ABSTRACT

This research aims to develop an Electronic Control Unit (ECU) system for Electric Power Steering (EPS) in autonomous electric vehicles. The implementation of an Isolated Power Supply is carried out to avoid problems Ground Loopwhich can increase signal interference. Testing was conducted using the vehicle's front wheels with torque applied to evaluate the system's accuracy in reading steering degrees. Test results showed that the system could display data accurately despite small fluctuations in steering degree readings, which were still within acceptable limits.

In the dynamic response test, the calculation results show a significant increase in accuracy on ECU B1 compared to ECU A1. The average valueMean Absolute Error(The MAE) on ECU A1 was 0.63, while on ECU B1 it dropped to 0.15, indicating a 76.2% reduction in error. Furthermore, the Standard Deviation value on ECU A1 was 5.30, while on ECU B1 it dropped to 2.24, indicating a 57.6% reduction in fluctuation. These improvements not only improve steering precision but also enhance the efficiency and reliability of the EPS system as a whole, supporting the development of more sustainable automotive technology.

Keywords:Electronic Control Unit (ECU), autonomous electric vehicle, Isolated Power Supply, Ground Loop.