
**Reciprocating internal combustion
engines — Vocabulary of components
and systems —**

**Part 10:
Ignition systems**

*Moteurs alternatifs à combustion interne — Vocabulaire des
composants et des systèmes —*

Partie 10: Systèmes d'allumage



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 70, *Internal combustion engines*.

This second edition cancels and replaces the first edition (ISO 7967-10:2014), which has been technically revised.

The main changes are as follows:

- [Clause 2](#), Normative references, added;
- subsequent clauses renumbered;
- new terms and definitions added;
- inappropriate words or expressions revised.

A list of all parts in the ISO 7967 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Reciprocating internal combustion engines — Vocabulary of components and systems —

Part 10: Ignition systems

1 Scope

This document establishes a vocabulary for ignition systems of reciprocating internal combustion engines.

In this document, the terms are classified as follows:

- a) types of ignition system;
- b) conventional ignition systems;
- c) electronic ignition systems;
- d) computer-controlled ignition systems;
- e) parameters for ignition systems.

NOTE ISO 2710-1 gives a classification of reciprocating internal combustion engines and defines basic terms and definitions of such engines and their characteristics.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 Types of ignition system

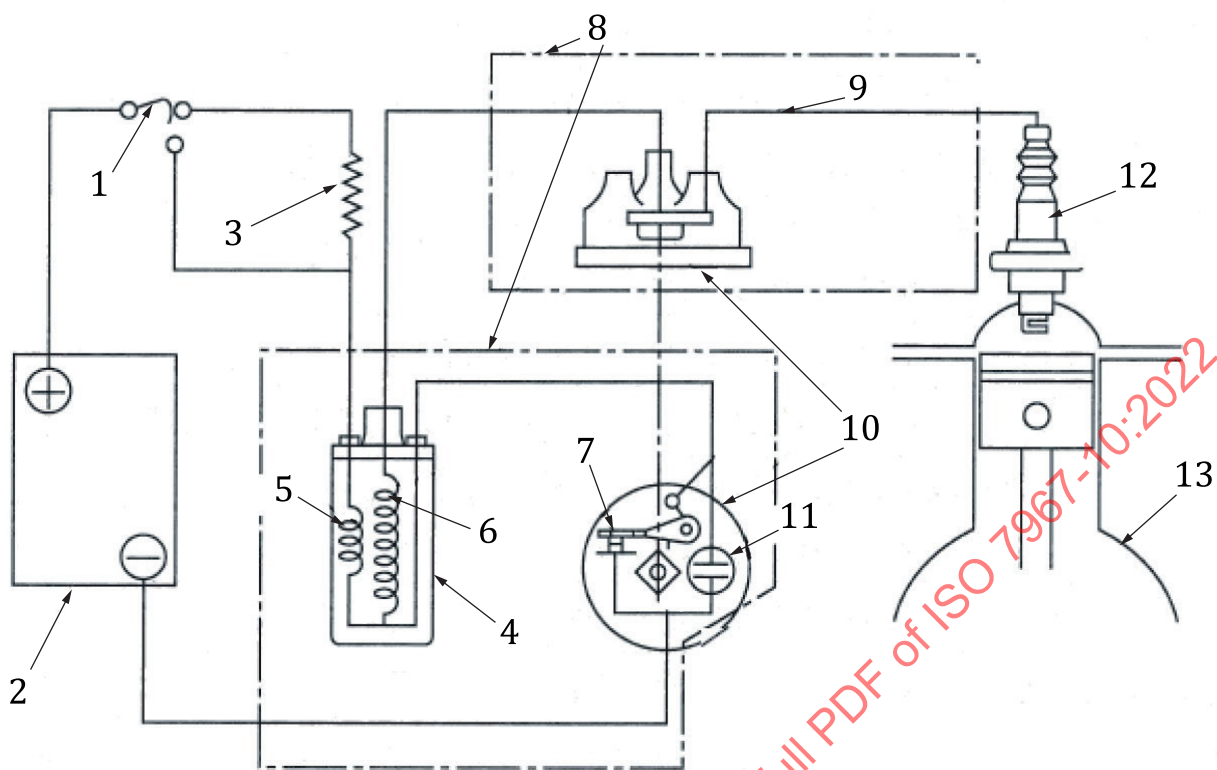
3.1.1 ignition system

ignition device system to ignite the fuel-air mixture in the cylinder

3.1.2 battery coil ignition system

ignition system (3.1.1) by battery and ignition coil

Note 1 to entry: See [Figure 1](#).



