

Intelligent temperature measurement

Variable temperature sensors provide new freedom with installation and operation

The optimum measurement points for pressure and temperature data are often difficult to access for the operators on-site. Therefore sensor solutions with versatile displays and highly-flexible process connections which are easy to install are in demand. Turck introduced the corresponding range of pressure sensors with the PS series last year. The TS series is now being launched on the market: Intelligent, EMC proof temperature sensors with flexible connection options – either directly or via M12 standard cable – and variable output signals.



The modular concept of the TS series offers a high level off flexibility when mounting. The display can be rotated upwards and can be read from the front.

Temperatures and pressures are the most frequently measured variables. Not only do they have a direct influence on our well-being when we encounter them in a weather report, but they are also vitally significant for safe and smooth operation of machines and systems. Pressure and temperature measurement also have something else in common: in addition to accuracy or reproducibility, the interfaces to the process and to the operator are also very important.

At the site “of the action”

For optimum detection of the process variable the sensor must be located as close as possible to the “site of the action”, which is certainly possible with correct selection of the process interface.

As the measurement points usually have the unpleasant feature that they are frequently located outside the observation field of the operator, flexible installation options for the processing and display unit is particularly important. With the interface to the operator on site, flexibility is just as important as the interface to higher level systems which can be implemented via different electrical outputs.

For Turck the sensor specialist, the identical demands placed on temperature and pressure measurement were reason enough to develop two product families on the same “platform”. Whereas the pressure sensors of the PS series had their premiere last year, TURCK presented the TS series at the HMI 2006 and the first of this series have been delivered recently.

Measurement range and outputs

The connection to the temperature sensor is implemented via a standard 4-pole M12 connector - either directly or via a cable. In order to comply with the versatile demands, Pt1000 class A elements are available for selection. The measurement range is from -50 to 500 °C, the result can be displayed in °C, °F, °K and ohms. Analogue to the already well known pressure sensors, the TS sensors devices feature either two transistor switching outputs or a switching and an analogue output and feature an accuracy of 0.2° K. Furthermore, variants with programmable output functions and switching logic are available.

The housing design, the operating concept and the output variations correspond with the pressure sensors which have already proven themselves in harsh day to day use. Just as with the pressure sensors, the TS400 is the fixed display version and the TS500 is the rotatable display version. With a diameter of just 34 mm, the compact sensors can be mounted on the conventional 40 mm (centre – centre) grid.

The display which is tilted by 45° enables installation from above or from the front. As the display must be visible from a customer defined direction, normally mounting aids will be required which allow the sensor to be rotated before it is installed. This function is integrated into the TS500 series. After installation the devices can be rotated to the desired position until optimum readability is achieved. The device is then fixed in position using a second nut.

Flexible display

The TS sensors feature a 4-digit seven segment LED display which indicates the measured value in normal operation and which supports the user during programming. The large and easily visible LED display is also easy to read with poor lighting and at long distances. The read direction of the display can be rotated by 180° using software, in order to read the values if the sensor is mounted horizontally. A row of LEDs above the 7-segment display permanently indicates the selected unit as well as the state of the switching outputs.

One of the most important aspects with the selection of an intelligent sensor is the level of user friendliness during programming. With the clear menu structure of the TS sensors it is possible to set the values for the setting points, output function, analogue ranges and a whole range of special functions such as switch delays, rotation and display direction or peak value memory. Additional external devices are not required.

The temperature sensors of the TS series feature excellent electromagnetic compatibility and comply with the demands of IP67 degree of protection. The housing is made completely of stainless steel; the electrical connections are reinforced with metal and provides excellent mechanical rigidity, which guarantees a high-level of operating security. The user has the choice between different probe lengths and sensor diameters with the temperature sensors. The standard temperature sensor can be easily adapted even to critical applications using thermo wells. This provides a maximum of usage flexibility.

The Author:

Klaus Ebinger is the Process Automation product manager at Hans Turck GmbH & Co. KG, Mülheim an der Ruhr/Germany.