

Automatic Wiper Control Using Rain Sensor

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Abstract—In previous days the windshield wipers were operated manually with the help of control lever switch which will be moved forward and back. The purpose of windshield wipers are to make the view visible to the drivers at the time of raining and fog, this wipers move continuously front and back which sends away the rain drops falls on windshield. On their highest speed, they move impressively fast. This project deals with automatic rain operated wiper.

Keywords—Rain sensor; A controller

1. INTRODUCTION

Automatic Wiper Control using Rain sensor, which is fully equipped by sensors circuit and wiper motor. This concept to reduce the concentration of the driver towards the control over wiper control. This makes the wiper to come in action when the rain fall occurs. This is an era of automation where it is broadly defined as replacement of manual effort by mechanical 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.

2. COMPONENTS USED TO CONSTRUCT

The main components used in supply system are:

- Rain sensor
- Control unit
- Relay circuit
- Wiper unit

2.1 Rain sensor:

A rain sensor or rain switch is a switching device activated by rainfall. There are two main applications for rain sensors. The first is a water conservation device connected to an automatic irrigation system that causes the system to shut down in the event of rainfall. The rain sensor works on the principle of total internal reflection. An infrared light beams at a 45-degree angle on a clear area of the windshield from the sensor inside the car. When it rains, the wet glass causes the light to scatter and lesser amount of light gets reflected back to the sensor.



Fig 1: Rain drop sensor.

2.2 Control unit:

An electronic control unit is a device responsible for overseeing, regulating and altering the operation of a car's electronic systems. Each of a car's electronic features, such as an anti-lock braking system or electronic fuel injection setup, will typically be controlled by an ECU.

2.3 Relay circuit:

Relays are switches that open and close circuits electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized.

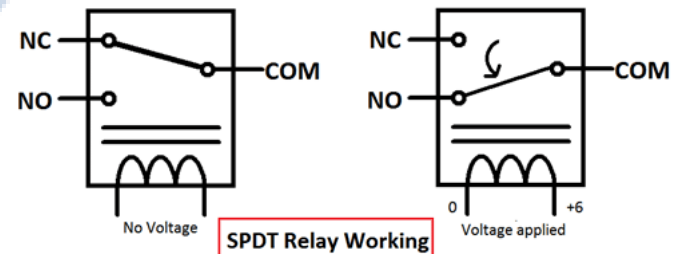


Fig 2: Relay.

2.4 Wiper unit:

Wiper motors are devices in the wiper system that functions on a power supply in order to move the wiper blades in a smooth motion. Like other motors, the wiper motor rotates continuously in one direction which is converted into a back and forth motion.



Fig 3: Wiper motor.

3. BLOCK DIAGRAM

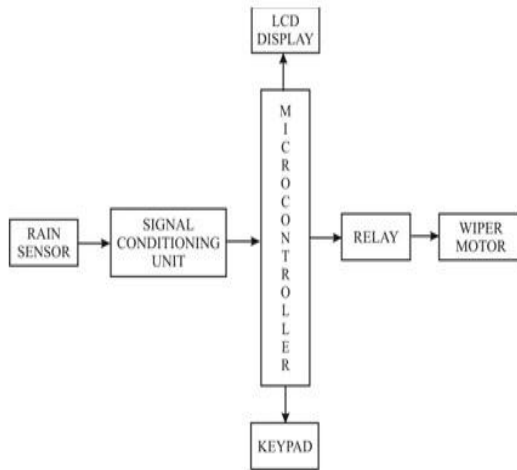


Fig 4: Block diagram.

4. WORKING

The wipers combine three technologies to perform their task, sensor on the windscreen to sense the rain, a combination of electric motor and worm gear reduction provides power to the wipers, a neat linkage converts the rotational output of the motor into the back-and-forth motion of the wipers, sensor is fixed in the wind screen.

This sensor is used to pass the rain fall signal to the electrical circuits. It takes a lot of force to accelerate the wiper blades back and forth across the windshield so quickly. In order to generate this type of force, a worm gear is used on the output of a small electric motor.

The worm gear reduction can multiply the torque of the motor by about 50 times, while slowing the output speed of the electric motor by 50 times as well.

The output of the gear reduction operates a linkage that moves the wipers back and forth. Inside the motor/gear assembly is an **electronic circuit** that senses when the wipers are in their down position.

The circuit maintains power to the wipers until they are parked at the bottom of the windshield, and then cuts the power to the motor.

A short cam is attached to the output shaft of the gear reduction. This cam spins around as the wiper motor runs.

The cam is connected to a long rod; as the cam spins, it moves the rod back and forth.

The long rod is connected to a short rod that actuates the wiper blade on the driver's side. Another long rod transmits the force from the driver-side to the passenger-side wiper blade.

5. PROJECT SKETCH

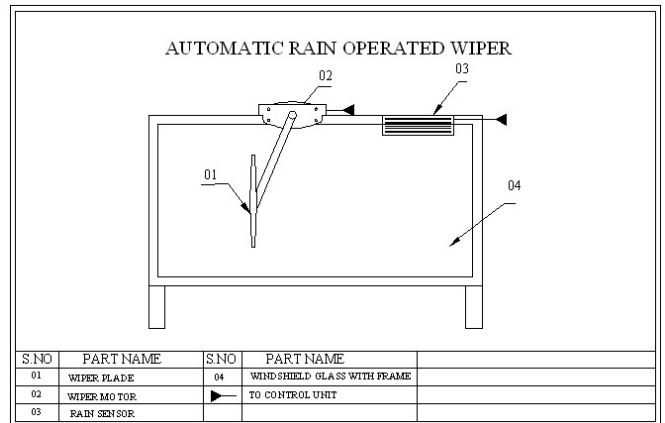


Fig 5: Sketch of project.

6. ADVANTAGES

- Low cost automation project.
- Free from wear adjustment.
- Less power consumption
- Operating Principle is very easy.
- Installation is simplified very much.
- To avoid other burnable interactions viz. \hat{A} (Diaphragm) is not used.
- It is possible to operate Manually/automatically by proving On/Off switch.
- Sensor cost is very low due to conductive sensor

7. CONCLUSION

In this concept the components we used are const effective and this circuit is a affordable and adaptable to the existing system. This helps to improve the life time of the wipers and reduced the effort to the driver on controlling over the wiper.

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