

RINGKASAN

RANCANG BANGUN PENYEARAH SATU FASA PADA SISTEM HYBRID PV DAN LISTRIK PLN UNTUK PENGISIAN BATERAI MOBIL LISTRIK

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Pada penelitian ini dilakukan perancangan rangkaian penyearah satu fasa yang nantinya akan diparalelkan dengan rangkaian Buck-Boost Chopper. Tegangan keluaran yang dihasilkan rangkaian penyearah satu fasa dan Buck-Boost Chopper yaitu sebesar 26,45V dan 24V dengan arus 0,5 A yang kemudian disetarakan menjadi 26V mengikuti tegangan rangkaian yang memiliki nilai tegangan keluaran tertinggi. Pada penelitian ini dilakukan beberapa pengujian dan analisis seperti, pengujian sinyal IGBT dan pengujian pengisian baterai lalu akan dibandingkan hasil pengujian dan analisis rangkaian ketika diparalelkan. Pada pengujian sinyal IGBT didapatkan beberapa kesimpulan yaitu nilai resitor berpengaruh pada nilai Duty Cycle dan Frekuensi, pada pengujian pengisian baterai didapatkan bahwa kondisi baterai memiliki nilai arus yang stabil 0,5 A ketika pengisian dari kondisi 0% hingga 75% setelah itu nilai arus akan mengalami penurunan dari 0,5 ke 0,42 hingga mencapai 0 A ketika kondisi baterai telah terisi penuh, sedangkan nilai suhu akan mengalami kenaikan seiring dengan proses pengisian baterai dan nilainya akan mengalami penurunan apabila kondisi baterai mencapai angka 75%. Untuk hasil pengujian dan analisis rangkaian paralel didapatkan bahwa arus dan suhu memiliki nilai yang tinggi ketika rangkaian diparalelkan, nilai arus dan suhu ketika rangkaian penyearah satu fasa dioperasikan yaitu 0,5 A dan 33,24°C pada kapasitas baterai 25% sedangkan ketika rangkaian diparalelkan memiliki nilai arus 0,52 A dan suhu 34,73 °C.

Kata kunci : Penyearah Satu Fasa, *Buck-Boost Chopper*, Pengisian Baterai

SUMMARY

DESIGN AND CONSTRUCTION OF A SINGLE PHASE RECTIFIER IN HYBRID PV SYSTEM AND PLN ELECTRICITY FOR CHARGING ELECTRIC CAR BATTERIES

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In this research, a single phase rectifier circuit was designed which will later be paralleled with a Buck-Boost Chopper circuit. The output voltage produced by the single-phase rectifier circuit and Buck-Boost Chopper is 26.45V and 24V with a current of 0.5 A which is then equalized to 26V following the circuit voltage which has the highest output voltage value. In this research, several tests and analyzes were carried out, such as IGBT signal testing and battery charging testing, then the results of the test and circuit analysis when paralleled were compared. In testing the IGBT signal, several conclusions were obtained, namely that the resistor value influences the Duty Cycle and Frequency values. In the battery charging test, it was found that the battery condition had a stable current value of 0.5 A when charging from 0% to 75% after which the current value would experience decreases from 0.5 to 0.42 to reach 0 A when the battery is fully charged, while the temperature value will increase along with the battery charging process and the increase will decrease if the battery condition reaches 75%. For the test results and analysis of parallel circuits, it was found that the current and temperature had high values when the circuit was paralleled, the current and temperature values when the single phase rectifier circuit was operated were 0.5 A and 33.24°C at 25% battery capacity, whereas when the circuit was paralleled the values current 0.52 A and temperature 34.73 °C.

Keywords : Single Phase Rectifier, Buck-Boost Chopper, Battery Charging