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Synchronised multiple level Induction Motor Controller and Protector with GSM

Prof. Munmun Das[1], Mr. Vishnukant Pawar[2], Mr. Sachin Sutar[3], Mr. Sagar Bandgar[4]

[1,2,3,4] *E&TC, PGMCOE, SPPU, (India)*

ABSTRACT

The function of a system is to control all twelve motor connected to the system using GSM and all the tanks are synchronised with each other. Motor Protection Relay (MPR) is to protect three-phase induction motors and additionally to communicate this data to the System Control and Data Acquisition in a control room. In the case of remote sites e.g. a pump station, the protection relays are used as standalone units. If a trip occurs or settings need to be changed a technician has to visit the remote site and address the problem. The ideal cost and time effective solution is to remotely perform these tasks via a reliable wireless network. A study was conducted to ascertain the viability of using the standard GSM cellular networks effectively control electric motors and to communicate with MPR's.

Keywords: Motor, GSM, Motor Protection Relay

I. INTRODUCTION

In this project, a motor is controlled by GSM as needed, this system can be operated in two modes (Auto/Manual), there are four levels at which this process needs to be implemented, as the water levels at the tank at top is reduced beyond particular level, Water will be pumped from tank below. User has to register mobile on the system, only after registration user gets control of the system. User can call or send message to Switch the On/Off.The system comes with level sensor, protection circuit and fault detection of its own. And a LCD display which is interfaced to the microcontroller, which displays all the actions by the controller.

The system is to be installed at location Mauli Hills near Khadakwasla Dam, basically the area and the terrain where the system has to be installed is the main reason for the automatic system. There are about 200 homes in the area that draw water from these tanks located at different level of system. The main task is to keep every tank full all the time to avoid inconvenience to users. The distance between any two units is 1-2km, and the overall are covered is 4km from bottom level to the top level.

