

INTISARI

Fasilitas Pembangkit Tegangan Tinggi Impuls 1200 kV milik Lab. TTT DTETI FT UGM terdapat kerusakan pada unit kontrol sehingga pengoperasian tegangan *charging* kapasitor menggunakan *contact voltage regulator* (CVR) yang diputar secara manual. Pengoperasian dengan cara ini kurang praktis, kurang akurat, dan kurang stabil dalam memutar CVR. Dengan demikian, dibutuhkan alat untuk dapat mengatur tegangan *charging* kapasitor yang terkontrol sehingga dapat mengurangi kekurangan dari pengoperasian secara manual. Prototipe sistem tegangan *charging* kapasitor dibuat untuk automatisasi dan digitalisasi. Prototipe menggunakan sistem *loop* tertutup. Prototipe terbagi menjadi *hardware* dan *software*. *Hardware* terbagi menjadi *kontroller*, *motor driven variac* dengan jenis motor *direct current* (dc), sensor tegangan *alternating current* (ac), alat proteksi seperti *no-fuse breaker* dan MCB, serta alat pengukur tegangan *multimeter* dan *oscilloscope*. *Software* yang digunakan adalah LabVIEW dengan pemrograman berbasis grafis dengan keunggulan *user interface* berupa virtual instrumen. Pengujian peralatan dibagi menjadi pengujian komponen seperti sensor tegangan, pengujian sistem pengaturan tegangan *charging existing* untuk menentukan persamaan yang digunakan dalam pembuatan algoritma sistem, serta pengujian final untuk evaluasi prototipe. *Interface* berbasis virtual digunakan untuk memenuhi digitalisasi sistem dan mempermudah dalam meningkatkan sistem. Fitur yang dibuat dalam sistem yaitu dapat melakukan set poin tegangan *charging* berbasis tegangan ac dan pengukuran tegangan *root mean square* (rms) *output variac*, serta menaikkan tegangan *variatic* secara otomatis dan peningkatan tegangan ac yang stabil. Untuk mengukur tegangan dc *charging* menggunakan *multimeter*. Prototipe dapat melakukan set poin tegangan untuk menaikkan tegangan ac dengan rata-rata eror sebesar -3.188 V terhadap nilai terukur *multimeter* serta *range* eror pengukuran tegangan menggunakan LabVIEW terhadap nilai terukur pada multimeter yaitu $-0.69V \leq \text{error tegangan} \leq 0.81V$ ac.

Kata kunci : tegangan *charging* kapasitor, *motor driven variac*, LabVIEW, *kontroller*, sensor tegangan

ABSTRACT

The 1200 kV Impulse High Voltage Generating Facility belonging to the TTT DTETI FT UGM Laboratory has damage to the control unit so that the operation of the capacitor charging voltage uses a contact voltage regulator (CVR) which is rotated manually. Operation in this way is less practical, less accurate, and less stable in rotating the CVR. Thus, a tool is needed to be able to adjust the controlled capacitor charging voltage so as to reduce the disadvantages of manual operation. The prototype of the capacitor charging voltage system is made for automation and digitization. The prototype uses a closed loop system. The prototype is divided into hardware and software. The hardware is divided into controllers, motor driven variac with direct current (dc) motor types, alternating current (ac) voltage sensors, protection devices such as no-fuse breakers and MCBs, as well as multimeter and oscilloscope voltage gauges. The software used is LabVIEW with graphical programming with the advantage of a user interface in the form of virtual instruments. Equipment testing is divided into component testing such as voltage sensors, testing of the existing charging voltage control system to determine the equations used in making the system algorithm, as well as final testing for prototype evaluation. Virtual-based interfaces are used to fulfill system digitization and make it easier to upgrade the system. The features made in the system are that it can set charging voltage points based on ac voltage and measure the root mean square (rms) voltage at the variac output, as well as increase the variac voltage automatically and increase the stable ac voltage. To measure the dc charging voltage use a multimeter. The prototype can set voltage points to increase the ac voltage with an average error of -3.188 V to the multimeter measured value and the error range for measuring voltage using LabVIEW to the measured value on the multimeter, namely $-0.69V \leq \text{error voltage} \leq 0.81V$ ac.

Keyword : capacitor charging voltage, motor driven variac, LabVIEW, controller, voltage sensor