KIT'S COLLEGE OF ENGINEERING, KOLHAPUR

A

PROJECT REPORT

ON

"ELECTRONICALLY CONTROLLED THROTTLE BODY"

UNDER THE GUIDENCE OF

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DEPARTMENT OF ELECTRONICS

2015-2016

CERTIFICATE

This is to certify that, mini project report entitled, **"ELECTRONICALLY CONTROLLED THROTLE"** submitted by **Shahapurkar Aniruddha, Urunkar Neha & Rajepandhare Utkarsha** is bonafide work carried out by him/her under the guidance of Er.Kazi.Z.M it is approved for partial fulfilment of the requirement of the Shivaji University, Kolhapur. For the year 2015-16.

This represents bonafide work of the students.

DATE:
PLACE: - KOLHAPUR

Er. Z.M.Kazi — **Project Guide**

Er.A.R.Nigvekar — **H.O.D**

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INDEX

FIGURE LIST

1.INTRODUCTION

A **throttle** is the mechanism by which fluid flow is managed by construction or obstruction. When a throttle is wide open, the intake manifolds usually at ambient atmospheric pressure. When the throttle is partially closed, a manifold vacuum develops as the intake drops below ambient pressure. The **Throttle Body** is the part of the air intake system that controls the amount of air flowing into the engine, in response to driver accelerator pedal input in the main. The throttle body is usually located between the air filter box and the intake manifold, and it is usually attached to, or near, the mass airflow sensor. The largest piece inside the throttle body is the throttle plate, which is a butterfly valve that regulates the airflow. On many cars, the accelerator pedal motion is communicated via the throttle cable, to activate the throttle linkages, which move the throttle plate .An engine's power can be increased or decreased by the restriction of inlet gases (*i.e.*, by the use of a throttle), but usually decreased.

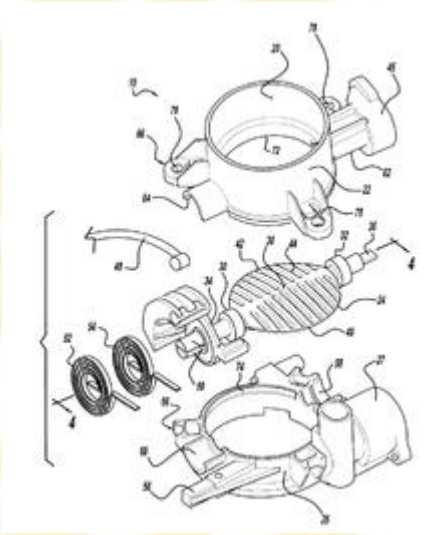

Figure1.1-Components of a Typical Throttle valve

Electronic throttle control is an automobile technology which electronically "connects" the accelerator pedal to the throttle, replacing a mechanical linkage. Electronic throttle controls establish the essential connection between the acceleration pedal and the throttle valve using electronic signals instead of a mechanical link. A electronic throttle consists of a throttle body with an electric motor, a pair of throttle position sensors and a control unit. The electronic throttle employs a closed-loop control algorithm. In electronic throttle control (also known as "drive-by-wire"), an electric motor controls the throttle

linkages and the accelerator pedal connects not to the throttle body, but to a sensor, which sends the pedal position to the Engine Control Unit (ECU). The ECU determines the throttle opening based on accelerator pedal position and inputs from other engine sensors.

When the driver presses on the accelerator pedal, the throttle plate rotates within the throttle body, opening the throttle passage to allow more air into the intake manifold. Usually an airflow sensor measures this change and communicates with the ECU. The ECU then increases the amount of fuel being sent to the fuel injectors in order to obtain the desired air-fuel ratio. Often a throttle position sensor (TPS) is connected to the shaft of the throttle plate to provide the ECU with information on whether the throttle is in the idle position, wide-open throttle (WOT) position, or somewhere in between these extremes.