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II. BLOCK DIAGRAM

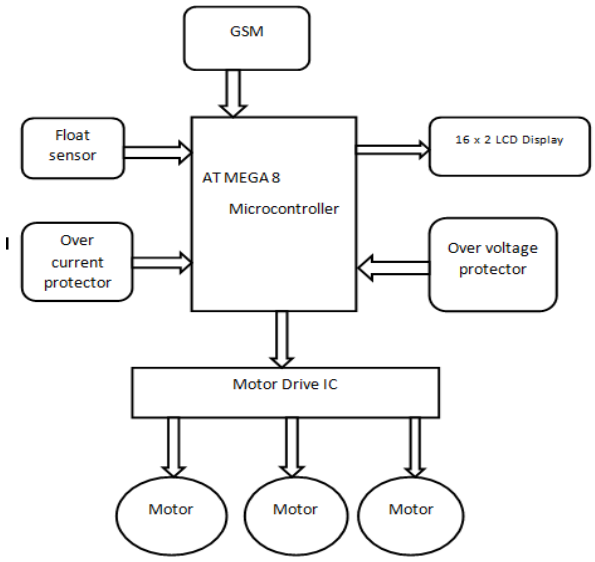

Fig 1. Block Diagram

III CIRCUIT DIAGRAM

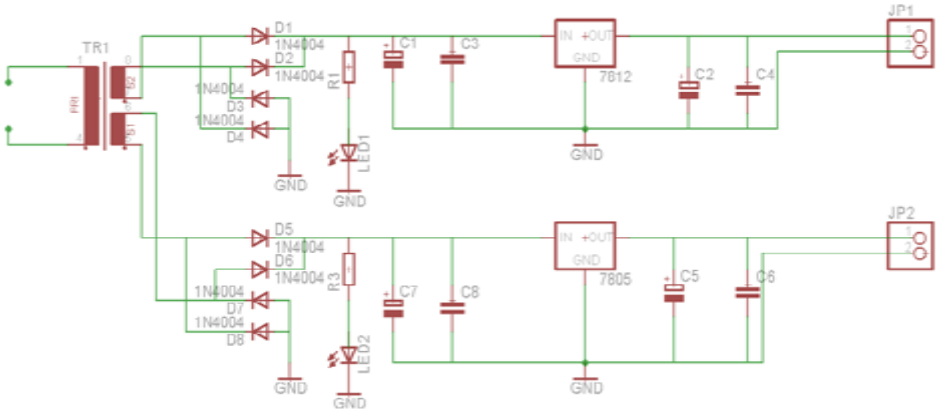

Fig. 2. Circuit Diagram

A regulated power supply is very much essential for several electronic devices due to the semiconductor material employed in them have a fixed rate of current as well as voltage. The device may get damaged if there is any deviation from the fixed rate. The AC power supply gets converted into constant DC by this circuit. By the help of a

voltage regulator DC, unregulated output will be fixed to a constant voltage. The circuit is made up of linear voltage regulator 7805 along with capacitors and resistors with bridge rectifier made up from diodes. From giving an unchanging voltage supply to building confident that output reaches uninterrupted to the appliance, the diodes along with capacitors handle elevated efficient signal conveyable. Power supply is a device that mechanized on DC voltages and also it can uphold its output accurately at a fixed voltage all the time although if there is a significant alteration in the DC input voltage.ICs regulator is mainly used in the circuit to maintain the exact voltage which is followed by the power supply. A regulator is mainly employed with the capacitor connected in parallel to the input terminal and the output terminal of the IC regulator. For the checking of gigantic alterations in the input as well as in the output filter, capacitors are used. While the bypass capacitors are used to check the small period spikes on the input and output level. Bypass capacitors are mainly of small values that are used to bypass the small period pulses straightly into the Earth.

