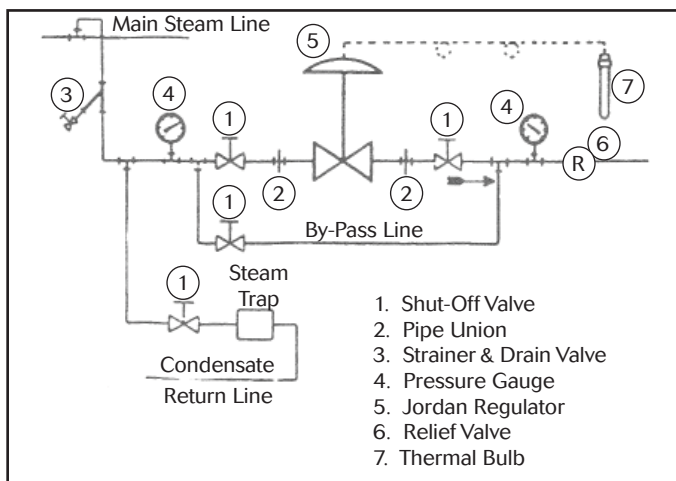


Warning: Jordan Valve Temperature Regulators must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued 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-term, trouble-free service if it is correctly installed. Spending a few minutes of your time reading these instructions now may save hours of trouble and downtime later.

Installation



1. To protect the temperature 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 temperature regulator is installed.
2. Shutoff valves, pressure gauges, and bypass piping should be installed as indicated in the diagram to provide easier adjustment, operation and testing.
3. In preparing threaded pipe connections, care should be taken 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 temperature 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

6. regulator.
6. The flow arrow on the regulator body must be pointed in the direction of the 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. Upstream and downstream piping near the regulator should be insulated to minimize condensation in hot vapor lines.
9. 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.
10. For best regulation, the temperature regulator should be installed as closely as possible to the unit in which the temperature is being controlled.
11. 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 a 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 4½" ra-

dus 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 a bulb on the bottom of the tank. Approximately 8" is sufficient distance from the source of heat or coolant to the sensing bulb.
7. *Pipeline Mounting* – When installing a 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.

Trouble Shooting

If You Experience 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.
- Foreign matter may be lodged in valve seats.
- Valve stroke may be out of adjustment.

If You Experience Underheating:

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

If You Experience Overheating:

- Overheating is often caused by foreign matter holding the valve seats in the open position. Inspect and clean seats or replace them.
- Check stroke adjustment.
- Check for damage or failure of the thermal system.

If You Experience Undercooling or Overcooling:

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

If You Experience Thermal System Failure:

Thermal system failure is usually indicated by failure of the regulator to respond to temperature changes, and when all other trouble shooting 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.

Start Up

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.

Note: These instructions apply to both the direct acting and the reverse acting regulators. The reverse acting regulator is identical to the direct acting regulator except for the design and operation of the pilot valve.

7. In the direct acting regulator, an increase of temperature at the sensing bulb will close the pilot valve seats which causes the main valve seats to close.
8. In the reverse acting regulator, an increase of temperature at the sensing bulb will open the pilot valve seats and main valve seats.

Therefore the reverse acting pilot valve assembly is an inverted version of the direct acting pilot valve. However, because of design differences, the upper bonnet of the regulator must be replaced to change the valve action.

Valve Seats

A. Disassembly

The valve seats of all Jordan 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. Note the scribe line on the side of the valve body and cap. Secure the outlet body hex (6) in a vise. Remove inlet pilot tube (25). Remove the cap screws (28) and lift the cap (7) straight up. Please note that there is an index pin secured in the valve cap that fits into the index pin hole in the valve plate (2). This index pin is on the same side as the scribe line on the valve cap and body, and it positions the valve plate in the valve body.
4. Before removing, check the valve disc (1) for a stamped arrow. This arrow points to the scribed line and the index pin hole in the valve plate. Since the disc can be rotated 180° in some sizes without affecting 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. A light tapping on the valve body is normally sufficient to loosen the pressure rings (8). Invert the valve body while holding the pressure ring and plate in place; then slowly let them drop out of the body into your hand.
6. Clean all the parts of the body and cap with solvent. The valve disc and plate then may 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 seating surfaces using a figure eight motion. If the parts are scarred, do not attempt to re-lap them, but return them to the factory for repair or replacement. If the seats are not scarred deeply, they can be repaired many times at nominal cost.
7. The vertical milled sections of the valve cap serve as a guide for the disc while stroking. A 0.005 feeler gauge should be used to check the clearance between the valve disc and the disc guides. To do so, place the valve disc in the cap with the lapped surfaces facing upward and check this clearance. If the clearance is less than 0.005, clean the disc guides 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 line 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. If necessary, heat (or cool) the sensing bulb to open the pilot valve.
4. To check the stroke adjustment, blow air into the inlet pilot 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 (4) 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. Place the plate and disc into the body bore followed by the pressure ring (8).
12. Note that the pressure ring (8) has one lapped surface. In replacing the pressure ring, make certain that the lapped surface faces the valve plate.
13. In replacing the valve cap (7), note that the scribe line on the valve cap and the valve body must be in alignment. Use care to make certain the disc guides and the index pin are properly aligned with the valve disc and the index pin hole in the valve plate. 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.
15. Replace inlet pilot tube (25).

Thermal System

1. The thermal system is a 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 replaced or returned to the factory for repairs.
2. The thermal system is easily removed in the field

by releasing the spring compression (by rotating the adjusting wheel downwards) and removing the four fillister head actuator screws (39).

