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(54) Title: TEMPERATURE TRANSMITTER WITH ON-LINE CALIBRATION USING JOHNSON NOISE

(57) Abstract

A temperature transmitter (10) and a process control system includes a sensor input (1, 2, 3, 4) for coupling to a temperature sensor (16) having a temperature dependent resistance. Resistance measuring circuitry (20, 26, 50) couples to the sensor input (1, 2, 3, 4) and provides a resistance output related to resistance of the temperature dependent resistance. Analog to digital conversion circuitry (78, 88) couples to the sensor input (1, 2, 3, 4) and provides a digital output related to AC signals across the sensor input. Digital signal processing circuitry (64) isolates a Johnson noise component of the AC signals and provides a digitized Johnson output. Temperature measurement circuitry provides a calibrated temperature output based upon the resistance output and the digitized Johnson noise output. Output circuitry (24) transmits the calibrated temperature output over the process control loop (11).

