

Revolutionizing Internal Combustion Engines: The Camless Engine Approach

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ABSTRACT

To eliminate the cam, camshaft and other connected mechanism the camless engine makes the use of three vital components the sensors the electronic control unit and the actuator mainly five sensors are used in connection with the valve operation. One for sensing the speed of engine and one for sensing the load on engine exhaust gas sensor valve position sensor and current sensor the sensor will send signal to the control unit and the electronic control unit consist of a micro processor which is provided with a software algorithm. The micro processor issues signals to the solid state circuitry based on this algorithm which in turn controls the actuator to function according to the requirement.

Keywords: : Camshaft, CamlessEngine,Actuator,Sensorsetc.

I. INTRODUCTION

The new emerging technology for the automotive technology are the camless engine the engine which does not have camshaft to lift both the intake and exhaust valve.

The various engine system have been developed in the effort to improve the engine performance and fuel economy of a automobile.

The cam has been an integral part of the IC engine. It controls the breathing channels(valves) of an IC engine i.e. the valves through which the fuel air mixture or air is supplied and exhaust drivn out.

It push open valves at proper time and guide their closer. in this technology we use a linear actuator to open and close intake and exhaust valve. The main function of the actuator is toused to open and closed the intake and exhaust valve. The actuator was developed for use as replacement for the camshaft to lift both the intake and exhaust valves.

II. OBJECTIVES

1. To improve the efficiency of the engine.
2. To reduce fuel consumption.
3. To reduce the weight and volume of the engine.
4. To provide flexible valve timing
5. To improve power over existing internal combustion engine

III. COMPONENTS USED

1. Atmega 16 micro-controller

It is an 8 bit high performance micro-controller of ATMEL'S MEGA AVER family with low power consumption. It is used on enhance reduced instruction set computing architecture

With 131 powerful instruction. It has four 8 bit ports designated as port A, port B, port C, port D for internal and external uses.



Figure.2.3.1 ATMEGA 16

2. 7805 voltage regulator IC

The 7805 voltage regulator employ built in current limiting ,thermalshutdown,and safe operating area protection which makes them virtually immune to damage from output overloads. 7805 is a three terminal positive voltage regulator.



Fig.4.9 : 7805 voltage regulator IC

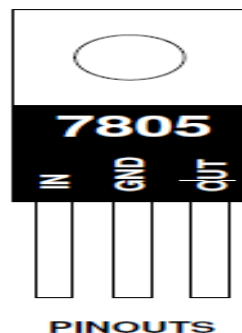


Fig.4.10 : pin out diagram of 7805 IC

3. LCD 1602ZFA

16*2 character LCD.

5*8 dots with cursor.

Built in a controller(KS0066 Or equivalent)

+5 volt power supply.

4. Sensor

A sensor is a converter that measures a physical quantity and converts it into a signal which canbe read by an observer or by an instrument. we have used obstacle sensor.

5. Actuator

Actuators are used to control the both intake and eshaust valve. We have used the linear actuator.

An actuator is a type of motor for moving or controlling a mechanism or a system. It is operated by a source of energy and converts that energy into some kind of motion.

6. Motor

An electric motor is an electric machine thatconverts electricalenergy into mechanical energy. The reverse of this would be the conversion of mechanical energy into electrical energy and is done by an electric generator.In normal motoring mode, most electric motors operate through the interaction between an electric motor's magneticfield and windingcurrents to generate force within the motor. In certain applications, such as in the transportation industry with traction motors, electric motors can operate in both motoring and generating or braking modes to also produce electrical energy from mechanical energy.

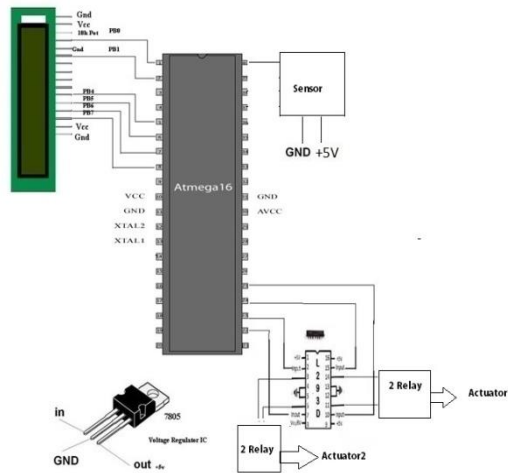


Fig. No. 5.8 Motor

IV. WORKING

In conventional engine the inlet and exhaust valve timing are constant due to cam when air fuel mixture enters in the combustion chamber, combustion takes place but due to the constant timing of valve, the gases are not expelled out of the cylinder through exhaust valve or it is a closed earlier or before expelling out all combustion gases.

The valve should open only after the complete combustion and should expelled out all gases but it doesn't happen and gases remain in the combustion chamber increasing its temperature and pressure and manage to the piston cylinder valve over heating takes place to avoid these instead of cam, we are using actuator that operated with the help of sensors, the sensor is inserted in the cylinder walls as the piston moves up the sensor senses the position of piston displacement and actuator actuates to open for intake at air fuel mixture after combustion takes place the piston moves downward and sense by sensor which actuates the second actuator to open the exhaust valve and all gases are expelled out from the cylinder thus gases do not remain in the cylinder and efficiency life of cylinder and overall engine performance increased.



Advantages

- 1) It has better fuel economy 7-10% increase.
- 2) High torque and power 10-15% increase.
- 3) Lower exhaust emission.
- 4) It improves ideal stability.

Applications

- 1) They are being prototyped by valves and Ricardo.
- 2) Used in the new FIAT 500.

V. CONCLUSION

- 1) An electro-hydraulic camless valve train was developed for a camless engine initial development confirmed its functional ability to control the valve timing, lift, velocity and event duration as well as to perform selectively variable deactivation in a four valve multi cylinder engine.
- 2) Further research and development are needed to take full advantages of the system.

VI. FUTURE SCOPE

- Camless engine can also be developed for variable valve timing.
- Camless engine also has scope in stationary engines because of less vibration
- As the camless engine removes all the disadvantages of cam engines, it also developed for application in aerospace.

VII. REFERENCES

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