

ABSTRAK

SISTEM MONITORING KADAR GAS KARBON MONOKSIDA, KARBON DIOKSIDA, HIDROGEN, DAN AMONIA MENGGUNAKAN SENSOR MQ-2 DAN MQ-135 BERBASIS NODEMCU ESP32 SEBAGAI PEMANTAU PENCEMARAN UDARA

Oleh

Mayola Prantica

Pada penelitian ini, telah dirancang sistem monitoring kualitas udara yang mampu memonitor kadar gas karbon monoksida (CO), karbon dioksida (CO₂), hidrogen (H₂) dan amonia (NH₃) berbasis nodeMCU ESP32. Penelitian ini menggunakan sensor MQ-2 dan MQ-135 yang dikendalikan oleh mikrokontroler ESP32. Prinsip kerja sistem ini adalah ketika sensor dibiarkan di udara terbuka, sensor akan mendeteksi kualitas udara di suatu daerah percobaan sensor. Hasil pengukuran akan diproses oleh ESP32 dan ditampilkan pada DMD P10 sebagai display dari sistem monitoring ini. DMD P10 dapat menerima data pada saat pengukuran menggunakan komunikasi *serial peripheral interface*. Mekanisme pengujian sensor, untuk sensor MQ-2 gas CO dan sensor MQ-135 gas CO₂ dilakukan dengan membandingkan nilai sensor dan nilai alat standar yang terkalibrasi. Sensor MQ-2 untuk gas H₂ dilakukan dengan perhitungan gas H₂ yang didapat dari penguapan H₂O dan sensor MQ-135 untuk gas NH₃ dilakukan dengan perhitungan nilai gas yang terdapat pada penguapan cairan amonia. Hasil penelitian menunjukkan sensor mampu mendeteksi nilai gas CO, CO₂, H₂ dan NH₃ dengan masing-masing nilai *error* 2,30%, 2,78%, 4,51% dan 1,69%.

Kata kunci : nodeMCU ESP32, Kualitas Udara, Monitoring, MQ-2, MQ-135.

ABSTRACT

MONITORING SYSTEM FOR LEVELS OF CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN AND AMMONIUM USING SENSORS MQ-2 AND MQ-135 ARE BASED ON NODEMCU ESP32 FOR AIR POLLUTING

By

Mayola Prantica

In this research, an air quality monitoring system was designed that is capable of monitoring the levels of carbon monoxide (CO), carbon dioxide (CO₂), hydrogen (H₂) and ammonia (NH₃), based on nodeMCU ESP32. This study uses MQ-2 and MQ-135 sensors controlled by an ESP32 microcontroller. The working principle of this system is that when the sensor is left in the open air, the sensor will detect the air quality in the sensor's experimental area. The measurement results will be processed by the ESP32 and displayed on the DMD P10 as a display for this monitoring system. DMD P10 can receive data at the time of measurement using serial peripheral interface communication. The sensor test mechanism, for the sensor MQ-2 CO gas and the MQ-135 sensor for CO₂, is carried out by comparing the sensor value and the calibrated standard instrument value. The MQ-2 sensor for H₂ gas is carried out by calculating the H₂ gas obtained from the evaporation of H₂O and the MQ-135 sensor for NH₃ gas is carried out by calculating the value of the gas contained in the evaporation of liquid ammonia. The results show that the sensor can detect CO, CO₂, H₂ and NH₃ gas values with error values of 2.30%, 2.78%, 4.51% and 1.69%, respectively.

Keywords: nodeMCU ESP32, air quality, monitoring system, MQ-2, MQ-135.