surface facing upwards and check this clearance. If the clearance is less than 0.005", clean the disc guide with a smooth file.

### B. REASSEMBLY

1. Replace the valve plate. In replacing, make certain that the index pin hole is on the same side as the scribe marking  $\times$  on the valve body. Align the disc pin so that it is centered in the body bore and protrudes upward through the slot in the plate.
2. In replacing the valve disc, the stamped arrow should be pointing to the scribe line on the valve body. Place the valve disc on the valve plate, engaging the disc pin.
3. Turn the adjusting screw (28) counter clockwise to release spring compression, thus opening the pilot valve.
4. To check the stroke adjustment, blow air into the inlet connection. The main valve will stroke to the open position, and the orifices should be open and in perfect alignment. If they are not, an adjustment is required.
5. To obtain the proper adjustment, remove the valve plate and disc from the valve body and loosen the stem locknut (18). Adjustment is obtained by

- rotating the disc pin (16) on the valve stem (17). To raise the valve disc, rotate the disc pin so that it rises on the valve stem.
6. When this preliminary adjustment is obtained, lock the valve stem locknut while holding the disc pin with an open end wrench.
  7. Now rotate the disc pin so that the valve plate and disc can be positioned in the valve body.
  8. Insert the valve plate and disc in the body bore, using the same precautions as outlined above.
  9. The seats will be in the closed position. To check the adjustment, again blow air into the inlet pilot connection to open the valve. Check the alignment of the orifices.
  10. If orifices do not line up properly, further adjustment will be required.
  11. Replace the plate and disc into the body bore, followed by the disc guide (10).
  12. Note that the disc guide (10) has one polished surface. In replacing the disc guide, make certain that the polished surface faces the valve plate (9). The index pin aligns the disc guide to the plate to make sure the slots in the disc align with the slots in the plate. Line the index pin up with the < on the valve body.
  13. In replacing the valve cap (7), note that the scribe marking > on the valve cap and the valve body must be in alignment. Use care to make certain that the disc guides and the index pin are properly aligned with the valve disc and the index pin hole in the valve plate, respectively. Normally a slight rotation of the valve cap is sufficient to obtain proper alignment.
  14. Replace the cap screws and tighten uniformly, being careful not to torque excessively. See page 4 for torque requirements.

---

### Pilot Valve Maintenance

---

1. If the regulator should fail to operate properly, pipeline foreign matter may have clogged the pilot valve mechanism.
2. Close the upstream and downstream shut-off valves.
3. Turn the adjusting screw clockwise to fully compress the spring, closing the pilot valve and main valve.
4. Remove the outlet pilot tube (19) and then slowly open the upstream shut-off valve. If line fluid flows from the tube connector in the bonnet, the pilot valve is leaking. If line fluid flows from the tube connector on the body, the main valve seats are leaking. Be sure to close the upstream shut-off valve and bleed off the pressure before proceeding with maintenance.
5. Loosen ring nut (1) and remove spring case assembly which includes handwheel (29), adjusting screw (28), thumblock (30), spring housing (31) and ring

- nut (1).
6. Remove the upper spring guide (26) from the adjusting spring (32). Remove the spring (32), pilot diaphragm plate (33) and pilot diaphragm (25).
7. Remove the pilot seat assembly with a socket wrench.
8. Clean the pilot seat assembly with a solvent and compressed air. If the pilot seat is scarred, the pilot assembly should be replaced as a unit.
9. Install the pilot seat assembly carefully so that no burrs are raised on the hex.
10. Reassemble in reverse order, making certain that the pilot diaphragm (25) and pilot diaphragm plate (33) are positioned properly in the spring housing (31).

---

### Main Valve Stem, Disc Pin and Lower Spring Replacement

---

1. Remove the strainer inlet pilot tube (5) and outlet pilot tube (19). Follow the procedure outlined under Valve Seats and remove the valve disc and plate.
2. Unscrew the bottom cap (12) and remove the lower return spring (13) and lower spring guide (14).
3. Remove the bonnet screws (20) and lift the bonnet assembly from the main valve body.
4. The main diaphragm (4) can now be removed and replaced if necessary.
5. To remove the disc pin (16), unscrew the stem locknut (18) and the disc pin from the valve stem (17). The stem can now be removed upward through the body flange.
6. The disc can now be removed through the valve body bore by lifting up and out.
7. Clean all parts of the valve body and cap with solvent and replace any part which appears to be worn or defective.
8. Reassemble in reverse order. Insert the stem through the body flange and the disc pin into the body bore.
9. Thread the stem through the locknut and into the disc pin approximately 1/4".
10. Place the valve main diaphragm plate (6) on the valve stem making certain that the valve stem is positioned properly in the hole of the main diaphragm plate.
11. Replace the main diaphragm making sure that it is installed properly in the recess of the valve body.
12. Place the valve bonnet assembly on the valve body and tighten cap screws uniformly and diagonally.
13. Insert the return spring guide (14) and the return spring (13) in the bottom cap (12) making certain that the spring guide engages the disc pin properly.
14. A stroke adjustment will probably be required. Please note the procedure outlined under Valve Seats.
15. Replace the strainer, inlet pilot tube, and outlet

pilot tube.

16. Valve is now ready for installation and start up.

---

## Trouble Shooting

---

### Erratic control

- Oversizing causes cycling and hunting and reduces the rangeability of the valve. Make certain that your sizing is correct.
- Excessive foreign matter on seats.
- Valve stroke out of adjustment. Check and readjust if necessary.
- Valve disc may not be moving freely. Check disc guide clearance.

### Will not operate

- Diaphragm ruptured.
- Improper spring setting.
- Upstream pilot tube clogged.

