Rancang Bangun Alat Ukur Multifungsi 5 In 1 (Altimeter, *TDS Meter, Soil Moisture Meter, Thermometer*, Barometer) Digital *Portable* Berbasis Arduino Nano

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ABSTRAK

Kemajuan teknologi dalam instrumentasi berkembang dengan pesat. Berbagai jenis teknologi telah banyak diciptakan untuk dapat mempermudah manusia dalam melakukan pekerjaannya. Sebagai salah satu teknologi yang berkembang ialah teknologi di bidang pengukuran. Oleh karena itu dirancangan suatu alat ukur multifungsi 5 IN 1 (Altimeter, *TDS* meter, *Soil Moisture* meter, *Thermometer*, dan Barometer) digital *Portable*. Alat ini dapat mengukur ketinggian, padatan pada volume air, kelembaban tanah, suhu dan tekanan udara dalam satu alat ukur multifungsi. Alat ukur ini akan di rancang menggunakan sensor BMP280, sensor TDS, dan *Soil Moisture* sensor berbasis Arduino Nano. Alat bekerja secara otomatis merespon berapa besar nilai pengukuran yang dideteksi oleh sensor yang digunakan. Arduino Nano kemudian memproses dan memberikan *output* yang telah diprogram sebelumnya. Hasil pengukuran ini kemudian ditampilkan pada LCD. Berdasarkan hasil pengujian, maka didapatkan selisih antara nilai alat ukur yang dibuat mendekati nilai alat ukur standar sehingga didapatkan tingkat keakurasian pembacaan masing - masing sensor berfungsi dengan baik dan akurat. Pada pengukuran sensor BMP280 didapat rata-rata *error* Pengujian 1 Altimeter 0,85% Barometer 0,018% *Thermometer* 2,95%. Pengujian 2 Altimeter 1,6% Barometer 0,038% *Thermometer* 3,2% dan Pengujian 3 Altimeter 0,88%, Barometer 0,019% *Thermometer* 1,58%. Hasil perbandingan sensor TDS dengan TDS meter didapat rata-rata *error* 5,14% dan pada pengujian *Soil Moisture* sensor didapatkan rata-rata *error* 2,84%.

Kata kunci : Alat Ukur Multifungsi 5IN1, Altimeter, TDS Meter, *Soil Moisture* Meter, *Thermometer*, Barometer, sensor BMP280, Sensor TDS, *Soil Moisture* sensor.

Design and Build a 5 In 1 Multifunction Measuring Instrument (*Altimeter*, TDS Meter, Soil Moisture Meter, Thermometer,* Barometer *) Digital Portable Based On Arduino Nano

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ABSTRACT

Technological advances in instrumentation are developing at a rapid pace. Various types of technology have been created to make it easier for humans to do their work. As one of the technologies that develop is technology in the field of measurement. Therefore, inthe design of a multifunctional measuring instrument 5 IN 1 (Altimeter, TDS Meter, Soil Moisture Meter, Thermometer, and Barometer) digital portable. This tool dapat measure height, solids at the volume of water, ground pressure, temperature and air pressure in one multifunctional measuring instrument. This measuring instrument will be designed using the BMP280 sensor, TDS sensor, and Soil Moisture sensor based on Arduino Nano. The tool works automatically responding to how much of the measurement value is detected by the sensor used. Arduino Nano then processes and delivers a pre-programmed output. The results of this measurement are then displayed on the LCD. Based on the test results, the difference between the value of the measuring instrument made is close to the value of the standard measuring instrument so that the level of accuracy of the readings of each sensor is obtained to function properly and accurately. In the measurement of the BMP280 sensor, the average test error1 Altimeter 0.85% Barometer 0.018% Thermometer 2.95% was obtained. testing2 Altimeter 1.6% Barometer 0.038% Thermometer 3.2% and testing3 Altimeter 0.88%, Barometer 0.019% Thermometer 1.58%. The results of the comparison of the TDS sensor with the TDS meter obtained an average error of 5.14% and in Soil Moisture sensor tests, an average error of 2.84% was obtained.

Keywords : *Multifunctional Measuring Instrument 5IN1, Altimeter, TDS Meter, Soil Moisture Meter, Thermometer, Barometer, BMP280 sensor, TDS sensor, Soil Moisture sensor.*