Figure1.2-A Typical Throttle

2.BLOCK DIAGRAM & DESCRIPTION

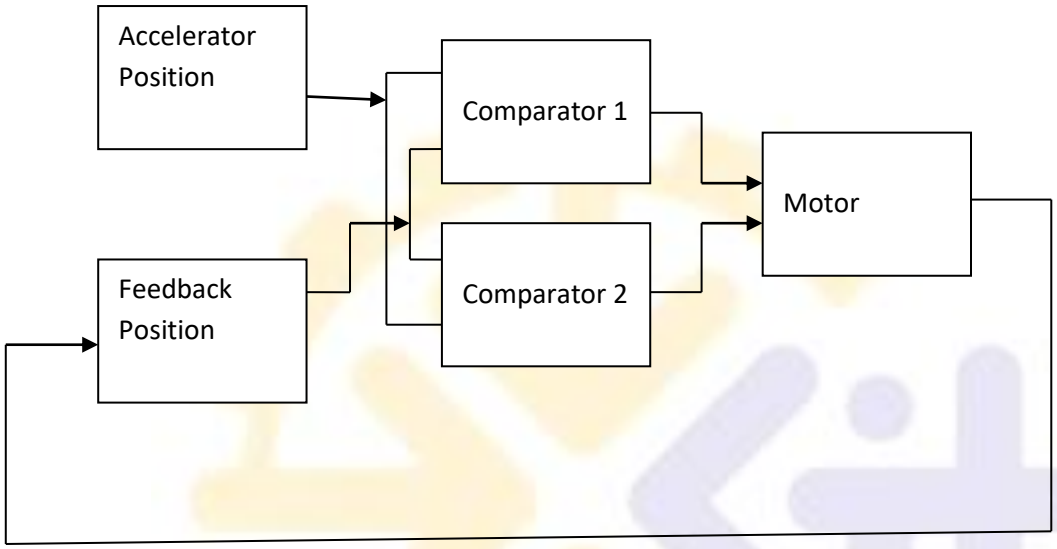

Figure 2.1- Block Diagram

We are going to use two comparators .The inverting terminal of first comparator is connected to non inverting terminal of the second & the non inverting terminal of first comparator is connected to inverting terminal of the second.

We are going to apply voltage obtained at the output of accelerator pot to one of these shorted paths & the voltage obtained at the output of feedback pot to the other shorted path.

The outputs of two comparators are applied to the input terminals of motor. If first input is high & second is low motor will rotate in clockwise direction & if first input is low & second is high motor will rotate in anti clockwise direction & this will adjust the feedback pot as per accelerator position.

