JORDANVALVE

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I & M Mark 80

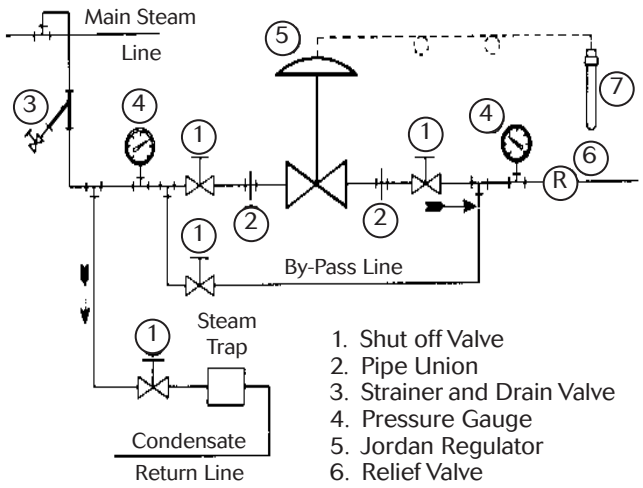
Installation & Maintenance Instructions for Mark 80 Temperature Regulator

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



1. To protect the valve 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.
2. Shutoff valves, pressure gauges and by-pass piping should be installed as indicated in the Ideal Installation Schematic to provide easier adjustment, operation, and testing.
3. 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.
4. For best control, 3' 0" straight sections of pipe should be installed on either side of the valve.
5. In preparing threaded pipe connections, care should be exercised to prevent pipe-sealing compound from getting into the pipelines. Pipe-sealing compound should be used sparingly, leaving the two end threads clean. Jordan uses, and recommends, thread sealer Teflon ribbon.
6. The flow arrow on the valve body must be pointed in the direction of 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.
7. If possible, install a relief valve downstream from the valve. Set at 15 psi above the control point of the valve.
8. In hot vapor lines, upstream and downstream piping near the valve should be insulated to minimize condensation.
9. 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.
10. Where surges are severe, a piping accumulator is recommended.
11. 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.
12. For injection heating applications, the regulator should be installed above the maximum water level in the tank, or a check valve should be used to prevent water from backing up into the regulator.
13. For best regulation, the temperature regulator should be installed as closely as possible to the unit in which the temperature is being controlled.

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 evaluation.

PROTECT VALVES WITH LINE STRAINERS

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 adapter) 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 the 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.

Trouble Shooting

If You Experience Erratic Control:

- An oversized valve causes cycling or hunting. An under sized valve causes temperature to drop under peak loads. Recalculate required size.
- 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 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 holding the valve seats in the open position. Inspect and clean seats or replace them.
- Check stroke adjustment.
- Check or 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 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 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 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.
7. Body and cap bolts should be retightened per torque procedures after valve reaches operating temperature.

Valve Maintenance

Caution: Make certain that there is no pressure in the valve before loosening any fittings or joints. The following steps are recommended:

1. Close inlet shutoff valve.
2. Allow pressure to bleed off through downstream piping. Do not attempt to reverse the valve by bleeding pressure from the upstream side of the valve.
3. When the pressure gauges indicate that all pressure has been removed from the system,

close the outlet shutoff valve, and the valve may be serviced.

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

Click here to view the Repair and Maintenance video for the Mark 80 Series or visit jordanvalve.com/support/videos.

Valve Seats

A. DISASSEMBLY

The valve seats in all Jordan regulators are lapped to a 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 the shutoff valve on each side of the valve, and remove valve from line.
2. Note scribed "<" on the side of the valve body (1) and cap (2). Secure the body outlet flat in a vise. Remove the cap screws and two nuts, and lift the cap straight up.
3. Before removing, check the disc (5) for a stamped arrow. This arrow points to the "<" on the body. Remove the disc guide and the disc. Place the valve disc on the bench with lapped surface facing up. Protect the lapped surfaced on both sides of the disc guide.

IMPROPER HANDLING OF SEATS WILL RESULT IN LEAKAGE OR POOR CONTROL.

It is imperative that the disc pin not be rotated when disassembling, cleaning, or reassembling, since this affects the stroke adjustment.

