An Autonomous Automatic Water Supply using Humidity Sensor

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Abstract— This project intends to link the concepts regarding irrigation process i.e. irrigating the land without man power. Several aspects regarding the irrigation process and our development in irrigation have been cited. This project also discusses the possible ways to get useful and practical results of all the concepts that are available for irrigation process. In this project we are mainly using the humidity sensor for irrigating method with PIC microcontroller by which we are controlling the motor ON and OFF and we also using the capacitor bank in this project to run the motor in any two phase this is one of the important one which we are using in our project in which the people are facing the problems now a days and also the GSM modem to receive the message when the motor is ON and when it is OFF and the humidity level weather the level of humidity is HIGH or else it is LOW. And then the other important thing is that the level detector to know the water level in the well or in the in the tank which will protect the damage of the coil in the motor.. The main outcome of this project is to bring about the ideas of smart irrigation method and to reduce the wastage of water and the man process and it can be used in different method like trip system, spraying system in the agricultural land. We want to make it as a modern agricultural system with this project which we have been cited.

Key words: PIC Microcontroller, MPLab Software, GSM

I. INTRODUCTION

Nowadays the cultivation lands are converted into as apartments and industries have been constructed in agricultural lands so that the nature of the world has been spoiled, but countries like India were dependent up on the agriculture. But demand for water has been increased tremendously. Due to over exploitation, water had become a scarce resource. So wastage of water must be reduced. This occurs maximum in irrigation field Fig. 1, but most of the countries depend upon agriculture. So we propose our project to automatically maintain the agriculture land by using embedded system technology with the help of humidity sensor. The controller is programmed to set the pump on/off timings in the PIC. The controller directly controls the water pumping system. The controller continuously watches the humidity module. Whenever the sensor reaches the set value of humidity it automatically switches off the pumping circuit. And we also using capacitor bank to run the motor in any two of the phases. And each and every action will be cited to us through the message by the GSM modem and then the level sensor also used in this system to protect the damage of the coil in the motor. So our proposed system is fusion of humidity and level sensors with the capacitor bank.

Fig. 1: Drip Irrigation System

II. HUMIDITY SENSOR

Humidity sensor is used to sense the humidity value of the land by measuring the voltage. When the voltage is high, humidity is high. When the voltage is low, humidity is low. This is the method of sensing the humidity value in our system we are using SY-HS-220 module (Fig. 2).

Fig. 2: Humidity Sensor

III. GSM MODEM

- A GSM modem(Fig. 3) is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities.

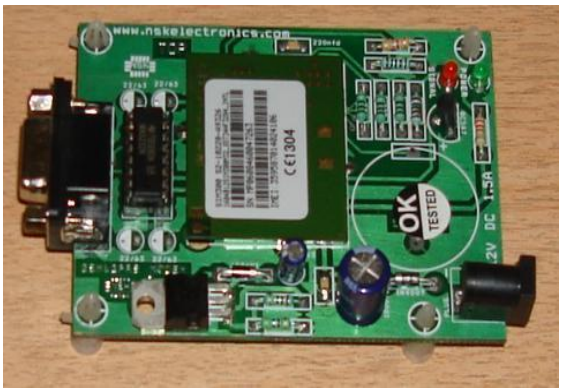

Fig. 3: GSM Modem

IV. RELAY

The core of the electromagnetic relay(Fig. 4), naturally, is an electromagnet, formed by winding a coil around an iron core. When the coil(Fig. 5) is energized by passing current through it, the core in turn becomes magnetized, attracting a pivoting iron armature. As the armature pivots, it operates one or more sets of contacts, thus affecting the circuit. When the magnetic charge is lost, the armature and contacts are released

- Demagnetization can cause a leap of voltage across the coil, damaging other components of the device when turned off. Therefore, the electromagnetic relay usually makes use of a diode to restrict the flow of the charge, with the cathode connected at the most positive end of the coil.
- Contacts on an electromagnetic relay can take three forms. Normally opened contacts connect the circuit when the device is activated and disconnect it when the device is not active, like a light switch. Normally closed contacts disconnect the circuit when the relay is magnetized, and a change-over incorporates one of each type of contact. The configuration of the contacts is dependent upon the intended application of the device.
- The electromagnetic relay is capable of controlling an output of higher power than the input, and it is often used as a buffer to isolate circuits of varying energy potentials as a result. When a low current is applied to the electromagnet, throwing the switch, the device is capable of allowing a higher current to flow through it.

Fig. 4: Relay

- This is advantageous in some applications, such as tripping alarms and other safety devices, because a safer low current can be used to activate an application requiring more energy.

