



# JORDAN VALVE

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## I & M MK 801/802 Series

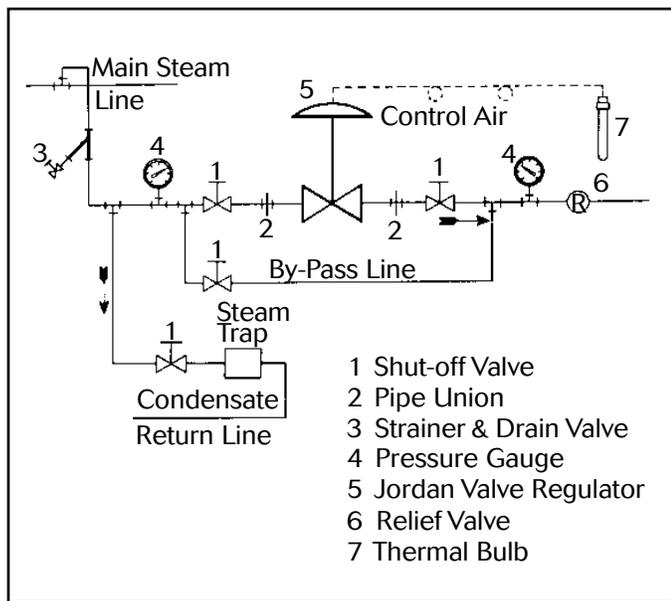
### Installation & Maintenance Instructions for Mark 801/802 Temperature Regulators

**Warning:** Jordan Valve temperature 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



### Preferred Installation

- To protect the temperature regulator from grit, scale, chips, and other foreign matter, all pipe lines and piping components should be blown out and thoroughly cleaned before the temperature regulator is installed.
- Shutoff valves, pressure gauges, and bypass piping should be installed as indicated in the Ideal Installation Schematic to provide easier adjustment, operation, and testing.
- In preparing threaded pipe connections, care should be taken to prevent pipe sealing compound from get-

ting 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.

- 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.
- 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.
- 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.
- For best control, 3'-0" straight sections of pipe should be installed on either side of the valve.
- To minimize condensation in hot vapor lines, upstream and downstream piping near the regulator should be insulated.
- For injection heating applications, the regulator should be installed above the maximum water level in the tank, or a check valve should be installed to prevent water from backing up into the regulator.
- For best regulation, the temperature regulator should be installed as closely as possible to the unit in which the temperature is being controlled.
- On steam control applications, install a steam trap of sufficient capacity to drain the coil or condenser. Be sure to have a good fall to the trap, and no back pressure. Best control is obtained when the coil or condenser is kept dry.

### Bulb Installation

The thermal system is hermetically sealed unit consisting of a sensing bulb, capillary tubing, protective armor, and actuator assembly. This unit contains the thermostatic charge that operates the temperature regulator. Please do not tamper with it. In case the charge is lost, the thermal system must be replaced as a complete unit. It is not repairable in the field and must be returned to the factory for repairs.

1. **Correct Installation:** for effective temperature control, correct installation of the sensing bulb is essential. For best results, the bulb should be installed at a point of true representative temperature and where there is good circulation. A thermometer or other temperature sensing device (if used) should be placed as close as possible to the sensing bulb of the regulator.
2. Handle the capillary and armor carefully so they are not crushed, kinked or twisted. A bend of 4-1/2" radius or larger is recommended.
3. *Horizontal Mounting* – When the bulb is to be mounted horizontally, it must be turned so that the word TOP (stamped on the adaptor) faces upward.
4. *Vertical Mounting* – No special precaution is required when the bulb is mounted vertically pointing down.
5. *Inverted Mounting* – A special capillary is required if the tip of the bulb will be higher than the capillary end. The temperature regulator equipped with a standard capillary will not function properly in an inverted position.
6. *Insertion* – For accurate control, the entire length of the bulb should be inserted. Avoid locating a bulb in the direct path of steam or water. Never lay the bulb on the bottom of a tank. Approximately 8" is sufficient distance from the source of heat or coolant to the sensing bulb.
7. *Pipeline Mounting* – When installing the sensing bulb in piping, be sure that the pipeline is at least twice the diameter of the sensing bulb so that free flow is obtained around the bulb.
8. *Finned Bulbs* – Finned bulbs should be installed at right angles to the air movement. Good circulation is required to sense the average temperatures.
9. When the bulb is installed at a point higher than the regulator itself, the range may be somewhat lowered. Conversely, the range may be raised if the bulb is installed below the regulator.

