ABSTRACT

DESIGN OF THYRISTOR CIRCUIT AS A SINGLE PHASE BRIDGE WITH VARIOUS ANGLES

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The thyristor circuit as a single phase bridge with varying angle uses four thyristors controlled by varying the firing angle (α) to regulate the output voltage. After being designed, assembled, and tested using varying angles starting from the ignition angle α = 0°, V = 30,9 V, I = 0,29 A, P = 8,961 W were obtained so that V_m was 13 V, V_{eff} was 9,19 V, and V_{pp} was 26 V. At an angle of α = 90°, V = 20,95 V, I = 0,20 A, P = 4,19 W were obtained, so that V_m was 12,5 V, V_{eff} was 8,84 V, and V_{pp} was 25 V. At an angle of α = 150°, V = 7,89 V, I = 0,07 A, P = 0,55 W were obtained, so that V_m was 7,5 V, V_{eff} was 5,30 V, V_{pp} was 15 V. The measurement results were then compared using PSIM simulation software. Based on measurement and calculation data, it is known that the larger the ignition angle (α), the smaller the voltage, current, and power produced. The output waveform displayed through the oscilloscope and PSIM program shows conformity. For the load R = 100 Ω + L = 60 mH, the measurement results also show almost the same value, with the only difference being in the output waveform. Based on the results of this test, the design tool can be used as a practical medium in learning power electronics.

***Keywords**: Circuit, Rectifier, Thyristor, Bridge, Firing Angle*