Key

- | | | | |
|---|--|----|--|
| 1 | ignition switch (3.2.6) | 8 | distribution parts |
| 2 | battery | 9 | high-tension cord (3.2.25) |
| 3 | resistor | 10 | distributor (3.2.9) |
| 4 | ignition coil (3.2.8) | 11 | condenser |
| 5 | primary coil | 12 | spark plug (3.2.21) |
| 6 | secondary coil | 13 | engine |
| 7 | contact breaker (3.2.12) | | |

Figure 1 — Typical configuration of battery coil ignition system

3.1.3

magneto ignition system

ignition system ([3.1.1](#)) by magneto ([3.2.1](#))

3.1.4

high-tension ignition system

ignition system ([3.1.1](#)) by high-voltage electricity of secondary circuit of ignition coil produced by sudden current change in the primary circuit

3.1.5

dual ignition system

ignition system ([3.1.1](#)) with duplicate lines for redundancy

3.1.6

multi-point ignition system

ignition system ([3.1.1](#)) with more than two igniters installed on one cylinder

Note 1 to entry: An ignition system with two igniters is called a two-point ignition system.

3.1.7**electronic ignition system**

ignition system (3.1.1) with ignition timing control by electronic device or circuit that generates electric pulses, which in turn generate a better spark that can burn the lean mixture and provide better economy and lower emissions

3.1.8**conventional ignition system**

ignition system (3.1.1) with mechanical ignition timing control by the *contact breaker* (3.2.12) of the *distributor* (3.2.9)

3.1.9**electronic ignition system with breaker**

electronic ignition system (3.1.7) with *contact breaker* (3.2.12)

3.1.10**breakerless electronic ignition system**

electronic ignition system (3.1.7) without *contact breaker* (3.2.12)

3.1.11**computer-controlled ignition system**

digital ignition system

computer-based ignition system which is usually a part of the electronic engine control unit (ECU)

Note 1 to entry: The ECU consists of a central control unit (CPU) or a microprocessor, random access memory (RAM), read-only memory (ROM) and input/output interfaces. Based on information from input sensors (e.g. engine air flow, coolant temperature, crank position, throttle position), ECU determines optimum settings for the output actuators of, for example, fuel injection, ignition timing and idle speed.

3.1.12**pre-chamber ignition system**

ignition system (3.1.1) for gas engines, in which ignition is caused by the flame made in the small sub-combustion chamber (pre-chamber) provided on the cylinder head

3.2 Conventional ignition systems**3.2.1****magneto**

electric generator for ignition using a permanent magnet

3.2.2**two-point ignition magneto**

magneto (3.2.1) for ignition with two igniters which has one rotor and two sets of electric circuits

3.2.3**flywheel magneto**

magneto (3.2.1) with a rotor which also works as a flywheel for the engine

3.2.4**starting vibrator**

electromagnetic vibrator which supplies intermittent electric current starting from the battery to the primary circuit of the *magneto* (3.2.1) directly connected with the engine to assist ignition

3.2.5**permanent magnet circuit**

magnetic circuit which includes components such as permanent magnets and armatures

3.2.6**ignition switch**

switch which opens and closes the primary circuit of the *ignition system* (3.1.1)

3.2.7

earth switch

stop switch

switch to short-circuit the primary circuit of the *magneto* (3.2.1) to shut down the engine