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## Troubleshooting

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### Erratic Control

- An oversized valve causes cycling or hunting. An undersized valve causes temperature to drop under peak loads. Recalculate required size from Jordan Catalog TCV.
- Inlet pressure may be low.
- Steam traps downstream may need reconditioning.
- Safety valve may be jammed open.
- Foreign matter may be lodged in valve seats.

### Underheating

- Be sure that by-pass seats are fully open.
- Be sure that inlet pressure is adequate.
- Clean line strainer screens.
- Clean steam traps and be sure that they are working properly. If the return line from the trap is cool, the steam coil may be clogged.

### Undercooling or Overcooling

- Be sure that coolant is circulating properly and that all steps have been taken as indicated for underheating or overheating as above.

### Thermal System Failure

- Thermal system failure is usually indicated by failure of the regulator to respond to temperature changes, and when all other troubleshooting steps have failed to correct the problem. The adjusting spring will hold a direct acting valve OPEN or reverse acting valve CLOSED.

The thermal system can be tested by placing the sensing bulb in a container which can be quickly heated with steam or hot water, or cooled with cold water or crushed ice. Observe the valve stem while alternately heating and cooling the bulb. If the stem does not move, it is likely that the thermal system has lost its fill. The thermal system is hermetically sealed and cannot be repaired in the field. It must be replaced by a complete, new thermal system or the old unit must be repaired at the factory.

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## Start-Up

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1. Close the inlet and outlet shut-off valves.
2. Slowly open the by-pass, and begin heating or cooling action.
3. Fully open the inlet shut-off valve. Then slowly open the outlet shut-off valve.
4. Close the by-pass valves when the approximate temperature is reached.
5. Allow approximately 30 minutes to reach stable operation before attempting to adjust the temperature setting (and after each new setting).
6. To change the control temperature, rotate the adjusting wheel downward to decrease and upward to increase the temperature setting.

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## Valve Seats

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### A. Disassembly

The valve seats in all Jordan temperature regulators are lapped to a light band flatness. Maintaining such tolerances is of great importance for your assurance of excellent control and tight shut-off. Do not use metallic objects in removing the seats. Care in handling is important. Improper handling will result in leakage or improper control upon installation.

1. Close shut-off valve on each side of the regulator.
2. Remove the control valve from the line.
3. With the valve in the horizontal position, secure the body hex in a vise with the valve cap (1) on top.
4. Remove the cap bolts (2) and lift the cap (1) straight up.
5. Remove the pressure ring (8). Remove the disc and plate assembly (4, 3) from the valve body. Invert the

valve body while holding the disc and plate assembly in place; then slowly let the assembly drop out of the body into your hand.

It is imperative that the Disc Pin assembly is not rotated when disassembling, cleaning or reassembling because it will affect the stroke adjustment of the valve.

6. Using a fine emery cloth, clean the plate seat in the body (49). Clean the body and cap cores with a good quality solvent.
7. To clean the disc (4) and plate (3), remove the guide screws (5). Place 4/0 polishing cloth or jeweler's cloth on a smooth, flat surface and polish the lapped surfaces of the disc and plate by rubbing them on the cloth in a circular motion. If the parts are scarred, do not attempt to re-lap them. Return them to the factory for repair or replacement. Clean the pressure ring (8) in the same manner.

### B. Reassembly

1. Place the disc (4) on the plate (3) and replace the guide screws (5). Do not allow the guide screws to bind.
2. Replace the disc and plate assembly in the valve body so that the disc pin engages the disc and the plate is seated firmly in the valve body.

The orifice alignment should be checked only when the actuator stem assembly is in the position (up or down) that will hold the valve fully open. *Direct Acting* - up and open. *Reverse Acting* - down and open.

3. Check the disc and plate orifice alignment. The orifices must be fully open and in perfect alignment.
4. If the orifices are not in perfect alignment, proceed to Valve Stroke Adjustment below. If the alignment is perfect, proceed with steps 5 and 6.
5. Once the orifices in the plate and disc are properly aligned, 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.
6. Remove the straight edge and replace the pressure ring, and the cap being careful not to rotate the seat assembly. Replace the cap bolts and tighten in the sequence and to the torque specified on the last page.

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## Disc Pin

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1. Remove the pressure ring (8) and the disc and plate assembly (4,3) as outlined in the preceding section "Valve Seats".

