

# Electric Car Charging System by Alternator

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**Abstract:** -- This research paper relates to the functioning of an electric car with self charging from the alternator to the battery. The alternator produces the electricity while the wheel is moving, allowing the alternator to move with the wheel friction. In this paper, we take all the components of alternators that include a DC-DC converter, motor, battery and controller. Alternator gets the drive from friction. Here the alternator has the ability to generate the 14V DC, which is directly connected to the DC-DC converter throughout the battery. The DC-DC converter has the ability to step up to the 50V and that is enough to charge four batteries which are connected into the series connection that produces the 48V supply. The controller gets connected to the battery, motor and another connection.

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**Keywords** — Battery, Alternator, Controller and DC-DC Converter, Motor.

## I. INTRODUCTION

In the electric vehicle, we mainly use an electric power and their supply is indicated from the battery. Battery is installed in an electric car and also to be mounted with the vehicle. The performance of an electric vehicle is more as compared to another type of vehicle. It also has a maximum output efficiency rather than to that of internal combustion engine. Whenever the electricity is used in the vehicle, it produces a zero percentage of emission while it is running or in the initial condition. This process is totally emission-less. It has power to carry the vehicle at minimum time. An electric car has totally different work from that of internal combustion engine. In an electric vehicle, all the circuit and switch are controlled by the controller. Controller is directly connected to the motor, battery and another lighting system. The motor drives to the accelerator pedal that is controlled through the controller. In the electric vehicle, re-chargeable batteries are mostly used. The battery is charged with the charging system. In the electric vehicle the main component that we use is battery, controller, motor and another more components. Battery is charged through the charger to be plugged in with the house electricity. Electric car can be changed to kinetic energy; electricity can be converted from kinetic energy to electric energy. It has a minimum power loss and maximum output efficiency rather than the internal combustion engine which has less output efficiency. The motor is installed at the rear differential between the rear wheels. Alternator works on the principle of electromagnetic induction and it

also moves around its axis to produce electricity. With the installation of the alternator it increases the range of battery and it provides the battery charging while the electric car is in running condition than the alternator produces electricity.

## II. BATTERIES

Selected batteries are the BOSS batteries, rechargeable batteries.

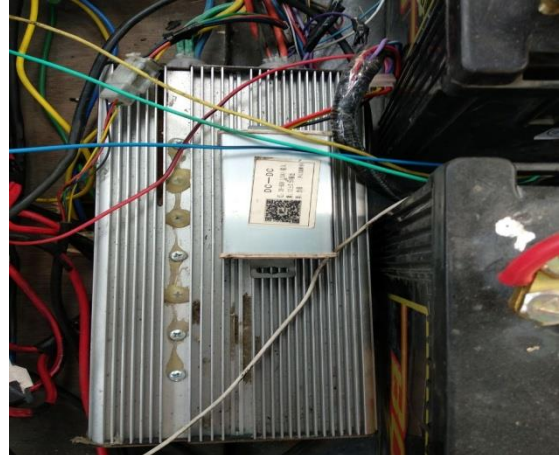
Specification:-

4 Batteries each are connected in series with 12V voltage.

- a) Cycle use: 13.9V-15.0V
- b) All battery voltage: 48V
- c) Single battery voltage: 12V
- d) Weight of battery:  $23 \times 4 = 92\text{KG}$  (with acid)
- e) Battery capacity: 90Ah
- f) The battery takes 7-9 hour to get fully charged.



**Figure: - 1 BATTERY**



**Figure; - 2 controller**

### III. CONTROLLER

A device that works and operates the electric motor to control the motor speed is known as a controller. Motor can automatically start and stop to be controlled by the controller. To select the forward and reverse rotation, both direction forward and reverse are controlled by the forward-reverse switch that is directly connected with the controller. Intelligent motor Controller is used in the electric vehicle.

Specification of the controller:-

- a) Model no. : CZ128
- b) Maximum current: 10 Amp
- c) Related Power: 3000 watt
- d) Related voltage: 48V (voltage)
- e) Embedded voltage: 42V
- f) Heat dissipation: Natural Cooling
- g) Throttle voltage: 3V-5V
- h) Brake level: High + Low
- i) Angle: 120 Degree



**Figure; - 3 controller**

### IV. DC-DC CONVERTOR

It converts the voltage from 48V-72V to 12V (voltage). It regulates the voltage as per its condition.

