

INTISARI

PENINGKATAN AKURASI PADA PENGUKURAN *AIR FLOW* BERBASIS SENSOR DIFFERENTIAL PRESSURE

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Pengukuran *air flow* merupakan proses mengukur aliran udara yang biasanya menggunakan alat bernama *flowmeter*. Pengukuran *air flow* banyak digunakan pada kehidupan sehari-hari baik pada bidang otomotif, industri, maupun kesehatan. *Flowmeter* memiliki banyak jenis, bentuk, dan prinsip kerja yang ada di dunia, salah satunya jenis pengukuran *air flow* yang berbasis sensor *differential pressure*. Pengukuran *air flow* berbasis sensor *differential pressure* memiliki *noise* yang berasal dari faktor internal maupun eksternal.

Penelitian kali ini membuat pengukuran *air flow* berbasis sensor *differential pressure* dengan venturimeter dan melakukan peningkatan akurasi pengukurannya menggunakan beberapa metode. Sensor *differential pressure* yang digunakan pada penelitian ini adalah MPX5010DP. Metode - metode yang digunakan pada penelitian ini untuk meningkatkan nilai akurasi adalah metode average, kalman, average kalman, dan average kalman min max.

Pengujian metode - metode yang digunakan untuk meningkatkan akurasi dilakukan pengujian pada rentang 0.34375 L/s - 0.49107 L/s. Hasil pengukuran *air flow* non filter dibandingkan dengan anemometer memiliki nilai akurasi sebesar $97,8\% \pm 0,3\%$, akurasi metode average sebesar $98,1\% \pm 0,3\%$, akurasi metode kalman sebesar $99,0\% \pm 0,2\%$, akurasi metode average kalman sebesar $98,1\% \pm 0,4\%$, dan akurasi metode average Kalman min max sebesar $98,0\% \pm 0,3\%$. Metode kalman merupakan metode terbaik untuk meningkatkan akurasi pengukuran *air flow* sebesar 1,3% lebih besar dari pengukuran *air flow* non filter.

Kata kunci : *Air flow Measurement, Differential pressure, Venturimeter, Average, Kalman, Average Kalman, Average Kalman Min Max*

ABSTRACT

IMPROVED ACCURACY IN *AIR FLOW* MEASUREMENT BASED ON *DIFFERENTIAL PRESSURE* SENSOR

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Air flow measurement is the process of measuring *air flow* which usually uses a tool called a flowmeter. *Air flow* measurements are widely used in everyday life, both in the automotive, industrial, and health fields. Flowmeters have many types, forms, and working principles in the world, one of which is a type of *air flow* measurement based on a *differential pressure* sensor. *Air flow* measurement based on a *differential pressure* sensor has noise from internal and external factors.

This study makes *air flow* measurements based on a *differential pressure* sensor with a venturimeter and improves the measurement accuracy using several methods. The *differential pressure* sensor used in this study is MPX5010DP. The methods used in this study to increase the accuracy value are the average, Kalman, average Kalman, and average Kalman min max methods.

Testing of the methods used to improve accuracy was tested in the range of 0.34375 L/s - 0.49107 L/s. The results of non-filter *air flow* measurements compared with anemometers have an accuracy value of $97,8\% \pm 0,3\%$, the average method accuracy is $98,1\% \pm 0,3\%$ the accuracy of the kalman method is $99,0\% \pm 0,2\%$, the accuracy of the average kalman method is $98,1\% \pm 0,4\%$, and the accuracy of the Kalman min max method is $98,0\% \pm 0,3\%$. The Kalman method is the best method to increase the accuracy of *air flow* measurement by 1.3% greater than non-filter *air flow* measurement.

Keywords : *Air flow Measurement, Differential pressure, Venturimeter, Average, Kalman, Average Kalman, Average Kalman Min Max*