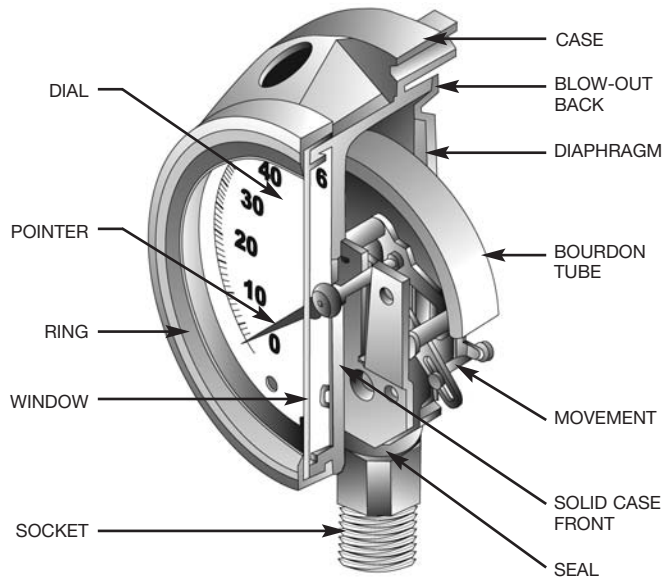


Pressure Gauges

DESIGN & OPERATION



Description

A pressure gauge is a mechanical instrument designed to measure the internal pressure and/or vacuum of a vessel or system. Trerice Pressure Gauges are offered in a variety of styles, sizes, and wetted part materials to meet the demands of standard and special applications.

Principles of Operation

Most Trerice Pressure Gauges are constructed with a bourdon tube sensing element. When the sensing element is subjected to pressure, it flexes and the resulting motion is transmitted as a measurement through a mechanical movement to the dial face pointer.

Selecting a Pressure Gauge

Case

Cases are available in a wide variety of materials and configurations. The combination of material and configuration is generally determined by the demands of the application, as well as the preferences of the gauge specifier. The more demanding the environment, the more rugged the case construction (i.e., polypropylene or stainless steel for industrial applications vs. aluminum or steel for construction or commercial applications). Gauge mounting or retrofitting needs may affect case selection (i.e., a gauge to be panel mounted will require either a front flange or u-clamp style case). For safety considerations, a "solid-front" case style may be required. Each application will have a unique set of requirements which will help guide the specifier in selecting the appropriate case style.

Wetted Parts and Pressure Medium

Under normal operating conditions, only the tube and socket assembly (Wetted Parts) of a pressure gauge will come into contact with the fluid being measured (Pressure Medium). The selection of the assembly will be determined by the composition of the medium. Air, gas, steam, water and other noncorrosive media are usually satisfied by a bronze or brass bourdon tube and brass socket assembly. Stainless steel or Monel wetted parts are used when the medium contains corrosive elements or when high operating pressures or temperatures will be encountered. A diaphragm seal is recommended for highly corrosive media or that which may solidify or deposit solids within the tube and socket assembly of the gauge. (See the Diaphragm Seal section of this catalog.)

All Trerice Pressure Gauges should be carefully selected to meet the demands of the particular application. The information contained in this catalog is only offered as a guide to assist in making the proper selection.

Improper application may cause failure of the gauge, resulting in possible personal injury or property damage. For correct use and application of all pressure gauges, please refer to Pressure Gauge Standard ASME B40.100. This document may be obtained from the American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990.

Connection and Mounting

The socket connection provides an entrance port for the process medium as well as a means to mount the gauge to a pipeline or vessel. Male connections can be provided with NPT, BSPT, or other thread styles, in sizes from 1/8" through 1/2". A high-pressure, 9/16" LHT connection is also available. The mounting location indicates where the connection protrudes from the case. Trerice Pressure Gauges are available with three standard mounting locations: lower male (LM), lower back male (LBM), and center back male (CBM). Other connection locations may be available on some models.

Window and Ring

The window provides a means for viewing the measurement, as well as protection of the dial face and pointer of the instrument, and is normally held in place by a ring, which is screwed or snapped to the case of the gauge. Plastic, clear glass and laminated glass are common window materials. Ring styles include threaded, bayonet, friction, crimped and hinged, depending upon the case type.

Pointer

There are essentially three types of pointers available on Trerice Pressure Gauges: a micro-adjustable pointer (providing high quality and accuracy); a friction-type pointer (providing adjustability and durability); and a plain, non-adjustable pointer (providing economic reliability).

Accuracy

The accuracy of a pressure gauge is expressed as a percentage (plus or minus) of the maximum scale range. Please refer to Pressure Gauge Standard ASME B40.100.

Measurement Range and Dial

The maximum operating pressure of the application should not exceed 75% of the measurement range selected. Therefore, the specified range should be twice the normal operating point of the gauge to avoid damage to the gauge internal. A wide variety of measurement ranges is available, from 30" Hg vacuum through 20,000 psi pressure. Ranges are indelibly presented in black figures and markings upon a white dial face.

During system start-up or shut-down, system pressures can greatly exceed intended conditions. Pressure gauges should be protected by appropriate isolation devices such as, but not limited to, needle valves, gauge cocks, etc.

Environmental Conditions

Pressure gauge selection will be influenced by the environmental conditions under which the gauge is expected to perform. Condensation or waterproofing concerns can be addressed through the use of hermetically sealed or weatherproofed gauges. Case construction should be considered when selecting a gauge to be used in conditions of extreme or sustained heat or cold, or where the atmospheric environment may contain corrosive elements.

Pressure gauges provide an excellent and reliable means of measuring and indicating process conditions, however they are passive devices. They are not substitutes for active safety devices. For start-up or test situations on closed loop systems, a safety relief device must be used.

Liquid Filling

Liquid filling (glycerin, silicone or other fills) can prolong the life of a pressure gauge by minimizing wear on the gauge internal resulting from vibration or oscillation. Liquid filling also acts as a permanent lubricant to the moving parts of the instrument.