BURNS ENGINEERING

Application Note
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Improving Accuracy with a Transmitter

APPLICATION

Many times the question has been asked "How can I improve the accuracy?" Nearly any process where temperature is controlled can benefit from more accurate measurement. For example if a standard Grade B RTD is connected to a transmitter and installed into a typical process, the measurement accuracy can easily be over 1°C when all error sources are combined. There's more to accuracy than just looking at the RTD interchangeability numbers. Even given perfect installation with no errors, the interchangeability reflects only about 85% of the probe accuracy. Interchangeability alone for a Grade B sensor is 1°C at 200°C. Adding in other error sources and the accuracy can be over 1.5°C.

T55 HART Transmitter

T55 with matching capability

CHALLENGE

How can the accuracy be improved without replacing the sensor or other components in the control loop?

SOLUTION

Adding a transmitter with matching capability to the control loop is an easy and inexpensive way to improve the measurement system accuracy. First the RTD has to be calibrated at the end points of the desired measurement span. Then the transmitter can be calibrated with the actual resistance values from the RTD calibration. This eliminates most of the RTD interchangeability leaving only the transmitter accuracy and the RTD repeatability. So the ±1.5°C accuracy at 200°C now becomes as low as ±0.20°C. Small improvements can be made if the transmitter has the capability of entering the calibration coefficients which further refines the R vs. T relationship.

For further information see the Technical Papers and RTDology sections on our website at: www.burnsengineering.com

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