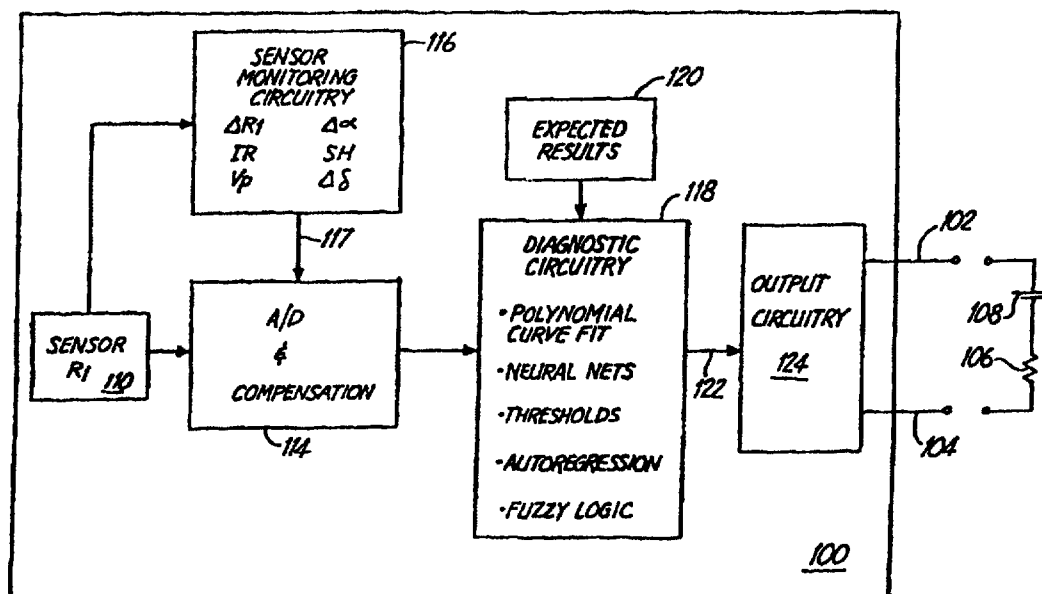


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(54) Title: DIAGNOSTICS FOR RESISTANCE BASED TRANSMITTER**(57) Abstract**

A transmitter (100) in a process control system includes a resistance sensor (110) sensing a process variable and providing a sensor output. Sensor monitoring circuitry (116) coupled to the sensor (110) provides a secondary signal related to the sensor (110). Analog-to-digital conversion circuitry (114) coupled to the sensor output and the sensor monitoring circuitry (116) provides a digitized sensor output and a digitized secondary signal. Output circuitry (124) coupled to a process control loop (102, 104) transmits a residual life estimate related to residual life of the sensor. A memory stores a set of expected results (120) related to the secondary signal and to the sensor (110). Diagnostic circuitry (118) provides the residual life estimate as a function of the expected results (120) stored in the memory, the digitized sensor output and the digitized secondary signal.