4. Lightly tap on the body to remove the plate (4). Invert the body, let valve plate drop out into your hand, and place it on the bench with lapped surface facing up.
5. Clean all the parts, body, and cap with solvent. Place a piece of 4/0 polishing cloth or jewelers cloth on a smooth, flat surface such as a surface plate, and polish the disc, plate, and disc guide lapped seating surfaces using a "figure 8" motion. If the parts are scarred, do not attempt to re-lap them, but return them to the factory for repair and replacement. If the seats are not scarred deeply, they can be repaired at nominal cost.
6. The vertical sections of the disc guide serve as guides for the disc while stroking. A 0.005" feeler gauge should be used to check for clearance between this surface and the side of the disc. If the clearance is less, clean the guide surfaces in the disc guide with a fine file.

B. REASSEMBLY

1. Place the plate in the body, lapped surface facing the cap. The index pin hole should be on the same side as the "<" on the body. Align the disc pin so that it is centered in the body bore and protrudes though the center slot in the valve plate (unless you are changing the valve action - See Section on Changing Valve Action.)
2. Place the disc on the plate, engaging the index pin. If there is an arrow on the disc, it should point toward the index pin hole on the plate.
3. Place the disc guide onto the plate, engaging the disc pin. Rotate the assembly slightly until the slot openings in the disc are parallel to the opening in the plate, and perpendicular to the stem. Stroking the valve will aid in this alignment.
4. Align the ">" on the cap with the "<" on the body, and place the cap over the two studs in the body.
5. Install the nuts and cap screws. Tighten uniformly. See back page for torque requirements and tightening procedures.

Stem, Disc Pin & Packing Replacement

1. Remove disc and plate following the procedure outlined under *Valve Seats*.
2. Loosen stem connector nut and bolt and remove connector.
3. Back out the four allen head yoke screws (1/2" - 2" sizes) which will allow the body to be separated from the yoke.
4. Remove the packing flange nuts and the packing flange.
5. Loosen the stem locknut and rotate the disc pin counterclockwise, pulling the valve stem upward while doing so.
6. When pulling the stem completely out of the body you will remove most of the packing assembly also. The remaining parts of the packing assembly can "fished" out with a small screw driver.
7. Clean the packing bore in the body with solvent and blow dry.
8. The disc-pin may be removed through the body bore.
9. Clean the stem and disc-pin with solvent if they are to be reused.
10. Reassemble the disc-pin, stem and locknut in the valve body as they originally were.
11. Replace the packing spring and packing retainer in the packing bore.
12. Reassemble the new packing on the stem with the open part of the "V" downward (^). There will be a flat on the top and bottom. Place the packing follower on top of the packing.
13. Gently push the packing into the packing bore and place the packing flange on the stem and over the packing studs.
14. Put on the flange nuts and tighten them partially. At this point it is recommended that you gently move the stem up and down three or four times to align

the assembly.

15. Tighten the flange nuts until the packing follower bottoms out on the top of the body.
16. Replace actuator in reverse order. Reassemble the valve by inserting seats as outlined in Valve Assembly Section for the size valve you are working with. Then follow the instruction for seat alignment.

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 returned to the factory for repairs.
2. The thermal system is easily removed in the field releasing the spring compression (by rotating the adjusting wheel downwards) and removing the four filister head actuator screws (7Y). Do not remove the adaptor plate (4A) as this will allow excessive stroking of the specially formed diaphragm, thereby causing malfunction. To reassemble, merely place the new thermal system onto the yoke (1Y) and reinsert the four actuator screws. The valve stroke adjustment will not be affected if the steps are followed carefully.

Valve Stroke Adjustment

If the temperature regulator requires a stroke adjustment after maintenance on one of the above points, follow these procedures.

A. Direct Acting

1. Make sure that the actuator stem is stroked fully upwards by the spring.
2. Loosen the locknut (8V) and the stem connector bolt (12Y) but do not remove the connector assembly (10Y).
3. Install the plate and disc in the valve body following the procedures outlined under VALVE SEATS. Orifices of the disc and plate must perfectly align in the full open position. Loosen the stem locknut (8V) and adjust the position of the disc on the plate by rotating the valve stem (9V) (clockwise to raise and counter clockwise to lower) until the seats are in the fully opened position.

