



# Technical Information Bulletin

## Selecting and Using Temperature Transmitters

### WHAT IS A TRANSMITTER?

Basically, a transmitter is a signal conditioner. It accepts a low level input signal from a sensor, a millivolt signal from a thermocouple or a resistance signal from an RTD (Pt100), and provides an output signal that is directly proportional to the input-signal. Most transmitters provide a current output signal (generally 4 to 20 mA or 0 to 20mA signal) rather than a voltage output.

Conversion to a current signal virtually eliminates any interference from line noise and allows accurate transmission over relatively long distances using ordinary uncompensated copper wire. The use of expensive thermocouple wire or extension wire is no longer necessary.



Transmitters are available in both isolated and non-isolated versions. Isolated transmitters are used to provide galvanic separation between the sensor input and signal output. When grounded sensors are used or leakage to ground occurs (with ungrounded thermocouples), isolated transmitters must be used.

### 2-WIRE TRANSMITTERS

2-wire transmitters allow the same two wires to carry both the transmitter power and the transmitters signal. The transmitter electronics is designed to use less than 4 mA for internal consumption. As the input signal (from the sensor) changes, the current drawn from the power supply will vary from 4 to 20 mA in direct proportion to the sensor change. This current change is referred to as the "loop current". This 2-wire technique allows significant savings by reducing the size of the transmitter installation as well as a reduction of installation time and materials required while still providing accurate signal transmission.

Ideally, the 2-wire Transmitter should be placed in the sensor connection head to provide the best signal. A wide range of 2 wire head-mount transmitters (in both isolated and non-isolated versions) to fit almost any standard connection head are offered. When a 2-Wire Head-mount transmitter cannot be used (because of extreme temperature or vibration) a complete line of 2-Wire Rail mount transmitters is offered.

### 4-WIRE TRANSMITTERS

4-wire transmitters use two separate wires for power and two for signal transmission. 4-wire transmitters can provide a wide variation of output signals (4 to 20mA, 0 to 20mA, and/or voltages). In some configurations 4-wire transmitters can provide multiple outputs as well as several alarm and control functions.

### MICROPROCESSOR BASED TRANSMITTERS

Temperature & Process Instruments offers the S-Products' Line of microprocessor-based temperature instruments are as simple to select as they are to operate. Incorporating some of the most advanced technology in the industry, a single transmitter can be programmed (using a personal computer with an interface module) to accept RTD, Thermocouple, Millivolt, Milliampere or Ohms input. Our "intelligent" MP82850 contains a built-in programming possibility via one push-button.



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### What is the accuracy of this transmitter?

You may have noticed that most specifications do not state a general accuracy. That is because the accuracy of a transmitter depends on so many factors. The ambient temperature, for example. Therefore a percentage of the range is mentioned that also is related to the difference in ambient temperature. In worst case the zero point and span can drift in opposite directions, but mostly the general accuracy will be better than all deviations added together. Then again, we have to point out that the accuracy of a thermocouple sensor is much worse

### Money Savings

When integrating temperature transmitter with a standard 2 wire, 4 to 20mA output signal you can use less expensive 2 leg copper wire, eliminating the need for more expensive 3 and 4 leg copper or thermocouple extension wire.

### Options and Accessories

#### Digital Communication



HART® Communicating via a digital signal superimposed on the analog output signal our Mp82700 Hart (R) transmitters allow reconfiguration and interrogation from a control room without interrupting the analog signal. Able to fit in a small, standard connection head, it is easily programmed in the field to your exact requirements via an optional "Point 'N Click" PC based software and provides a simultaneous analog and digital (HART® Protocol) outputs over a single twisted pair of wires.

#### Communication and Programming Kit

This software program is suitable for all microprocessor based transmitters using S-Products' interface for connection to your computer's



#### Protection Heads and Local Indication



Local read-out of the signal is possible on all microprocessor based transmitters with the small display unit. The Mp82-Display is a loop powered plug-in LCD readout for local display of the measured temperature. Easy to connect on top of the transmitter using the same connector as the interface. Models which can be supplied with option "D" (Plug-In Loop-Powered Readout) are: Mp82700(-H), Mp82800 and Mp82800-R.

This specially designed DAN-W connection head with window is suitable for all the Mp82000 Series microprocessor based headmounting temperature transmitters with display (Direct Read Out).

#### Temperature and Process Panel Meters and Indicators

Choose from our comprehensive line of Panel Meters and Indicators for Automation and Process Applications.

