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## I & M Mark 60 (2½" - 4")

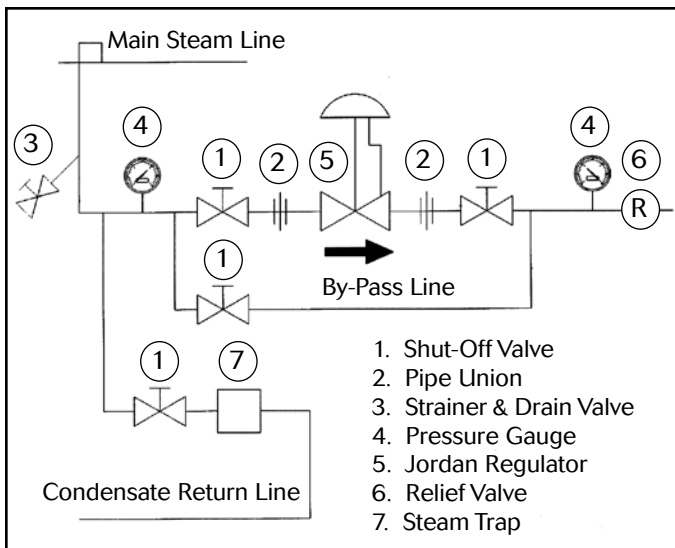
### Installation & Maintenance Instructions for Mark 60 (2½" - 4") Pressure Regulator

**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.

### Installation



- To protect the regulator from grit, scale, thread chips, and other foreign matter, ALL pipelines and piping components should be blown out and thoroughly cleaned before the installation process begins.
- Shutoff valves, pressure gauges, and by-pass piping should be installed as indicated in the Installation Schematic to provide easier adjustment, operation, and testing.
- A line strainer should be installed on the inlet side of the valve to protect it from grit, scale and other foreign matter. A 0.033 perforated screen is usually suitable for this purpose. Line strainers are available from Jordan Valve.
- For best control, 3' 0" straight sections of pipe should be installed on either side of the valve.
- In preparing threaded pipe connections, care

- should be exercised to prevent pipe-sealing compound from getting into pipelines. Pipe sealing compound should be used sparingly, leaving the two end threads clean. Jordan uses, and recommends, thread sealer Teflon ribbon.
- The flow arrow on the valve body must be pointed in the direction of the flow. Ideally the valve should be installed in the highest horizontal line of piping to provide drainage for inlet and outlet piping, to prevent water hammer, and to obtain faster response.
- If possible, install a relief valve downstream from the valve. Set at 15 psi above the control point of the valve.
- In hot vapor lines, upstream and downstream piping near the valve should be insulated to minimize condensation.
- In gas service, if the control pressure (downstream) is 25% of the inlet pressure or less, expand the outlet piping at least one pipe size. A standard tapered expander connected to the outlet of the valve is recommended.
- Where surges are severe, a piping accumulator is recommended.
- On steam control applications, install a steam trap with sufficient capacity to drain the coil or condenser. Be sure to have a good fall to the trap, and no backpressure. Best control is maintained if the coil or condenser is kept dry.

### Control Line

A control line must be installed as follows:

- Connect one end of a 3/8" control line to the 3/8" NPT tapped opening in the underside of the lower spring housing.
- Connect the other end in a straight run of pipe 3 to 5 feet downstream of the valve.
- 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 downstream of the valve instead locate the tap in the pipeline lead-

### PROTECT VALVES WITH LINE STRAINERS

- ing to the vessel.
- The control line should be sloped away from the valve.
  - Install a shut-off valve (not a needle valve) in the control line.
  - Install a pressure gauge in the control line or near the inlet of the valve to aid in setting the valve and checking for inlet pressure during maintenance procedures. (There is a 1/4" NPT tapped opening in the lower bonnet.)

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## Start-Up

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- Fully open the control line shut-off valve.
- Fully open the outlet shut-off valve.
- Slowly open the inlet shut-off valve.
- Slowly open and close outlet shut-off valve several times. This fully strokes the valve to insure satisfactory operation.
- With the outlet shut-off valve open, slowly screw down the adjusting screw until the desired pressure is shown on the outlet pressure gauge.
- To change the controlled pressure, turn the adjusting screw clockwise to increase the pressure, and counterclockwise to decrease the pressure.
- Body and cap bolts should be retightened to 90-ft./lbs. torque after valve reaches operating temperature.

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## Trouble Shooting

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### If You Experience Erratic Control:

- Oversizing causes cycling and hunting and reduces the rangeability of the valve. Make certain that your sizing is correct.
- Steam Traps downstream may need attention.
- Safety Valve may be jammed open.
- 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 and clearance of the stem to the bushings.

### If the Valve Will not Operate:

- Diaphragm ruptured.
- Adjusting spring broken. Replace.
- Improper spring setting. Reset.

