GSM BASED 3 PHASE STAR DELTA STARTER FOR 3 PHASE INDUCTION MOTOR

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*Abstract-*This project uses GSM technology and an Arduino UNO to control a three-phase motor. A three-phase motor is commonly used in agriculture. Agriculture is the mainstay of economic prosperity in countries like India. When the farm is a few kilometres away from the farmer's home, the farmer must turn on or off the motor by go on foot or by personal vehicle, which is a more expensive alternative. If the motor is not operated correctly, the motor will be damaged,or it may be destroyed. As a result, the farmer would be able to regulate the motor from a more convenient location. Our goal is to use GSM technology to control the motor from afar. Using the GSM technology, we can control the motor from any place for benefit to farmers. This project can also be used to control three-phase industrial motors through GSM. Manually operating industrial motors can be extremely risky and result in serious accidents. To avoid such a disaster, this GSM-based project is quite beneficial. We may also use this project to connect home appliances to start them automatically without the need for a human start.

Keywords: **3 Phase motor, GSM technology, Arduino UNO, Star delta**

1. INTRODUCTION

Everything is becoming tiny, portable, and mobile in today's fast-paced society. The most significant breakthrough in this field is the mobile phone for communication. These have greatly simplified and connected our lives.Almost everyone nowadays is familiar with its application and can benefit from it. Mobile communication technology is constantly changing. Each had advantages and disadvantages. The second generation of mobile communications is represented by the Global System for Mobile Communication (formerly Groupe Spécial Mobile).

The project's goal is to take advantage of the mobile nature of communication and application afforded by GSM technology, specifically SMS. The acronym SMS stands for Short Message Service.

Short Message Service (SMS) is an integrated paging service that allows GSM cellular customers to send and receive data up to 160 characters long directly on their phone's LED display. The use of SMS simplifies the user's understanding and application of the project.

We will design and implement a control system to turn on and off a three-phase motor in this project. For irrigation, farmers cannot rely solely on the weather and rainfall. As a result, farmers rely on motors for irrigation. Agriculture makes extensive use of three-phase motors. Traditionally, they were operated manually by the user, and protection was either neglected or required the usage of an isolated unit. To be able to start from a cell phone, we'll use an Arduino and a relay module as a bridge between the power part (electrical part) and control parts (electronic part). The days of a farmer relying exclusively on rainfall for irrigation are long gone. Farmers nowadays prefer three-phase motors for their equipment.

Objectives- The following are the project's objectives:
• Creating an automatic controller for farm motors.
•Create an automated controller for industrial motors.
• To operate household appliances without the use of a manual.

2. HARDWARE REQUIREMENTS

Arduino UNO: The Arduino Uno is an open-source microcontroller board designed by Arduino.cc based on the Microchip ATmega328P microcontroller. The board has digital and analog input/output (I/O) pins that can be used to connect to different expansion boards (shields) and other circuits. The board features 14 digital I/O pins (six of which are capable of PWM output), 6 analogue I/O pins, and is programmable via a type B USB cable using the Arduino IDE (Integrated Development Environment).

Fig. 1 Arduino UNO

GSM 900A MODULE: The SIM900A GSM Module is the smallest and cheapest GSM module available.In most embedded applications, Arduino and microcontroller are used. The module uses GSM technology to communicate with a mobile sim card. It operates on the 900 and 1800 MHz frequency bands and allows users to make and receive phone calls and SMS messages. Developers can create customised applications using the keypad and display interface.

Fig.2 GSM 900A Module

LCD 16x2:LCD is the abbreviation for liquid crystal display. It is a type of electronic display module that is utilised in a wide range of circuits and devices such as mobile phones, calculators, computers, television sets, and so on. Multi-segment light-emitting diodes and seven segments are the most common applications for these displays. The main advantages of utilising this module are its low cost, ease of programming, animations, and the fact that there are no restrictions on displaying unique characters, special and even animations, and so on.
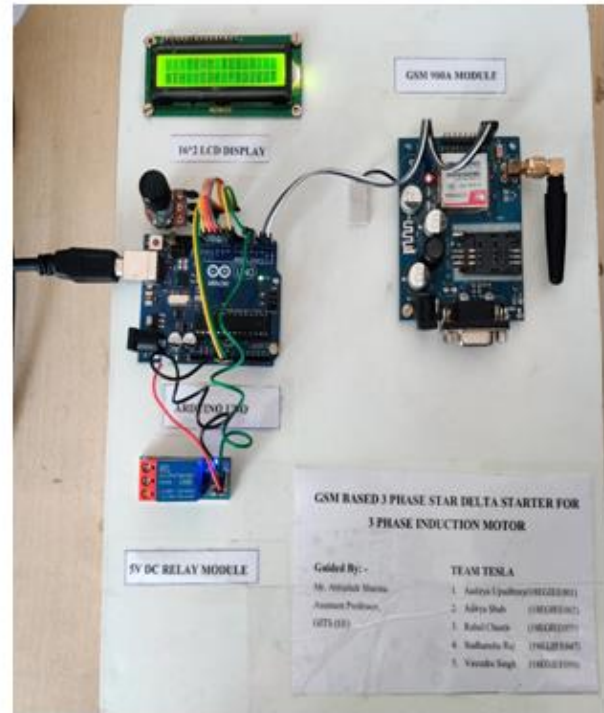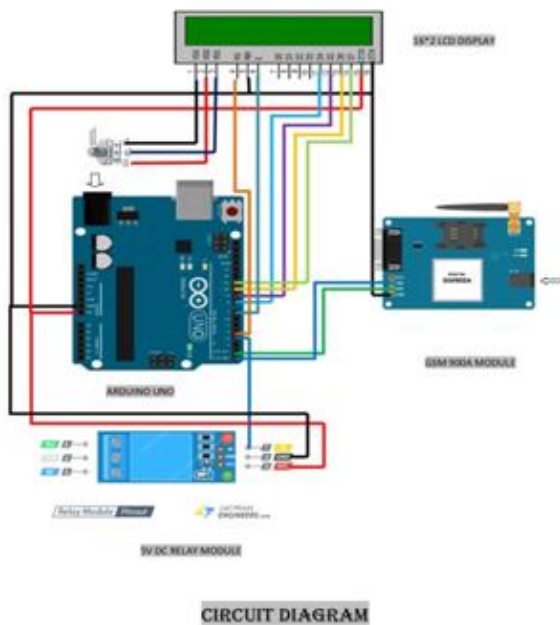

