

## ABSTRACT

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Traditionally, single phase induction motor is used with a starting capacitor and centrifugal switch in the auxiliary winding, while the running capacitor is used in the main winding. This kind of method will increased the maintenances cost and the breakdown percentage. Therefore, this project is to design a Conventional method in starting a single phase 1 HP induction motor using an adjustable AC capacitor. In this case, the single phase 1 HP induction motor will be using an electronic switch and one capacitor to prove that identical starting performance could be replace in using one capacitor rather than using two capacitors.

An electronic switch combines with four MOSFETs is used to form an H-Bridge and is connected in parallel with the capacitor. This electronic switch must be able to short the capacitor during each cycle to provide large enough capacitance to rotate the rotor of the induction motor. This is done by proper controlling the timing of the MOSFET.

Additionally, Pulse Width Modulation (PWM) is required for controlling the OSFET firing timing to restrict power applied to the AC voltage. The touch off pulses can be displaced within phase angle of  $0^\circ$  to  $180^\circ$ . The phase angle between  $0^\circ$  to  $180^\circ$  is applied to make sure that the supply is made intersectional between positive or negative phase so that the h-bridge can function.

The TCA785 is a phase control IC that can self-generate the Pulse Width Modulation (PWM). PWM is a combination of sinusoidal waveform with saw tooth waveform. Sinusoidal wave form is obtained from alternating current (AC) supply while MOSFET driver provides saw tooth waveform.

In conclusion, the objective and task were achieved and the presence of an electronic switch is able to improve the torque and efficiency of the motor.

**Keywords:** single phase induction motor, capacitor, auxiliary winding, main winding, electronic switch, torque, efficiency.