3.CIRCUIT DIAGRAM AND DESCRIPTION

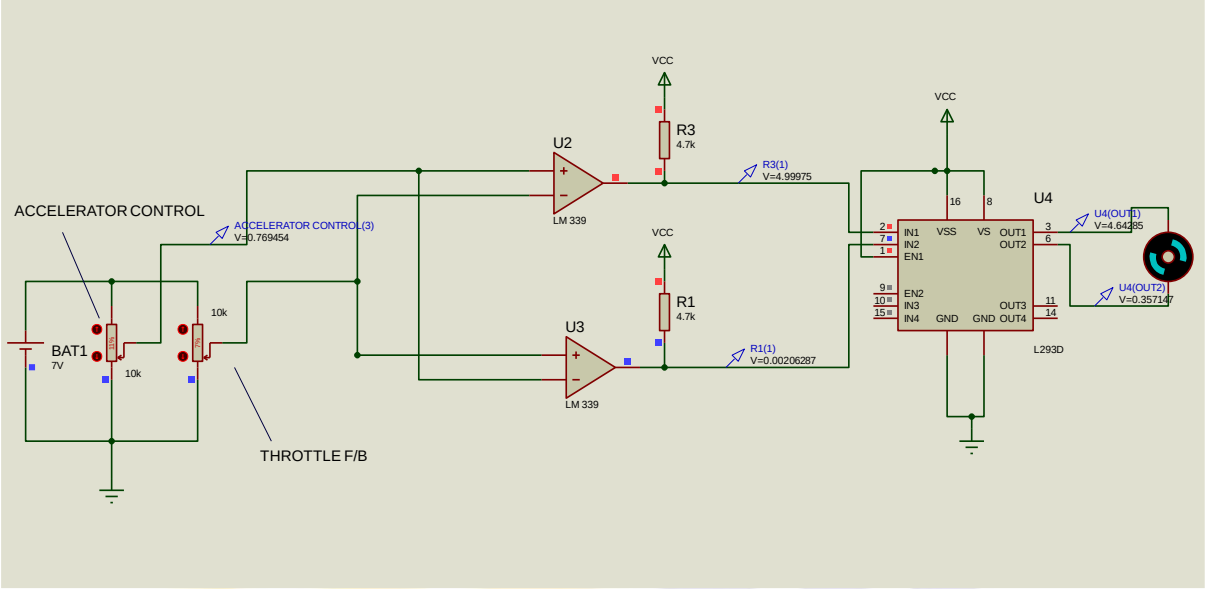

Figure 3.1- Circuit Diagram

In this circuit we are going to use two 10k pots .One for accelerator positioning & the other as a feedback pot which is coupled to throttle body.We are going to use two comparators using LM 339 IC. The inverting terminal of first comparator is connected to non inverting terminal of the second & the non inverting terminal of first comparator is connected to inverting terminal of the second.

At the output of both comparators we are connecting pull up resistors of 4.7k each. Whenever the accelerator voltage is greater than feedback voltage output of only first comparator will be high & due to the pull up resistor the Vcc voltage will get coupled to the IN1 terminal of L293D motor driver IC.So the motor will rotate in clockwise direction & When the accelerator voltage is less than feedback voltage output of only second comparator will be high & due to the pull up resistor the Vcc voltage will get coupled to the IN2 terminal of L293D motor driver IC. So the motor will rotate in anti clockwise direction. When the positions of both accelerator & feedback pots is same then both comparators output will be high . So motor will stop rotating.

4.COMPONENT LIST

COMPONENT DESCRIPTION	RATINGS	QUANTITY	UNIT PRICE (Rs)
LM 339		1	15
L293D		1	60
Resistors	4.7k	2	1
Potentiometer	10k	2	10
Motor		1	60