Note: The stem will rotate in the stem connector if the connector bolt is loosened slightly. Proper positioning of the valve stem and actuator stem must be maintained during adjustment of the seats.

B. Reverse Acting

1. Make sure that the actuator stem is stroked fully downwards. Loosen the spring completely and pull down on the stem or heat the bulb so that the actuator moves the stem downward. Then, follow the procedures 2 and 3 under Direct Acting above.

After perfect alignment is obtained, tighten the stem connector bolt and nut (11Y, 12Y) and the locknut (8V)

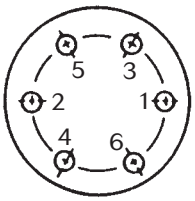
Ordering Spare Parts

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.

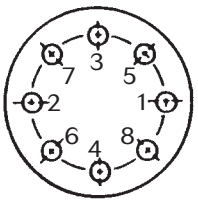
NOTE: Any parts ordered without a valve serial number that are found to be incorrect are subject to up to a minimum 25% restock charge when returned.

Torque Requirements

Valve Size	Body Material	
	Cast Iron Ductile Iron Bronze	Cast Steel Stainless Steel
1/2″ & 3/4″	140 in.-lbs.	200 in.-lbs.
1″ & 1-1/4″	140 in.-lbs.	200 in.-lbs.
1-1/2″ & 2″	140 in.-lbs.	200 in.-lbs.

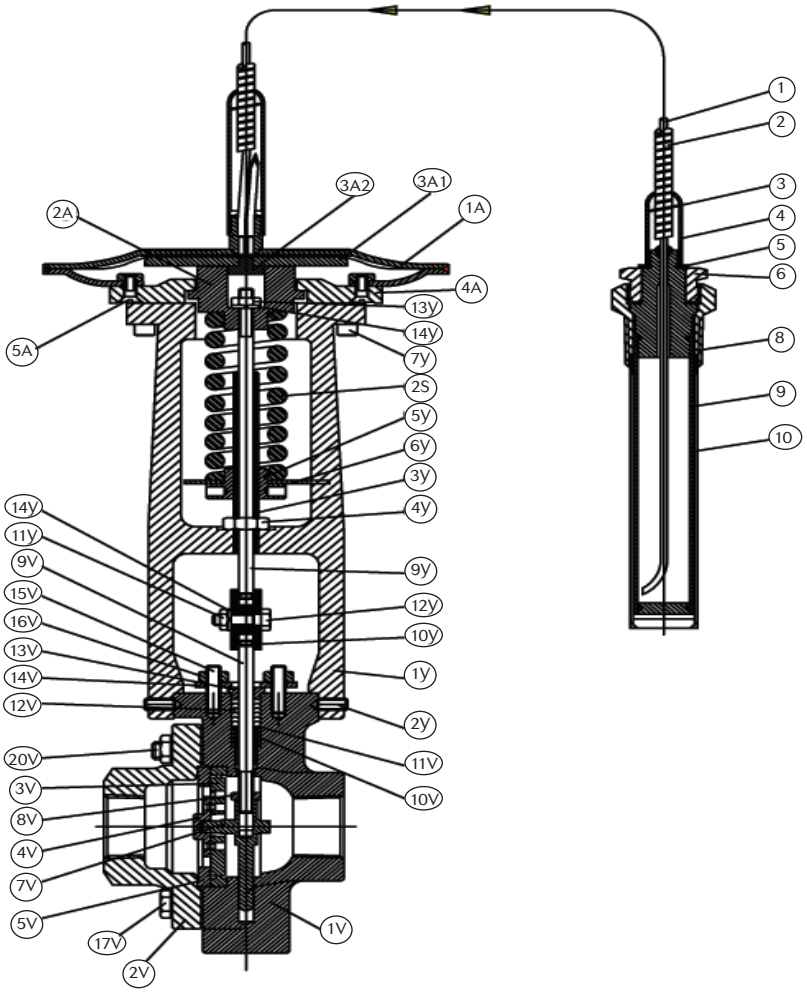


6 bolts
(or multiples)



8 bolts
(or multiples)

Illustration and Parts List



Special Note

To reverse the action of a temperature regulator, rotate the disc and plate 180°. A slight stroke adjustment may be necessary.