2. Remove the stem connector nut (19) and bolt (18). Remove the two halves of the stem connector (17).
3. Back out the four Allen headscrews (50) which will allow the yoke (20) to be lifted off the body (49).
4. Loosen the disc pin nut (7) and rotate the disc pin (6) counter-clockwise while putting the stem (16) upward. DO NOT completely remove the stem, but raise it only enough to allow the disc pin to be removed.
5. Replace the disc pin and reassemble in reverse order following procedures in "Valve Seats" and "Valve Stroke Adjustment".

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## Packing

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To replace the packing, the valve need not be removed from the line; however, PRESSURE MUST BE REMOVED FROM THE VALVE.

1. Loosen and remove the stem connector nut (19) and bolt (18), and remove the two halves of the stem connector (17).
2. Remove both packing flange nuts (15), the packing flange (12), and the packing follower (11).
3. The packing spring (9) should eject the packing (10); if not, a slight amount of downstream pressure might be necessary to remove the packing.
4. Remove the packing retainer (13) and the packing spring (9).
5. Clean the packing bore in the body and the stem thoroughly with solvent and blow out solvent.
6. Reassemble new packing in reverse order. Packing nuts must be tightened until the packing follower flange bottoms out on the top of the valve body.
7. Engage the valve stem (16) and actuator stem (22) in the stem connector (17). Replace stem connect to bolt and nut and tighten. No stroke adjustment is required.

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## Valve Stroke Adjustment

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If, after one of the preceding maintenance procedures, the valve requires a stroke adjustment:

1. Remove the pressure ring (8) and the disc and plate assembly (4, 3) as outlined in the section "Valve Seats".
2. Loosen the disc pin locknut (7) and replace the disc and plate assembly.
3. Loosen the stem connector nut (19) only enough to allow the stem (16) to rotate. DO NOT remove the stem connector (17) as proper positioning of the valve stem and actuator stem must be maintained.
4. **Direct Acting:** Make sure that the stem is stroked fully upward by the spring so that the seats are fully open. Cool the bulb if necessary, being careful not to cool to more than 30°F less than the lower limit of the control range.

5. **Reverse Acting:** Make sure that the stem is stroked fully downward so that the seats are fully open. Loosen the spring and pull the stem down or heat the bulb if necessary, being careful not to exceed the upper limit of the control range by more than 30°F.
6. The orifices in the plate (3) and disc (4) should be fully open and in perfect alignment. If the orifices are not properly aligned, adjust the position of the disc on the plate by rotating the valve stem (16) causing the disc pin (6) to move up or down, as required, on the stem. Once the orifices are properly aligned remove the plate and disc assembly and tighten the disc pin locknut (7) against the disc pin (6), being careful not to move the disc pin. Replace the plate and disc assembly and recheck the alignment to be sure nothing has moved.
7. Replace the pressure ring and cap as outlined in the "Valve Seat" section.

## Thermal System

1. The thermal system is hermetically sealed unit consisting of a sensing bulb, capillary tubing, protective armor, and actuator assembly. This unit contains the thermostatic charge that operates the TCV. Please do not tamper with it. In case the charge is lost, the thermal system must be replaced as a complete unit. It is not repairable in the field and must be returned to the factory for repairs.
2. The thermal system is easily removed in the field by releasing the spring (27) compression (by rotating the adjusting wheel (24) downwards) and removing the four filister head actuator screws (30). Do not remove the adaptor plate (31). The valve stroke adjustment will not be affected if the steps are followed carefully.

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## Thermometer

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If your Mark 801/802 Temperature Regulator is equipped with a dial thermometer, it can be recalibrated by turning the calibrator screw slightly, or removing the needle and replacing it while checking against a glass industrial thermometer. Do not attempt to remove the thermometer as it is also hermetically sealed with the thermal system.

