

Testing and fine-tuning measurement performance

The process of testing and fine-tuning a newly made sensor determines its true performance in real life situations. The importance of this procedure is becoming increasingly clear as the world demands lower energy consumption, higher performance and better quality.

Pentronic can adapt this procedure to the specific needs of each customer.

Most temperature sensors from Pentronic are subjected to traceable acceptance tests before being delivered to the customer. The company has expanded this process and now offers various levels of customised solutions.

The standard test is done at 0 °C (Pt100s/RTDs) or 100 °C (thermocouples). At the customer's request, this test can also be done at other temperatures that are more relevant

to the specific purpose in question.

One alternative acceptance test commonly applied to larger production runs of thermocouples is as follows: Sensors made from the same roll of material are subjected to two types of tests. The sensors made from the first, last, and middle section of the roll are tested at several specific temperatures in order to confirm the material's properties in detail. The remaining sensors are subjected to the standard test.

OPTIMISING MEASUREMENT SYSTEMS

In another type of test, two or three sensors that form part of a single temperature probe must stay within a specific tolerance range during the test.

The next level of acceptance testing involves testing parts or all of an entire measurement system. One example involves fine-tuning sensors and transmitters so they operate optimally together.

"We fine-tune thousands of sensors and transmitters like this every year," says sales manager Roland Gullqvist.

This fine-tuning reduces measurement uncertainty and also means that readings can be used directly without being corrected (while of course taking into account the relevant measurement uncertainty). The same method is used in the field to acceptance test or calibrate an entire measurement chain within a customer's industrial process. These

field tests are usually done by Pentronic's accredited laboratory.


LIFE-OR-DEATH CALIBRATIONS

The key to achieving optimal measurement performance is to do the testing and fine-tuning at the correct temperature. One obvious example is temperature measurement in heart-lung machines. When a patient's heart is shut down and the machine has taken over is not the time to be making approximate measurements.

"Two of our colleagues underwent heart operations during which they were connected to heart-lung machines equipped with temperature sensors from Pentronic," Roland explains. "One of them had helped to design and sell the type of sensor being used, and the other colleague had helped to manufacture it."

There could be no clearer illustration of how crucial it is to match a sensor's acceptance test to the sensor's specific future task.

All acceptance tests done at Pentronic are performed in a room that is immediately adjacent to the company's accredited laboratory, and are done with full traceability to national standards. If the customer wishes, the acceptance tests and calibrations can be done inside the laboratory and under accreditation in order to achieve the highest possible precision.

The most advanced form of acceptance testing is done on several thousand products each year and involves total acceptance testing inside the accredited laboratory. 



Edin Beganovic (at left) helps to construct temperature sensors for heart-lung machines and Per Wilén has helped to design and sell these sensors. Both have personally tested the design as patients during heart operations.