

ABSTRAK

ANALISIS PENGARUH PEMASANGAN REGULATOR PNEUMATIK TERHADAP STABILITAS GERAK SILINDER PADA MESIN PENCETAK TAHU

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(56 Halaman, 7 Gambar, 23 Tabel, 7 Lampiran)

Penelitian ini bertujuan untuk menganalisis pengaruh pemasangan regulator pneumatik terhadap stabilitas gerak silinder pada mesin pencetak tahu. Metode penelitian yang digunakan adalah metode eksperimen dengan pendekatan komparatif melalui pengujian sistem pneumatik sebelum dan sesudah pemasangan regulator. Variabel yang diamati meliputi tekanan kerja, waktu gerak piston turun, dan waktu gerak piston naik pada variasi tekanan 4 bar, 6 bar, dan 8 bar dengan lima kali pengulangan untuk setiap kondisi. Analisis data dilakukan menggunakan statistik deskriptif, uji normalitas Shapiro-Wilk, uji homogenitas Levene, uji Welch ANOVA, dan uji lanjut Games-Howell. Hasil penelitian menunjukkan bahwa penggunaan regulator menghasilkan gerak silinder yang lebih stabil dan konsisten dibandingkan kondisi tanpa regulator. Kondisi terbaik diperoleh pada penggunaan regulator dengan tekanan kerja 8 bar yang menghasilkan rata-rata waktu piston turun sebesar 0,844 detik dan waktu piston naik sebesar 0,870 detik. Dengan demikian, pemasangan regulator pneumatik terbukti mampu meningkatkan kestabilan gerak silinder dan performa mesin pencetak tahu.

Kata Kunci: pneumatik, regulator tekanan, silinder pneumatik, stabilitas gerak, mesin pencetak tahu.

ABSTRACT

ANALYSIS OF THE EFFECT OF INSTALLING A PNEUMATIC REGULATOR ON CYLINDER MOTION STABILITY IN A TOFU PRESS MACHINE

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(56 pp, 7 Figures, 23 Tables, 7 Attachments)

This study aims to analyze the effect of installing a pneumatic regulator on the stability of cylinder movement in a tofu-making machine. The research method used is an experimental method with a comparative approach, conducting tests on the pneumatic system before and after the installation of the regulator. The observed variables include working pressure, piston downward travel time, and piston upward travel time at varied pressures of 4 bar, 6 bar, and as well as 8 bar, with five repetitions for each condition. Data analysis was performed using descriptive statistics, the Shapiro-Wilk normality test, Levene's homogeneity test, the Welch ANOVA test, and the Games-Howell post-hoc test. The results showed that the use of a regulator produced a more stable and consistent cylinder movement compared to the condition without a regulator. The best condition was obtained using a regulator with a working pressure of 8 bar, which produced an average piston downward travel time of 0.844 seconds and an upward travel time of 0.870 seconds. In conclusion, the installation of a pneumatic regulator is proven to be capable of improving the stability of cylinder movement and the performance of the tofu-making machine.

Keywords : pneumatic system, pressure regulator, pneumatic cylinder, motion stability, tofu molding machine