Advanced Autoswitch For Motor Starter

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Abstract- *The country like India, which largely depends on rainfall, many of times due to weather change, the total rainfall in a particular area may be either insufficient or ill-timed. In order to get the maximum yield, it is essential to supply the optimum quantity of water and maintain a correct timing of water. Also, the farmer has a pressure of turning ON and OFF the water motor at correct intervals of time. This problem can be reduced with the help of an Auto switch. This project is primarily designed to form Autos witch with advanced features so by using GSM on message or call motor is stopped. In overload protection load is exceed form limit then it will stop system, phase fault case when a parameter exceeds the maximum operating limit, the circuit is automatically switched off to avoid any damage to the motor.*

Keywords- Auto switch, microcontroller, single phase motor, AC motors, GSM module (mobile), Android, SMS, a current sensor, soil moisture sensor, regulated power supply..

I. INTRODUCTION

In last few years there is a rapid growth in this system. The communication of the user with the centralized unit through SMS. The centralized unit communicates with the system through SMS which will be received by the GSM with the help of the SIM card mounted in it. The GSM sends this data to ARM7 which also continuously receives the data from sensors in some form of codes. After processing, this data is displayed on the liquid crystal display. Thus in short whenever the system receives the activation command from the subscriber it checks all the field conditions and gives a detailed feedback to the user and waits for another activation command to start the motor. The starter coil is indirectly activated by means of a transistorized relay circuit. When the motor is started, a constant monitoring on soil moisture and the water level is done & once the soil moisture is reached to sufficient level the motor is automatically turned off & it sent to the subscriber that the motor is turned off. The water level indicator indicates three levels low, medium, high and also empty tank.

II. REVIEW OF PREVIOUS WORK

In the year 2015, Prof. R.R Jadhav, Prathmesh P Pandit, Shubham D. Pal and Vineet H. Risbud developed a system which enhances the water distribution in the field optimally. The system protects the motor from overloads, overheating and phase imbalances.It also provides automatic restarting if normal conditions are re-established.The major advantage of this system as follows Uniform distribution of water at regular intervals, reduction in labour cost, prevention of unwanted water spillage, minimization of occurrences of motor faults and intimation to the user about the completion. Most commonly farmers use the mobile phone. The system developed specially for farmers whose pump sets are located far away from their homes due to the capability of remote control using a cell phone and intimation about any abnormal conditions.

In Auto switch circuit the fundamental function is that the system trips and protects instantly an improper current sensing. Dry running is dangerous for submersible pumps. Motors of submersible pumps are designed for running under water. They use water as a heat-transfer medium. In case the water level goes down and the pump runs dry, the motor gets overheated and burns out. Due to such Dry running, the bearing temperature also increases, damaging the bearing and the surrounding portion of the pump.

III. DEMONSTRATION PROTOTYPE OF ADVANCED AUTOSWITCH

A. GSM Module

A GSM module is a chip or circuit that will be used to establish communication between a mobile device or a computing machine and a GSM system.These modules consist of a GSM module powered by a power supply circuit and communication interfaces (like RS-232, USB 2.0, and others) for a computer. 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.It is used in the system for calling facility. When caller call it is received by GSM module and message of on and off is received.According to the instruction received it is sent to controller and operation performed.

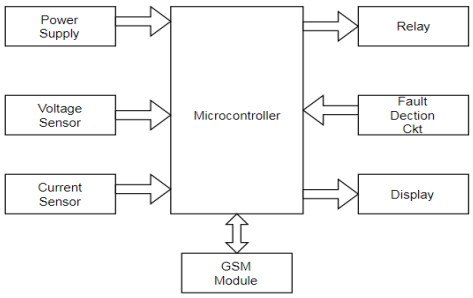
B. Sensor Package

A Current sensor is used to sense current of the system. An Idle current needed for the system is 5A. When current increase or decrease because of chance in water level is sensed by the current sensor.ACS712 provides economical and precise solutions for AC or DC current sensing in industrial, commercial, and communications systems. The device package allows for easy implementation by the customer. Typical applications include motor control, load detection and management, switched-mode power supplies, and overcurrent fault protection. The device is not intended for automotive applications.

C. Use of Relay

The relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. They are often used to interface an electronic circuit (working at a low voltage) to an electrical circuit which works at very high voltage.

IV. METHODOLOGY



A.Message Facility

The motor start by sending a message by using a simcard. this message is received by simcard placed in hardware through GSM module. The message received by GSM module is received by the controller. A message is displayed on liquid crystal display that" Motor is ON".

B.Overload Protection

Enhancement of current above its threshold level detects overload of current. Overload of current cause motor damage. The standard value of current is 5A and voltage is 220V. On the given standard value motor is ON. When the current is enhanced above 5A overload is occurred and motor OFF.

C. Power Supply

The first block is of a three-phase power supply which is a common method of alternating-current electric power generation, transmission, and distribution. It is also used to power large motors and other heavy loads. This circuit requires a heavy load so as to verify the current and voltage rating required to Auto switch according to the set limits. Alternatively, a three-phase power can be converted into a single phase by shifting its phase with an external circuit to produce a single phase power supply to the Auto switch circuit. For testing purposes, a three-phase power supply is used in which a parallel connection of halogens and bulb are connected which can enable to vary the load so that voltage and current could be tested for nominal rating according to the motor's specification. Switching off one at a time to reduce the load and simultaneously measuring the adjacent voltage and current ratings can be done in this parallel combination.

D. V-I Testing

For the testing purpose, we have connected 1 CT coil in the circuit such that one terminal is connected to dc voltage and another is connected to the microcontroller. When wire

connected to the motor is passed through the CT coil due to current use by motor wire gets its own electromagnetic field. Due to the wire and CT coil's electromagnetic field. some changes occur due to which voltage drop occurs at the other end of CT coil. By calculating drop we can calculate current use by the motor, and be calculating current we can calculate voltage also by knowing internal resistance. By knowing the current and voltage values, power can be calculated. The voltage and current readings are being displayed on the 7 segment display.

V. CONCLUSION

Auto switch project is designed to make the switch smart. Thus the developed system increases the water distribution in the field properly. The system ensures the protection of motor against overload, extra heating and phase imbalances. Detection of phase fault become easier and system turn off the system after detecting it. Dry run protected due to advanced features of an auto switch. The use of cell phone has become common in farmers. The system proves whose pumps are placed far away from their homes due to the capacity of remote control using the cell phone and instructions about any abnormal conditions.

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