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## Maintenance

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**Caution: Ensure that the valve is de-pressurized before loosening any fittings and joints. The following steps are recommended before performing any maintenance on the valve.**

- Close the control line shut-off valve.
- Close the inlet shut-off valve.
- Allow pressure to bleed off through downstream piping. Do not attempt to reverse the flow through

- the valve by bleeding pressure from the upstream side of the valve.
- When the pressure gauges indicate that all pressure has been removed from the system, close the outlet shutoff valve. The valve may be removed from the line and serviced.

**Note: Refer to the drawings at the end of the document for description and proper orientation of parts.**

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## Seat Removal

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**Jordan Valve Sliding Gate Seats are lapped to light band flatness. Maintaining such tolerances is of paramount importance of your assurance of excellent operation and tight shutoff. DO NOT use metallic objects in removing the seats. Care in handling is imperative.**

- With the valve out of the line, remove the cap bolts (29), and lift the cap (28) straight up off of the body (19). Notice that the cap has an internal vertical web on which the disc spring is located. Check the connection of the disc spring (26).
- Lift the disc (25) off of the plate (23) and place on a clean surface with the lapped sides up.
- Place the valve body on its side. Place a hand over the plate (23) to receive it and tap lightly on the back of the plate with a soft, blunt object; push the plate (23) out evenly. Place the plate on a clean surface, lapped side up.
- Clean all parts and the body and cap with a good quality solvent. The disc (25) and the plate (23) may then be cleaned. Place a 4/0 polishing cloth or jeweler's cloth on a smooth, flat surface and in a figure "8" motion. If the parts are scarred, do not attempt to re-lap them, but return them to the factory for repair or replacement.
- Continue on to the procedures outlined under STROKE ADJUSTMENT.

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## Diaphragm Replacement

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- In removing the diaphragm (9), you must first remove the disc and the plate. This is outlined under SEAT REMOVAL previously.
- Remove all of the compression from the spring (6) by rotating the adjusting screw (1) counterclockwise until it moves freely. (*Failure to remove the pressure from the spring could result in personal injury or damage to the valve.*)
- Remove the spring housing bolts (8) and spring housing (7). Remove the spring (6), and the spring seat (5).
- Hold the disc pin (17) with an open-end wrench and remove the diaphragm assembly by rotating counterclockwise. The diaphragm assembly consists of the upper diaphragm plate (11), diaphragm (9), and lower diaphragm plate (12).
- If the diaphragm must be replaced, secure the low-

er diaphragm plate (12) in the vise. Use a wrench on the hex of the upper diaphragm plate (11) and turn counterclockwise to remove.

6. Remove the diaphragm and replace 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 - 1/4 turn.
7. Continue on to the procedures outlined under STROKE ADJUSTMENT.

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### Disc Pin Replacement

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1. Remove the disc and the plate, following the procedure outlined under SEAT REMOVAL.
2. Remove the diaphragm as outlined under DIAPHRAGM REPLACEMENT.
3. Holding the disc pin assembly with an open-end wrench, loosen the stem locknut (16). The stem (15) can now be unscrewed from the disc pin (17) and removed.
4. Remove the disc pin (17) and locknut (16).
5. Check the condition and clean all parts. Clean the stem bushing. Replace any defective parts.
6. Reassemble in reverse order and follow the procedures outlined under STROKE ADJUSTMENT.

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### Stroke Adjustment

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1. Do not tighten locknut (16) on the stem (15); run it to the upper end of the thread with the disc pin (17) located at about the center of the threaded section. The valve stroke adjustment is determined by how far the diaphragm assembly is threaded onto the stem. Holding the stem (15) lightly with pliers, thread the diaphragm assembly approximately 4 turns onto the valve stem (15) and center the disc pin (17) in the valve body. Tighten locknut (16).
2. Place the plate and disc in the valve body so that the disc pin (17) protrudes through the center slot in the plate (23) and engages the disc (25). Use new gaskets (21,22). Follow the same precautions outlined under SEAT REMOVAL. Align the plate (23) and disc (25) so that their markings (either TOP or TOP REVERSE) are toward the diaphragm.
3. Push the diaphragm assembly down against the valve body and check the orifice alignment of the disc (25) and plate (23). The orifices should be fully open and in perfect alignment.
4. If the orifices are not in perfect alignment, rotate the diaphragm assembly counterclockwise to lower the valve disc (25), and clockwise to raise the valve disc (25).
5. The total stroke of the Series 60 PRV is equal to the orifice width plus 1/16" overlap. Consequently, perfect alignment is required for proper operation.
6. After proper adjustment has been obtained, place the spring (6) on the upper diaphragm plate (11) and the spring seat (5) on the spring.
7. Before replacing the spring housing, be sure that

if the diaphragm is metal that it is centered in the body recess. If the diaphragm is elastomer and the seats are aligned, but the diaphragm and body bolt holes are not aligned, turn the diaphragm assembly counterclockwise to align the holes.

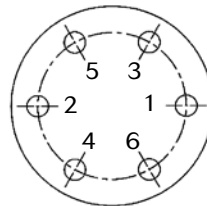
8. Make sure that the spring housing is centered on the body and hand tighten the spring housing bolts and nuts, then proceed with the TORQUE PROCEDURES.