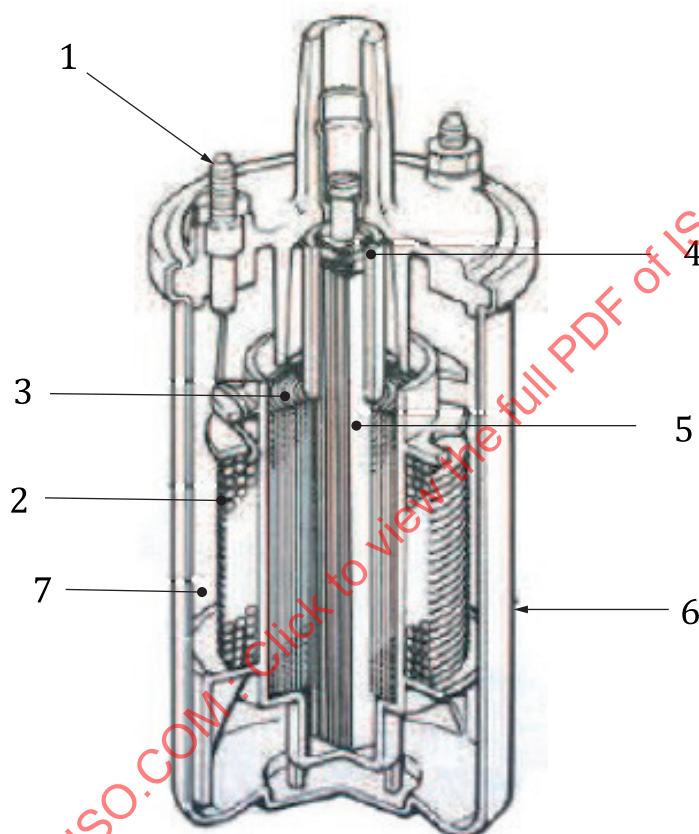
3.2.8

ignition coil

ignition armature

coil which produces high voltage for ignition in the *battery coil ignition system* (3.1.2) or the *magneto ignition system* (3.1.3)

Note 1 to entry: See [Figure 2](#).



Key

1	primary terminal	5	core
2	primary coil	6	case
3	secondary coil	7	insulation material
4	spring		

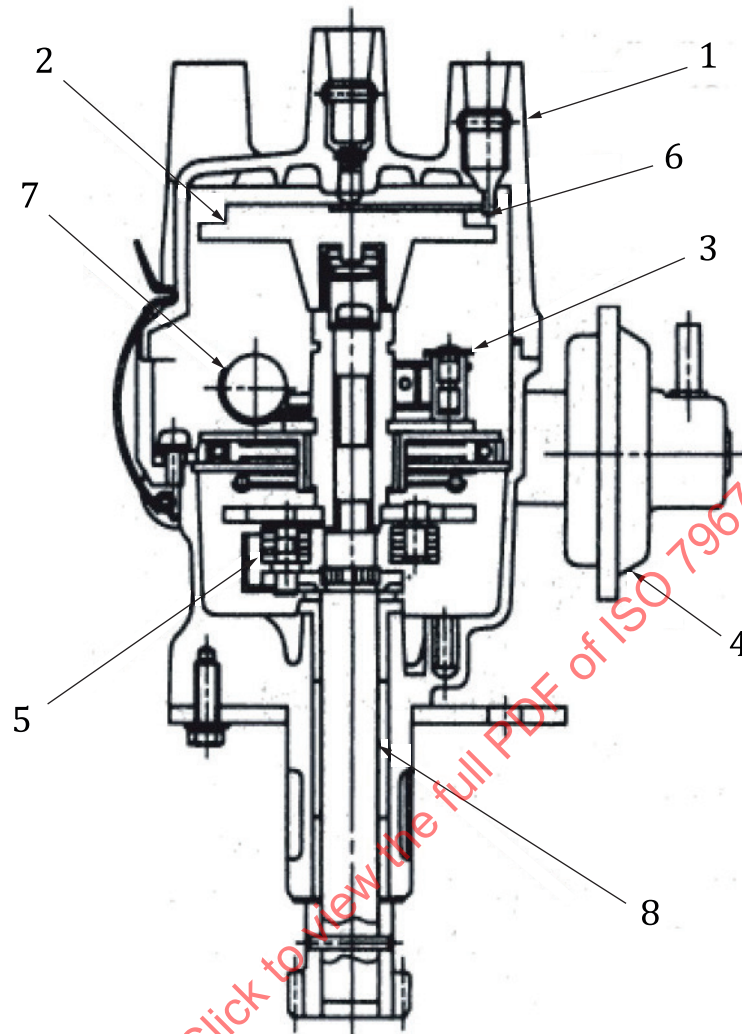
Figure 2 — Typical ignition coil

3.2.9

distributor

device which distributes high voltage electricity for ignition to cylinders of multi-cylinder engines in the proper order

Note 1 to entry: See [Figure 3](#).

