

# Activation of a Bicycle's Automatic Braking System

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## ABSTRACT

People used to have shorter lives in the past. There has been a dramatic spike in the number of people killed in car accidents as the number of people using automobiles continues to rise. There have been a lot of accidents recently caused by brake failure; thus, it would be beneficial to have automated brake control in order to lessen the impact of these incidents. A collection of sensors, including an emitter and a receiver, is mounted in front of the vehicle. In order for the sensor to identify an obstruction, it constantly sends out waves, which are reflected and picked up by the receiver. The camera receives a signal from the reflected wave, and depending on the object's distance, it activates the buzzer or brakes. To apply the brakes, a solenoid valve is used. A solenoid valve uses pneumatics to activate the brakes in response to an electrical input. A look into the road safety of the future.

## 1. INTRODUCTION

Accidents occur due to technical problem within the vehicle or due to mistake of driver. Sometimes the drivers lose control over the vehicle and sometimes accident occurs due to rash driving. When the drivers come to know that vehicle is going to collide they become nervous and they don't apply the brakes. Majority of the accidents occur this way. The system designed will prevent such accidents. It keeps track of any vehicles in front. It will continuously keep the track of the distance between the two vehicles. When two come dangerously close the microprocessor(PLC) in the system activates the brakes and it will stop the vehicle.

The existing approaches in preventing accidents are:

Honda's idea of ABS which helps the rider get hassle free braking experience in muddy and watery surfaces by applying a distributed braking and prevents skidding and wheel locking [1] Volvo launched XC60 SUV which was equipped with laser assisted braking. This is capable to sense a collision up to 50 mps and apply brakes automatically [1] Drawbacks in the existing approaches: ABS can only help if the rider applies it in right time. Manually and maintains the distance calculations. ABS has its own braking distance. Moreover most of the commuter bikes in India don't have ABS because it's very expensive[2]. Volvo's laser assisted braking could not work effectively in rainfall and snowfall season and laser is easily affected by atmospheric conditions [3].

## 2.COMPONENTS

- BATTERY
- SWITCH
- MCB
- PLC
- SMPS
- SENSOR
- SENSOR
- ELECTROMAGNETS
- TO AND FRO MOTION MOTORS

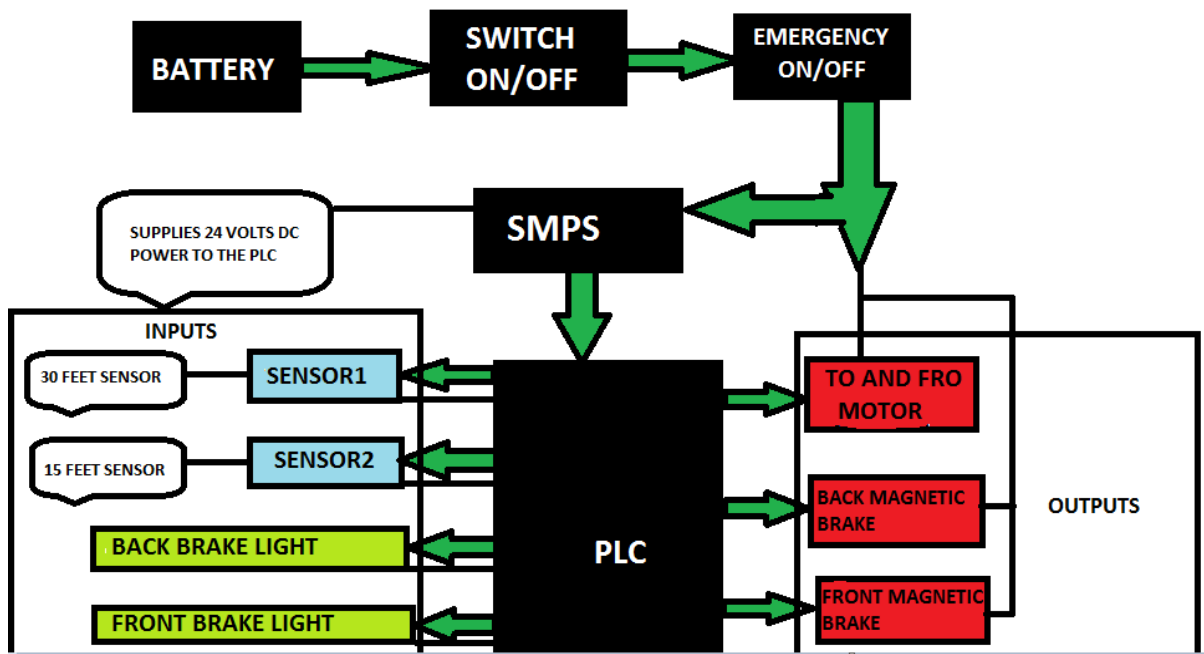


Figure 1. Braking System diagram

### SWITCH

Elcom Push button switch in a Roundhead type, Momentary / ON-OFF type as per requirement.

