Manometer

Pressure gauges and their applications



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Pressure gauges, also called manometers, are used for the determination and indication of the physical pressure of liquids and gases. In most cases, the relative pressure related to the atmospheric air pressure is measured. Moreover, absolute pressure, differential pressure and vacuum are measured. Vertical column pressure gauges such as U-tube manometers, inclined tube manometers and ring balances are used as well as pressure gauges with a spring-elastic measuring element such as Bourdon-tube gauges, diaphragm pressure gauges and capsule-type pressure gauges.

With U-tube manometers, pressure is indicated by means of a fluid column which relocates. To determine the pressure, you fill about half of a U-shaped glass tube with water or another liquid. If there is a difference in pressure between the two columns of the U, the fluid column moves to the side where the pressure is lower. The level difference forms the basis of the differential pressure measurement.

Vertical column pressure gauges work with approximately the same principle as U-tube manometers.

Ring balances are equipped with a pivoted hollow ring with a partition wall, which is partly filled with a sealing liquid. The chambers above the liquid are connected to the test pressures which turn the ring until an equilibrium of forces in relation to a





counterweight fixed at the bottom is obtained.

A Bourdon-tube gauge is a pointer instrument the tube of which consists of a spirally, circularly or helically coiled spring, depending on the pressure range to be measured. Pressurisation makes the Bourdon tube uncoil partly. The change of path of the Bourdon tube is transferred to the pointer by means of a tie rod and a gear wheel.

Diaphragm pressure gauges use a circular diaphragm spring as their measuring element, which is normally clamped between two flanges. Pressurisation makes the diaphragm spring bend and this bending movement then triggers a rotation of the pointer via a motion work.

Capsule-type pressure gauges are a special version of diaphragm pressure gauges. Two capsuletype springs are welded to the edges one above the other so that a closed pressure chamber results (capsule). The medium to be measured is directed into the capsule-type spring via a capillary tube so that both capsule-type springs can bend and twice the pitch of spring can be used for the measurement.

With absolute and differential pressure gauges, spring-elastic measuring elements are used in most cases. For absolute pressure measurements, the atmospheric air pressure applied to the measuring spring must be replaced by a vacuum. With aneroid barometers, the inside of the capsule-type spring is vented so that the air pressure coming from outside deforms the membranes.

For differential pressure measurement, diaphragm spring measurement systems are most commonly used. A difference in pressure within the chambers makes the diaphragm springs bend. This difference in pressure is displayed as the spring stroke is transferred to the measuring element by means of a push rod.

Modern pressure gauges are controlled by microprocessors and have a high degree of accuracy and short response times. With some, you can transfer data to a PC or laptop (pressure gauges with interface).

Accessories (external sensors etc.) are also available.

