

# Design and Performance of 48v BLDC Drive System

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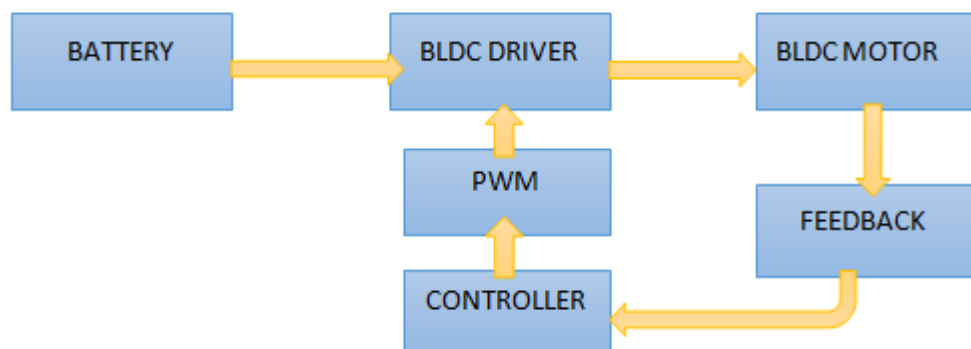
## ABSTRACT

Instead of combustion engine we can use the electric motor ,because combustion engine have negative impact on environment due to fuel consumption and emit carbon-di-oxide, resulting air pollution, global warming. We proposean electrical propulsion system,high torque with less power loss,high efficiency because carbon bursh and commutator are not used . Brushless DC motor overcome many problem of the brushed DC motor and widely applied in various field. The flexibility of the drive system is increased using controller.The 3-phase inverter is implemented using ac supply feeding to the BLDC motor.

**Key words:**BLDC motor , Controller ,Electric vehicle,3-phase inverter etc..

## INTRODUCTION

Efforts to improve air quality in heavily populated urban communities have renew interest in the development of electric vehicle technology. However, the key issues which are challenging in the design of electric vehicles are the electric propulsion system, energy sources and battery management system Solving any of those issues and electric vehicles will compete - complement the conventional internal combustion engines vehicles .This paper will mainly focus in design and performance of electric propulsion system alternative. Direct Current (DC) and Brushless Direct Current (BLDC) motors drives have been widely applied as propulsion system to EVs because of their technology and control simplicity. However, with the showing technology in switching semiconductors and digital signal processors at reasonable costto more interest in using AC induction motors instead of DC motor . BLDC motor having lightweight, small volume, low cost, less maintenance and high efficiency. These advantages are important for EV applications.



**Fig 1.1 BLDC Motor block diagram**

The BLDC motor is energized by lead- acid battery. directly we give dc supply BLDC motor cannot work so we put the inverter set up .The 3 phase inverter connected between the motor and battery.the inverter covert the Dc to AC .AC supply passes through the BLDC motor.then the motor will rotate it produce a speed and torque, After speed and torque given to the feedback signal and fed to the controller. Controller produce the PWM signal than PWM signal send to the inverter, PWM signal is the dc signal, so inverter convert the dc to ac signal. this process is continuous.

## RESULT AND ANALYSIS

BLDC Motor of high-power rating is not available easily. When compared to other motor, cost of BLDC motor is really high. BLDC Motor and its controller should be matched to each other. Coupling the motor with the gear box of the existing vehicle was tiresome and time consuming



Fig .1.2BLDC Motor Drive

Thus, by providing BLDC drive we can achieve smooth operation, high efficiency, high torque, easy speed regulation, low maintenance, reliable, no carbon brushes and no sliprings .Which is shown in( fig1.2). As per the weight and required torque of the vehicle we can convert the conventional vehicles to pollutant free, highly efficient electric vehicles. For further improvement of this project, we can use solar power to charge the batteries thus making the electric vehicle more efficient.

### E-VECHICLE LOADING ANALYSIS

LOAD	VOLTAGE	SPEED
No load	48V	0
1 person	41.2V	500rpm
2 Person	40.4V	300rpm

### CONCLUSION

This paper presented design of a certain part of an electric vehicle. The electric vehicle is propelled BLDC Motor and powered by lead acid battery .which are charged by solar panel. After many experiment performed, the pic 16f887A control system proposed and developed in this paper is able to operate the vehicle at different speeds under flat and uphill road conditions. However, during uphill condition the current required was quite high compared to current supplied to DC motor used on the same vehicle under the same condition. Therefore,to be comparable to DC motor, more research work is required on control strategies in order to improve the performance of BLDC Motor used in EV. Due to its low cost, robustness, high reliability and free from maintenance.Hence, it is believed that the work carried out will contribute in development of future electric vehicles based on the use BLDC Motor.

### FUTURE SCOPE

10 years after we are expecting only electric vehicles on our country and if we can convert the existing combustion vehicles to electric vehicles that will more cost efficient. Furthermore, the storage capacity and charging time can also be improve the entire reliability and efficiency of the system.

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