# How does an alternator work

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The alternator produces a type of electricity known as AC or alternating current, which is why it"s called an alternator. With AC electricity, the current of electrons flows forwards and backwards constantly. This is the same type of electricity you will find in your power outlets within your homes, but the voltage in your homes in much higher.

However, all the electrical components within the car use another type of electricity known as DC or direct current. With this type of electricity, the electrons flow in just one direction, this is the same as the electricity you get from a battery.

So the alternator converts the Alternating current into direct current via a rectifier. The output voltage of the alternator varies with the speed of the car, so the alternator also uses a regulator to limit this and maintain a near constant output.

The engine combusts fuel. This is used to turn the crankshaft and propel the vehicle along. The engine only provides mechanical force, it does not produce electricity. So, we need a way to power all the electrical devices within the vehicle and that"s where the alternator comes in.

Once the engine is running, the alternator is used to recharge the battery so that it has enough stored energy to start the engine again in future. The alternator will also power the cars electrical devices while the engine is running.

Let"s have a look at the main parts of the alternator. At the front of the unit we find the pulley. This is a wheel which has grooves cut into it that help grip the belt that provides the rotational force from the engine.

The internal components are held inside the main housing. The housing consists of 2 parts, the front and rear bracket. There are some slots cut into the casing to allow air to pass through and remove the unwanted heat which is generated.

At the back of the unit we have the electrical connections. There are many different designs but this is an example of a simple 3 wire design, with an internal regulator and rectifier which has the following terminals:

B terminal. This is the output which charges the battery.S terminal. This allows the regulator to sense the voltage.F terminal. This is connected to the ignition and provides the initial power to the electromagnet at start up.

Then we find 3 separate sets of copper wires which are wound between these slots in a certain order. One end of each coil is connected together to form a neutral point, this is a star configuration.

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At the centre of the alternator we find another coil of wire which is wound around an iron core and is connected to the shaft. The shaft also holds two slip rings. The slip rings are connected to opposite ends of the coil. Within the rear housing we find some brushes. These are some spring loaded carbon blocks which are pushed outward to rub against the slip rings to form an electrical connection. The car battery initially provides electricity to the coil via the brushes. As the electricity passes through the coil, it generates an electromagnetic field.