RANCANG BANGUN SISTEM MONITORING ASAP ROKOK DI TOILET SEKOLAH MENGGUNAKAN SENSOR MQ-7 DAN *TRANSCEIVER* nRF24L01+ DENGAN *OUTPUT* SUARA BERBASIS MODUL ISD 1820

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ABSTRAK

Telah dirancang sistem monitoring asap rokok di toilet sekolah menggunakan sensor MQ-7 dan *transceiver* nRF24L01+ dengan *output* suara berbasis modul ISD 1820. Sistem perangkat keras ini terdiri dari dua unit yaitu *transmitter* dan *receiver*. Unit *transmitter* terdiri dari sensor MQ-7, rangkaian *transceiver* nRF24L01+, Arduino Uno R3. Unit *receiver* terdiri dari rangkaian *transceiver* nRF24L01+, LCD, Arduino Uno R3, modul ISD 1820. Sensor MQ-7 berfungsi untuk mendeteksi gas karbon monoksida pada asap rokok. Karakterisasi sensor MQ-7 didapatkan fungsi transfer y= 0,0635x + 0,3808 dengan nilai regresi sebesar R^2 = 0,9808. Nilai *error* yang didapatkan dari perbanding gas yang terbaca oleh sensor MQ-7 dengan *biogas analyzer* sebesar 5,35%. Pengujian *transceiver* nRF24L01+ didapatkan jarak maksimum pengiriman data sejauh 502 m tanpa penghalang dan 68 m dengan penghalang dinding. Rancangan keseluruhan alat dapat berfungsi dengan baik, sensor MQ-7 dapat mendeteksi gas karbon monoksida sejauh 110 cm dan saat konsentrasi lebih dari 1 ppm maka speaker pada modul ISD 1820 akan aktif sebagai alarm peringatan.

Kata Kunci : gas karbon monoksida, arduino UNO R3, sensor MQ-7, *transceiver* nRF24L01+, *biogas analyzer*

THE DESIGN OF CIGARETTE SMOKE MONITORING SYSTEMS IN SCHOOL TOILETS USING MQ-7 SENSOR AND TRANSCEIVER NRF24L01 + WITH ISD 1820 MODULE BASED SOUND OUTPUT

ABSTRACT

A cigarette smoke monitoring system in school toilets has been designed using MQ-7 sensor and transceiver nRF24L01+ with ISD 1820 module based sound output. This hardware system consists of two units that is a transmitter and receiver. The transmitter unit consists of a MQ-7 sensor, a transceiver circuit nRF24L01+, Arduino Uno R3. The receiver unit consists of transceiver circuit nRF24L01+, LCD, Arduino Uno R3, ISD 1820 module. The MQ-7 sensor functions to detect carbon monoxide gas in cigarette smoke. MQ-7 sensor characterization obtained transfer function y = 0.0635x + 0.3808 with a regression value of R^2 = 0.9808. The error value obtained from the comparison of gas read by the MQ-7 sensor with a biogas analyzer is 5.35%. The transceiver nRF24L01+ test obtained that the maximum distance of data transmission is 502 m without barrier and 68 m with wall barrier. The overall design of the device can function properly, the MQ-7 sensor can detect carbon monoxide gas as far as 110 cm and when the concentration is more than 1 ppm the speaker on the ISD 1820 module will be activated as a warning alarm

Keywords: carbon monoxide gas, arduino UNO R3, sensor MQ-7, transceiver nRF24L01 +, biogas analyzer