

FABRICATION OF AUTOMATIC EMERGENCY EXIT FOR SCHOOL BUS

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Abstract - The objective of this project is to open the emergency exit for bus using vibration sensor. Emergency exit door is a valuable attachment to escape and rescue the passengers in the accident. Emergency exit system for automobile using sensors, which means every vehicle has individual vibration sensor for send the signal and that open the emergency exit door in buses using motor and limit switch arrangement on both side of the bus. If vehicle meet the accident, automatically release the door. In future we have to implement a application for all the industries who are all using the transport system. We have to implement some other safety measures. The project is successfully designed and tested which provides accurate door open and efficient safety measures in case of emergencies. This allows the school management and parents to have a peace of mind and helps them to carry out their schedule in a tension- free manner

Key Words: electric motor, battery, Arduino

1. INTRODUCTION

Nowadays Automation occupies various electronic sections by its comfortable nature. This is an era of automation where it is broadly defined as replacement of manual effort by pneumatic power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased.

Degrees of automation are of two types,

1) Full automation

2) Semi automation

1.1 NEED FOR AUTOMATION

Automation can be achieved through computers, hydraulics, pneumatics, and robotics. etc., of these sources, pneumatics form an attractive medium for low cost automation The automobile vehicle is being atomized for the following reasons.

To achieve high safety

To increase the efficiency of the vehicle

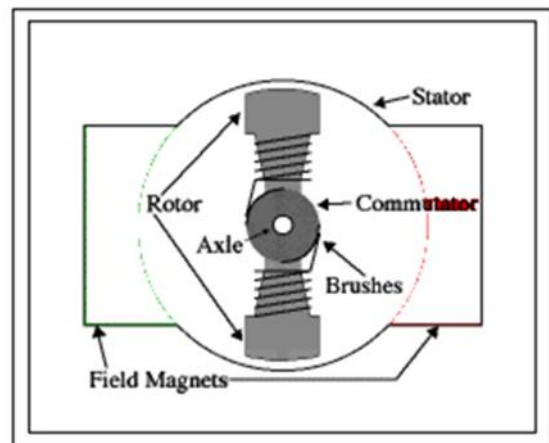
To reduce the vehicle accident

To reduce the fatigue of workers

2. EQUIPMENT

2.1 MOTOR

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.



2.2 BATTERY

In our project we are using secondary type battery. It is rechargeable type. A battery is one or more electrochemical cells, which store chemical energy and make it available as electric current. There are two types of batteries, primary (disposable) and secondary (rechargeable), both of which convert chemical energy to electrical energy. Primary batteries can only be used once because they use up their chemicals in an irreversible reaction. Secondary batteries can be recharged because the chemical reactions they use are reversible; they are recharged by running a charging current through the



battery, but in the opposite direction of the discharge current. Secondary, also called rechargeable batteries can be charged and discharged many times before wearing out. After wearing out some batteries can be recycled.

2.3 VIBRATION SENSOR

A piezoelectric sensor is a device that uses the piezoelectric effect to measure pressure, acceleration, strain or force by converting them to an electrical signal.

Piezoelectricity is the ability of crystals and certain ceramic materials to generate a voltage in response to applied mechanical stress. Piezoelectricity was discovered by Pierre Curie and the word is derived from the Greek piezein, which means to squeeze or press.

The piezoelectric effect is reversible in that piezoelectric crystals, when subjected to an externally applied voltage, can change shape by a small amount. The effect finds useful applications such as the production and detection of sound, generation of high voltages, electronic frequency generation, microbalance, and ultra fine focusing of optical assemblies.

Piezoelectric sensors have proven to be versatile tools for the measurement of various processes. They are used for quality assurance, process control and process development in many different industries

2.4 ARDUINO

Arduino is a single-board microcontroller meant to make the application more accessible which are interactive objects and its surroundings. The hardware features with an open-source hardware board designed around an 8-bit Atmel AVR microcontroller or a 32-bit Atmel ARM. Current models consists a USB interface, 6 analog input pins and 14 digital I/O pins that allows the user to attach various extension boards.



