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Embedded system based single phase to three phase Converter

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Abstract - This paper proposes style of 3 part induction control mistreatment single part input and GSM. it's wireless speed management technique that is GSM based mostly. Wireless technique proves to be economical and reliable power is enhanced. In constant V/Hz methodology, it's necessary to keep up a relation between magnitude and frequency of the voltage applied to machine of a motor. This helps to keep up associate more or less constant level of magnitude of field within the mechanical device throughout operational vary. Thus, it's potential to keep up capability of manufacturing most constant torsion. switch power convertor provides energy to a motor. This energy is controlled by Pulse breadth Modulated, a symbol by applying it to the gates of the facility transistors. PWM signals square measure generated pulses with mounted frequency, magnitude and variable pulse breadth. activate and turns off intervals the junction transistor/ electronic transistor /semiconductor device /semiconductor unit /semiconductor} occur once a PWM signal is applied to gate of an influence transistor.

Index Terms— PIC, GSM , LCD , IM , PWM, Scalar management.

I. INTRODUCTION

Motor drives employed in wide power vary. The realizable speed vary is crucial in adjustable speed drive applications i.e. dominant of a boiler feed-water pump . an influence convertor required wherever speed and position controlled is vital. it's used as associate interface between the input power and motor. All industries demand many ways that have high dependableness and strength.[1].A managementler control speed of motor through the H Bridge and IGBT. A controller used wireless technique that is GSM based mostly. This wireless technique extremely dependable and economical in applications [2],[9].Switching power converters give a

straightforward thanks to regulate each the frequency and magnitude of the voltage and current applied to motor. It provide higher potency and performance with less generated noises[14]. the foremost common principle behind this is often constant V/F voltage applied to mechanical device of a motor maintain a relentless ratio[5],[6]. It helps to maintained most constant torsion manufacturing capability.

Switching power device provides energy to motor. This energy controlled by Pulse breadth Modulated signal by applying it to gates of power transistors.PWM signals generate pulses with mounted frequency and magnitude and variable pulse breadth [3].

II .SYSTEM MODELLING

A. Block Diagram Description

Rectification of single part offer is finished by employing a diode bridge rectifier. This corrected signal filtered for the ripple. Ripple on the DC bus is filtered by exploitation Associate in Nursing condenser .To IGBT based mostly 3 part electrical converter filtered DC bus is connected, that is controlled by PIC16F7X7[10].The output of the electrical converter is 3 part having variable frequency .Interfacing of electric switch keys in hot water supplying commands i.e. run, stop and to alter direction of motor. For dynamical motor frequencies monthly acceleration and fastness options ar enforced. Times for each of those options ar user selectable means that it will set throughout compile time. LEDs ar accustomed show standing indications i.e. run, stop, forward and reverse. PWM output generated by exploitation PIC16F87XX. IGBT drivers drive through optoisolators exploitation PWM output. every IGBT driver generates complementary signals for driving the higher or lower halves of the 3 part electrical converter. It helps to feature dead time between their several higher and lower switch driving signals[8],[11].

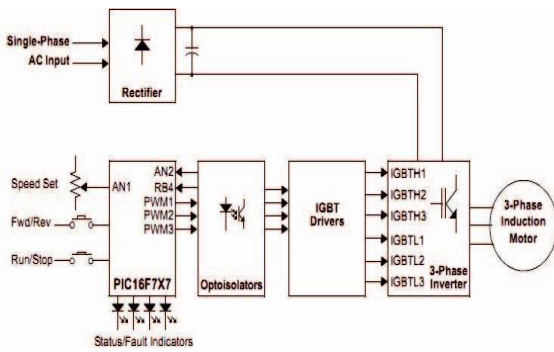


Fig.1 diagram of Embedded System For Single Phase To Three Phase Converter. Block diagram

B. Motor Drive

To 3 section electrical converter bridge three section induction motor connected as shown in figure two .The power electrical converter has half dozen switches that controlled so as to get 3 section AC output from DC bus. PWM signals generated from the microcontroller management these half dozen switches. Switches IGBT H1 through IGBT H3, that connected to DC+ square measure referred to as higher switches. Switches IGBT L1 through IGBT L3 connected to DC square measure referred to as lower switches. The duty cycle of the PWM signals determines the amplitude of section voltage. once motor runs that times 3 out of six switches are on at any given time i.e. either one higher and 2 lower switches or vice-versa. shift produces harmonics. because of inductive nature of motor mechanical device winding , filter is employed to provide a 3 section wave with less harmonics. once switches turned off, because of inductive nature of windings, it opposes to any unexpected changes in flow of current till all of energy of windings dissipated,For this across every switch quick recovery diodes square measure used. These diodes square measure called freewheeling diodes[14].

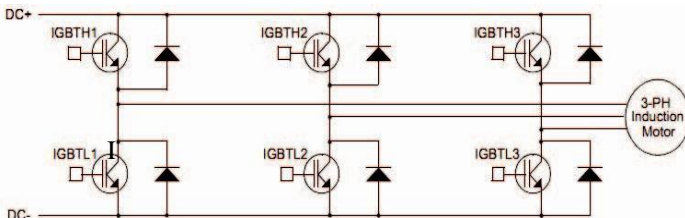


Fig.2.Three phase inverter bridge

One care ought to be taken that higher and lower switches of a similar [*fr1] bridge shouldn't be switched on at a similar time .It helps to stop the DC bus provide from being shorted . For

that purpose one logic is applied that dead time given between change off one switch and change on the opposite.

