SPEED SYNCHRONISATION OF MULTPLE BLDC MOTOR USING ZIGBEE MODULE

G.Deepthi
KCG College of Technology, Affiliated to Anna University
Mail id : deepthig11.08@gmail.com

Mr.V.Subramaniyan
Assisant Professor, Electrical and Electronics Engineering
KCG College of Technology, Affiliated to Anna University
Mail id : subramaniyan@kcgcollege.com

Abstract—**This Paper explains about how to overcome the difficlties of multiple BLDC motor without using a conveyor belt. Generally, in industry all the motors are connected in the form of conveyor belt so that the speed of the motor will be same to produce a desired output. But if in some case, if any of the one motor gets damaged all the motor connected through conveyor belt can also get damaged, so that all the motors will stop at a time and there will be huge loss by time, money and work, etc., To succeed in dealing with, the synchronizing method is the way to control the speed of all motors.**

Keyword: pic16f877A, LCD Display, IC7805, IC7812, Zigbee module, MP Lab, Proteus software, X-CTU Software

I. INTRODUCTION

In many industries, several motors have been arranged and have tremendous demand. The ultimate aim for all these motors used in industries is maintaining a same speed. This can be attained by synchronization method. Synchronization is nothing but operating two or more data's at the same time. By synchronizing the speed all the motors can be achieved at same speed and produce a desired output.This synchronization can be done by a computer system on a chip that does a job i.e., Microcontroller,it contains an integrated processor memory(a small amount of RAM, program memory, or both)and programmable input/output peripherals,which are used to interact with things connected to the chip.This synchronization is done by a wireless module called Zigbee.Compare to other wireless devices such as wifi,Bluetooth,zigbee has more advantage in case of communicating the data's. In this paper, synchronizing the speed of the motors is one part of the way but also synchronizing the parameters of all motors such as voltage and current also included.

## II. OBJECTIVE

A. SCOPE OF THE PROJECT

Our ultimate goal is to minimize the work and time of industry people when any problem arises in case of any such motors when it is connected via belt. This can be overcome by setting up the speed which is carried out by wirelessly by using microchip. This can be viewed by LCD display too which is connected with microcontroller pic16f877A.

B. METHODOLOGY

By this paper synchronizing the speed of the motor is done by pic16f877A and by a wireless module called Zigbee. This method includes two sections:

1) Monitor Section

2) Control Section

The block diagram involved in this paper based on methodology represents below;
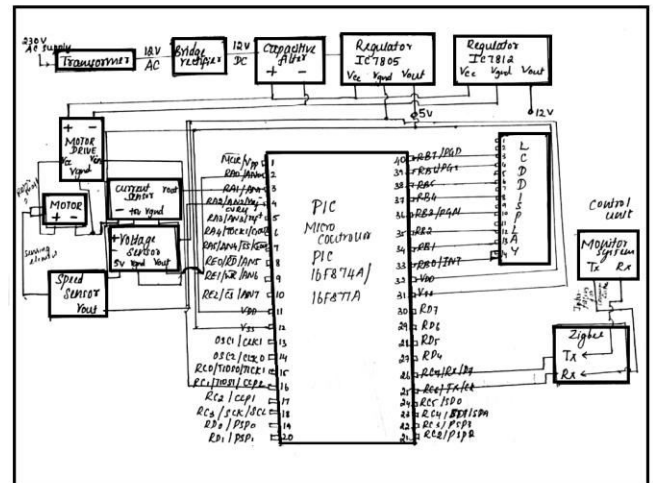
1) MONITOR SECTION :

All the parameters such as voltage, current, speed are displayed in the LCD Display which are sensed by voltage, current and speed sensors. This LCD Display is used as monitor section.

2) CONTROL SECTION :

From the monitor section, if any data does not match the requirements this control section is used to control the parameters by Zigbee module and by pic microcontroller of pic16f877A

III. HARDWARE DEVELOPENT

The main component involved in this paper is Zigbee module and PIC Microcontroller of PIC16F877A. In this paper there are two receiver sections of two BLDC motor i.e.

1) RECEIVER SECTION 1; 2) RECEIVER SECTION 2 Both the sections have the following components and sections..,

1. POWER SUPPLY :

A 230V AC Supply for Transformer and a 12v AC Supply for Bridge rectifier. A 12V DC Supply for Capacitive filter and Regulator for IC7805 and IC7812

2. TRANSFORMER :

The transformer which is used in this paper is used to transfer 230V AC into 12V AC and fed to the bridge rectifier.

3. BRIDGE RECTIFIER :

The output of the transformer i.e. 12V AC is gets converted into 12V DC and fed to capacitive filter. This capacitive filter is used to remove the harmonics and the power supply used in capacitive filter is given to the regulator of IC7805 and IC7812.