3. Lift out the upper spring guide (41) and pilot stem (33). If necessary to replace pilot stem, remove the upper locknut (40) and unscrew the upper spring guide. Count the number of turns required to remove the upper spring guide. Replace the upper spring guide on the new pilot stem, using the same number of turns that were used to remove it. Lock it in position, using the upper locknut (40).
4. After removing the upper spring guide assembly, the adjusting spring (31) may be removed. Replace if necessary and replace the upper spring guide assembly.
5. Place the thermal system onto the cage (11) and reinsert the four actuator screws. The valve stroke adjustment will not be affected if these steps are carefully followed.

Replacement of Main Valve Diaphragm

1. Remove the inlet pilot tube (25) and outlet pilot tube (26). Follow the procedure outlined under Valve Seats and remove the valve disc and plate.
2. Unscrew the bottom cap (20) and remove the lower spring (22) and lower spring guide (21).
3. Remove the bonnet screws (29) and lift the bonnet assembly from the main valve body (6).
4. The diaphragm (30) can now be removed and replaced if necessary.
5. Remove the diaphragm plate (32).
6. To remove the disc pin (4), unscrew the stem locknut (18) and the disc pin from the valve stem (5). The stem can now be removed upward through the body flange.
7. The disc pin is removed through the valve body base.
8. Reassemble in reverse order. Insert the stem through the body flange and disc pin into the body bore.
9. Thread the stem into the locknut and then into the disc pin approximately 1/4".
10. Place the main diaphragm plate (32) on the valve stem.
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 to approximately 120 inch/pounds torque.
13. Insert the return spring guide (21) and the return spring (22) in the bottom cap (20) making certain that the spring guide engages the disc pin properly.
14. A stroke adjustment will be required. Please not the procedure outlined under Valve Seats, Reassembly.
15. Replace the inlet pilot tube and outlet pilot tubes.

Replacement of Stem Packing

1. Turn adjusting wheel (35) until all spring compression is removed.
2. Completely unthread the ring nut (23).
3. Lift off entire top assembly, being careful to avoid the trapped steam which will now escape. Examine the pilot stem (33) for dirt.
4. Remove packing nut (13) and packing gland (14).
5. Remove pilot seat (12) and examine the Teflon ring for foreign matter which might prevent the pilot stem from seating properly.
6. In the direct acting regulator, the lower end of the pilot stem is the seating surface. In the reverse acting regulator, the lower pilot stem is separate from the pilot stem and is removed after the pilot seat.
7. Replace packing (15) and o-ring (16).
8. Reassembly in reverse order.

Thermometer

If the regulator is equipped with a dial thermometer, it can be re-calibrated by holding the pointer hub with a screwdriver and moving the pointer to the correct temperature.

Torque

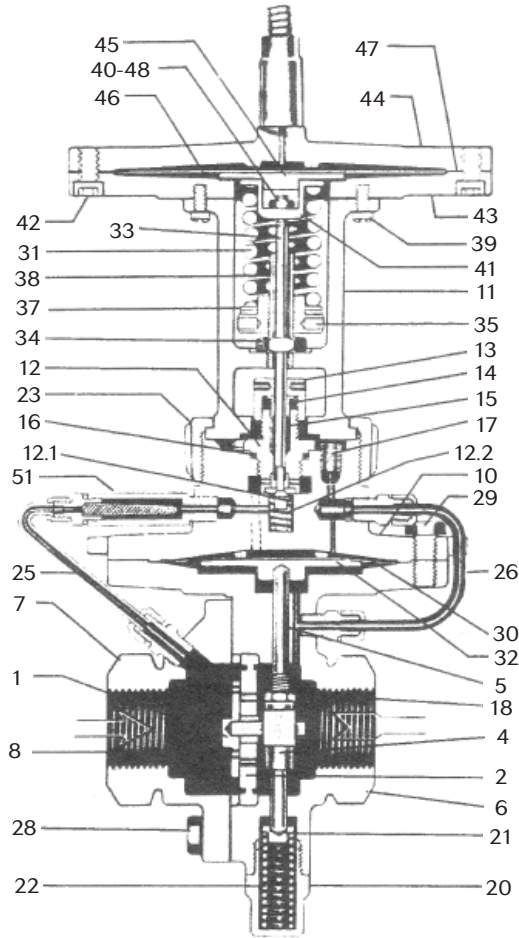
Torque Requirements for Body Bolts	
Valve Size	Torque (in./lbs.)
1/4" & 3/8"	70
1/2" & 3/4"	110
1" & 1-1/4"	120
1-1/2"	140
2"	140

Ordering Spare Parts

Use only genuine Jordan Valve parts to keep your valve in good working order. So 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, Plug Material and Seat Size, Spring Range or 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 a minimum 25% restock charge when returned.

Illustration and Parts List



Item	Description	Item	Description	Item	Description
1	Disc	16	O-Ring	34	Nut
2	Plate	17	Pipe Plug	35	Adjusting Wheel
4	Disc Pin	18	Nut	37	Washer
5	Stem	20	Bottom Cap	38	Adjusting Screw
6	Body	21	Spring Guide	39	Screw
7	Cap	22	Lower Spring	40	Nut
8	Pressure Ring	23	Ring Nut	41	Spring Guide
10	Bonnet	25	Inlet Pilot Tube	42	Screw
11	Cage	26	Outlet Pilot Tube	43	Diaphragm Case
12	Pilot Seat	28	Body Cap Screw	44	Diaphragm Dome
12.1*	Pilot Stem	29	Bonnet Cap Screw	45	Diaphragm Plate
12.2*	Pilot Stem Spring	30	Diaphragm	46	Diaphragm
13	Packing Nut	31	Adjusting Spring	47	Gasket
14	Packing Gland	32	Diaphragm Plate	48	Lock Washer
15	Packing	33	Stem	†	Recommended Spare Parts

* Parts required for reverse acting regulators only.