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I & M Mark 85

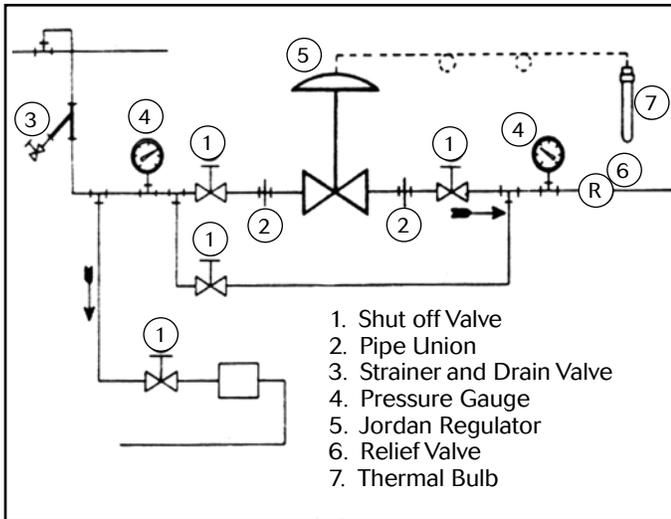
Installation & Maintenance Instructions for Mark 85 Fail-Safe Temperature Regulator

Warning: Jordan Valve Regulators and Control Valves 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



- 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.
- Shut-off valves, pressure gauges, and by-pass piping should be installed as indicated in the diagram to provide easier adjustment, operation, and testing.
- 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.
- 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.
- 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 regulator.
- In hot vapor lines, upstream and downstream piping near the regulator should be insulated to minimize condensation.
- 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.
- 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.

- 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 with a radius of 4-1/2 pipe diameters or larger is recommended.
3. HORIZONTAL MOUNTING - When the bulb is to be mounted horizontally, it must be turned so that the word TOP and a center punch mark (stamped on the adaptor) faces upward.
4. VERTICAL MOUNTING - No special precaution is required when the bulb is mounted vertically.
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 8D 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 temperature.
9. When the bulb is installed at a point higher than the regulator itself, the range will probably be somewhat lowered. Conversely, the range will be raised if the bulb is installed below the regulator.

Troubleshooting

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.
- Safety relief valve may be jammed open.
- Foreign matter may be lodged in valve seats.
- Valve stroke may be out of adjustment.

If You Experience Underheating:

- Be sure that shut-off valves 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.

If You Experience Overheating:

- Overheating is often caused by foreign matter hold-

ing 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 that coolant is circulating properly and that all steps have been taken as indicated for underheating or overheating in items 2 and 3 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 CLOSED or reverse acting valve OPEN.

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 increase and upward to decrease the temperature setting.
7. Body and cap bolts should be retightened per torque procedures after valve reaches operating temperature.

Valve Seats

A. DISASSEMBLY

The valve seats in all Jordan regulators are lapped to light band flatness. Maintaining such tolerances is of paramount importance for your assurance of excellent control and tight shut-off. Do not use metallic objects in removing the seats. Care in handling is imperative.

1. Close shut-off valve on each side of the regulator.
2. Remove the regulator from the line.
3. Note the \times on the side of the valve body and cap. Secure the outlet body hex (1V) in a vise. Remove the cap screws (17V, 20V) and lift the cap (2V) straight up. Please note that there is an index pin secure in the valve cap that fits in to the index pin hole in the valve plate. (3V) This index pin is on the same side as the \times on the valve cap and body, and it positions the valve plate in valve body.
4. Before removing, check the valve disc (4V) for a stamped arrow. This arrow points to the \times and the index pin hole in the valve plate. Since the disc can be rotated 180 degrees 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. A light tapping on the valve body is normally sufficient to loosen the pressure ring (5V) and plate (3V). 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.

IMPROPER HANDLING OF THE SETS WILL RESULT IN LEAKAGE OR IMPROPER CONTROL.

It is imperative that the disc pin (7V) is not rotated when disassembling, cleaning, or reassembling, since this affects the stroke adjustment of the valve.

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. Return 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 guide for the disc while stroking. A 0.005 feeler gauge should be used to check the clearance between the sides of 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 sides of the disc guides with a smooth file.

