

Pengendalian Motor Induksi Tiga Fasa Secara Sekuensial Menggunakan Software Syaraf Listrik Sebagai Alternatif Pengganti PLC

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ABSTRAK Komputer dengan perkembangannya yang sangat pesat baik secara software maupun hardware dewasa ini telah memainkan peran yang sangat penting dan strategis dalam kehidupan manusia. Komputer digunakan secara luas oleh masyarakat untuk menunjang aktivitasnya sehari-hari mulai dari aplikasi-aplikasi yang sederhana di lingkungan rumah tangga, maupun dalam aplikasi-aplikasi yang lebih besar dan rumit dalam dunia bisnis dan industri.

Dengan perkembangan teknologi komputer yang ada saat ini dan dengan telah diciptakannya software syaraf listrik memungkinkan untuk dapat dilakukan pemrograman sistem kontrol yang lebih sederhana dan murah karena interface pengontrolan dapat dibuat sendiri dalam bentuk rangkaian elektronika sederhana dengan bahasa pemrograman yang cukup sederhana pula namun memiliki kemampuan kontrol seperti yang diinginkan.

Dalam penelitian ini dilakukan pengontrolan motor induksi tiga fasa dalam mode kontrol sekuensial dengan memanfaatkan software syaraf listrik dan rangkaian interface berupa rangkaian elektronika menggunakan transistor sebagai saklar elektronik.

Metode yang digunakan dalam penelitian ini adalah metode eksperimen dimana langkah yang dilakukan adalah perancangan dan perakitan rangkaian interface, kemudian dibuat pemrograman rangkaian kontrol menggunakan software syaraf listrik, dan selanjutnya dilakukan percobaan atau eksperimen secara nyata dalam bentuk pengontrolan motor induksi tiga fasa.

Hasil eksperimen menunjukkan bahwa software syaraf listrik dapat digunakan untuk melakukan pengontrolan motor induksi tiga fasa dalam mode kontrol sekuensial baik secara *interlock* maupun *non interlock*.

Kata kunci: software syaraf listrik, mode kontrol sekuensial, rangkaian interface, motor induksi tiga fasa

A. Pendahuluan

Saat ini penggunaan motor listrik digunakan secara luas dalam dunia industri sebagai penggerak mekanik. Jenis motor listrik yang paling banyak digunakan di industri adalah motor induksi, dimana pemakaian motor jenis ini di industri mencapai sekitar 90% dari jenis motor listrik yang ada.

Biasanya motor-motor listrik tersebut dikendalikan dengan menggunakan PLC (*Programmable Logic Controller*). Dengan menggunakan PLC diperoleh unjuk kerja pengendalian yang cukup memuaskan, namun kendalanya adalah harga PLC relatif mahal sehingga jika digunakan untuk mode pengontrolan yang tidak terlalu kompleks akan menyebabkan *cost investment* yang cukup besar tidak sebanding dengan unjuk kerja yang diperlukan.

Dengan perkembangan teknologi komputer yang ada saat ini dan dengan telah diciptakannya software syaraf listrik, maka faktor biaya yang mahal tersebut dapat dikurangi karena melalui software tersebut dapat dilakukan pemrograman sistem kontrol yang lebih sederhana dan murah karena interface pengontrolan dapat dibuat sendiri dalam bentuk rangkaian elektronika sederhana dengan bahasa pemrograman yang cukup sederhana pula namun memiliki kemampuan kontrol seperti yang diinginkan.

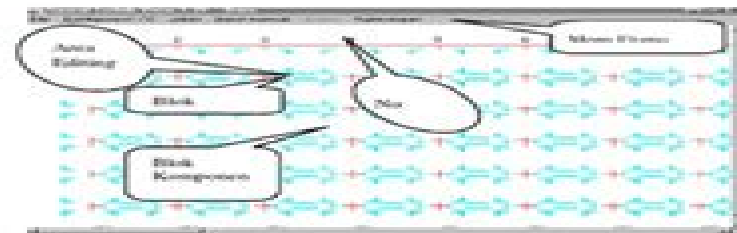
Di samping itu, program yang dibuat dapat diujicoba terlebih dahulu secara simulasi sebelum diterapkan secara *real time* pada benda sebenarnya

yang mana dalam hal ini adalah motor-motor listrik arus bolak-balik, khususnya motor induksi.

B. Metode

1. Software Syaraf Listrik

Software syaraf listrik adalah software yang sistem kerja rangkaianannya bertunggal seperti syaraf pada rangkaian kontrol listrik. Software syaraf listrik memiliki analogi hubungan, dengan rangkaian kontrol listrik sederhana.



Gambar 1. Menu Editor

Pada Gambar 1 tampak menu editor, di bagian atas jendela utama terdapat beberapa menu utama (*file*, konfigurasi *I/O* jalan, *input manual*, status dan keterangan). Pada bagian bawah terdapat area perancangan/editing yang berfungsi menempatkan komponen pada rangkaian perancangan.

Pengendalian Motor Induksi Tiga Fasa Secara Sekuensial

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