**Specification: -**

- Input voltage: 48V - 72V
- Output voltage: 12V
- Input current: 36V - 60V (10A)
- Output current: 12 ± 0.5V



*Figure; - 4 Dc-Dc Convertor*



*Figure; - 5 Motor*

#### V. MOTOR

Brushless DC motor (BLDC) is directly connected with the differential at the rear wheel. The direction of the brushless DC motor moves in clockwise rotation as well as anti-clockwise rotation. This motor is both sided rotational motor. While the vehicle is running, the maximum torque of the motor is 220Nm. In this vehicle only one DC motor is installed at the rear end of the vehicle.

Specification: -

Number of motor: 01

Type: DC only

Gear in motor: 01

Weight of motor: 6Kg

Direction of motor: Clockwise rotation and Anti-clockwise rotation

Input DC voltage: 240V

Maximum output power: 850 Watt

Maximum torque: 220Nm

Maximum speed of motor: 3000 rpm

Maximum phase current: 110 Amp

Rated torque: 130Nm

Rated phase current: 110 Amp

Rated output power: 850Watt

No. of pole: 6

Magnet flux: 0.07

With all fully charged battery, top speed of the vehicle is 30-35 km/hr. It can carry out the load capacity of 700 – 900 Kg but the maximum weight handling capability is 800kg. The ground clearance is 350mm and rolling resistant co-efficient is 0.01. When included all, the maximum battery weight of electric vehicle is 212 kg where the weight of vehicle is 122 kg without battery. Mild steel and square bar 25\*25\*1 mm are being the material of vehicle's chassis. Material for body building is mild steel 24 gauge/0.599 mm sheets. These all are the specifications of the vehicle.



*Figure; - 6 Vehicle Body*

#### VII. SPEEDOMETER

In this component it shows to you the speed of the vehicle and how much the battery charge is there in the percentage. This is not an electronic meter but it is the mechanical meter. This is fitted in the dashboard of the vehicle, it displays the battery charging in percentage. It has a smooth function and is easy to fit in the electric car. Its performance is high and easy to operate.



*Figure: - 7 Speedometer*

### VIII. ALTERNATOR

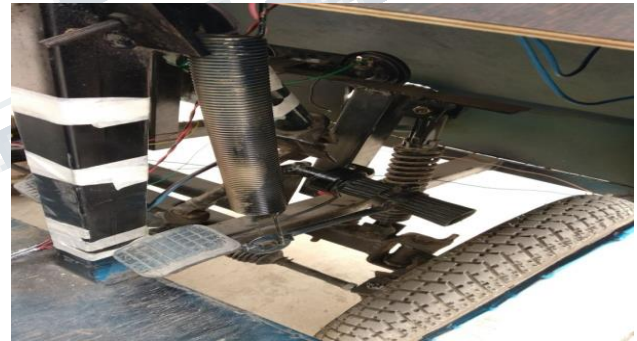
This is a part of car and it is also belongs to electrical generator category that converts mechanical energy into current. Because the magnetic field goes forward and forward through the field cooler, there is an alternate current. In the alternator, the rotor moves around the magnetic flux. It produces the electric current from the mechanical energy. This is known as an alternator. In the vehicle it runs with the wheel friction and produces the electricity to charge the vehicle battery. When the electric vehicle is in running motion than the alternator produces 13.8V to 14.8V. This ratio is without power loss due to friction but with friction power loss, the remaining power is 11.9V to 12.7V. Alternator works on the 1200 rpm to 8000 rpm (approximately).



*Figure: - 8 Alternator*

### IX. ACCELERATOR

In an electric vehicle, there is no engine and also there is no air flow needed and therefore there is no throttling device. A driver accelerator to the vehicle system by the controller is converted into the demand of electric motor power and is sent to the motor controller. The motor controller then orders the motor to take the power from the battery and thus the accelerator is fully controlled by the controller.



*Figure: - 9 Accelerator Pedal*

### X. CONCLUSION

It reduces the pollution from the cities. The city has been defined to develop a battery power vehicle for daily use and to change eco-friendly methods for daily short-term basis within the cities. In conventional work, the concept of self-charging has been found in conventional battery power vehicles, which was the goal of changing the concept of plug-in charging. This work started with the study of technology, the use of components and future of

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the battery power for electric car. For many trials, the battery was checked for the supply of resources from the DC-DC converter. It shows successful results of a conductor for charging rotational energy from the wheels to charge the batteries in the series. On the basis of their special applications used in the automobiles field, alternative systems, motor, motor controllers, DC-DC converters were selected. From the results, we can conclude that when the vehicle system has been adopted, the vehicle travels for a long time.

Alternator produces 12V-14V, which uses rotational energy from the wheel under the fast motion. DC-DC Converter receives as a 12V DC to 54V DC; the result is to charge the batteries.

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