III. RESULTS AND DISCUSSIONS

A .System Hardware Result

Constant V/f is management technique that tries to keep up flux of the machine constant that is n't rely on speed. If an flux of associate induction motor maintained constant thentorque ofthe motor depends solely on slip ofmotor and forconstant torque operation slip can remainconstant[4],[7]. For this operation, motor speed becomes linear perform of synchronous speed. Motor speed will be controlled by setting synchronous speed only[12].If stator resistance of an induction motor neglected , stato coil voltage of motor is dependant solely of synchronous frequency and also the stator coil flux.

Following figure three shows the snap of the project work

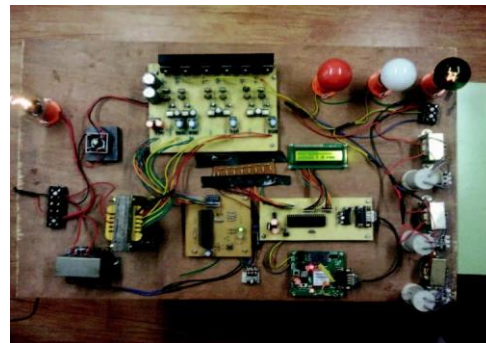


Fig. 3. Snapshot of the project work

Following figure 4 shows snapshot of IR Plate and Slotted CD for Speed Measurement

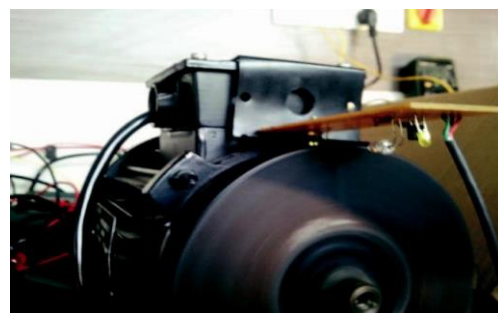


Figure 4 : Snapshot of IR plate and slotted CD for speed measurement

B. Analysis Of Speed Control

The mechanical device flux as operate of mechanical device voltage and synchronous frequency. If magnitude relation of the mechanical device voltage to synchronous frequency maintained , mechanical device flux are maintained [13]. This referred as constant V/f operation. For constant flux operation

torsion of associate degree induction motor are dependant solely on slip of motor. Table one offers speed for 3 part voltages.

Table 1. Speed for three phase voltages

Voltages			IM Speed
RY	YB	BR	
56	59	60	726
58	60	112	748
58	120	120	770
57	123	120	781
58	120	120	814
58	120	120	825
58	120	120	836
90	120	120	858
60	120	120	869

Table 2 show comparison of the actual speed and sms speed value. Table 2. Comparison of the actual speed and sms speed

Sr.No.	SMS sent speed	IM actual Speed (rpm)	Voltages (volts)	TORQUE
1	200	347	415	10.26
2	400	715	415	4.98
3	600	1080	415	3.29
4	800	1440	415	2.47

Figure 5 shows pictorial view of PWM waveform at high speed

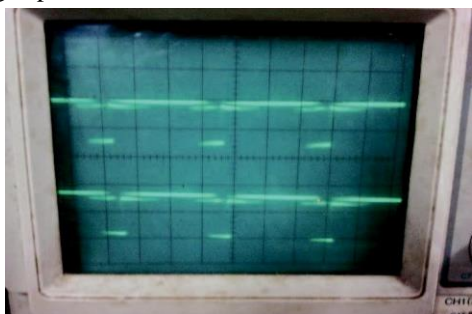


Fig 5. High speed PWM

Figure 6 shows pictorial view of low speed PWM of speed

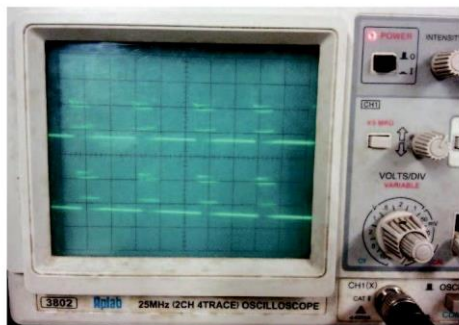


Fig. 6. Low speed PWM

Figure 7 shows pictorial view of PWM output waveform

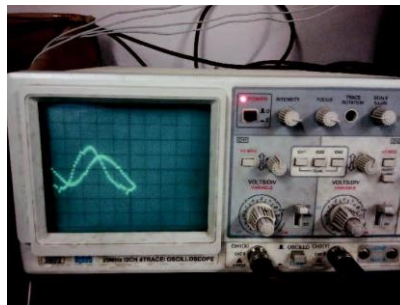


Fig. 7. PWM output waveform

IV. CONCLUSION

In this paper wireless speed management of AN induction motor developed and tested for 3 part 230 V and a hundred and ten V. By mistreatment rectifier and PWM electrical converter it attainable to vary voltage and frequency .It helps to take care of quantitative relation constant and therefore flux remains constant too therefore completely different in operation zone for varied speeds and torques .Due to that motor is totally utilised and speed additionally controlled at its most speed. Role compete by mobile that created attainable to transmit readings over wide distance at low price and moderate rate to regulate speed of motor. In developed system, speed management of motor noninheritable with accuracy of ±15 rev. therefore style of 3 part induction GSM speed management by single part input with GSM is stable, economical and economical.

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