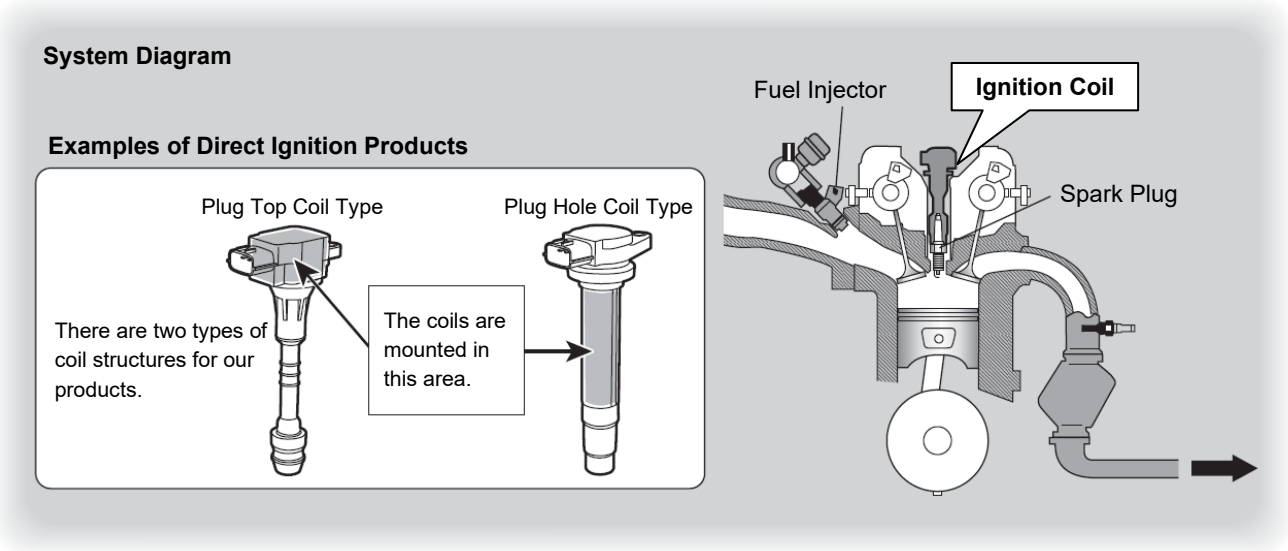
WHAT IS AN IGNITION COIL?

An ignition coil is a device that converts a 12-V battery voltage to a high voltage and is used for discharging sparks at the spark plug. The ignition coil consists of the primary and secondary coils, which have different numbers of turns. The ignition coil uses the on-board battery as the power source. When an electric current is supplied to the primary coil, the iron core becomes magnetized, the magnetic energy accumulates, and the magnetic field is generated in the surrounding area. When the electric current at the primary coil is cut off by switching off the igniter, the magnetic field changes. Owing to this change in the magnetic field, a self-induction occurs, and a voltage of 200–400 V is induced in the primary coil. In addition, the occurrence of voltage in the primary coil causes a mutual induction, resulting in a high voltage of 25–30 kV in the secondary coil.

In a conventional method, the voltage generated in the ignition coil is sent through the distributor to the spark plug of each cylinder. However, in recent years, a direct ignition method, which uses no distributor and instead applies a dedicated coil arranged at the spark plug of each cylinder, has become mainstream.

The main shapes of the direct ignition method include the plug top coil, where the coil portion is arranged at the cylinder head cover, and the plug hole coil, where the coil is inserted in the plug hole. For the first time in the world, Hitachi has started mass production of a plug top type ignition coil. Plug top coils have become the most commonly used coil types because they can easily adapt to changes in the vehicle and because of the battery durability.



TYPICAL SYMPTOMS IN CASE OF FAILURE

Symptoms in case of failure

- When accelerating, the engine speed does not increase or a “breathing” phenomenon occurs
- Idling becomes unstable or the engine stops
- Difficulty in starting the engine even though the battery and starter motor are working normally

A large difference in the service life of the ignition coil occurs depending on the environment inside the engine room, conditions of other secondary components, and how the ignition coil was handled during maintenance. If the troubling symptom persists irregularly or if the symptom does not improve despite no wire disconnections or short circuits, we recommend replacing the ignition coil.

REQUEST TO OUR CUSTOMERS WHEN REPLACING THE IGNITION COIL

To prolong the service life of your vehicle:

- We recommend replacing all cylinders
  There is a possibility that ignition coils for cylinders other than the one having trouble have degraded.
- We recommend replacing the spark plug at the same time
  If wear of the spark plug electrode has progressed, the operation load of the ignition coil would be high owing to the high voltage sparks, leading to a shortened service life.