

Rancangan Prototype Pembangkit Listrik Tenaga Mikrohidro (PLTMH) Berbasis Whirpool Menggunakan Turbin Francis

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Abstrak

Prototype pembangkit listrik tenaga mikrohidro (PLTMH) berbasis whirpool menggunakan turbin francis, pelaksanaan pengujian dilakukan di tiga sungai yang berbeda. Pengujian dilakukan menggunakan generator DC dengan kapasitas 24 volt, 30 watt pada putaran 500 rpm. Generator ini dihubungkan ke Charger Controller (SCC) 10 Ampere untuk mengatur pengisian baterai agar tidak terjadi over charging dan over voltage. Tegangan yang masuk pada baterai diubah dari tegangan Direct Current (DC) ke Alternating Current (AC) menggunakan inverter 100 watt dari keluaran inverter ke beban lampu AC 12 watt. Debit air, arus, daya listrik dan masing-masing tegangan generator, charge controller, inverter akan diamati. Untuk mengetahui putaran generator, tachometer digunakan untuk mengetahui putaran generator. Dari hasil pengujian sungai brumbungan lor, gending tegangan generator terendah 13,2 Volt pada putaran 343,5 rpm, tegangan masukan charger controller 12,4 Volt, tegangan keluaran inverter 204 Volt dan Arus keluaran inverter 0,03 Ampere, daya keluaran imverter 6,12 watt. pengujian sungai wiroborang kota probolinggo tegangan generator terendah 12,9 Volt pada putaran 353,7 rpm, tegangan masukan charger controller 11,9 Volt, tegangan keluaran inverter 202 Volt dan Arus keluaran inverter 0,01 Ampere, daya keluaran imverter 2.02 watt. pengujian sungai dringu tegangan generator terendah 10,7 Volt pada putaran 141,7 rpm, tegangan masukan charger controller 10,8 Volt, tegangan keluaran inverter 201 Volt dan Arus keluaran inverter 0,01 Ampere, daya keluaran imverter 2,01 watt.

Kata Kunci : Turbin francis, Generator DC, Charge Controller, Inverter, Pengujian

Whirlpool Based Microhydro Power Plant (PLTMH) Prototype Design Using a Francis Turbine

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Abstract

Prototype of a whirlpool-based micro-hydro power plant (PLTMH) using a francis turbine, the tests were carried out in three. Tests were carried out using a DC generator with a capacity of 24 volts, 30 watts at 500 rpm. This generator is connected to a 10 Ampere Charger Controller (SCC) to regulate battery charging so that over charging and over voltage do not occur. The incoming voltage to the battery is changed from Direct Current (DC) to Alternating Current (AC) using a 100 watt inverter from the output of the inverter to a 12 watt AC light load. Water discharge, current, electric power and each generator voltage, charge controller, inverter will be observed. To find out the rotation of the generator, a tachometer is used to determine the rotation of the generator. From the results of the brumbungan lor river test, the lowest generator voltage gending is 13.2 Volts at 343.5 rpm, the charger controller input voltage is 12.4 Volts, the inverter output voltage is 204 Volts and the inverter output current is 0.03 Amperes, the inverter output power is 6, 12 watts. testing the Wiroborang River, Probolnggo City, the lowest generator voltage is 12,9 Volts at 353,7 rpm, the charger controller input voltage is 11,9 Volts, the inverter output voltage is 202 Volts and the inverter output current is 0.01 Amperes, the inverter output power is 2,02 watts. testing the Dringu River, the lowest generator voltage is 10,7 Volts at 141,7 rpm, the charger controller input voltage is 10,8 Volts, the inverter output voltage is 201 Volts and the inverter output current is 0.01 Amperes, the inverter output power is 2,01 watts.

Keywords : Francis turbine, DC Generator, Charge Controller, Inverter, Testing