---

## Ordering Spare Parts

---

Use only genuine Jordan Valve parts to keep your valve in good working order. So that we can supply the parts, which were designed for your valve, we must know exactly which product you are using. The only guarantee to getting the correct replacement parts is to provide your Jordan Representative with the valve serial number. This number is located on the valve identification tag. If the serial number is not available, the parts needed for your valve might be determined using the following information: Model Number, Valve Body Size, Seat Material and Cv Rating, Spring Range and Set Point, Trim Material, Part Name - Number and Quantity.

NOTE: Any parts ordered without a valve serial number that are found to be incorrect are subject to up to a minimum 25% restock charge when returned.

---

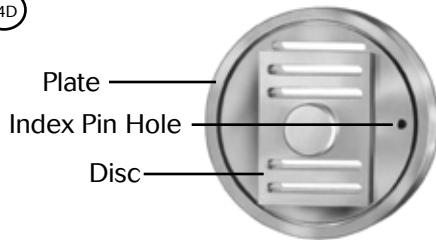
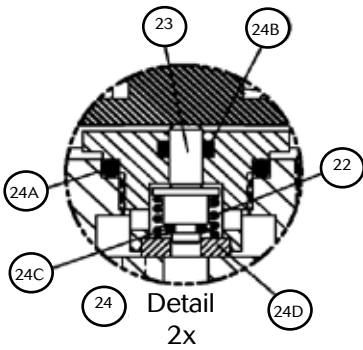
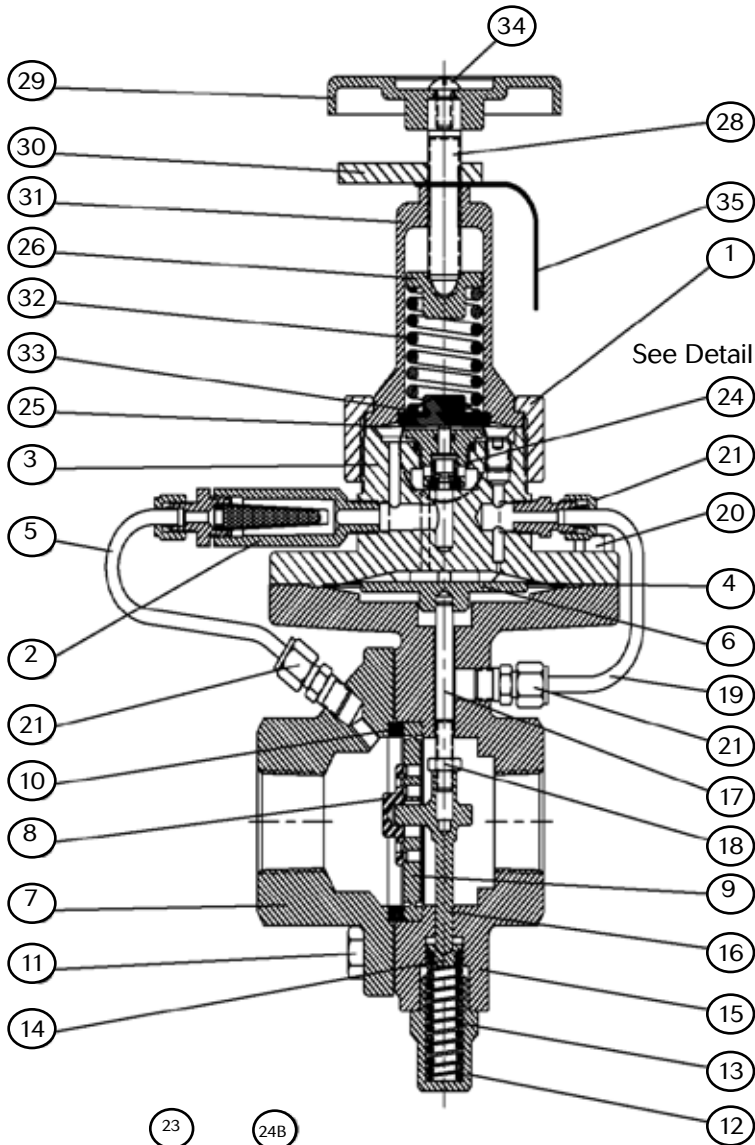
## Torque Values

---

For bolt #11, see Illustration and Parts List on last page.

Valve Size	Torque in. / lbs.
1/2" & 3/4"	110
1" & 1-1/4"	120
1-1/2"	140
2"	140

## Illustration and Parts List



Item	Description	Quantity
1	Ring Nut	1
2	Strainer Assembly	1
3	Bonnet	1
*4	Diaphragm	1
5	Tubing (Inlet)	1
6	Diaphragm Plate	1
7	Cap	1
*8	Disc	1
*9	Plate	1
*10	Disc Guide	1
11	Body Cap Screw	4
12	Bottom Cap	1
13	Spring (Return)	1
14	Spring Seat (Return)	1
15	Body	1
*16	Disc Pin	1
*17	Stem	1
18	Stem Locknut	1
19	Tubing (Outlet)	1
20	Bonnet Cap Screw	8
21	Tubing Connector	3
22	Pilot Spring	1
*23	Pilot Stem	1
*24	Pilot Valve	1
*24A	Pilot Valve O-Ring	1
*24B	Pilot Stem O-Ring	1
*24C	Pilot Seat O-Ring	1
*24D	Pilot Seat	1
*25	Diaphragm (Pilot)	1
26	Spring Seat (Range)	1
28	Adjusting Screw	1
29	Handwheel	1
30	Thumb-Lock	1
31	Spring Housing	1
32	Spring (Range)	1
33	Pilot Diaphragm Plate	1
34	Handwheel Screw	1
35	Name Plate	1
36	Body Stud (not shown)	2
36	Stud Nuts (not shown)	2
*	Recommended Spare Parts	