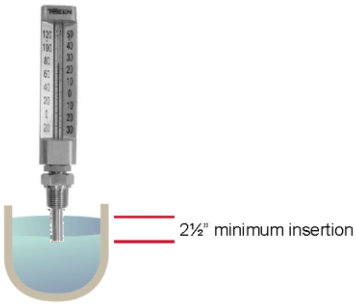
Liquid-in-glass Thermometers (VT & IT)

Liquid-in-glass thermometers have a glass tube in front of a metal scale. It extends into a metal chamber and has a glass bulb attached. This tube is completely sealed and the bulb contains a predetermined amount of liquid which, on expanding and contracting caused by temperature changes, will indicate the temperature for a given temperature range.

Installation of Liquid-in-glass Thermometers

NOTE: Make sure that while connecting the thermometer to the process, the sensitive portion of its stem (the last 2½" from the end) is located well within the flow of the medium being measured for temperature. This will ensure accurate readings with minimal response time.



Accuracy

Inaccuracy may be caused by a broken tube, scale shifting in slots from original position, liquid separation, sensitive bulb not fully immersed in the media, or by poor circulation. Poor circulation can be explained as follows: If there is poor agitation in a fluid, the temperature stratifies or has hot or cold spots. The thermometer will read only the temperature in which the sensitive bulb is immersed. It is, therefore, important to locate on installation the sensitive bulb in the correct position.

Corrosion

The use of separate sockets of special material is recommended for corrosive or highly abrasive service.

Location

Care should be taken to locate the instrument on the equipment where vibration is at a minimum.

Thermowell Connection

Remove the thermowell from the thermometer if supplied with one. Install this thermowell in the pipeline or service as required. Insert the stem of the thermometer through the thermowell. Position thermometer for best reading position and tighten down. If the thermowells are purchased separately from the thermometers, then a suitable temperature transfer medium must be added to the well to properly conduct the temperature to the thermometer bulb. A mixture of graphite and oil, heat transfer paste, or even a light oil will suffice.

Union Bushing (Hub) Connection

Remove the union bushing from the thermometer if supplied with it. Install this union bushing in the pipeline or service as required. Insert the stem of the thermometer through the union bushing hole, engaging stem coupling nut with union bushing threads. Position thermometer for best reading position and tighten down coupling nut. 2½" minimum insertion

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Liquid-in-Glass Separation

All liquid-in-glass thermometers are subject to separation of the liquid column. When this occurs, the thermometer will not read correctly. Some ranges and types are more readily susceptible to separation than others.

Causes of Separation

1. Rough handling in shipment causes most separations. If the thermometer is given a sudden jar, the weight of the liquid column in the bore has sufficient inertia to separate the column.
2. If the thermometer with an expansion chamber at the top of the tube (away from the bulb) is accidentally overheated, some of the liquid is driven into the expansion chamber. As the thermometer later cools, the liquid column recedes towards the bulb. If the thermometer is left in a horizontal or inverted position while cooling, part of the liquid will remain in the expansion chamber. This would cause separation of the liquid column.

How to Re-unite Separated Liquid Column

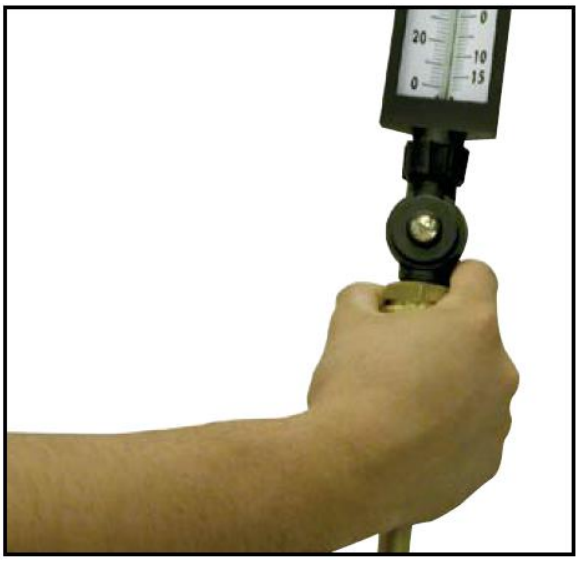
When the reservoir or expansion chamber is at top of the tube (away from the bulb)

Heat the bulb of the thermometer slowly, observing the rise of the liquid in the tube. The point of separation should be driven into the expansion chamber. Take care that the chamber never becomes completely filled or the internal pressure will cause the tube to break. After the separation enters the expansion chamber, put the thermometer in an upright position. Give the tube a slight jar so that the particles of entrapped gas will rise above the liquid. When the liquid recedes, the column will be joined.

When there is no reservoir at the top of the tube

Put the thermometer bulb in dry ice, so as to draw all the liquid into the tube. Tap the bulb gently on a hard surface with the thermometer held in an upright position, bringing the liquid together. When gradual heat is applied and the liquid rises, the column will be joined.

Scale Rotation



Grasp connection end firmly.

Rotate locking nut by hand.

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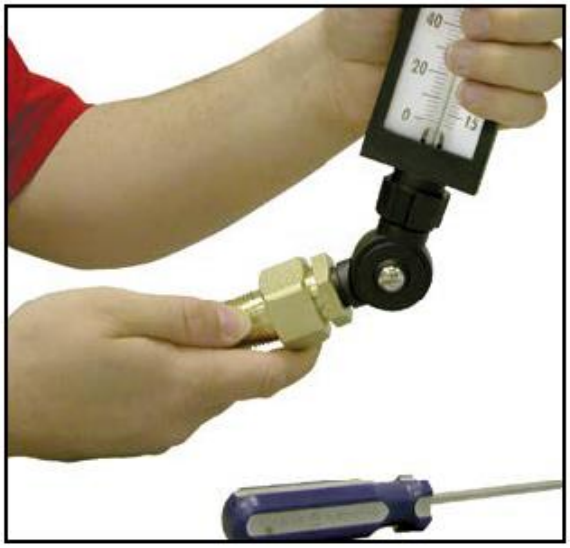
Vari-angle Rotation

Loosen single screw (A).



Tilt to desired angle.

Tighten screw (A) to secure the angle.

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