**Key**

- | | |
|--|--|
| 1 distributor cap (3.2.10) | 5 centrifugal timer (3.2.18) |
| 2 distributor rotor (3.2.11) | 6 terminal |
| 3 contact breaker (3.2.12) | 7 condenser |
| 4 vacuum control (3.2.19) | 8 rotor shaft |

Figure 3 — Typical construction of distributor**3.2.10****distributor cap**

distributor cover

part of a *distributor* ([3.2.9](#)) which has the arrangement of terminals for proper distribution of high-voltage electricity for ignition

3.2.11**distributor rotor**

distributor arm

rotating part of a *distributor* ([3.2.9](#)) which distributes high-voltage electricity to the terminals of the *distributor cap* ([3.2.10](#))

3.2.12**contact breaker**

device which opens and closes the primary circuit of the *distributor* ([3.2.9](#))

3.2.13

breaker points

contact points

electric terminal in the *distributor* (3.2.9) for opening and closing the primary circuit

3.2.14

timing cam

distributor cam

contact breaker cam

cam which controls a contact breaker lever

3.2.15

cam type ignition timing advancer

device which causes *ignition timing advance* (3.5.3) by varying the relative angle between the axes of the *distributor rotor* (3.2.11) and the *timing cam* (3.2.14)

3.2.16

shaft timing advancer

timing advance system which varies the relative angle between the axes of the *magneto* (3.2.1) and the engine shaft

3.2.17

auto-timer

automatic spark advance

ignition timing advancer which works automatically according to the engine speed and power

3.2.18

centrifugal timer

centrifugal control

centrifugal advance

auto-timer (3.2.17) working by centrifugal force

3.2.19

vacuum control

vacuum advance

auto-timer (3.2.17) working by intake air pressure

3.2.20

multi-contact distributor

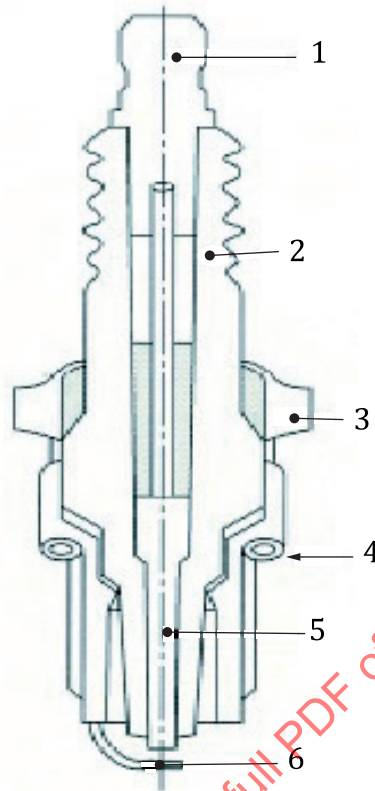
distributor (3.2.9) with more than two sets of *contact breakers* (3.2.12), which are switched depending on the operating condition of the engine

3.2.21

spark plug

part which ignites a fuel-air mixture with the spark generated between electrodes by high voltage

Note 1 to entry: See [Figure 4](#).

**Key**

- | | | | |
|---|-----------|---|------------------|
| 1 | terminal | 4 | gasket |
| 2 | insulator | 5 | centre electrode |
| 3 | housing | 6 | ground electrode |

Figure 4 — Cut-out view of a spark plug**3.2.22****spark gap**

gap between two electrodes of the *spark plug* (3.2.21)

3.2.23**cold type spark plug**

spark plug (3.2.21) resistant to pre-ignition with high *heat value* (3.5.4)

3.2.24**hot type spark plug**

spark plug (3.2.21) with low *heat value* (3.5.4) which can be easily heated

3.2.25**high-tension cord**

high-tension cable

cable which connects the high-voltage terminal of an *ignition system* (3.1.1) and a *spark plug* (3.2.21)

3.3 Electronic ignition systems**3.3.1****transistor ignitor system**

TCI system

ignition system (3.1.1) using a transistor to interrupt the electric current to the primary circuit of the *ignition coil* (3.2.8)

3.3.1.1

full-transistor ignitor

transistor ignitor which initiates the primary electric current by electric signals instead of a *contact breaker* (3.2.12)