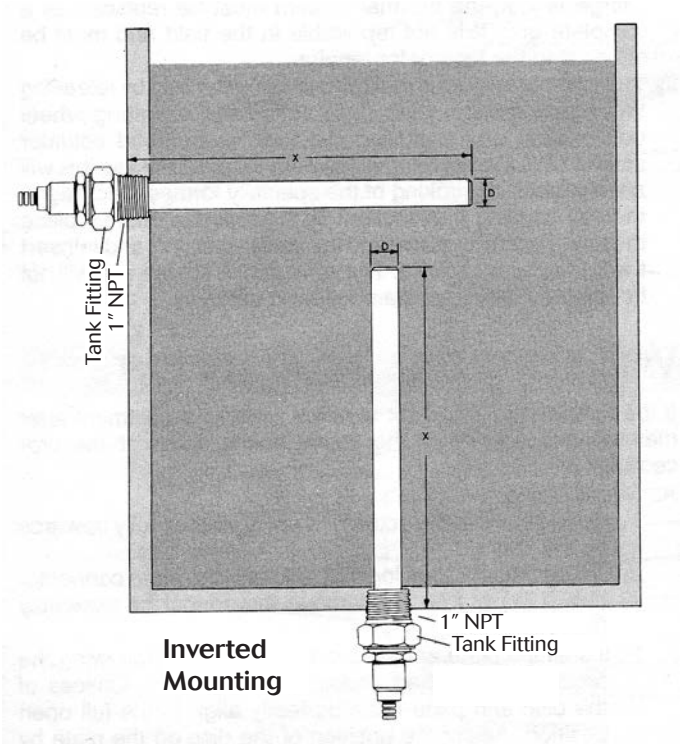
Direct Acting up and open INDEX PIN	Reverse Acting down and open INDEX PIN
	

Item	Description	Item	Description	Item	Description
1V	Body	17V	Body Cap Screw	14y	Lockwasher
2V	Cap	20V	Body Stud and Nut	1A	Actuator Assembly
3V	Plate	1AC	Name Plate (not shown)	2A	Stroke Stop
4V	Disc	2S	Spring	3A1	Diaphragm Plate
5V	Disc Guide	1y	Yoke	3A2	Diaphragm Plate Lug
6V	Index Pin (not shown)	2y	Yoke Screw	4A	Adaptor Mounting Plate
7V	Disc Pin	3y	Adjusting Post	5A	Mounting Plate Screw
8V	Stem Locknut	4y	Jam Nut	1	Capillary
9V	Valve Stem	5y	Adjusting Screw	2	Armor
10V	Packing Spring	6y	Spring Washer	3	Retaining Ring
11V	Packing Retainer	7y	Actuator Screw	4	Short Adaptor
12V	Packing	9y	Actuator Stem	5	Retaining Ring
13V	Packing Follower	10y	Stem Connector	6	Bulb Nut
14V	Packing Flange	11y	Stem Connector Nut	8	Tank Fitting
15V	Packing Flange Stud	12y	Stem Connector Bolt	9	Bulb Assembly
16V	Packing Flange Nut	13y	Stroke Stop Nut	10	Well Assembly

