



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

I & M Mark 687 Series

Installation & Maintenance Instructions for Mark 687 Piloted Soft Seated Regulator

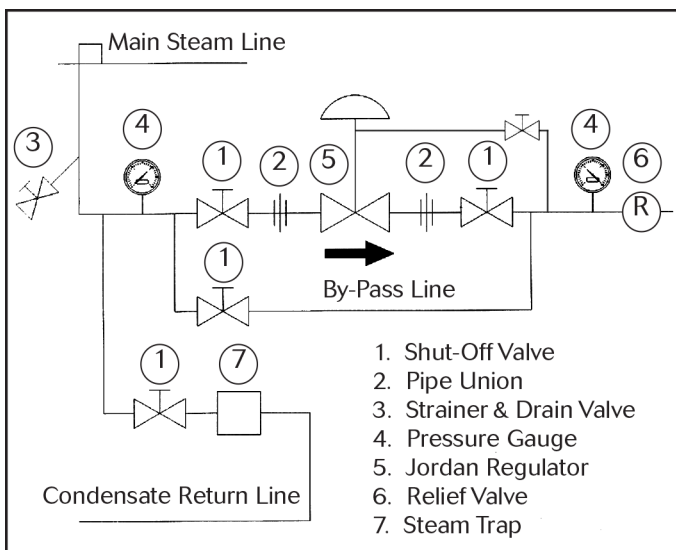
Warning: Jordan Valve pressure regulators must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued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

6. Install a shutoff valve (not a needle valve) in the control line.
7. Ideally, a gauge should be installed in the control line near the regulator to assist in setting the product.

Control Line



A control line must be connected to the regulator as follows:

1. Connect one end of a 3/8" control line to the 1/4" npt port in the center of the upper case.
2. Connect the other end to a straight run of pipe 3 to 5 feet in length downstream of 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. Any connection should be at least 2 feet away from such a fitting.
4. DO NOT locate the control line tap in a vessel located downstream of the valve. Instead, locate the tap in the line leading to the vessel.
5. The control line should be sloped away from the valve.

Start-Up

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

1. Fully open the control line shutoff valve.
2. Fully open the outlet shutoff valve.
3. Open the inlet shutoff valve just enough to hear flow start running through the regulator. Observe the downstream pressure gauge. Once pressure is seen on this gauge, slowly open the inlet shutoff valve the remainder of the way until fully open.
4. To change the set pressure, turn the adjusting screw on the top of the pilot valve to get the regulated pressure to the desired set point.
5. Secure the jam nut on the adjusting screw.

Maintenance

Caution: Ensure that the valve is de-pressurized before loosening any fittings or joints. The following steps are recommended before proceeding with any maintenance on the valve.

1. Allow all pressure to bleed off through the downstream piping. Do not attempt to reverse the pressure through the regulator by bleeding the pressure from the upstream piping.
2. When the pressure gauges indicate that all the pressure has been removed from the system, close the outlet shutoff valve and control line shutoff valve.

Note: Refer to the drawing at the end of this document for descriptions and proper orientation of the parts.

Pilot Valve

1. Remove the tubing that connects the pilot valve to the main valve.
2. Unscrew the pilot from the pipe nipple on the main valve.

Pilot Diaphragm

1. Release the spring tension of the range spring (5) by turning the adjusting screw (1) counter-clockwise until free.
2. Remove the spring housing bolts (7), spring housing (3), spring guide (4), range spring (5), and upper diaphragm plate (6) from the pilot body (14).
3. Remove and replace pilot diaphragm, and assemble in reverse order.
4. Spring housing bolts should be evenly cross-torqued to 200 in-lbs.

Pilot Valve Seats

1. Carefully loosen the bottom cap (15) from the pilot body.
2. The return spring (16) and plug (17) will come out with the bottom cap.
3. The strainer screen (not shown) should be pulled out of the body cavity and cleaned.
4. Unscrew the pilot seat assembly (13) from the pilot body.
5. Replace the pilot seat assembly as a unit and re-install all parts in reverse order.
6. Minimum torque on the pilot seat is 200 in-lbs and 50 ft-lbs on the bottom cap.
7. The use of a liquid Teflon paste or similar assembly fluid is recommended for both the pilot seat and bottom cap.

Main Valve

Note: All work to the main valve can be accomplished in-line. The only reason to remove the valve is if the location makes it too difficult to work on the regulator.

Main Valve Diaphragm

1. Remove pilot valve tubing.
2. Remove the control line to the upper case.
3. Remove the actuator bolts (24) and nuts (25) from the upper and lower actuator cases. Important - leave two opposing bolts assembled.
4. Use caution when removing the final two bolts. The upper case is spring-loaded by the internal return spring (22).
5. Remove the return springs from the diaphragm plate (20).
6. Remove the valve stem bolt (15) and seal washer (27) from the diaphragm assembly.
7. Remove the diaphragm stop (12) from the center of the diaphragm plate.
8. Lift off the diaphragm plate and remove the diaphragm (21).
9. Inspect and replace as required by reversing the above steps.

