

Abstract

The AC induction motor is the workhorse of modern industry. Worldwide about 50 million motors are installed every year that have greater than ½ hp. Today only a small percentage of these motors utilize variable speed drives. Almost half of the variable speed AC drives sold today are in the 1 to 5 hp range. Companies producing this range of drives are under a great deal of pressure to reduce costs. Lower system cost will result in higher volumes as more applications use variable speed. The power semiconductors are a significant portion of the cost of these drives. The drive which we are going to manufacture will be a low cost one because we are not going to vary all the parameters. Only important parameters will be varied which will be discussed later in the report. This drive will be for particular application as required by the customer because in the market there are drives which have additional features which the customer might not require but he has to pay for that features also which will cost him extra. Our drive will only provide the required features as demanded by the customer. In this sense we can call it a low cost drive. For providing the pulses to the IGBT we are using SPWM technique. The main purpose of this project is to control the speed of an AC motor using a V/F control technique.

The motor drive consists of three main parts. First is a converter. This takes the input ac voltage and converts it to a dc voltage. Next is a filter. This is to insure a clean dc signal to motor. Last is inverter. This is a series of IGBT's that switch on and off in a sequence such that output signal is pulsing a particular frequency. The inverter is main operating part of drive. Once the signal can be manipulated to a desired frequency the motor can be run at any desired speed. IGBT drivers are used to provide isolation between power circuit and control circuit as well as for amplification of PWM signal. Among the different converter topologies adjustable frequency PWM inverter is the best choice for induction motor drive.

Control circuit will be implemented using a motor controller chip which has dedicated PWM generators.

The aim is to design and fabricate the ac drive.