**MCB** - A miniature circuit breaker automatically switches off electrical circuit during an abnormal condition of the network means in overload condition as well as faulty condition. Nowadays we use an MCB in low voltage electrical network instead of fuse.

### 3.PROGRAMMABLE LOGIC CONTROLLER

A **Programmable Logic Controller (PLC)** or **programmable controller** is an industrial digital computer that has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, robotic devices, or any activity that requires high reliability, ease of programming, and process fault diagnosis.

### **Delta DVP24XP200T 16 input 8 output Programmable Logic controllers**

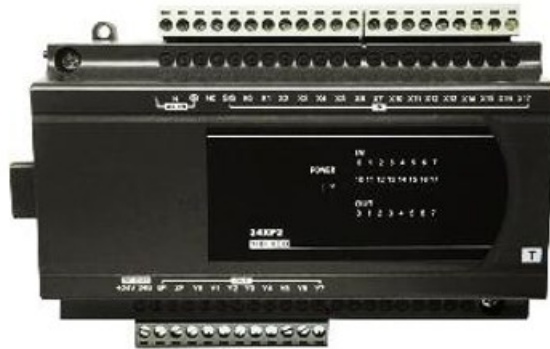


Figure 2. Programmable Logic controllers

No of Inputs (Digital/Analog) :16 input

No of Outputs (Digital/Analog) :8 output

Rated Power Supply :100-240 VAC

Program Memory :16k Steps

Operating Temperature : 50-55

### **20M RS485 SHORT RANGE LASER DISTANCE SENSOR**

### **10M USB BACKBOARD LASER DISTANCE MEASURE SENSOR**

Measuring Range → 20M

Storage Temperature → -25 — 60 degrees

Working Temperature → 0 – 40 degrees

### **ELECTROMAGNETS**

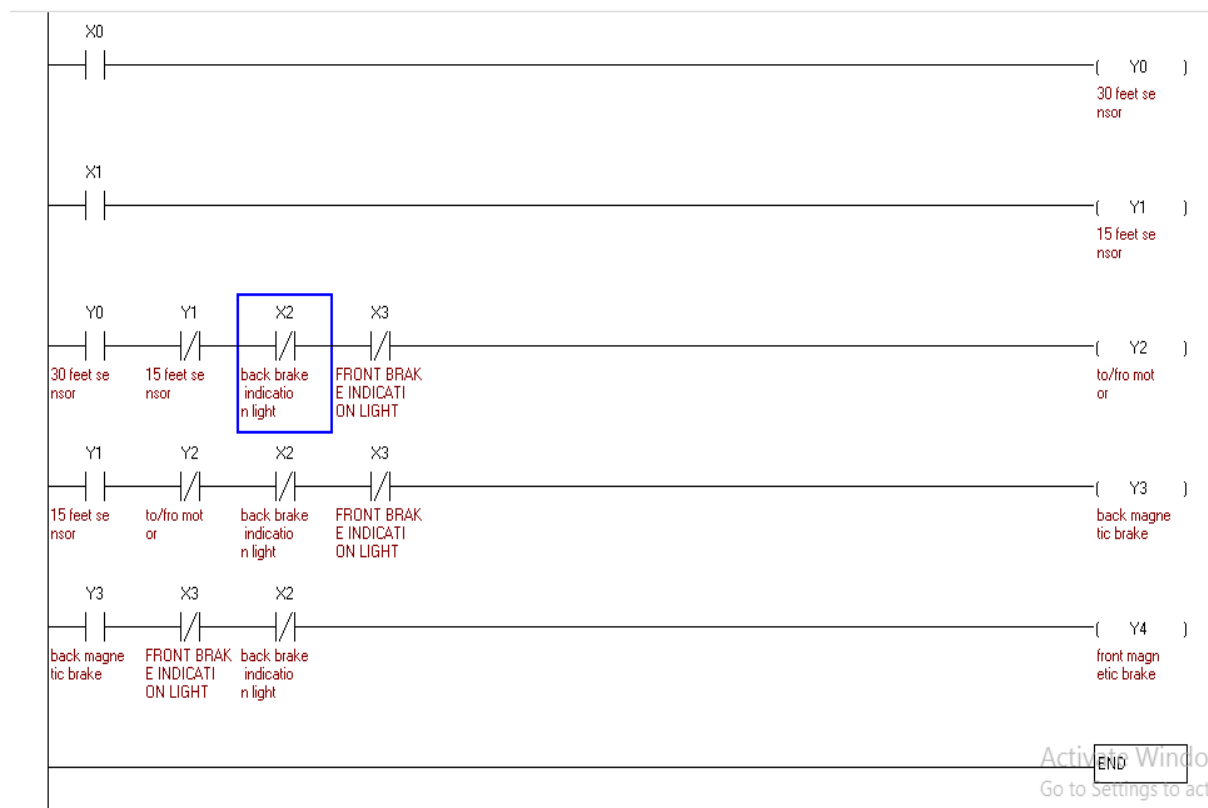
#### **DC 12VKK – P60/60**

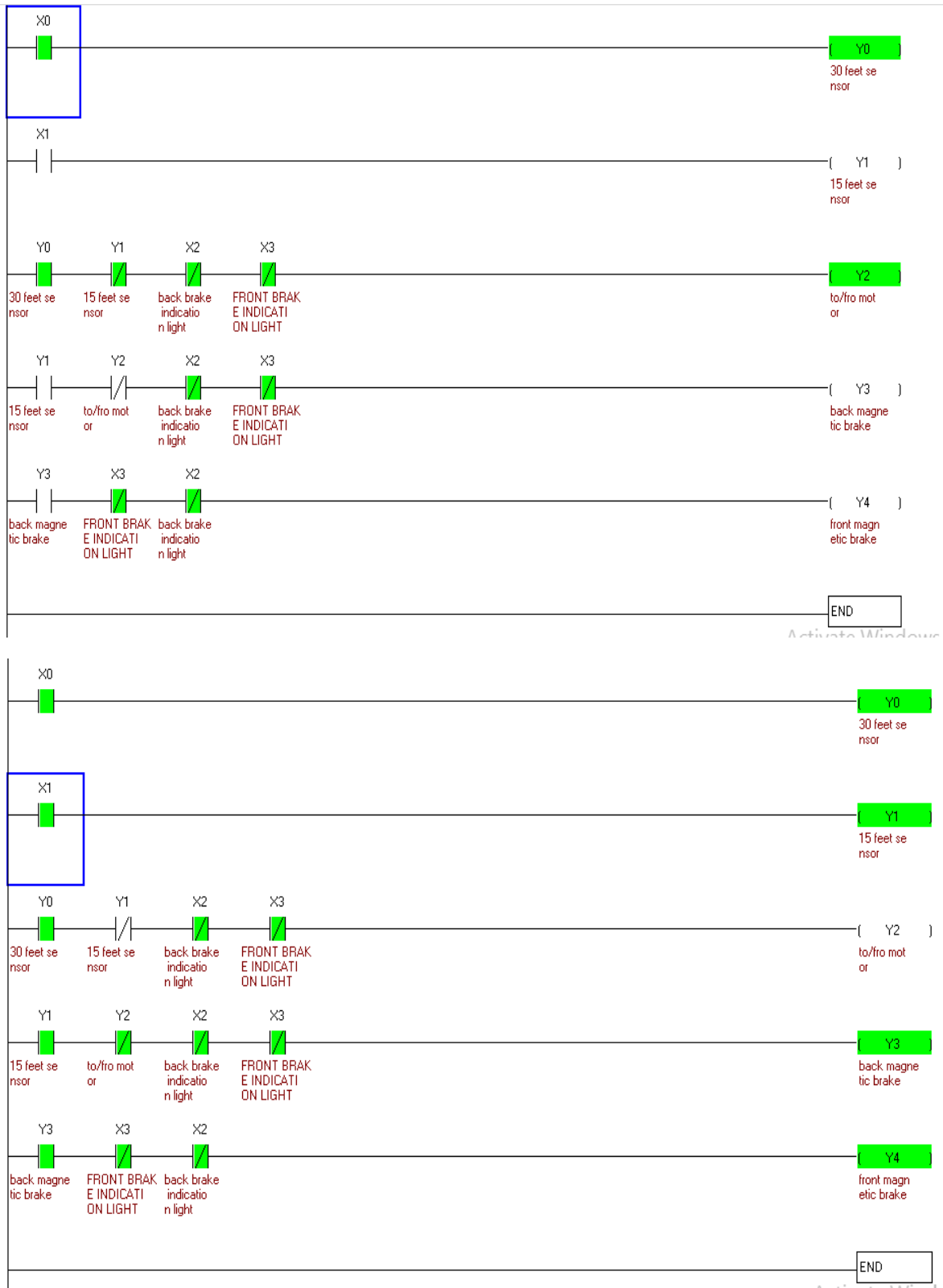
DC 12V KK-P60/60 Large Suction 100 KG Lifting Solenoid Electromagnet consist of an iron core and a coil to attract magnetic substances, using the magnetic action induced by electric current, only while the current is applied. This compact functional device offers high power with high reliability. The structure and design to release the residual magnetism left after de-energization is also one of its unique features.

1. Operating Voltage: 12V DC

2. Lifting Capacity: 100 KG
3. Size (D): 60 mm
4. Electric lifting magnet.
5. Powerful and compact.
6. Smooth and flat surface.
7. Low consumption and reliable.
8. Ambient temperature within 130 degrees.

### LADDER LOGIC





### Conclusion

In this project, we present the implementation of an automatic braking system for forward collision avoidance. This system detects obstacles and automatically reduces the vehicle's speed, eliminating the need for the driver to manually brake. The model of the system was stimulated using a PLC. As a result, fewer accidents occur, and many lives are likely spared.

As a result of this stimulating project, we learnt how an autonomous braking system works, which will be useful for our future research and studies.

### References

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