Pressure sensors for pneumatic and hydraulic applications
Maximum Operating Comfort

TURCK

Industrial Automation

The demands placed on pressure sensors employed within the machine engineering sector for the measurement of hydraulic and pneumatic pressure are high. Which requirements they should meet and what a sensor specialist has to say on the matter are explained by an expert.

The pressure of a gas or a liquid is a key magnitude during the operation of many machines and facilities. In the process automation sector the pressure level is normally transmitted to the controller as an analogue value, however in the majority of applications within the machine engineering sector it is of interest whether a particular limit value has been exceeded or not.

The required switch-point accuracy generally lies around one percent of the end value. Furthermore, the choice of higher accuracy on grounds of reducing variants also proves an important criteria in pursuit of cost reduction. Thus the same sensors can be employed for different measurement ranges. However there are further requirements: the installation of the sensors should be simple, quick and preferably not require the use of an additional mounting adaptor. Here a versatile device that can be read from the front and from above according to the different positions of the machine's pressure connection is of advantage.

In addition to their function as switches, pressure sensors are often used to replace manoscopes. Therefore they need to be easy to read and to display the adjacent pressure with sufficient accuracy. An important consideration in the design of a pressure sensor is its ease of operation. It should be easy to operate, preferably without the use of tools, whereby false operation has to be categorically ruled out.

Turck's answer to these requirements is the new pressure sensor series PS400/ PS500. They cover all the important pressure ranges in the machine engineering sector from minus one to zero bar and from zero bar to 400 bar. The pressure can be programmed and displayed either in bar, psi, kPa or Mpa. The sensors are equipped either with two transistor switching outputs or with a switch and an analogue output.

The switch-point accuracy of the device represents 0.5% of the end value. If a sensor is employed at only up to a half of its nominal pressure then it operates, relative to the range used, with an accuracy of 1%, as demanded within the machine engineering sector. As a result it is possible to significantly reduce the number of variants. A further special feature of the sensors: a patent medium stop system seals the sensor in the event of damage to the measuring cell due to overpressure and thus reliably prevents a leak in the machine. With a circumference of just 34 millimetres the sensors can be easily assembled within the common machine engineering grid dimensions of 40 millimetres (middle-middle). The display inclined at 45 degrees enables the sensor to be mounted either at the top or the front of the pressure bearing vessel.

As the sensor needs to be readable from a given direction determined by the operator, a mounting assistant is generally required, enabling the sensor to be adjusted before being secured. This function is integrated into the PS500 series. After the attachment of the pressure connection the sensor can be freely rotated until the desired position is reached. Only then is the device secured using a second nut.

The pressure sensors from the PS400/ PS500 series are equipped with a 4 digit, 7 segment display that under normal operation displays the adjacent pressure and assists the operator in the programming of the sensor. The clearly visible LED display can be accurately read even under poor lighting conditions and from greater distances. The sensors reading direction can be rotated by 180 degrees by means of the software, enabling the values to be read when the sensor is mounted horizontally.

A row of LEDs above the 7 segment display continually display the selected pressure unit as well as the status of the switching outputs.

One of the most important considerations in the choice of an intelligent pressure sensor is the programming comfort. With the new pressure sensors the values for the forward and back switch-points, output functions and analogue range can be altered in just a few steps by means of the menu structure. This applies to a variety of other special functions such as the switching delay, rotation of the display direction or the peak pressure memory. The use of an additional external device such as a laptop or a special programming device is not necessary.

Unit of the ‚PS400''PS500' series:
patented ‚medium Stop System' prevents damage to the measurement cell and possible leaks in the installation.

For this purpose the pressure sensors of the PS400/ PS500 series are fitted with two push buttons. The two buttons ‘Mode’ and ‘set’, with the help of which the various parameters can be selected and adjusted, can be manually operated without the use of tools.

For ease of operation the values can be scrolled upwards and downwards. If the selected value is to be saved and therefore an alteration made to the programming, then the button ‘Enter’ has to be pressed. This is recessed and can only be activated using a simple tool such as a ball point pen.

Without using a tool the operator is able to view all of the values and after the elapse of a time window is able to make adjustments . However he doesn’t need to worry that he could accidentally change the programming. Only by resorting to a tool is the operator in the position to permanently modify the sensor settings.

The Author:
Thorsten Evers,
Productspecialist Pressure Sensors
Hans Turck GmbH & Co. KG, Mülheim

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