

# Extending the Measurement Range of Differential-Pressure Flowmeters with Parameters Identified Online

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The differential-pressure devices are usually used to measure the flowrate of liquid or gaseous fluid under high temperature and high pressure conditions in thermal power plants. In engineering applications, the error of differential-pressure flowmeters exceeds the allowable range of accuracy of flow measurement when the flowrate is lower than one-third of the upper limit. This paper presents a cost-effective method to extend the measurement range of differential-pressure flowmeters under industrial process conditions. Aiming at solving the problems in practical installations, this paper analyzes the sources of the systematic errors in flow measurement and identifies the main reason that limits the measurement range of such devices in negligible flows. A solution that simultaneously uses two differential-pressure transmitters with different ranges to measure the output differential-pressure of the primary device is proposed. Based on the outputs of two differential-pressure transmitters, the signal processing system selects one of them as the proper signal to process. Meanwhile, the discharge coefficient and the expandable factor are identified online. On the basis of observing ISO 5167 strictly, the measurement range of the flowmeter is extended from 3:1 to 9:1 and the experimental results show that the method is feasible.

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