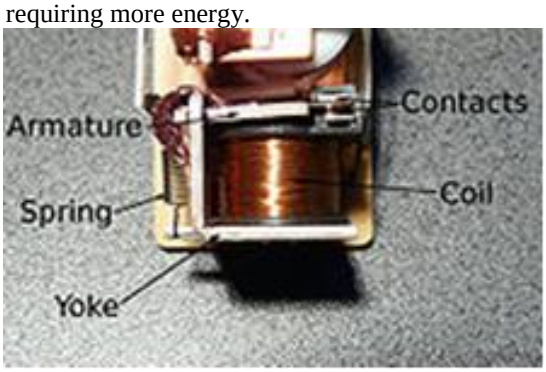

Fig. 5: Relay Coil

V. CAPACITOR BANK

The capacitor bank (Fig. 6) is used to run the motor continuously without any interrupt while if any mistake in any one of the phase. It shifts the phase in to 120 degree and make run the motor in three phases itself without any interrupt.

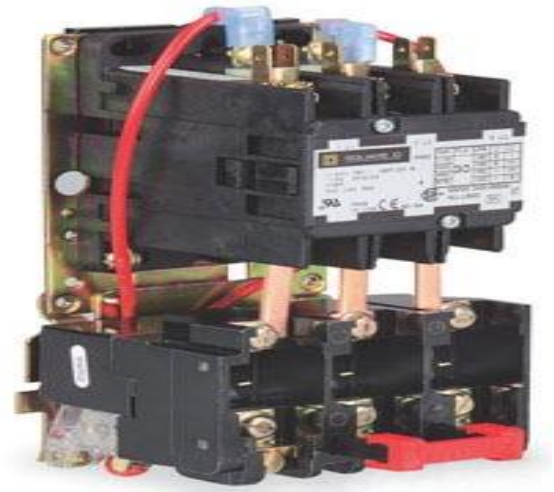

Fig. 6: Capacitor Bank

This is the working of the capacitor bank which is very use full in agriculture. These are the material which we are using in our proposed system.

VI. PROPOSED SYSTEM

In this system (Fig. 7), we are using the PIC microcontroller to control the entire system. The humidity sensor sense the humidity value which is connected to the PIC microcontroller through the port A which convert the analog signal in to the digital, and then the level sensor which sense the level of the water in the well or in the tank and send it to the PIC microcontroller and then the capacitor bank which is connected to the relay which maintain the supply

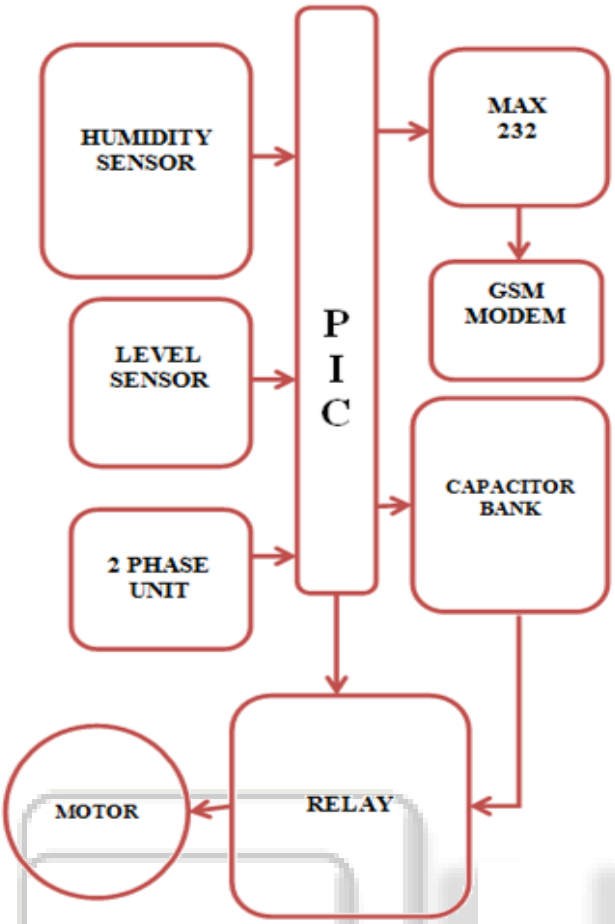

Fig. 7: Schematic Diagram of proposed system

As three phase at all moment, and then the relay is connected to the microcontroller to control the motor ON and OFF. The GSM is connected to the microcontroller through MAX 232 to interface both PIC microcontroller and the GSM modem.

VII. Conclusion

This system of irrigation with embedded technology will save the time and cost of running equipment. The hardware part has been assembled and the same has been tested with sufficient capacity motor to draw the water from the well. The sensors like humidity, level sends the reading to PIC Microcontroller, which in turn sends the necessary message signals to the end user, in particular for drip system of irrigation.

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