B. REASSEMBLY

1. Place the valve plate in the body seat recess. In replacing, be sure that the index pin hole is on the same side as the \times on the valve body. Align the disc pin so that it is centered in the body bore and protrudes through the center slot of the valve plate.
2. Place the valve disc on the valve plate, engag-

- ing the disc pin. Be sure that the arrow which is stamped on the disc points to the \times on the valve body.
3. Note that the pressure ring has one lapped surface. In replacing the pressure ring, make certain that the lapped surface faces the valve plate.
4. In replacing the valve cap, note that the \times on the valve cap and body must be in alignment. Use care to insure that the disc guides and the index pin are properly aligned with the valve disc and index pin hole in the valve plate. Normally, a slight rotation of the valve cap is sufficient to obtain proper alignment.
5. Install the cap screws and tighten uniformly, diagonally from each other. See back page for torque requirements.

Disc Pin Assembly

1. Remove the valve disc and valve plate (3V, 4V) following the procedure outlined under "Valve Seats" above.
2. Loosen the steam connector nut and bolt (10Y and 11Y) and remove connector assembly (9Y).
3. Back out the four allen head yoke screws (2Y) which will allow the valve body (1V) to be separated from the valve yoke (1Y).
4. Loosen the lower rod locknut (8V) and rotate the disc pin counterclockwise, pulling valve stem (9V) upward while doing so. Do not remove the valve stem completely but raise it sufficiently so that the disc pin may be removed by pulling up and out.
5. Replace the disc pin and reassemble in reverse order following the procedures outlined under VALVE SEATS and STROKE ADJUSTMENT.

Packing

1. Remove connector assembly (9V).
2. Remove both packing flange nuts (16V).
3. Remove packing flange (14V) and packing follower (13V).
4. Should packing spring (10V) not eject packing set, a slight amount of downstream pressure might be necessary to remove the packing set.
5. Remove packing retainer (11V) and packing spring (10V).
6. Clean packing bore with solvent and blow out thoroughly.
7. Assemble in reverse order and tighten packing nut (16V) so that packing follower (13V) bottoms out on top of valve body.
8. Engage valve stem (9V) and actuator stem (8Y) with connector (9Y). Tighten connector nut and bolt. No stroke adjustment is required.

Thermal System

1. The Series 85 thermal system consists of the sensing bulb, capillary, armor, diaphragm dome, diaphragm case, diaphragm plate, optimal pressure gauge, and Tru-Seal. This complete unit contains the thermostatic charge. **DO NOT TAMPER WITH THE UNIT OR LOOSEN PRESSURE GAUGE BECAUSE THE THERMOSTATIC CHARGE COULD BE LOST.** If the thermostatic charge is lost, the thermal system must be replaced as a complete unit. It cannot be repaired in the field. It must be returned to the factory for repairs.
2. The complete thermal system is easily replaced in the field by removing the stem connector assembly (9Y, 10Y, 11Y) and by then removing the four fillister head screws (7Y).
3. Replace the thermal system in the reverse order. **CHECK THE STROKE ADJUSTMENT AS OUTLINED BELOW.**

Valve Stroke Adjustment

A. DIRECT ACTING

1. With the thermal system attached to the yoke and the stem connector assembly secured, release the spring compression by rotating the adjusting wheel (5Y) downward. The sensing bulb should be maintained at a temperature below the low point of the regulator range. This ensures that the thermal system is stroked fully upward.
2. Remove the cap (2V) and check the alignment of the orifices in the disc and plate. The disc (4V) should be in the uppermost position with the orifices perfectly aligned and fully open.
3. Adjust the position of the disc (4V) on the plate (3V) by first loosening the stem connector nut and bolt (10Y, 11Y) and locknut (4Y) and then threading the actuator stem (8Y) into the adjusting screw (3Y) to raise the disc, or out of the adjusting screw to lower disc.
4. When the proper adjustment is obtained, tighten the stem connector nut (11Y) and bolt (10Y) and the locknut (4Y).
5. Replace the cap (2V) as outlined under VALVE SEATS.

B. REVERSE ACTING

1. With the thermal systems attached to the yoke, and with the stem connector assembly secure, fully compress the spring by rotating the adjusting wheel (5Y) upward. This ensures that the thermal system is stroked fully downward.
2. Remove the cap (2V) and check the alignment of the orifices in the disc and plate. The disc (4V) should be in the lower-most position with the

orifices perfectly aligned and fully open.

3. If the disc and plate are not properly aligned, follow steps 3, 4, and 5 as outlined above for DIRECT ACTING STROKE ADJUSTMENT.

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.

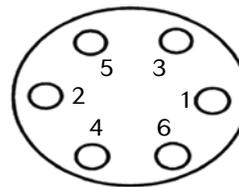
NOTE: Any parts ordered without a valve serial number that are found to be incorrect are subject to up to a minimum 25% restock charge when returned.