Fig.3 LCD 16x2 display

Relay Module: A relay is an electromechanical component that serves as a switch. DC energises the relay coil, allowing contact switches to be opened or closed. A coil and two contacts, such as normally open (NO) and normally closed (NC), are usually included in a single channel 5V relay module (NC).

A 5v relay is an automatic switch that is typically used to regulate a high-current utilising a low-current signal in an automatic control circuit. The relay signal's input voltage varies from 0 to 5V.

Fig.4 Relay Module

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3. CIRCUIT DIAGRAM& CONSTRUCTION:

CIRCUIT DIAGRAM

4. WORKING & RESULT

A 3 Phase motor can be switch ON/OFF using this project consisting of ARDUINO UNO, GSM 900A, RELAY with a mobile message The Purpose of this project is to control & switch 3 Phase motor by using a mobile phone message. When we turn on the system, First of all system shows the introduction on LCD DISPLAY of project then after that the GSM MODULE's NW led starts blinking with a 3s delay that means the system is in the network. Then we are ready to control the loads. When we send SMSfrom smart phone, the GSM MODULE receives the corresponding data and intern transmits that data to Arduino.

If we send "#A.motor on*", then the data received by the GSM MODULE. This data is transmitted to Arduino then compares the received data with the data written in the sketch and accordingly turns on the 'motor on'. Similar action can be applicable to another key for off. Using this type of connection, we can switch on & off the any 3-phase motor.

"#A.motor on*" for Switch on the Motor &

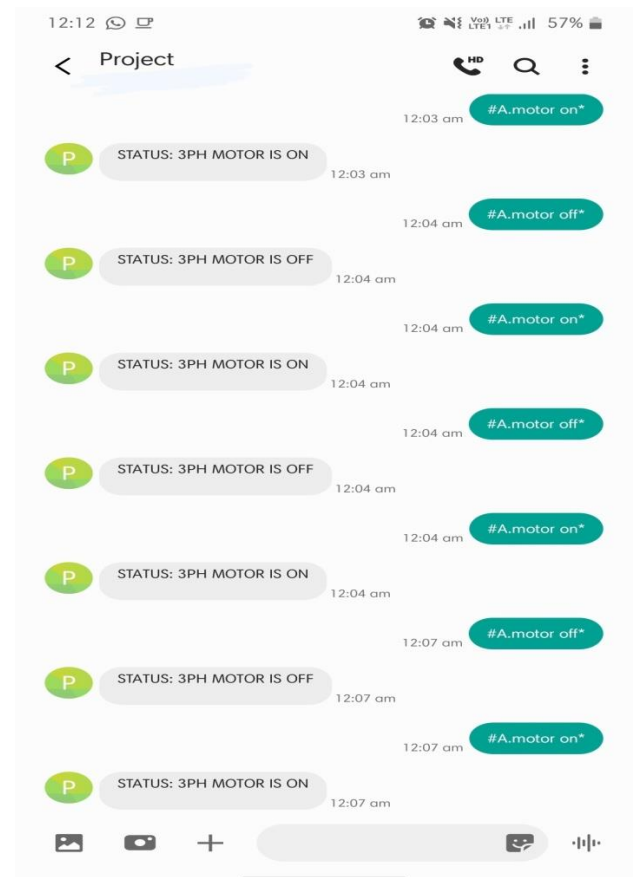**"#A.motor off*"** for Switch off the Motor.

Fig.5 SMS alert for motor on & off

5. CONCLUSION & FUTURE SCOPE

The goal of the project is to connect the Arduino to a GSM modem and have the Arduino start the motor in response to a message from the user's phone. It was created by combining the capabilities of all of the hardware components that were utilised. Every module's presence has been carefully considered and arranged, ensuring that the unit functions optimally. As a result, particular parameters were developed for monitoring the motor's operation utilising GSM technology.

It can be concluded that the design used in this study provides portability, flexibility, and data transmission with little power usage.

FUTURE SCOPE:

• The project can be used as a foundation for develop a system that can be used in higher level projects such as weather forecasting, temperature updates, device synchronisation and so on.
• The project can be customised to accomplish total home automation.
• PLC version for factory control from afar.
• An educational module on mobile robots.

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