

Smart sensors function more reliably at a lower total cost

For 100 years industry has measured temperature in more or less the same way. Signals from thermocouples and resistance thermometers are transformed into an analogue signal of 4 to 20 mA.

Now this technology is about to be phased out. Pentronic is leading the way in digital measurement.

Digitalisation itself is not new – it has been happening for 50 years and is replacing and complementing analogue technology in one area after another. Now it's the turn of temperature measurement.

"This is a consequence of the development known as industry 4.0 or the connected factory," explains Pentronic's sales manager Dan Augustini.

Pentronic is at the forefront of this change. The company offers smart temperature sensors with digital communication, a bus that requires little energy and allows for up to 50 sensors on one cable, plus a gateway for

communication with e.g. Profibus, Profinet and Ethernet/IP.

"We also have a prototype of the world's first thermocouple with an IO link," Dan reveals.

Smart temperature sensors have big advantages. The entire measurement system is simpler to install, maintain and upgrade, all at a far lower cost. Many of Pentronic's



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customers are machine builders. Today some machines can be so covered by cables – one for each sensor – that they are pink (the colour code for type N thermocouples).

With a digital bus it is enough to have one cable running between the sensors. Normally no calibration is required from the point where the signal becomes digital.

"Digital transmission only has two states. Either it works or it doesn't. There are no errors that can sneak in like they can in an analogue circuit," Dan says.

The remaining task is to calibrate the actual probe tip. Thermocouples and Pt100s are still the best methods for rapid measurement response and low measurement uncertainty respectively.

"It could also be possible to create an exchange system for smart temperature sensors. We would deliver new ones after the calibration has expired and take back the old ones, which we would inspect and calibrate before sending them out again," Dan says.

The result is what is popularly known as a circular process, in which the resources are reused. It also paves the way for purchasing temperature measurement as a function. 