Torque Values

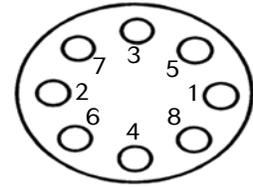
Standard Torque for Cap to Body Bolts (in. - lbs.)

| Valve Size | Valve Body Material | |
|-------------|------------------------|-------------------------------|
| | Ductile Iron Bronze | Cast Steel Stainless Steel |
| 1/4" & 3/8" | 70 | 150 |
| 1/2" & 3/4" | 110 | 150 |

Bolt Pattern / Torquing Sequence

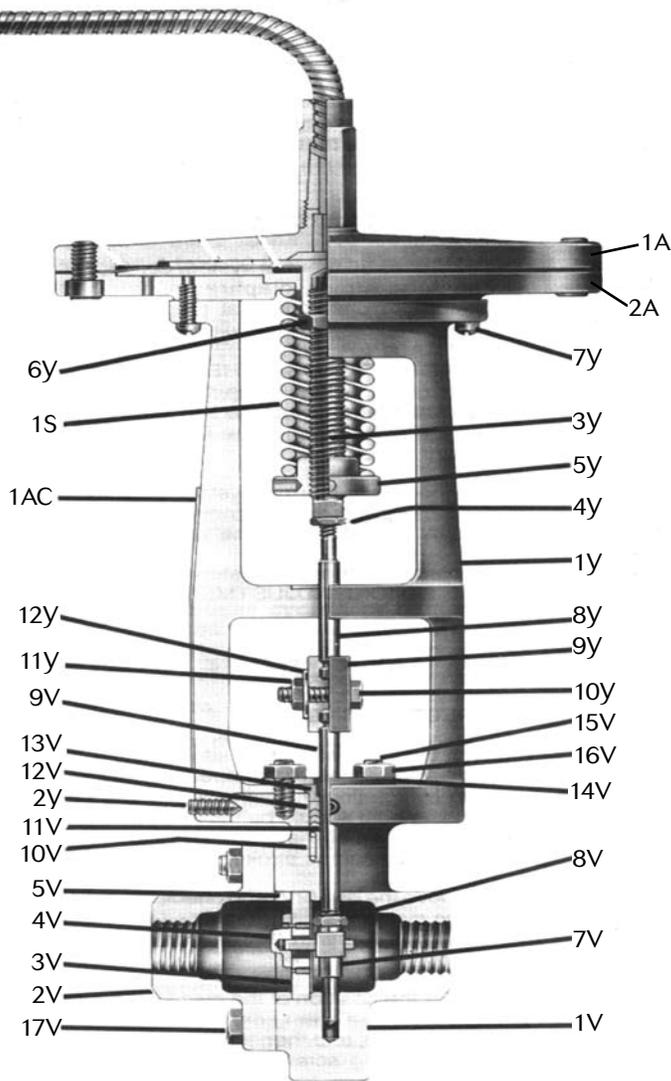


6 bolts
(or multiples)



8 bolts
(or multiples)

Illustration and Parts List



Special Note

To reverse the action of a temperature regulator, rotate the disc and the plate 180°. A slight stroke adjustment is necessary as outlined above depending on the action now required.

Direct Acting
up and open
INDEX PIN

Reverse Acting
down and open
INDEX PIN



| Item | Description | Item | Description | Item | Description | Item | Description |
|------|-------------------------|------|-----------------|------|-----------------------|------|---------------------|
| 1A | Upper Diaphragm Case | 1S | Adjusting Screw | 10y | Connector Bolt | *8V | Lower Rod Lock Nut |
| 2A | Lower Diaphragm Case | 1Y | Yoke | 11Y | Connector Nut | *9V | Valve Stem |
| 3A | Diaphragm Plate | 2Y | Yoke Screw | 12Y | Lock Washer | 10V | Packing Spring |
| 4A | Plate Washer | 3Y | Adjusting Screw | 1V | Valve Body | 11V | Packing Retainer |
| 5A | Diaphragm | 4Y | Locknut | 2V | Valve Cap | *12V | Packing |
| 6A | Sealing Gasket | 5Y | Adjusting Wheel | *3V | Plate | 13V | Packing Follower |
| 7A | Case Bolt | 6Y | Adjusting Nut | *4V | Disc | 14V | Packing Flange |
| 8A | Vacuum Gauge (optional) | 7Y | Actuator Screw | *5V | Pressure Ring | 15V | Packing Flange Stud |
| 9A | Tru-Seal Nut (optional) | 8Y | Actuator Stem | 6V | Index Pin (not shown) | 16V | Packing Nut |
| 1AC | Name Plate | 9Y | Stem Connector | *7V | Disc Pin | 17V | Body Cap Screw |
| * | Recommended Spare Parts | | | | | | |