ABSTRAK

ANALISA PERBANDINGAN DATA PENGEREMAN DINAMIK & NON DINAMIK PADA MOTOR 3 *PHASE*

(2025: xv + 38 Gambar + 20 Tabel + 15 Daftar Pustaka)

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Penelitian ini membandingkan pengereman dinamik dan non-dinamik pada motor induksi tiga fasa yang dikendalikan PLC FX3U dan didukung VFD. Fokusnya menilai prinsip kerja, waktu henti, serta implikasi keandalan dan keselamatan. Rancang bangun meliputi rangkaian daya-kontrol (forward–reverse–brake), injeksi arus DC, serta pengukuran arus, tegangan, kecepatan, dan frekuensi. Metode mencakup setel parameter VFD, pemrograman ladder urutan rem, dan prosedur keselamatan pelepasan energi. Analisis deskriptif-kuantitatif memakai kurva kecepatan-waktu dan profil arus. Pengujian menunjukkan tren konsisten: kenaikan arus injeksi mempercepat penghentian; pada 0,10 A, waktu henti mendekati 0,59 s, lebih singkat dibanding non-dinamik. Temuan menegaskan rem dinamik efektif untuk henti cepat tanpa komponen gesek, meski perlu elemen tambahan dan disipasi panas. Sebaliknya, non-dinamik lebih sederhana/berpotensi hemat energi, namun lebih lambat dan bisa menuntut perawatan. Data diambil dari perancangan dan pengujian modul laboratorium terkait. Keterbatasan meliputi variasi beban tetap dan satu kapasitas motor. Hasil diusulkan sebagai rujukan pemilihan strategi pengereman untuk proses industri dan praktikum.

Kata kunci: motor pengereman; dinamik, non-dinamik.

ABSTRACT

COMPARATIVE ANALYSIS OF DYNAMIC & NON-DYNAMIC BRAKING DATA ON A 3-PHASE MOTOR

(2025: xv + 38 Figures + 20 Tables + 15 References)

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This study compares dynamic and non-dynamic braking on a three-phase induction motor controlled by an FX3U PLC and supported by a VFD. The focus is to evaluate the working principle, stopping time, as well as implications for reliability and safety. The design includes power-control circuits (forward–reverse–brake), DC current injection, and measurement of current, voltage, speed, and frequency. The method involves setting VFD parameters, programming the ladder sequence for braking, and applying safety procedures for energy release. Descriptive-quantitative analysis employs speed–time curves and current profiles. Experimental results show a consistent trend: an increase in injected current accelerates the stopping process; at 0.10 A, the stopping time reaches approximately 0.59 s, shorter than the non-dynamic method. The findings confirm that dynamic braking is effective for rapid stopping without friction components, although it requires additional elements and heat dissipation. Conversely, non-dynamic braking is simpler and potentially more energy-efficient but slower and may demand more maintenance. Data were obtained from the design and testing of the related laboratory module. Limitations include constant load variations and a single motor capacity.

Keywords: *motor; dynamic; non-dynamic braking;.*