

Pneumatic Bumper with Automatic Braking System

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Abstract- In this system we are used IR sensor. By using this sensor which can sense or detect the vehicle coming from in front of our vehicle. The IR sensor sends this signal to the engine by using relay control valve as well as this stops the working of engine. During the working of braking system the limit switches are placed below the pedal of brake. The brake pedal activates the pneumatic bumper which reduced the damage of vehicle during the accident.

Index Terms - Pneumatic bumper, Automatic operated braking system, IR transmitter & receiver, electromechanical system.

1. INTRODUCTION

The main aim to design this system is based on electronic feedback signal sending to the engine and activate the pneumatic bumper is called "automatic pneumatic bumper" This system is consists of IR sensors, electronic Control Unit, Pneumatic bumper as well as braking system . The IR sensor is used to detect the vehicle which is come in front of vehicle. There is any obstacle closer to the vehicle then feedback signal is given to the system and this activate the bumper.

The pneumatic bumper system is used to protect the man and vehicle against the injuries during the collision. This system is only activated the vehicle speed is above than the normal speed of vehicle. This vehicle speed is sensed by the sensor and this feedback signal is given to the control unit and pneumatic bumper is activated.

2. OBJECTIVE

The objective of behind this paper is to improve the prevention technique of accidents and also reducing the hazard from accidents like damage of vehicle, injury of human etc. The main aim to design this system is based

on electronic feedback signal sending to the engine and activate the pneumatic bumper is called "automatic pneumatic bumper". This system is consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system. The IR sensor is used to detect the obstacle. There is any object closer to the vehicle the feedback signal is given to the bumper activation system.

3. METHODOLOGY

3.1 IR Sensor

A sensor which can detect any a physical variable. the sensor requires calibration in order to be useful as a measuring device. The IR transmitter sends 45 kHz (frequency can be adjusted) carrier under 555 timer control. The transmitted signal reflected by the obstacle and the IR receiver circuit receives the signal and giving control signal to the unit.



Fig.1. IR Sensor

3.2 Double acting cylinder

Pneumatic cylinder consists of:

- A) Piston
- B) Cylinder



Fig.2. Double Acting Cylinder

The DCV valve is used to control the direction of air flow in the pneumatic system. The directional valve does this by changing the position of its internal movable parts.

3.3 Relay control valve

Electronic relay circuit is electro-mechanical device which is used to control the movement of solenoid valve & electric motor.



Fig.3. Relay control valve

3.4 Limit switches

It is a mechanical device which senses the physical movements i.e. linear. It limits the mechanical motion or position with an electrical circuit.



Fig.4. Limit Switches

4. WORKING PRINCIPLE

The IR transmitter circuit is to transmit the Infra-Red rays. If any obstacle is there in a path, the Infra-Red rays reflected. This reflected Infra-Red rays are received by the receiver circuit is called "IR Receiver".

The IR receiver circuit receives the reflected IR rays and giving the control signal to the control circuit. The control circuit is used to activate the solenoid valve.

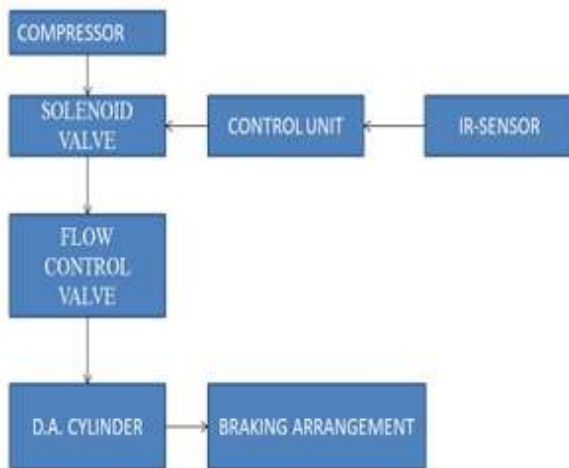


Fig.5.Working Principle Diagram

5. ADVANTAGES

1. Free from wear adjustment.
2. Less power consumption.
3. It gives simplified very operation.
4. Installation is very simple.

6. DISADVANTAGES

1. Additional cost is required to use the system.
2. Vehicle speed above high.
3. Systems have few limitations in densely traffic road.

7. APPLICATIONS

1. For Automobile applications.
2. For Industrial applications.
3. Passenger car vehicles.

8. FUTURE SCOPE

1. Infrared sensors can be replaced by ultrasonic sensors.
2. Regular bumpers can be replaced by hydraulic bumpers.
3. Infrared sensors can sense eye blinking and give signal to solenoid valve when driver sleeps.

9. CONCLUSION

Our main aim behind the designing of this system is to improve the prevention technique of accidents and also reducing the hazard from accidents like damage of vehicle, injury of human etc.

We observed that our system is able to achieve all the objectives which we have determined. This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning,

purchasing, assembling and machining while doing this project work.

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