

ABSTRAK

RANCANG BANGUN ALAT PENDETEKSI KADAR AMONIA BERBASIS IoT DI PT. PUPUK SRIWIDJAJA PALEMBANG

(2025 : 71 Halaman , 48 Gambar + 4 Tabel + Daftar Pustaka + Lampiran)

AULIA RAMADAN

062230320648

Gas amonia merupakan salah satu senyawa kimia yang umum digunakan dalam proses industri, khususnya di sektor pupuk dan petrokimia. Paparan gas ini dalam konsentrasi tinggi dapat berdampak negatif terhadap kesehatan serta meningkatkan risiko kecelakaan kerja. Untuk meminimalkan bahaya tersebut, dirancang sebuah alat pendeteksi kadar amonia berbasis Internet of Things (IoT) yang mampu memberikan pemantauan secara real-time terhadap kondisi udara di lingkungan industri, seperti di PT Pupuk Sriwidjaja Palembang. Sistem ini memanfaatkan sensor MQ-137 untuk mendeteksi konsentrasi gas amonia dan menggunakan ESP32 sebagai mikrokontroler utama untuk pengolahan dan pengiriman data ke platform pemantauan jarak jauh.

Alat ini mampu mengklasifikasikan tingkat konsentrasi amonia ke dalam tiga kategori, yaitu: aman (0–100 ppm), waspada (100–300 ppm), dan bahaya (300–1000 ppm). Nilai kadar amonia (ppm) dan suhu ditampilkan melalui dot matrix, serta divisualisasikan secara real-time menggunakan aplikasi Blynk untuk memudahkan pemantauan jarak jauh. Selain itu, sistem juga dilengkapi dengan seven segment 6 digit untuk menampilkan waktu, sensor DHT22 untuk membaca suhu dan kelembaban lingkungan, serta lampu pilot sebagai indikator visual status kondisi. Pengaturan lampu indikator tersebut dikendalikan melalui relay 3 channel, yang secara otomatis mengaktifkan lampu sesuai kondisi gas terdeteksi. Seluruh rangkaian didukung oleh power supply sebagai sumber tegangan utama. Dengan perancangan ini, diharapkan sistem dapat memberikan solusi pemantauan gas amonia yang efektif, akurat, dan mendukung keselamatan kerja di lingkungan industri.

Kata Kunci: Amonia, Internet of Things, MQ-137, ESP32, Blynk, Keselamatan Kerja.

ABSTRACT

IoT-BASED AMONIA LEVEL DETECTION TOOL at PT. PUPUK SRIWIDJAJA PALEMBANG

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AULIA RAMADAN

062230320648

Ammonia gas is one of the chemical compounds commonly used in industrial processes, especially in the fertilizer and petrochemical sectors. Exposure to high concentrations of this gas can have a negative impact on health and increase the risk of work accidents. To minimize these hazards, an Internet of Things (IoT)-based ammonia level detector was designed that is able to provide real-time monitoring of air conditions in industrial environments, such as at PT Pupuk Sriwidjaja Palembang. This system utilizes the MQ-137 sensor to detect the concentration of ammonia gas and uses the ESP32 as the main microcontroller for processing and sending data to the remote monitoring platform.

This tool is able to classify ammonia concentration levels into three categories, namely: safe (0-100 ppm), alert (100-300 ppm), and danger (300-1000 ppm). The value of ammonia levels (ppm) and temperature are displayed through a dot matrix, and visualized in real-time using the Blynk application to facilitate remote monitoring. In addition, the system is also equipped with a 6-digit seven segment to display time, a DHT22 sensor to read the temperature and humidity of the environment, and a pilot light as a visual indicator of the condition status. The indicator light setting is controlled through a 3-channel relay, which automatically activates the light according to the detected gas condition. The entire circuit is supported by a power supply as the main voltage source. With this design, it is expected that the system can provide ammonia gas monitoring solutions that are effective, accurate, and support work safety in industrial environments.

Keywords: Ammonia, Internet of Things, MQ-137, ESP32, Blynk, Work Safety.