

ABSTRAK

ANALISIS EFISIENSI MOTOR INDUKSI 3 FASA SEBAGAI POMPA AIR SUNGAI DI PUSRI-III PALEMBANG

(2025: xv + 46 Halaman + 26 Daftar Gambar + 5 Daftar Tabel + Lampiran)

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Motor induksi tiga fasa merupakan salah satu komponen vital dalam industri, termasuk di PT Pupuk Sriwidjaja Palembang yang memanfaatkan motor ini untuk menggerakkan pompa air sungai yang berperan penting untuk menyalurkan air sungai Musi yang akan diolah menjadi air bersih guna mendukung proses produksi pupuk serta kebutuhan operasional sehari-hari di pabrik. Namun, dalam konversi energi listrik ke energi mekanik, selalu terjadi rugi-rugi daya yang memengaruhi efisiensi kerja motor. Penelitian ini bertujuan untuk menganalisis besarnya rugi-rugi daya dan efisiensi motor induksi tiga fasa tipe 6P-4006-JA yang digunakan sebagai pompa air sungai di PT. Pupuk Sriwidjaja Palembang tersebut. Metode penelitian yang digunakan meliputi studi literatur, observasi lapangan, dan wawancara. Berdasarkan hasil perhitungan, nilai rugi-rugi daya motor bervariasi tergantung beban kerja, dengan rentang rugi-rugi sebesar 2.706,87 Watt hingga 7.265,55 Watt. Sementara itu, nilai efisiensi motor berada pada kisaran 91,54% hingga 94,83%. Hasil ini menunjukkan bahwa di salah satu pengukuran motor, efisiensinya tercatat melebihi standar efisiensi berdasarkan standar IEC 60034-30-1 yaitu 94,2%. Namun, di beberapa pengukuran lainnya motor tercatat mengalami penurunan efisiensi dibawah standar. Penurunan efisiensi terutama disebabkan oleh peningkatan beban yang menaikkan arus dan memperbesar rugi-rugi tembaga. Maka dari itu dapat dilakukan hal seperti penyesuaian beban di titik kerja optimal motor, pemeliharaan berkala seperti pelumasan dan pembersihan komponen seperti *strainer* pompa untuk meningkatkan dan menjaga efisiensi tetap optimal dan sesuai standar.

Kata Kunci: Motor Induksi 3 Fasa, Rugi-Rugi Daya, Efisiensi

ABSTRACT

EFFICIENCY ANALYSIS OF 3-PHASE INDUCTION MOTOR AS A RIVER WATER PUMP IN PUSRI-III PALEMBANG

(2025: xv + 46 Pages + 26 List of Figures + 5 List of Tables + Attachment)

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Three-phase induction motors are one of the vital components in industry, including at PT Pupuk Sriwidjaja Palembang, which utilizes this motor to drive river water pumps that play an important role in distributing water from the Musi River to be processed into clean water to support fertilizer production processes and daily operational needs at the plant. However, in the conversion of electrical energy into mechanical energy, power losses always occur that affect the working efficiency of the motor. This research aims to analyze the amount of power losses and the efficiency of the 6P-4006-JA type three-phase induction motor used as a river water pump at PT Pupuk Sriwidjaja Palembang. The research methods used include literature study, field observation, and interviews. Based on the calculation results, the motor power losses vary depending on the working load, with a range of losses from 2,706.87 Watts to 7,265.55 Watts. Meanwhile, the motor efficiency values are in the range of 91.54% to 94.83%. These results show that in one of the measurements, the motor efficiency was recorded to exceed the efficiency standard based on IEC 60034-30-1, which is 94.2%. However, in several other measurements, the motor was recorded to experience a decrease in efficiency below the standard. The efficiency reduction is mainly caused by an increase in load which raises the current and enlarges the copper losses. Therefore, actions such as load adjustment at the motor's optimal working point, periodic maintenance such as lubrication and cleaning of components like the pump strainer can be performed to improve and maintain efficiency at an optimal level and in accordance with the standard.

Keywords: 3 Phase Induction Motor, Power Losses, Efficiency