3.3.1.2

semi-transistor ignitor

transistor ignitor using a contact breaker signal for initiating the primary electric current

3.3.2

magneto electronic ignition system

ignition system (3.1.1) in which *magneto* (3.2.1) is used to obtain high-voltage electric current

3.3.3

condenser discharge ignition system

CDI system

ignition system (3.1.1) which obtains high voltage in the secondary coil by emitting the charge saved in the condenser into the primary coil

3.3.4

Hall type (electronic) ignition system

ignition system (3.1.1) in which the ignition timing signal is produced by a “Hall effect” switch

Note 1 to entry: When a magnetic field is applied to the conductor material by passing current in one direction, at a right angle to its surface, a small voltage is generated in the material. This effect is called the “Hall effect” after the discoverer of this phenomenon.

3.3.5

photoelectric ignition system

ignition system (3.1.1) in which an infrared sensor triggers *primary current* (3.5.13) when a rotor blade blocks the light path

3.3.6

oscillating electronic ignition system

ignition system (3.1.1) in which ignition timing is produced by eddy current disruption of two coil sensors caused by passing magnets

3.4 Computer-controlled ignition systems

3.4.1

direct ignition system

ignition system (3.1.1) in which both an ignition coil and an ignition plug are used and ignition is controlled electronically by an engine control unit

3.4.2

crankshaft position sensor

electronic device used to monitor the position of the crankshaft

3.4.3

camshaft position sensor

electronic device used to monitor the position of the camshaft

3.4.4

single spark ignition coil

ignition plug which produces one ignition spark

3.4.5

dual spark ignition coil

ignition plug which produces two sparks for two cylinders

3.4.6**coil-on plug**

ignition coil with a built-in plug

3.5 Parameters for ignition systems**3.5.1****dwelling angle**

rotation angle while the *breaker point* (3.2.13) is closing

3.5.2**minimum advance for best torque****MTB**

latest ignition timing for maximum engine torque at the same operating condition

3.5.3**ignition timing advance**

setting the ignition timing to a position in advance of the reference

Note 1 to entry: This term is sometimes used as the quantity from the reference, expressed as the rotation angle of the crankshaft.

3.5.4**heat value**

<spark plug> numerical value indicating the characteristics against pre-ignition

3.5.5**heat rating**

temperature range in which the centre electrode of a *spark plug* (3.2.21) is usable without a malfunction, such as pre-ignition

3.5.6**cold fouling rating**

criterion of the ability of resistance against fouling by products of combustion and self-cleaning under the normal operating conditions of a *spark plug* (3.2.21)

3.5.7**supply voltage**

d.c. voltage at the input of the system

[SOURCE: ISO 6518-1:2002, 5.30]

3.5.8**required spark plug voltage**

voltage required at the *spark plug* (3.2.21) terminal necessary to fire the spark plug

[SOURCE: ISO 6518-1:2002, 5.5]

3.5.9**minimum available voltage**

minimum voltage available at the spark plug terminal when the system is loaded by a capacitor and a resistor in parallel

[SOURCE: ISO 6518-1:2002, 5.4]

3.5.10**spark duration**

time during which a spark is present across the *spark gap* (3.2.22)

[SOURCE: ISO 6518-1:2002, 5.22]

3.5.11

arc voltage

voltage observed at the spark plug terminal during arcing

3.5.12

ignition voltage reserve

difference between the available voltage and the *required spark plug voltage* ([3.5.8](#))

[SOURCE: ISO 6518-1:2002, 5.6]

3.5.13

primary current

electrical current flowing through the coil primary winding

[SOURCE: ISO 6518-1:2002, 5.11, modified — “electrical” added to the definition.]

3.5.14

coil interruption

interruption acted on the primary circuit current of the ignition coil by a switch or other signalling device to generate high voltage in the secondary circuit by electromagnetic induction

3.5.15

spark energy

energy discharged between the spark-gap electrodes, including both capacitive and inductive components

[SOURCE: ISO 6518-1:2002, 5.23]

3.5.16

spark current

current passing between the spark-gap electrodes

[SOURCE: ISO 6518-1:2002, 5.20]

3.5.17

insulation voltage

maximum voltage that the secondary coil can withstand without connecting a spark plug or any discharge devices