Thermal System

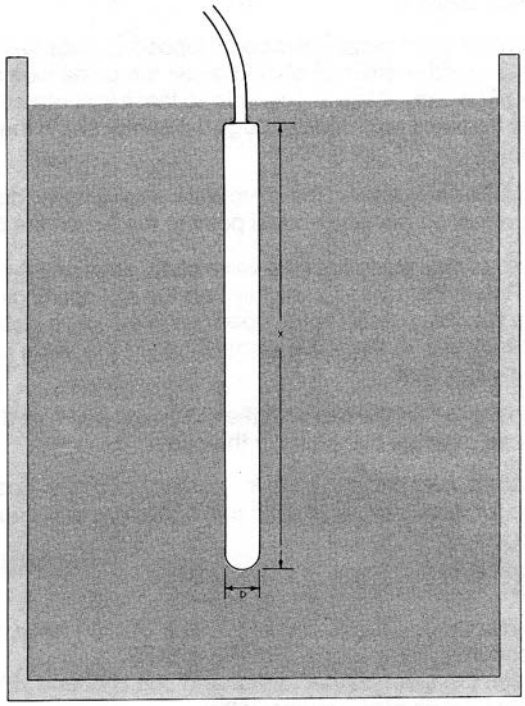
TYPE A BULB - STANDARD

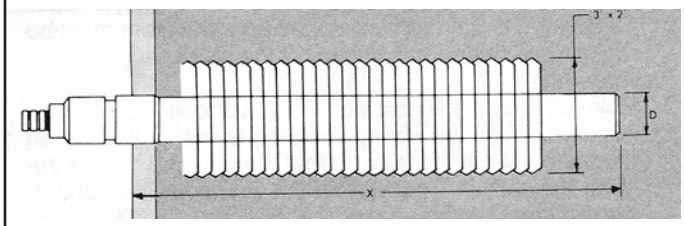
Type A — The standard JORDAN thermal bulb that can be used for applications requiring threading of the bulb into a tank, piping, etc. It may also be threaded into a thermowell. Fitting is 1″ NPT. Refer to factory for special lengths.



TYPE B BULB - PLAIN

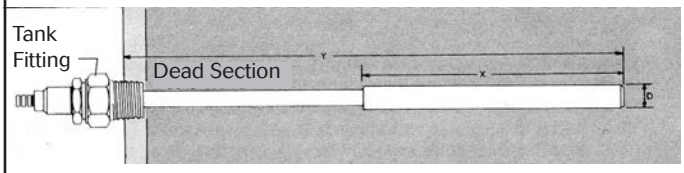
Type B — A plain bulb which does not have a tank fitting. It is made for suspension in open tanks. The capillary and armor should be properly supported so that the possibility of crimping is eliminated. Type B bulbs are used for coated bulbs. Plastisol coating is suitable for 160°F maximum. Use Teflon for higher temperature.





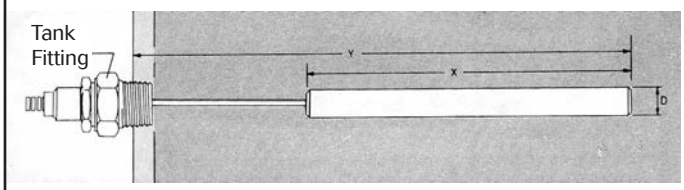
TYPE C BULB - FINNED

Type C — A finned bulb made for sensing atmospheres. Its fins increase the effective exposed surface, giving the necessary sensitivity. It is used effectively in air ducts, drying kilns, etc. Good circulation is necessary, and the bulb is generally installed with the use of a split flange downstream of the blower or fan. Available in copper with aluminum fins only. An 8″ diameter flange is optional.



TYPE D BULB - RIGID EXTENSION

Type D — A rigid extension type thermal bulb. The extension is generally a dead section. The length of the live section is the same as the Type A, and the length of the dead section would depend upon your requirements. Used on large tanks where poor circulation causes false temperature readings at the walls. The tank fitting can be threaded directly into the tank, and a well is not required.



TYPE E BULB - EXTENSION

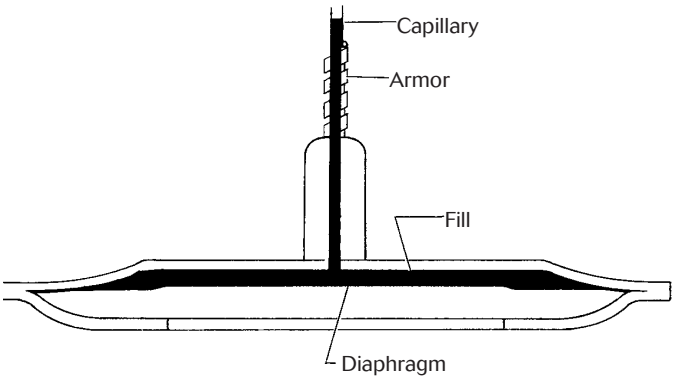
Type E — An extended type thermal bulb that is pressure tight. If mounted horizontally, a well is needed for support. The length of the live section is the same as the standard bulb.