FIG. 4.1 Component list

5.Result

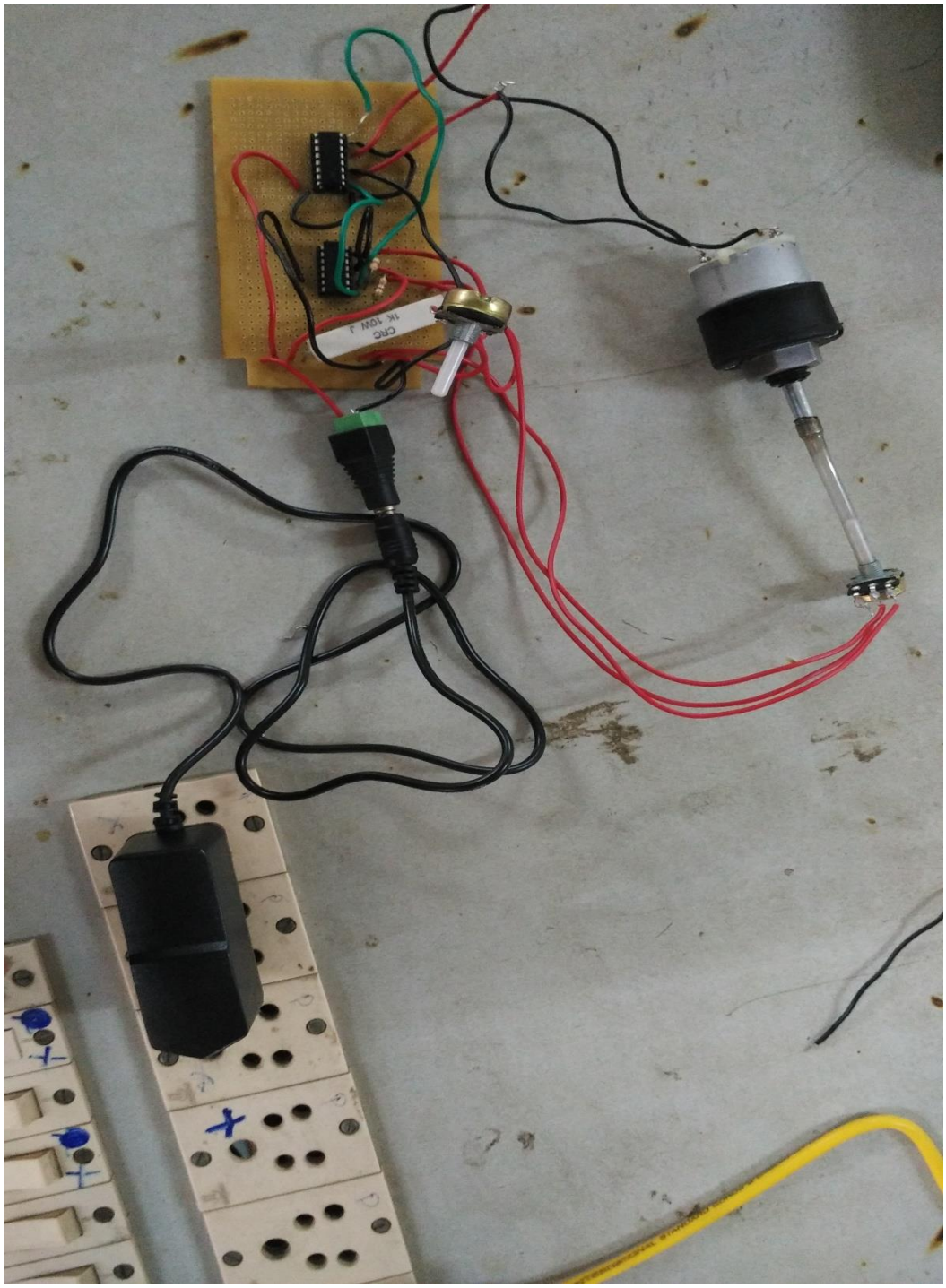

Fig. Implementation

6.ADVANTAGES & DISADVANTAGES

Advantages:

- Safety can be improved by providing computer controlled intervention of vehicle controls with systems such as Electronic Stability Control (ESC), adaptive cruise control and Lane Assist Systems.

- Ergonomics can be improved by the amount of force and range of movement required by the driver and by greater flexibility in the location of controls. This flexibility also significantly expands the number of options for the vehicle's design.

Disadvantages:

- The cost of the systems is often greater than conventional systems. The extra costs stem from greater complexity, development costs and the redundant elements needed to make the system safe.
- Failures in the control systems can result in an unstoppable runaway vehicle - if the throttle, ignition and transmission are all beyond the direct control of the driver there is no effective way to stop the vehicle in such an event

7.Applications:

- Cruise control
- Engine RPM limiter to prolong life
- Vehicle speed limiter
- Fuel economy
- Emissions control

8.CONCLUSION

When we rotate the accelerator pot such that the voltage at accelerator pot is greater than the feedback pot voltage, the motor will rotate in clockwise direction & the throttle valve will be opened to the required amount & when we rotate the accelerator pot such that the voltage at accelerator pot is less than the feedback pot voltage, the motor will rotate in anti clockwise direction & when the required position of the feedback pot is obtained, motor stops rotating. In this way, the throttle valve opening is controlled electronically.

9.REFERENCES

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