

Abstract

Iman Gamal Morsi

Microcontroller System for Oil Refinery Parameters Measurements Based on Piezoresistive and Strain Gauge Pressure Sensors

In oil refinery there is a variety of physical parameters such as pressure, flow rate and level that need to be measured. A microcontroller system is built based on PIC 16F877A, piezoresistive differential pressure DP sensor (24PC series) and strain gauge DP sensor (IDP-10) with ranges from 0 to 15psi. The results of the microcontroller system showed that the percentage error for piezoresistive sensor in pressure from 0.43808% to 8.613 %, in flow rate from 0.21929% to 20.340%, and in level from 0.43808% to 2.5789%. While the percentage error for strain gauge sensor from 0.846% to 1.946% for pressure measurement, from 0.1% to 0.4% for flow rate measurement and from 0% to 0.64% for level measurement. The percentage error of the piezoresistive sensor is more than the percentage error of the strain gauge sensor: for pressure measurement by about 6.667%, for flow rate measurement by about 19.94% and for level measurement by about 1.9389%. Fuzzy logic is used to predict the output surface of pressure, flow rate, and level measurements.