85.11 - Electrical ignition or starting equipment of a kind used for spark-ignition or compression-ignition internal combustion engines (for example, ignition magnetos, magneto-dynamos, ignition coils, sparking plugs and glow plugs, starter motors); generators (for example, dynamos, alternators) and cut-outs of a kind used in conjunction with such engines.

8511.10 - Sparking plugs

8511.20 - Ignition magnetos; magneto-dynamos; magnetic flywheels

8511.30 - Distributors; ignition coils

8511.40 - Starter motors and dual purpose starter-generators

8511.50 - Other generators

8511.80 - Other equipment

8511.90 - Parts

This heading covers electrical starting or ignition equipment and appliances for internal combustion engines of any kind (piston or other types), whether for use in motor cars, aircraft, boats or the like, or for stationary engines. It also covers generators and cut-outs for use in conjunction with such internal combustion engines.

The heading includes :

(A) **Sparking plugs**.

These consist of a central insulated electrode and a point (or points) attached to the casing. The casing is partly threaded at its base for screwing it into the cylinder-head, and there is a terminal at the top of the central electrode for connection to the source of current. When a high voltage is applied to the central electrode a spark jumps between that electrode and the point or points and is used for igniting the explosive mixture in the cylinder.

(B) **Ignition magnetos (including magneto-dynamos)**.

These are used to provide the necessary high tension voltage to be applied to the sparking plugs of an internal combustion engine; they are used mainly for racing cars, tractors, aircraft, motor-boat or motor-cycle engines. They are of the following main types :

(1) **Revolving armature magnetos**. These incorporate a form of AC generator in which an armature, wound with a primary low tension coil, rotates between the poles of a permanent magnet. This primary coil is connected to a contact breaker and capacitor, and the sudden making and breaking of the current in this coil induces very high voltage in a secondary winding. The whole is usually built in one housing, on the top of which a distributor arm is mounted to distribute the voltage to the sparking plugs in turn.

(2) **Stationary armature magnetos**. These are of two types. In both the armature winding, contact breaker and capacitor are stationary; but in one type the magnets revolve, whereas in the other type, the magnets are also stationary and soft iron inductors revolve between the magneto and the armature winding.

(3) **Magneto-dynamos**. These comprise a magneto and a dynamo combined into a single unit with a common drive; they are normally used on motor-cycles.

(C) **Magnetic flywheels.**

These consist of a magnetic device fitted to a flywheel to produce a low tension current for ignition purposes.

(D) **Distributors.**

These distribute the ignition current to the sparking plugs in turn, and also incorporate an interrupter to make and break the circuit in the primary winding of the ignition coil; both functions are synchronised with the strokes of the pistons in the cylinders by means of a cam driven by the engine.

(E) **Ignition coils.**

These consist of specially modified induction coils, usually in a cylindrical container. By connecting the primary via an interrupter to the battery, a high voltage is produced in the secondary and is led to the sparking plugs via a distributor.

In some ignition systems a double-spark ignition coil is connected directly to two sparking plugs and the coil generates an ignition spark in each plug simultaneously, with the spark from one plug producing its cylinder power stroke and the spark from the other plug having no effect on its cylinder because it is on the exhaust stroke. Such systems do not require a distributor as the ignition coil is connected directly to the sparking plugs. In these systems the coils are energised by an electronic (semiconductor) coil module.

(F) **Starter motors.**

These are small electric motors, usually of the DC series wound type. They are fitted with a small pinion capable of travelling up and down a screwed shaft, or with some other mechanical device for coupling them temporarily to the internal combustion engine to be started.

(G) **Generators (dynamos and alternators).**

These are driven by the engine, and serve to charge the batteries and to supply current to the lighting, signalling, heating and other electrical equipment of motor vehicles, aircraft, etc. Alternators are used with a rectifier.

(H) **Booster coils.**

These are small induction coils used, mainly on aircraft, when the turning speed at starting is too low for the engine magnetos to function.

(IJ) **Glow plugs.**

These are similar to sparking plugs, but in place of the electrode and points for producing a spark, they have a small resistor which, when current is passed, becomes heated. They are used to heat the air in the cylinders of diesel engines before and during starting.

(K) **Heating coils.**

These are intended for mounting in the air intake of diesel engines for starting purposes.

(L) **Dynamo cut-out apparatus**.

These prevent the dynamo from being driven as a motor, at the expense of the battery, when the engine is stationary or turning at low speed.

Cut-outs combined, in a single housing, with a voltage regulator or a current regulator are also classified here. In addition to protecting the battery and the dynamo, these devices ensure a constant flow of charge current or limit the intensity of this current.

PARTS

Subject to the general provisions regarding the classification of parts (see the General Explanatory Note to Section XVI), parts of the goods of this heading are also classified here.

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The heading **excludes** :

(a) Engine starters as used on airfields, bus stations, etc., for starting internal combustion engines and consisting essentially of a transformer and rectifier (**heading 85.04**).

(b) Electric accumulators (**heading 85.07**).

(c) Dynamos for use on bicycles for lighting purposes only (**heading 85.12**).