

Differential Temperature Measurement Using the Honeywell STT350 Smart Temperature Transmitter

- Differential temperature measurement in the chemical industry



Problem: How to obtain accurate differential temperature measurement economically.

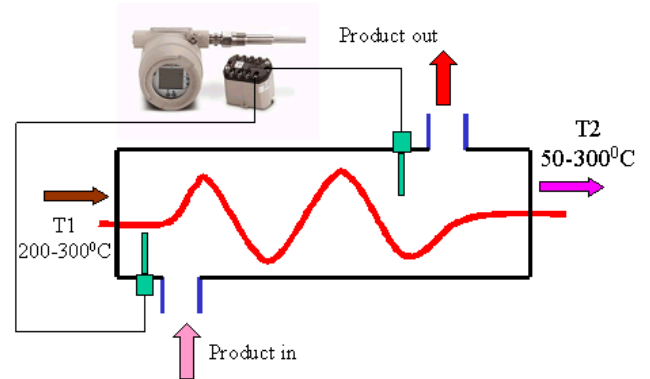
Many industrial processes require measurement of temperature differences. A chemical plant in Alabama incorporated several hundred heat exchangers. These heat exchangers were used to recover waste heat, which would otherwise be lost to the manufacturing process. In order to document and control the efficiency of heat exchangers, the plant engineers were prepared to purchase temperature transmitters with RTD measurement probes and thermowells. The large cost associated with this purchase motivated the engineers to look for the most efficient method for measuring the differential temperature at each heat exchanger.

Solution: The Honeywell Smart Temperature Transmitter STT350

In consultation with the local Honeywell representative, the plant engineers identified the STT350 Smart Temperature Transmitter as capable of measuring the difference between two temperatures in a single device. This enabled the plant to decrease the cost of its heat exchanger temperature transmitter expenditure by 40%. In addition, the computation of the differential temperature inside the transmitter decreased the complexity of the control system program.

In several cases, the actual temperature of the process fluid exiting the heat exchanger needed to be measured. In these cases, the process engineers were able to further economize by use of the less costly STT250 Smart Temperature Transmitter.

The diagram below shows a typical installation of the STT350 used for differential temperature measurement. Note that wiring savings are realized by having a single pair of wires running from the transmitter to the control system.



The product to be heated passes through the heat exchanger, which has an incoming fluid supplying heat in the temperature range 200°C to 300°C. Depending on the flow rates and temperature of the product the outlet temperature T2 can be in the range 50°C to 300°C. The differential temperature measurement (T1-T2) will have a range of 0°C to 250°C degrees i.e. if no heat is exchanged then the fluid passes through with no temperature change. If maximum heat is transferred, then T1 is 300°C and T2 is 50°C. The sensors for measuring T1 and T2 should be of the same type e.g. Two Pt100 type RTD's or Type J thermocouples. For the STT350 the type does not matter within the available library of 20 types, but both should be the same.

Benefits

The **STT350** for differential temperature measurement provides the following benefits:

- The STT350 requires the purchase of only one temperature transmitter as an alternative to the need for two temperature transmitters and a subtraction unit.
- Wiring savings are realized by having only one pair of wires running to the control room.
- If a sensor fails, the STT350 will recognize this and alert plant personnel so that corrective action can be taken.

- The STT350 can be user-calibrated to remove probe mismatch errors thereby increasing differential temperature measurement accuracy.

General Benefits of the STT350

- Microprocessor-based electronics results in increased reliability and functionality.
- Write protection improves security by eliminating unauthorized data base changes.
- Potted electronics protect against moisture and humidity.
- Auto diagnostics ease trouble shooting and repair.
- Safety approvals, including FM, CSA and CENELEC enable the STT350 to be installed in virtually any type of process environment.
- Wide selection of mounting configuration and materials of construction permits use in virtually many challenging connection situations and environments.
- Integral or remote meters available for point of use temperature monitoring.
- Other devices such as the Smart Field Communicator (SFC), the Smart Configuration Toolkit (SCT), as well as the Honeywell control system can monitor transmitter output.

More Information

For more information on STT350, visit www.honeywellprocess.com, or contact your Honeywell account manager.

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