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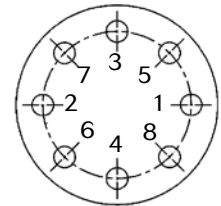
### Torque Procedure for Cap & Spring Housing Bolts

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1. Install all bolts hand-tight.
2. Torque the bolts in order of the bolt pattern to a value equal to 1/4 of the recommended torque value.
3. Re-torque each bolt to the recommended value using the same bolt pattern as shown.



6 bolts  
(or multiples)



8 bolts  
(or multiples)

Recommended Bolt Torque	
Body to Cap	90 ft./lbs.
Body to Spring Housing	125 ft./lbs. CS/SS Body
	85 ft./lbs. CI/DI Body
Spring Housing	85 ft./lbs. CI/DI Body

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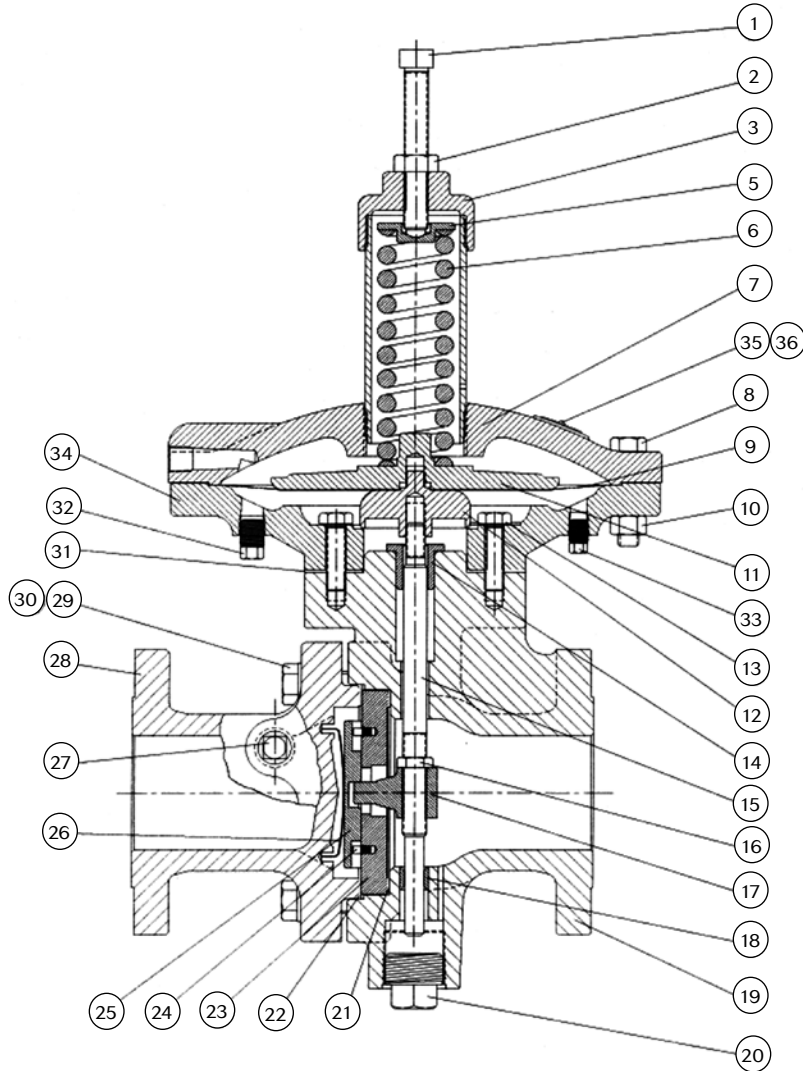
### Ordering Spare Parts

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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 Valve 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 able to be determined with 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 (see parts list chart).

**NOTE: Without a valve serial number, any parts ordered incorrectly are subject to up to a minimum 25% restock charge when returned.**

## Illustration and Parts List



Item	Description	Qty.
1	Adjusting Screw	1
2	Locknut	1
3	Closing Cap	1
5	Spring Seat	1
6	Spring	1
7	Spring Housing	1
8	Spring Housing Bolts	12
9	Diaphragm	2
10	Nut	12
11	Upper Diaphragm Plate	1
12	Lower Diaphragm Plate	1
13	Cap Screw	6
14	Upper Stem Bushing	1
*15	Stem	1
*16	Locknut	1
*17	Disc Pin	1
18	Lower Stem Bushing	1
19	Body	1
20	Pipe Plug	1
*21	Gasket	1
*22	Gasket	1
*23	Plate	1
*25	Disc	1
*26	Disc Spring	1
27	Pipe Plug	1
28	Cap	1
29	Cap Bolt	6
30	Lock Washer	6
31	Gasket	1
32	Pipe Plug	1
33	Pipe Plug	1
34	Lower Case	1
35	Name Plate	1
36	Drive Screw	2
*37	Index Pin	2
*	Recommended Spare Parts	