SNS COLLEGE OF TECHNOLOGY

COIMBATORE-35

DEPARTMENT OF MECHATRONICS ENGINEERING

19MCT402-APPLIED MECHATRONICS ENGG.
UNIT-2 AUTOTRONICS

Electronic ignition system definition:

An electronic ignition system is a type of ignition system that works electronic circuits, usually by transistors. The transistors are controlled by sensors to generate electric pulses which then generate a high voltage spark that can burn the lean mixture and provide a better economy and lower emission. The electronic ignition system is fully controlled electronically.

The electronic ignition system is vastly used in aircraft engines, bikes, motorcycles, and cars as it performs the same purpose as other types of ignition systems on them.

The function of an electronic ignition system is remaining the same as it produces a high voltage spark to the spark plug so that the fuel-air mixture can be burn or ignite. Because sensors are used in the system, it improves reliability and mileage and decreases emission.

Components of an electronic ignition system

Below are the components of an electronic ignition system and their functions:

Battery:

The battery is the power source of the ignition system as it transfers the required energy to the system as the ignition switch is on. The battery type used is an electrochemical system that stores charge and release them whenever they're needed. This battery having two terminals; positive and negative. The positive terminal is connected to the key (ignition switch) while the negative terminal is grounded.

Ignition switch:

The ignition switch is the power bottom that turns the system ON and OFF. When it's on, power is supplied from the battery and when off, the power supply is terminated.

Electronic control module:

This is where is electronic work begins in the system as it ON and OFF the primary current. The component is also known as the control unit of an ignition system. it's what monitors and controls the timing and intensity of the spark automatically.

The device receives voltage signals from the armature and set the primary coil on and off. Electronic control modules are placed separately outside the distributor or placed in the electronic control unit box of the vehicle.

Armature:

The armature is what generates a magnetic field in the system. unlike the battery ignition system that has contact breaker points, it's being replaced with the armature in the electronic ignition system. this armature consists of a reluctor with teeth that is the moving part, a vacuum advance, and a pickup coil to catch the voltage signals.

The electronic module collects the voltage signals from the armature so that the circuit can be made and break. This sets the timing of the distributor to accurately supply current to the spark plugs.

Ignition coil:

The ignition coil is advantageous as it helps to produce high voltage to the spark plug. The component is a pulse-type transformer and it produces the short fire or spark of high volt for the combustion. The ignition coil is two sets of winding which include primary winding (outer winding) and secondary winding (inner winding).

Distributor:

Current flows from the primary winding, while the distributor controls the on and off of the cycle of the current flow. It's used to distribute current to each spark plug in multi-cylinder engines. Finally,

Spark plugs:

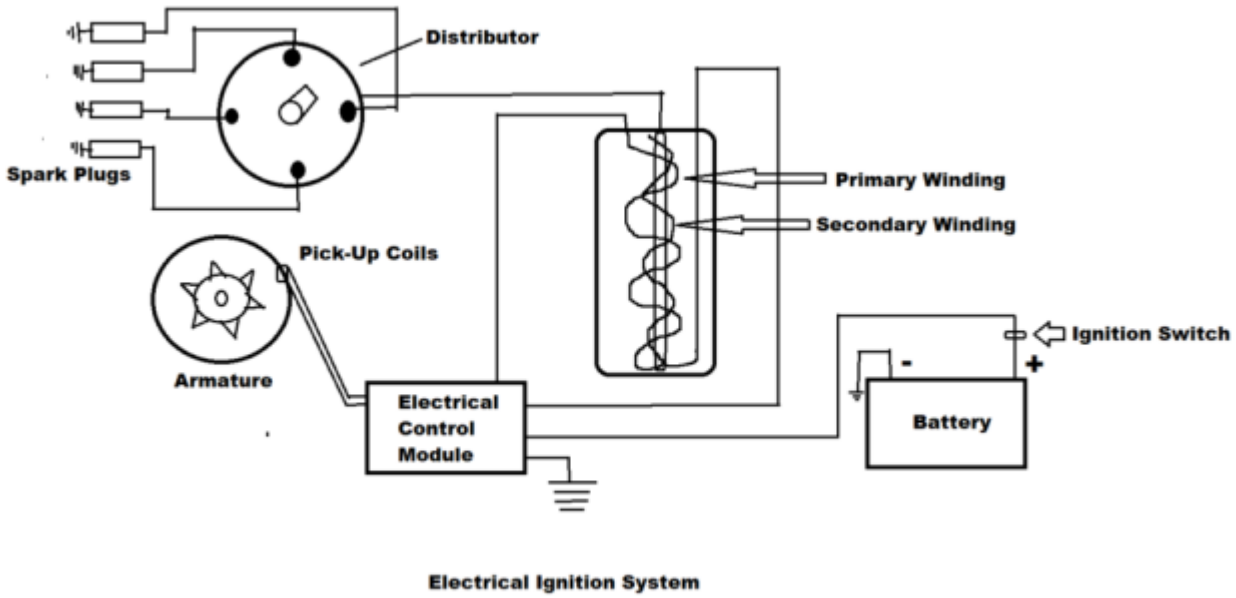
The spark plug is the component that generates the spark inside the cylinder, using the ignition coil high voltages to ignites the fuel-air mixture.

Working principle

Just like other types of an ignition system, the electronic ignition system is less complex and can be easy to understand. Its working begins as the engine start running which is when the ignition switch is on. The battery supplies power as the negative terminal is grounded and the positive is connected to the ignition switch.

The power is sent to the ignition coil which is of two winding if you can recall; primary and secondary winding. These windings are insulated but the primary is thicker than the secondary winding. There is an iron rod between them that helps to generate a magnetic field. The armature produce power as it rotates, it's connected to the electronic module, magnetic

pick-up occurs. When the magnetic pick-up and armature touches, the voltage signal is created. It generates further until a strong voltage signal generated.



Electronic ignition system diagram

Advantages:

Below are the benefits of an electronic ignition system in their various applications:

- Fewer moving parts increase their working efficiency.
- Low maintenance is required.
- It increases fuel efficiency.
- It generates fewer emissions.
- Good efficiency.

Disadvantages:

Despite the great advantages of the electronic ignition system, a limitation still occurs. Below are the disadvantages of electronic ignition system:

- The cost of the system is very expensive.