



OBJECTIVES

- Describe the function of the charging system
- Describe the layout of the charging system
- Discuss conditions of the battery enabling it to charge

INTRODUCTION

The charging system of an automobile is made of a combination of both the battery and the alternator. now that you have a better understanding of these two components, we can discuss charging aspect of this system.

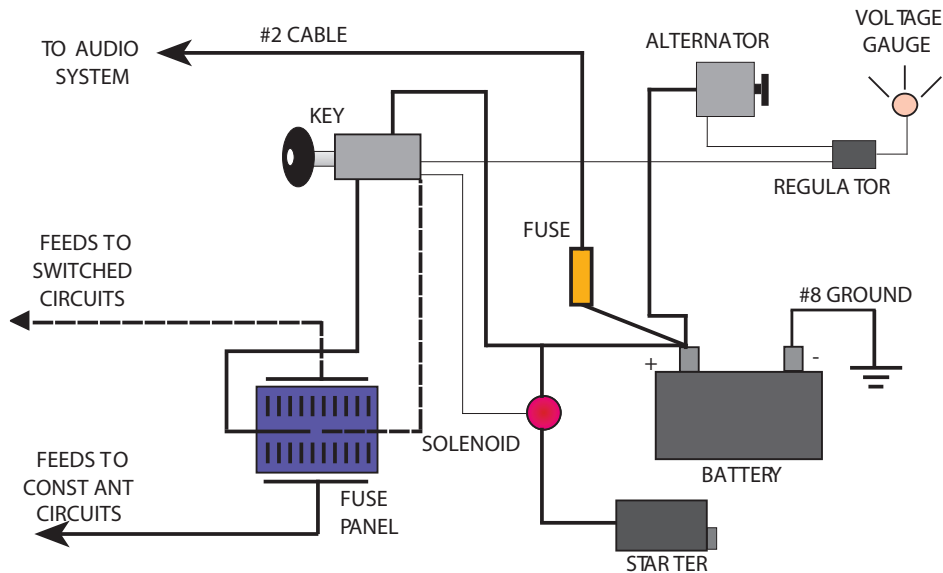
Charging Systems

The alternator has the job of not only providing the voltage and current for the vehicle while it is running, but also for charging the vehicles battery. With the engine running the alternator constantly monitors the state of the battery. As the batteries voltage drops below the fully charged 12.6 Volts the alternator automatically produces a higher voltage in order to replenish the battery.

In a perfect world this would never have to happen. As discussed earlier, the alternator is supposed to provide all of the power required by the vehicle. However as more vehicle electrical systems are brought on line (AC, power windows, defroster,...) the battery may be asked to supply some of the power for a short period of time. This is especially the case when adding aftermarket audio systems.

In order for this process to start, a voltage that is greater than that of the battery must be generated by the alternator. In most modern electrical systems the charging voltage being generated by the alternator is between 14 and 15 volts. Once the battery is presented with the higher voltage then the positive battery terminal begins to look more negative than the alternator. This higher voltage is needed to be able to draw off electrons from the positive side of the battery in turn leaving it with a higher positive charge. The electrons then pass through the alternator system to the chassis ground and are then deposited back on the negative side of the battery.





While this is the basic function of charging a battery, there are some considerations that must be taken into account for the battery to even take a charge. For example, the temperature of the battery has a lot to do with how efficiently it charges if at all. For a battery to properly charge, the electrolyte solution inside it must be around 40 degrees Celsius for the chemical reaction to occur.

In cold climates it is usually recommended to start your vehicle and let it idle for periods of 30 minutes or more to keep the battery charged. The time allows for the battery solution to warm up sufficiently to be able to charge the battery. It's not uncommon for batteries to die in the winter in vehicles that are only driven short distances at a time. Even though the vehicle is running, it may not run long enough to warm the battery to charge.

In hot climates this isn't usually a problem but there are still concerns. Since the solution in most lead acid batteries is liquid based, evaporation is a concern. With the modern sealed batteries there is not much to worry about, but with the pop-top batteries there is. Another concern is that you can boil the battery dry while driving. Since the battery will reach charging temperature quicker, it can actually overheat and the electrolyte could reach the boiling point. While you may not notice this occurring it is important to keep an eye on the battery's water level to ensure proper function.