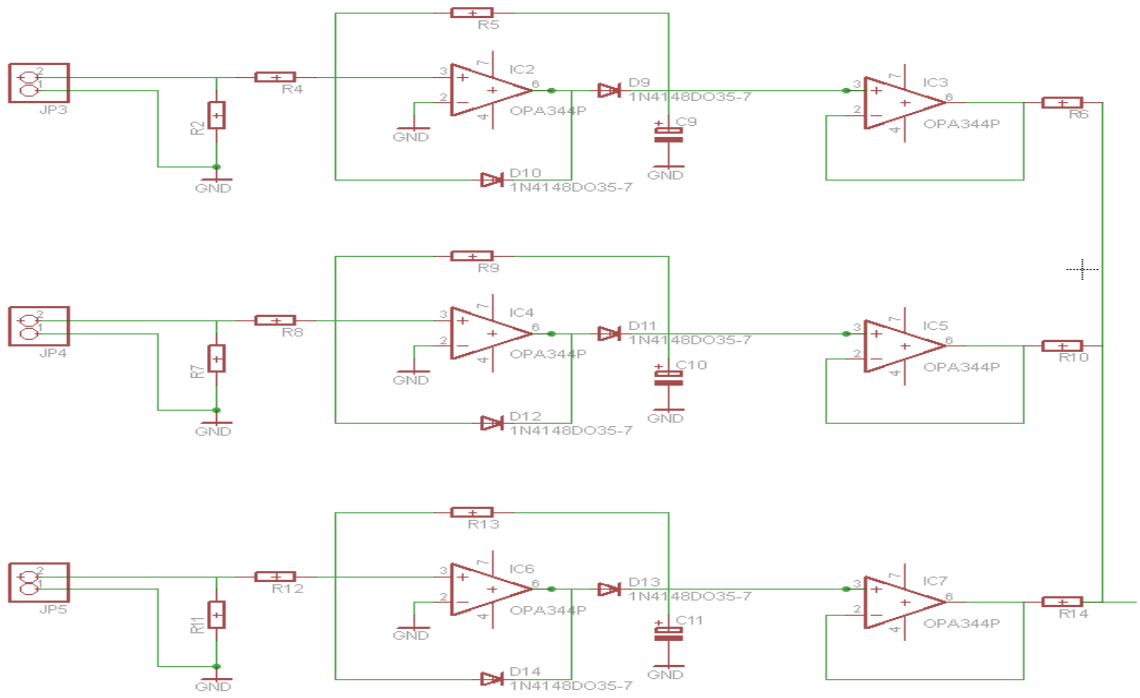

Fig. 3. Connection of OP-AMP

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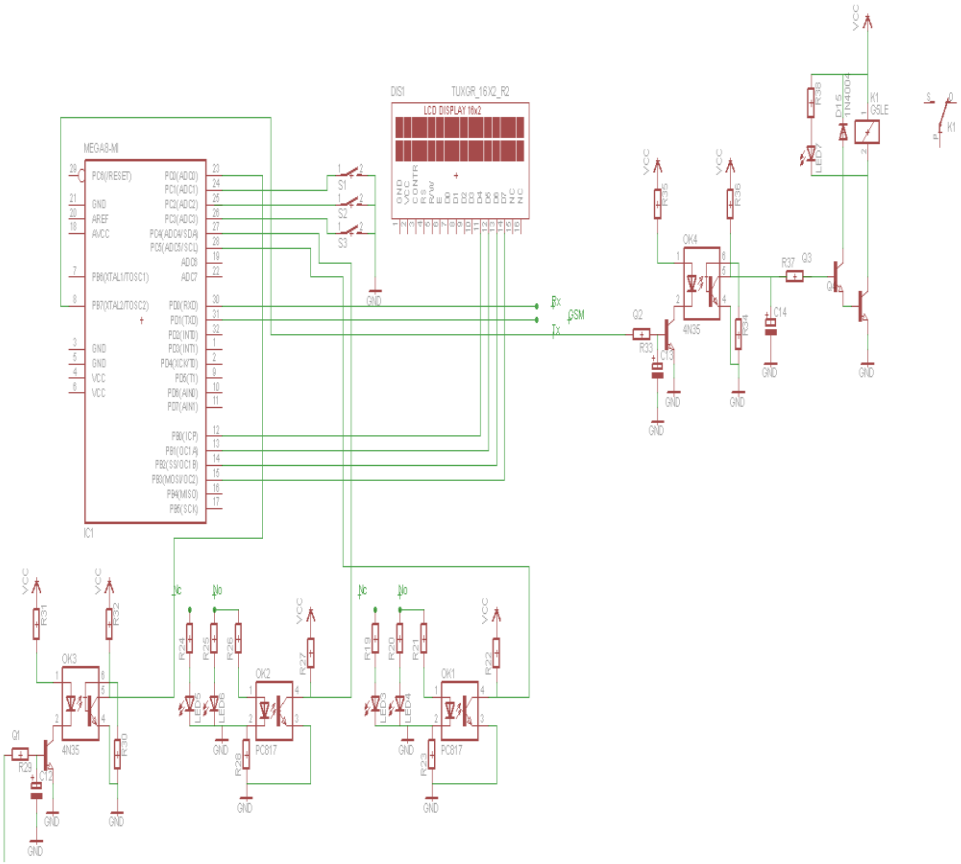

Fig. 4. Microcontroller Interfacing

IV. WORKING

The brain of the system is microcontroller ATMEGA8 which controls all the peripheral attached.The LCD is connected to the controller in a four bit mode. The signal from microcontroller to the LCD is given through port B P0-P3. Port D0 and D1 are configured from serial communication which is connected to the GSM Module. All the Indicators light are connected through various GP IO pins. The signal is isolated using 4N35 and 817IC so that the 12v supply doesn't get mixed with the 5v supply so that no spikes reach controller preventing it from any damage.

There are 3 current Transformers placed on the circuit each measuring the current for 1 phase of the three motors attached to the module. The signal conditioning process is done through OP-AMP 324 and supplied to the controller as input data.

There is Float Sensor attached to detect water levels provides required data to the controller.

V. CONCLUSION

All the motors at different stages will be synchronised using GSM module, and will be provided with over voltage and over current protection for safe and reliable operation.

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