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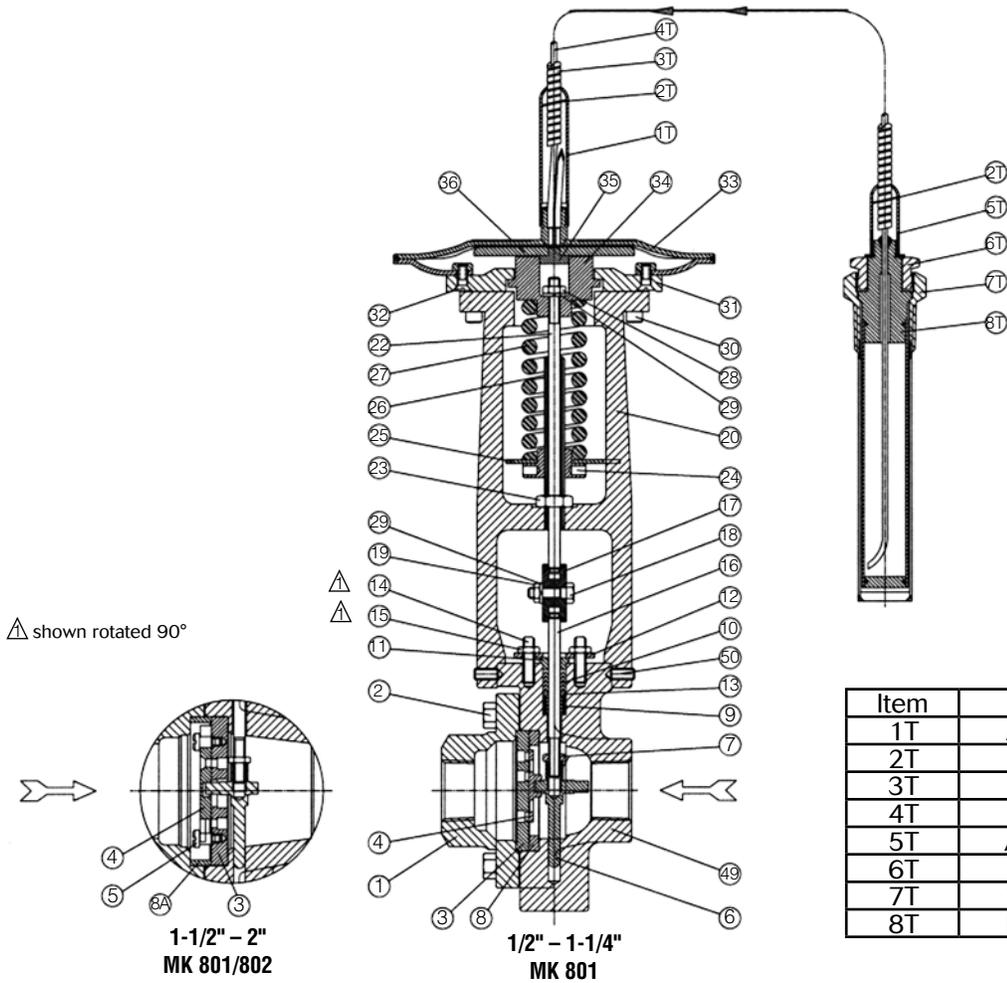
## Torque

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Torque for bolts (2) connecting valve cap to valve body (inch/pounds).

Valve Size	Valve Body Material	
	Ductile Iron Bronze	Carbon Steel Stainless Steel
1-1/2" – 2"	140	150

## Illustration & Part List



Item	Description	Quantity
1T	Adapter (Long)	1
2T	Retaining Ring	1
3T	Armor	8 ft
4T	Capillary	9 ft
5T	Adapter (Short)	1
6T	Bulb Nut	2
7T	Well Assembly	1
8T	Bulb Assembly	1

Item	Description	Quantity	Item	Description	Quantity
1	Cap	1	19	Stem Connector Nut	1
2	Cap Bolts	8	20	Yoke	1
3*	Plate	1	21	Nameplate (not shown)	1
4*	Disc	1	22	Actuator Stem	1
5	Guide Screw (1-1/2" – 2")	2	23	Lock Nut (Adjusting Post)	1
6*	Disc Pin	1	24	Adjusting Wheel	1
7*	Disc Pin Nut	1	25	Spring Washer	1
8*	Disc Guide (1/2" – 1-1/4")	1	26	Adjusting Post	1
8A	Pressure Ring (1-1/2" – 2")	1	27	Spring	1
9	Spring (Packing)	1	28	Nut (Actuator Stem)	1
10*	Packing	1	29	Lock Washer	2
11	Packing Follower	1	30	Screw (Yoke Adapter Plate)	4
12	Packing Flange	1	31	Adapter Plate	1
13	Packing Retainer	1	32	Screw (Adapter Plate- SWA)	4
14	Packing Stud	2	33	Actuator (SWA)	1
15	Nut (Packing Stud)	2	34	Stroke Stop	1
16	Stem	1	35	Plug (Diaphragm Plate)	1
17	Stem Connector	2	36	Diaphragm Plate	1
18	Stem Connector Bolt	1	49	Body	1
* recommended spare parts			50	Set Screw	4