ABSTRACT

Development of an Energy Module for Environmentally Friendly Transportation Based on Numerical Integration

Muhammad Luthfi Pratama Putra.[1)], Mohammad Nasucha, S.T., M.Sc., Ph.D.[2)]
[1)]*Student of Informatics Study Program, Pembangunan Jaya University*
[2)]*Lecturer of Informatics Study Program, Pembangunan Jaya University*

The development of electric vehicles (EVs) in Indonesia is rapidly advancing, especially with the issuance of Presidential Regulation Number 55 of 2019. One type of electric vehicle being developed is the e-cargo bike, which is used for environmentally friendly logistics. However, accurately monitoring the energy consumption of the e-cargo bike remains a challenge due to the lack of suitable commercial energy meter modules, particularly those with a measurement range of 50-100V / 0-30A and a calculation method based on numerical integration. Existing energy meters are more commonly designed for household and industrial use, which have more stable loads compared to electric vehicles. This research develops a numerical integration-based energy meter module to calculate energy consumption in real-time. The system uses an Arduino Nano, an ACS712 current sensor, and a voltage divider circuit, with the measurement results displayed on an OLED. Testing shows that this module can operate with high accuracy under the dynamic load conditions of an electric vehicle. With this development, it is hoped that the energy meter can support power efficiency, extend battery life, and provide a more suitable solution for the e-cargo bike.

Keywords: *Energy Meter, E-Cargo Bike, Numerical Integration, Arduino Nano, ACS712*