

***Design of a Nitrogen Oxide (NO_x) Gas Detector in a Car Cabin Using an
Arduino Microcontroller Electrochemical Gas Sensor MQ-131***

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ABSTRACT

An instrument has been made to monitor the levels of Nitrogen Oxide (NO_x) in the car cabin using an Arduino-based MQ-131 gas sensor. Which can provide buzzer and LED signals when the gas concentration has exceeded the specified threshold. Given the growth in the number of vehicles and increased air pollution, there is a risk of causing gas poisoning in the car cabin. The content of a gas in the air can be detected by a semiconductor type gas sensor that will change its resistance due to changes in the potential barrier by a reducing gas. NO_x gas in the air with a maximum level of 1000 ppm can be detected using the MQ-131 gas sensor combined with Arduino. Samples were measured in NO_x gas levels using a design tool and a gas analyzer together. Simulated in a cabin with five locations to find out the performance of the tool in detecting NO_x gas. The results of testing the sensitivity of the design tool using Arduino uno sensor MQ-131 The average percentage of error reading the design tool compared with the gas analyzer for each location 3.3%, 2.6%, 4.9%, 5.7%, 1.8%.

Keywords: AT Mega 328, Arduino Uno, MQ-131 Sensor, NO_x gas measurement

Perancangan Detektor Gas Nitrogen Oksida (NO_x) Dalam Kabin Mobil Menggunakan Microcontroller Arduino Dengan Sensor Gas Elektrokimia MQ-131

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ABSTRAK

Telah dibuat alat untuk memonitoring kadar gas Nitrogen Oksida (NO_x) pada kabin mobil menggunakan sensor gas MQ-131 berbasis arduino. Yang dapat memberikan isyarat *buzzer* dan LED apabila konsentrasi gas sudah melebihi ambang batas yang ditentukan. Mengingat pertumbuhan jumlah kendaraan dan meningkatnya polusi udara beresiko menyebabkan terjadi keracunan gas dalam kabin mobil. Kandungan suatu gas di udara mampu dideteksi oleh sensor gas tipe semikonduktor yang akan berubah resistansinya akibat perubahan penghalang potensial oleh suatu gas pereduksi. Gas NO_x di udara dengan kadar maksimal 1000 ppm mampu dideteksi menggunakan sensor gas MQ-131 yang dikombinasikan dengan arduino. Sampel diukur kadar gas NO_x menggunakan alat hasil rancangan dan gas analyzer secara bersamaan. Di simulasikan dalam kabin dengan lima lokasi untuk mengetahui kinerja alat dalam mendeteksi gas NO_x. Hasil pengujian kepekaan alat rancangan dengan menggunakan arduino uno sensor MQ-131 Persentase rata-rata nilai eror pembacaan alat rancangan di bandingkan dengan gas analyzer untuk setiap lokasi 3,3%, 2,6%, 4,9%, 5,7%, 1,8 %.

Kata Kunci : AT Mega 328, Arduino Uno , Sensor MQ-131, Pengukuran gas NO_x