

ABSTRAK

EVALUASI KINERJA SENSOR ELECTRIC FIELD MILL DENGAN RC FILTER PADA SISTEM MONITORING MEDAN LISTRIK ATMOSFER

(2026: v + 57 Halaman + 22 Gambar + 11 Tabel + Daftar Pustaka +
Lampiran)

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Pengukuran medan listrik atmosfer menggunakan sensor *Electric Field Mill* menghasilkan sinyal analog dengan amplitudo kecil dan rentan terhadap gangguan noise. Pengujian ini bertujuan mengevaluasi kinerja *Electric Field Mill* dengan penerapan *RC Low Pass Filter* pada sistem monitoring medan listrik atmosfer. Rangkaian pengolahan sinyal menggunakan IC *Low Pass Filter* dengan resistor 10 k Ω dan kapasitor 22 nF. Pengujian dilakukan melalui simulasi pada aplikasi Livewire dengan membandingkan karakteristik sinyal sebelum dan sesudah melewati filter berdasarkan parameter V_{max} , V_{min} , V_{mean} , dan V_{pp} . Hasil pengujian menunjukkan bahwa *RC Low Pass Filter* mampu mengurangi komponen ripple atau noise yang ditandai dengan penurunan nilai V_{pp} setelah proses penyaringan, sedangkan nilai V_{mean} relatif tetap. Dengan demikian, penerapan *RC Low Pass Filter* dapat meningkatkan kestabilan sinyal keluaran *Electric Field Mill* sehingga proses pembacaan oleh ADC ESP32 menjadi lebih baik dan akurat.

Kata Kunci: *Electric Field Mill*, RC Low Pass Filter, LM358, Pengolahan Sinyal, Medan Listrik Atmosfer, ESP 32.

ABSTRACT

**PERFORMANCE EVALUATION OF ELECTRIC FIELD MILL USING RC LOW PASS FILTER IN AN ATMOSPHERIC ELECTRIC FIELD MONITORING SYSTEM
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Measurement of the atmospheric electric field using an Electric Field Mill sensor produces an analog signal with a small amplitude and is susceptible to noise interference. This study aims to evaluate the performance of an Electric Field Mill by implementing an RC Low Pass Filter in an atmospheric electric field monitoring system. The signal conditioning circuit employs an LM358 operational amplifier and an RC Low Pass Filter with a resistor value of 10 k Ω and a capacitor value of 22 nF. Testing was conducted through simulation using the Livewire application by comparing signal characteristics before and after passing through the filter based on the parameters of V_{max}, V_{min}, V_{mean}, and V_{pp}. The results show that the RC Low Pass Filter is capable of reducing ripple and noise components, indicated by a decrease in the V_{pp} value after the filtering process, while the V_{mean} value remains relatively unchanged. Therefore, the implementation of the RC Low Pass Filter improves the stability of the Electric Field Mill output signal, resulting in better and more accurate signal acquisition by the ESP32 AD

Keywords : Electric Field Mill, RC Low Pass Filter, LM358, Signal Processing, Atmospheric Electric Field, ESP32.