The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button

3. DC MOTOR FORWARD REVERSE CONTROL

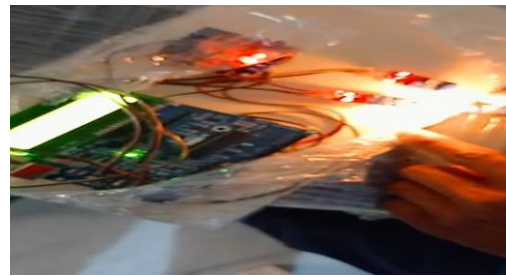
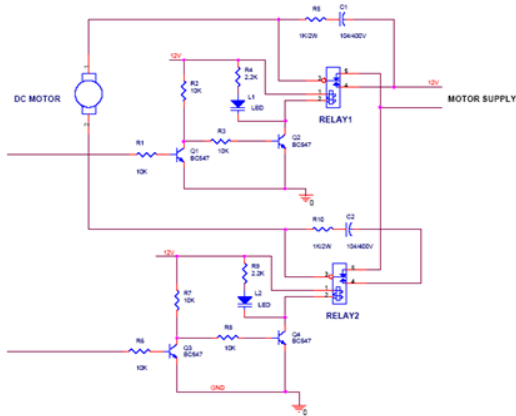
This circuit is designed to control the motor in the forward and reverse direction. It consists of two relays named as relay1, relay2. The relay ON and OFF is controlled by the pair of switching transistors. A Relay is nothing but electromagnetic switching device which consists of three pins. They are Common, Normally close (NC) and normally open (NO). The common pin of two relay is connected to positive and negative terminal of motor through snubber circuit respectively. The relays are connected in the collector terminal of the transistors Q2 and Q4.

When high pulse signal is given to either base of the Q1 or Q3 transistors, the transistor is conducting and shorts the collector and emitter terminal and zero signals is given to base of the Q2 or Q4 transistor. So the relay is turned OFF state.

When low pulse is given to either base of transistor Q1 or Q3 transistor, the transistor is turned OFF. Now 12v is given to base of Q2 or Q4 ++transistor so the transistor is conducting and relay is turn ON. The NO and NC pins of two relays are interconnected so only one relay can be operated at a time. The series combination of resistor and capacitor is called as snubber circuit. When the relay is turn ON and turn OFF continuously, the back emf may fault the relays. So the back emf is grounded through the snubber circuit.

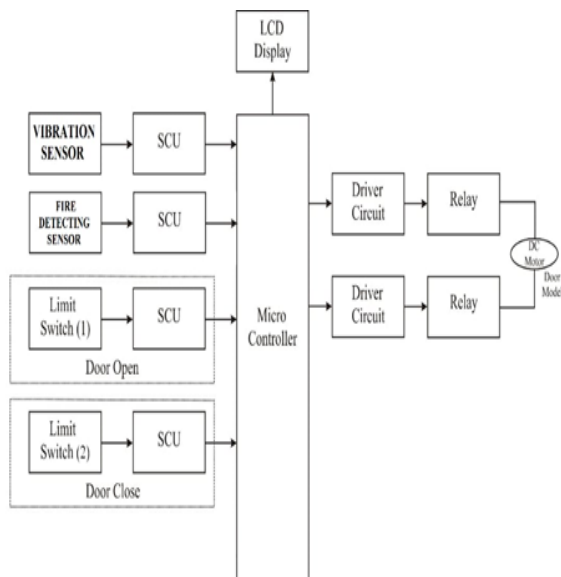
When relay 1 is in the ON state and relay 2 is in the OFF state, the motor is running in the forward direction.

When relay 2 is in the ON state and relay 1 is in the OFF state, the motor is running in the reverse direction.



4. WORKING

In this project, designed with components of vibration sensors, motor and limit switches.



In this design, vibration sensor is fitted at front side of bus. The same sense the vibration of the bus and checks with pre-assigned value of vibration and send the signal to the motor to release the emergency exit door till limit switch touching position. The same mechanism is fitted on the both side the bus. Here two limit switches is used to control the position the exit door. Emergency exit door is most important

attachment for each every bus and all passenger vehicles.

5. CONCLUSIONS

The project carried out by us will make an impressive mark in the field of school bus and van. It is very usefully for drivers to drive the vehicle without tension.

This project has also reduced the cost involved in the concern. The project has been designed to perform the required task taking minimum time.

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