4. REGULATOR:

Regulator of IC7805 is used to produce an output of 5V, this voltage is given to PIC16f877A for the supply of LCD Display, the Regulator of IC7812 is used to produce an output of 12V, and this voltage is given to motor drive for driving the motor.

5. PIC 16F877A :

The ports that are involved in pic16f877A based on the sensors and requirements this device can be controlled in a microcontroller device can control the data's. Here the data received by the Zigbee is given to the TX Pin of port RC6 and the data transmitted by the Zigbee is given to the RX pin of port RC7. Whatever data is received by the port c is given to RC1 i.e. ccp (Compare/Capture/PWM). This PWM pulse is given to motor drive. The voltage, current and speed sensors is connected to the port A of AN0, AN1, AN2. LCD Display connections have 7 pins i.e. from RB0 to RB7 (RB0, RB1, RB2, RB3, RB4, RB5, RB6, RB7)

6. MOTOR DRIVE :

It is used to help the motor to rotate by receiving the PWM pulse from pic16f877A

7. BLDC MOTOR :

Compare to other types of motors BLDC motor have good mechanical strength and produces a desired output. It is used in Variable Speed Applications. BLDC have stable operation in industries and precise motion control when compared to other types of motor.

8. SENSORS:

For monitoring the parameters the followings sensors are used:

A. VOLTAGE SENSOR :

It is used to sense the voltage and displayed in LCD Display.
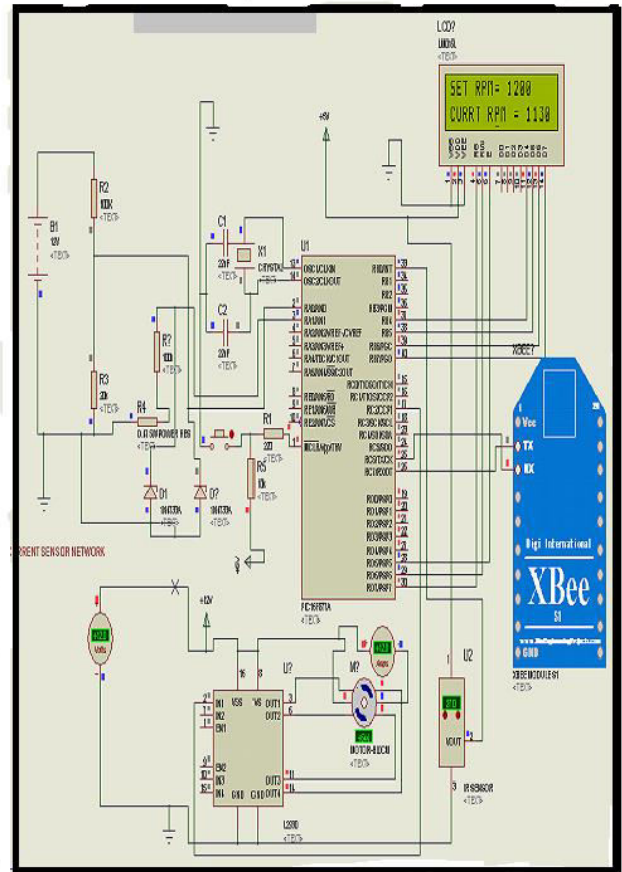
B. CURRENT SENSOR :

It is used to sense the current and displayed in LCD Display.

C. SPEED SENSOR :

It is used to sense the speed from the rotor shaft of the motor and are displayed in LCD display.

9. LCD DISPLAY:

LCD Stands for "Liquid Crystal Display" is used to Display the parameters i.e. Voltage, Current, Speed from the sensors to pic16f877A.
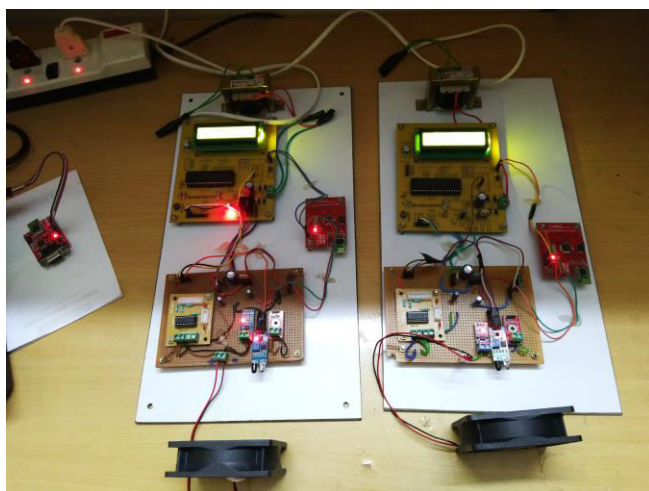

RECEIVER SECTION OF BOTH 1 & 2

10. ZIGBEE MODULE:

Compared to other wireless devices Zigbee is low cost and low powered mesh network used for monitoring and controlling applications and has greater advantage in distance

11.GADGET SETUP

OUTPUT:

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