

ABSTRACT

The proposed project presents the design and development of a real time standalone performance meter which has the main function of measuring and displaying the performance parameters of the phase wound induction motors. The idea of this project is based on the existence of rotor neutral voltage during the unbalanced three-phase which occur in any real practical three-phase wound rotor induction motor. The rotor neutral voltage which varies with the mechanical load or slip is the key in this performance meter.

This performance meter will take the wound rotor neutral voltage as its reference voltage and subsequently deduce the performance parameters of the motor through the characteristics database stored in the microcontroller (PIC16F877A) which is also the main control unit. The characteristics database is merely a data table describing the relationship of the rotor neutral voltage with the other performance parameters which is created through experimental testing. The performance parameters which are the mechanical torque (Nm), slip, efficiency, mechanical power (W), input power (W) and the rotor current (A) will be display on the LCD.

The neutral voltage which is an AC sine voltage is rectified through a bridge rectifier IC (RS406) filter to a DC level voltage through a filter capacitor then feed in to PIC16F877A ADC module. A phototransistor speed sensor will generate pulses with different frequency according to the shaft speed and microcontroller will read the pulses and calculate the shaft speed of motor. These two inputs data aided with characteristics database will display the rest of the performance parameters.

The project is carried out successfully with the functioning performance meter meeting requirements specified. The performance meter can be further developed for various model of motor flexible with the industrial needs.

Keywords: *Performance meter, wound rotor induction motor, PIC16F877A, performance parameters, rotor neutral voltage.*