

INTISARI

Sistem tenaga listrik yang digunakan di Indonesia secara keseluruhan adalah sistem tegangan tiga fasa dengan arus bolak-balik. Energi listrik tiga fasa ini dibangkitkan oleh generator tiga fasa yang disalurkan melalui saluran transmisi tiga fasa. Pada proses penyaluran energi listrik dari pusat pembangkit ke konsumen pasti mengalami drop tegangan. Sistem tegangan listrik tiga fasa pembebanan fasa R, fasa S, dan fasa T harus seimbang, apabila tidak seimbang maka akan timbul arus pada penghantar netral. Penggunaan beban nonlinier menyebabkan terdistorsinya gelombang sinusoida sehingga menyebabkan harmonik. Akibat ketidakseimbangan beban dan harmonik menyebabkan ketidak efisiensi penggunaan energi listrik. Penelitian ini dilakukan untuk mengetahui kualitas daya listrik pada RSAPAU Dr. S Hardjolukito Yogyakarta. Pengukuran dilakukan pada panel LVMDP. Pengukuran dilakukan selama 24 jam dengan interval 30 menit. Pengukuran meliputi Frekuensi [Hz], tegangan [volt], total *harmonic distortion* (THD) tegangan [%], arus [ampere], Total *Harmonic distortion* (THD) arus [%], faktor daya, unbalance voltage [%], dan unbalance arus [%]. Hasil pengukuran kualitas daya listrik diketahui bahwa terjadi masalah pada nilai total *harmonic distortion* (THD) arus [%] sudah melewati batas Standar IEEE 519-1992 sebesar 12 %. Harmonik arus menyebabkan ketidak efisiensi penggunaan energi listrik sehingga harus membayar kerugian sebesar Rp. 292.737 per-tahun. Berdasarkan hasil penelitian dan analisis data, untuk mereduksi harmonik dilakukan perencanaan pemasangan Filter pasif single tuned dan Aktif filter harmonik.

Kata Kunci : Kualitas Daya Listrik, Harmonik, Unbalance, Filter pasif single tuned, Aktif filter harmonik

ABSTRACT

The electric power system used in Indonesia as a whole is a three phase voltage system with alternating current. This three-phase electrical energy is generated by a three-phase generator delivered through a three-phase transmission channel. In the process of ignition electrical energy from the center of the plant to the consumer must experience the drop voltage. The three phase electrical voltage system of the R phase, the S phase, and the T phase have to be balanced, if unbalanced it will occur in the neutral conductance. The use of nonlinear load causes the Terdistorsinya of sinusoida waves so as to cause harmonics. Due to load and harmonic imbalance caused the inefficiency of electrical energy use. The research was performed to determine the quality of electrical power in the RSAPAU of Dr. S Hardjolukito Yogyakarta. Measurements are done on LVMDP panel. The measurement is done for 24 hours with 30 minutes intervals. Measurements include frequency [Hz], voltage [volt], Total harmonic distortion (THD) voltage [%], current [ampere], Total Harmonic Distortion (THD) current [%], power factor, unbalance voltage [%], and unbalance current [%]. The result of electrical power quality measurement is known that there is a problem with total harmonic distortion (THD) current value [%] has crossed the IEEE 519-1992 standard limit of 12%. Harmonic currents cause the lack of efficiency of electrical energy consumption so as to pay a loss of Rp. 292,737 / year. Based on the results of the research and data analysis, to reduce harmonics done planning installation of passive Filter single tuned and active filter harmonics.

Keywords: Power quality, harmonics, Unbalance, passive single tuned Filter, active harmonic filter