

## **ABSTRACT**

*CO gas is a gas that comes from incomplete combustion of motorized vehicles. The characteristics of CO gas itself are that it is odorless, colorless and tasteless. So it is difficult for humans to feel. Symptoms of CO gas poisoning are difficult to recognize, such as weakness, drunkenness, dizziness and headaches. If the level of CO gas inhaled is excessive, it will cause loss of consciousness and even rapid death. Based on this, a design was made for a CO gas detection device in the car cabin with a PID controller system using the Ziegler-Nichols tuning method. By using two MQ-7 sensors connected to the Arduino UNO and there is an LED indicator & buzzer. This system uses a PID controller to control the AC dimmer connected to the exhaust fan. The CO gas reading results are displayed on the LCD screen. The MQ-7 A sensor obtained an average error value of 6.039% and an average accuracy value of 93.96%. On the MQ-7 B sensor the average error value is 6.19% and the average accuracy value is 93.81%. In system testing without PID control, the average steady state error value was 3.3%, the average overshoot value was 6.3%, the average time rise value was 9.3 s, the average time peak value was 9.6 s, and the average settling time value is 15.85 s. Furthermore, in testing the performance of the exhaust fan using the Ziegler-Nichols PID controller, the average steady state error value was 2%, the average overshoot value was 5.6%, the average time rise value was 7.95 s, the average value -average peak time 8.3 s, and average settling time value 8.9 s. With these test results, the system with PID control is able to work better which can be seen from the average steady state error and average overshoot values.*

**Keywords:** *Exhaust Fan, Carbon Monoxide Gas, Car, MQ-7 Sensor, Ziegler-Nichols*