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AUTONOMOUS INSTITUTION
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Anjugramam - Kanyakumari Main Road, Palkulam,Variyoor P.O. - 629 401, Kanyakumari District.

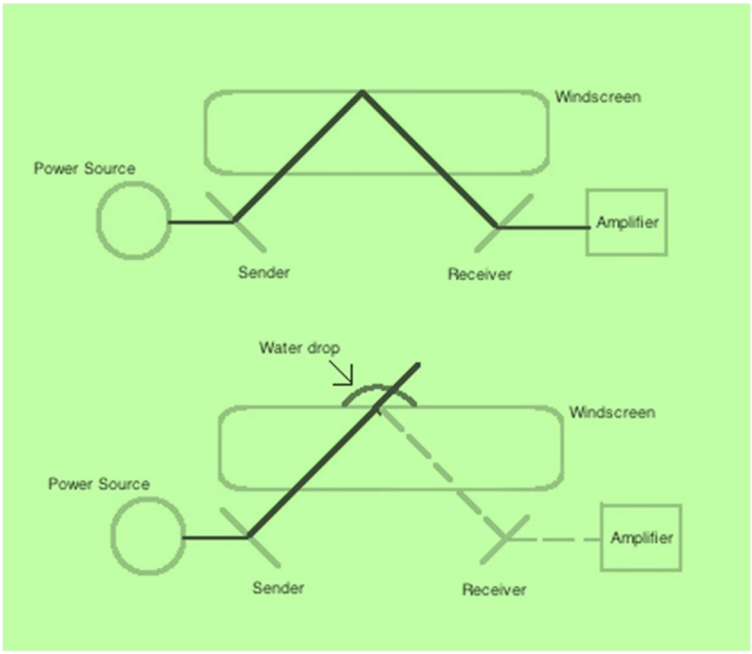
VII Semester

AU3008 Sensors and Actuators

UNIT – 3 - Variable and Other Special Sensors

3.9 Rain Sensor

- Rain sensors are devices designed to detect and respond to rainfall.
- They are commonly used in automatic irrigation systems, automotive windshield wipers, and smart building management systems.
- These sensors provide a convenient way to manage activities based on weather conditions, helping conserve resources and improving safety.
- Automotive rain sensors detect rain falling on the windshield of a vehicle.
- Most rain sensor implementations employ an infrared light that is beamed at a 45-degree angle onto the windshield from inside the car. If the glass is wet, less light makes it back to the sensor.
- The software in a rain-sensing system turns on the wipers when the amount of light reflected onto the sensor decreases to a preset level. The software sets the speed of the wipers based on how fast the moisture builds up between wipes. It can operate the wipers at any speed.
- The system adjusts the speed as often as necessary to match the rate of moisture accumulation.



Top Image:

- A power source is connected to a sender unit.
- The sender emits a beam of infrared light towards a receiver unit.
- The receiver is connected to an amplifier and a windscreen.

Bottom Image:

- A water drop is placed in the path of the infrared beam.
- The beam is blocked by the water drop, preventing it from reaching the receiver.
- The amplifier detects the absence of the signal and triggers the windscreen wipers

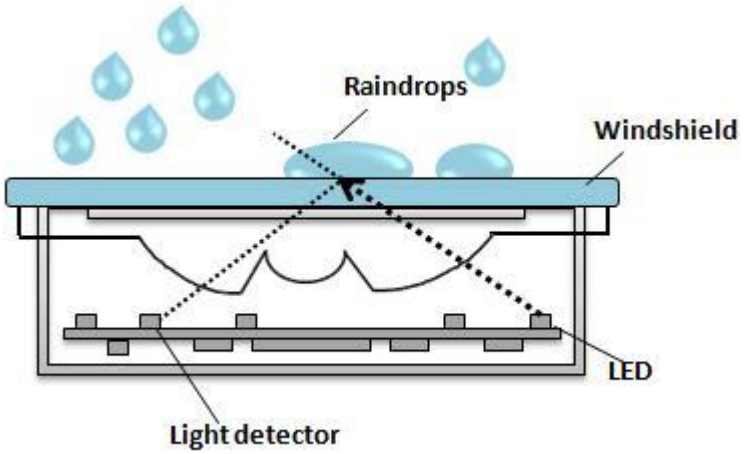


Fig. 3.9.2 Activation of the windshield wipers during rain

The image shows a diagram of a rain sensor, which is a device used in cars to automatically activate the windshield wipers when it starts to rain. Here's how it works:

Components:

1. **LED:** Emits infrared light.
2. **Light detector:** Detects the intensity of the reflected infrared light.
3. **Windshield:** The surface where raindrops fall.

Working Principle:

1. The LED continuously emits infrared light.
2. When the windshield is dry, the light is reflected back to the light detector.
3. When raindrops fall on the windshield, they scatter the infrared light.
4. The light detector senses the decrease in the intensity of the reflected light.
5. The sensor interprets this decrease as the presence of rain.
6. A signal is sent to the car's computer, which activates the windshield wipers.

Advantages:

- **Automatic operation:** No manual intervention required.
- **Improved visibility:** Ensures clear vision during rain.
- **Reduced driver distraction:** Focus on driving, not wiper control.

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