10. When re-assembling, it is necessary to balance the lower support plate (13) on top of the valve plug/stem assembly (4). Make sure the valve stem bolt engages all parts in the diaphragm assembly before tightening. Use a new seal washer (27).
11. To tighten the valve stem bolt, hold the outside of the diaphragm plate to prevent the assembly from turning while tightening the bolt.
12. Make sure to locate the return springs on the stamped guides in the diaphragm plate before assembling the upper case.

Main Valve Seats

1. Remove diaphragm as listed above.
2. Remove the actuator nut (11) from the lower case.
3. Lift the lower case assembly off of the bonnet.
4. Remove the 4 body bolts (not shown).
5. Lift off the bonnet assembly (1) from the main valve plug / stem assembly (4).
6. Remove the plug / stem (4), spacer (28), and case from the body bore. Note - the cage will normally come out with the plug.
7. Remove the seat assembly and o-ring (7) from the bore of the body.
8. Separate the plug / stem from the cage.
9. Remove plug -O-ring (18).
10. Clean all parts with a light solvent.
11. Replace o-ring numbers (7), (8), (18), & (19).
12. Use a light grease, such as Dow Corning #4 to lubricate all o-rings prior to re-assembly.
13. Place the seat o-ring (7) into the body bore, pushing it all the way into the corners of the bore.
14. Place the seat ring (5) on top of the o-ring.
15. Insert a new Teflon seat (6) into the groove on the seat ring.
16. Assemble the plug o-ring (18) to the plug groove. Place an additional amount of grease on the outside of the o-ring and carefully insert the plug / stem into the cage being careful not to damage the o-ring.
17. Place the cage and plug / stem on top of the seat assembly in the body.
18. Place a new spacer (28) on top of the cage.
19. Insert the bonnet (2) over the stem and onto the body.
20. Assemble the 4 body bolts using an even cross-torquing method. Torque to 75 ft-lbs.
21. Place the packing spring (26), retainer (29), new set of packing (10), and the packing follower (9) into the packing bore of the bonnet. Lubricate each piece of packing upon installation.
22. Place the lower actuator assembly over the bonnet. Make certain the port on the lower case is oriented to the same side as when it was removed, and is 90° to the flow direction.
23. Secure the actuator nut (11) to the lower case using a minimum of 100 ft-lbs or torque.
24. Follow the steps outlined above under "Main Valve Diaphragm" to finish assembling the actuator.

Recommended Spare Parts

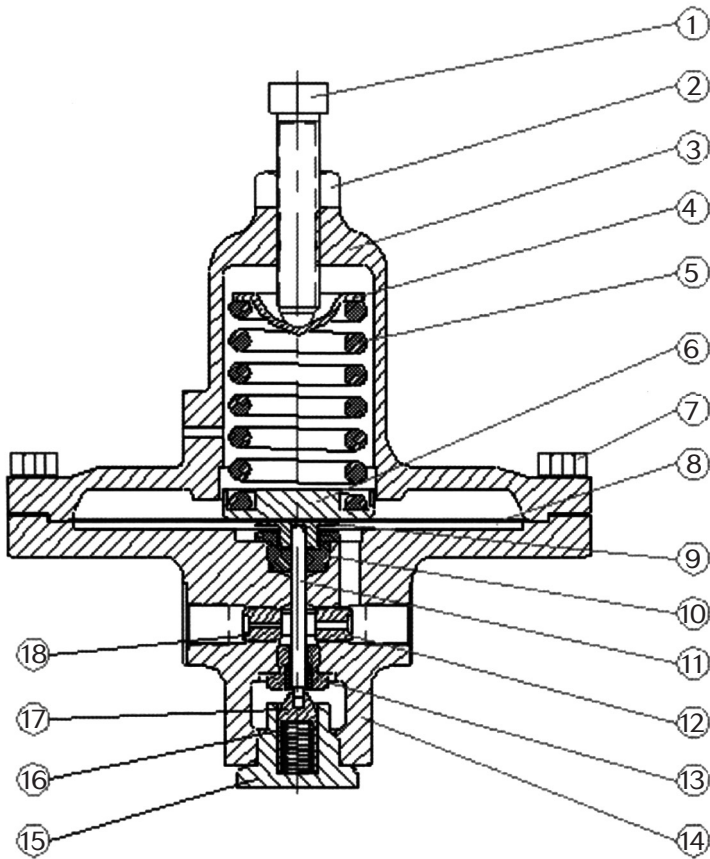
Pilot:

Diaphragm (8)
 Pilot Seat (13)

Main Valve:

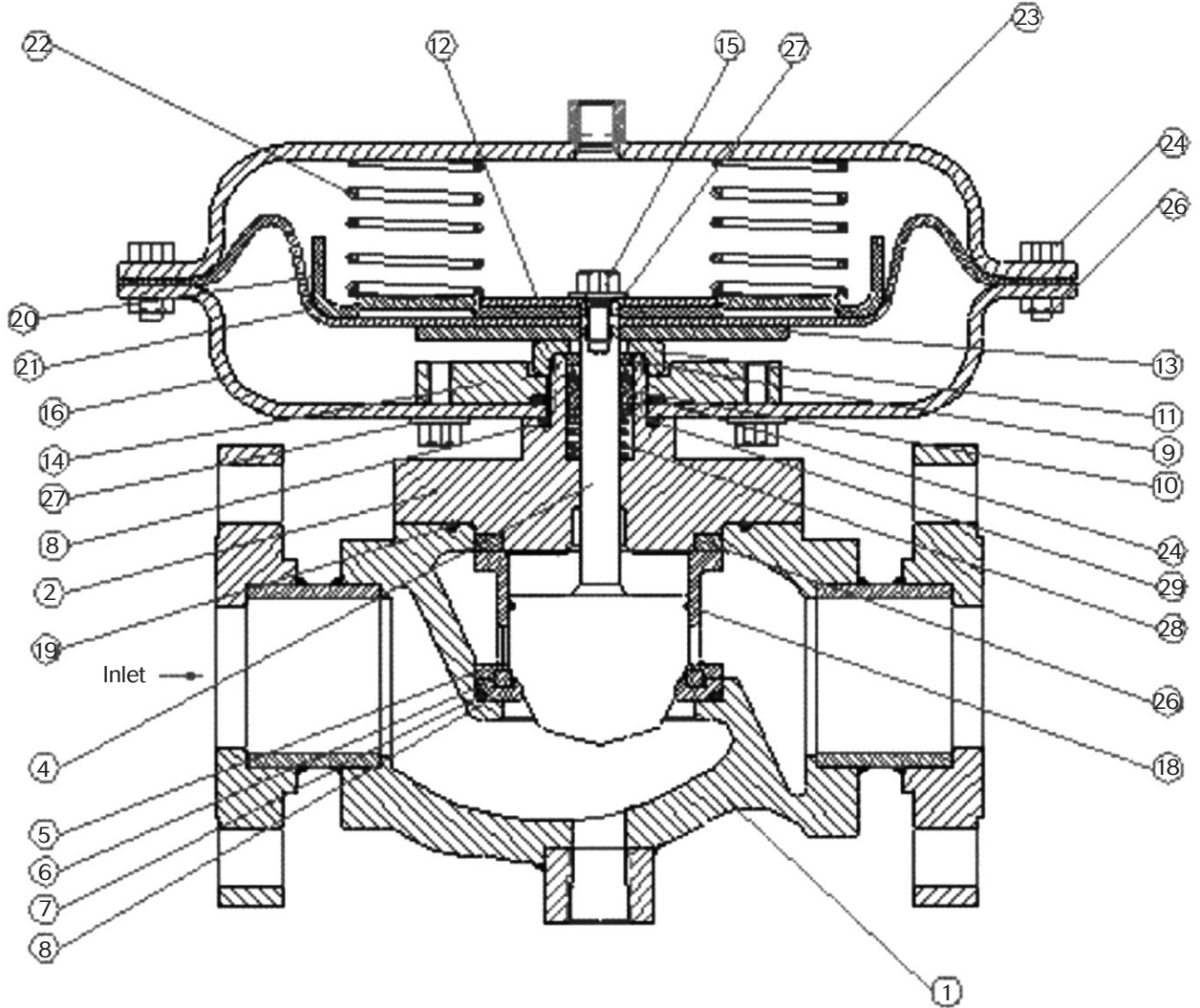
Set o-ring (7)
 Plug o-ring (18)
 Body o-ring (19)
 Bonnet o-ring (29)
 Soft seat (6)
 Spacer (28)
 Packing set (10)
 Diaphragm (21)
 Seal Washer (27)

Parts List



No.	Description	Qty
1	Adjusting Screw	1
2	Jam Nut	1
3	Spring Housing	1
4	Spring Guide	1
5	Range Spring	1
6	Upper Diaphragm Plate	1
7	Hex Head Cap Screw	1
8	Diaphragm	1
9	Lower Diaphragm Plate	1
10	Stem Guide	1
11	Stem	1
12	Orifice	1
13	Seat	1
14	Body	1
15	Body Cap	1
16	Return Spring	1
17	Plug	1
18	Speed Orifice	1

Parts List



No.	Description	Qty	No	Description	Qty
1	Body	1	16	Lower Case Assembly	1
2	Bonnet	1	17	O-Ring (Actuator)	1
3	Cage	1	18	O-Ring (Plug)	1
4	Stem & Plug Assembly	1	19	O-Ring (Body)	1
5	Seat	1	20	Plate, Diaphragm	1
6	Soft Seat	1	21	Diaphragm	1
7	O-Ring (Seat)	1	22	Springs	6
8	O-Ring (Bonnet)	1	23	Upper Case Assembly	1
9	Follower, Packing	1	24	Bolts	32
10	Packing	1	25	Nuts	32
11	Nut, Packing (Actuator)	1	26	Packing Spring	1
12	Diaphragm Stop	1	27	Washer, Seal	7
13	Plate Backing (Support)	1	28	Spacer	1
14	Plate, Mounting	1	29	Retainer, Packing	1
15	Bolt, Valve Stem	1			