Thermal System

OPERATION OF THERMAL SYSTEM

The LIQUID-VAPOR thermal system used on all Jordan temperature regulators is capable of delivering far more operating power than the simple liquid expansion system used on many competitive valves.

A pre-measured amount of volatile liquid fill is drawn into the thermal system, filling the upper diaphragm chamber, the capillary tube, and most of the bulb. As the controlled temperature increases, the volatile liquid fill in the sensing bulb begins to vaporize and creates pressure in the sealed system. This pressure, exerted on the diaphragm, drives the valve stem which closes direct acting valve seats or opens reverse acting valve seats.



SENSING BULB

The sensing bulb contains the volatile liquid fill. Standard sensing bulbs are copper and stainless steel. Other materials are available on special order. Special protective coatings such as Plastisol, or Teflon are also available on special order. The type B bulb is always used when a special protective coating is required. Special bulbs may, in some cases, be made to fit existing equipment; however, the dimensions change sharply and must be confirmed by Jordan's Engineering Department.

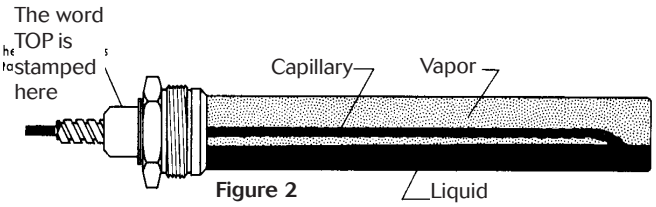


Figure 2

DIAPHRAGM & DIAPHRAGM HOUSING

Many Jordan temperature regulators feature the SWA actuator. The diaphragm housing is composed on two formed stainless steel plates. A stainless steel diaphragm is placed between the two plates and the three parts are heliarc welded to assure a vapor-tight assembly.

Other Jordan Regulators have cast iron diaphragm housing plates with a diaphragm bolted between them.

CAPILLARY & ARMOR

The capillary, connecting the sensing bulb to the diaphragm housing is copper as standard, or stainless steel as an alternate. Standard length is 8′ 0″ but other lengths, even up to 100′ 0″, are available on special order.

A flexible stainless steel armor is used to protect the copper capillary tube on standard thermal systems. Other materials such as Plastisol, Polypropylene, and Teflon are available on special order.

FILL

The type of volatile liquid used in Jordan thermal systems depends upon the desired temperature range. Jordan engineers have carefully selected liquid fills that can be used for controlling temperature from -20°F to 450°F.

INVERTED MOUNTING

The capillary tube extends to the end of the sensing bulb and is bent so that it will always be in the volatile liquid fill. (Fig's 2 & 4) The word TOP is stamped on the bulb fitting so the installer can mount it properly.

If the sensing bulb is to be mounted in an inverted position (Fig. 3) the capillary is shortened so that its tip will remain immersed in the liquid fill.

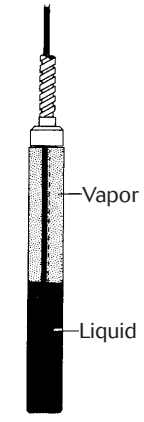
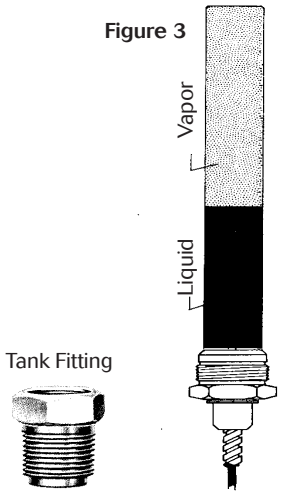


Figure 4

Figure 3



TANK FITTING

Tank fittings are furnished with thermal system types A, D, E and F unless a thermowell is purchased with the valve. The external threads on the fitting are 1″ NPT; the internal threads, matching the bulb nut threads, are 1-1/4″ - 18 UNEF-2B. Also available are tank fittings having 3/4″ NPT external threads.

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