INTERNATIONAL STANDARD

ISO 7967-10

Second edition
2022-04

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

Reference number
ISO 7967-10:2022(E)

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Published in Switzerland

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Foreword

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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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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

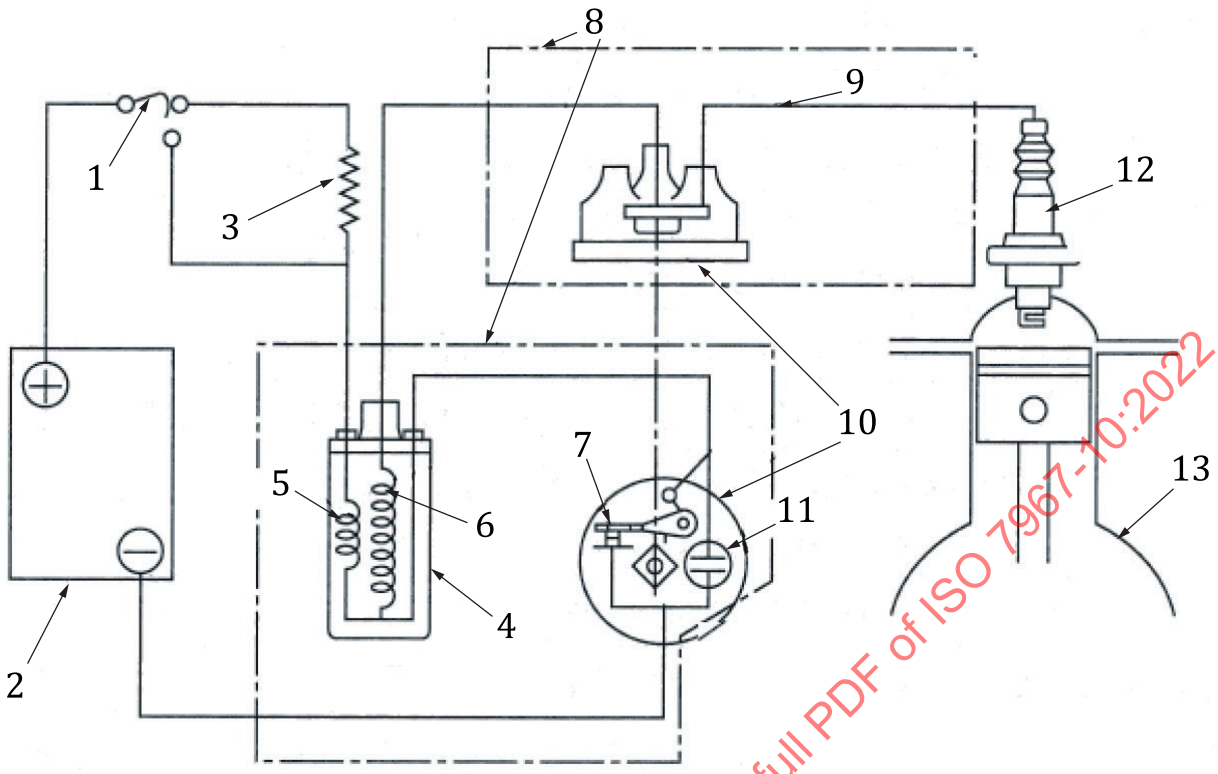
— IEC Electropedia: available at https://www.electropedia.org/

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	resister	10	distributer (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

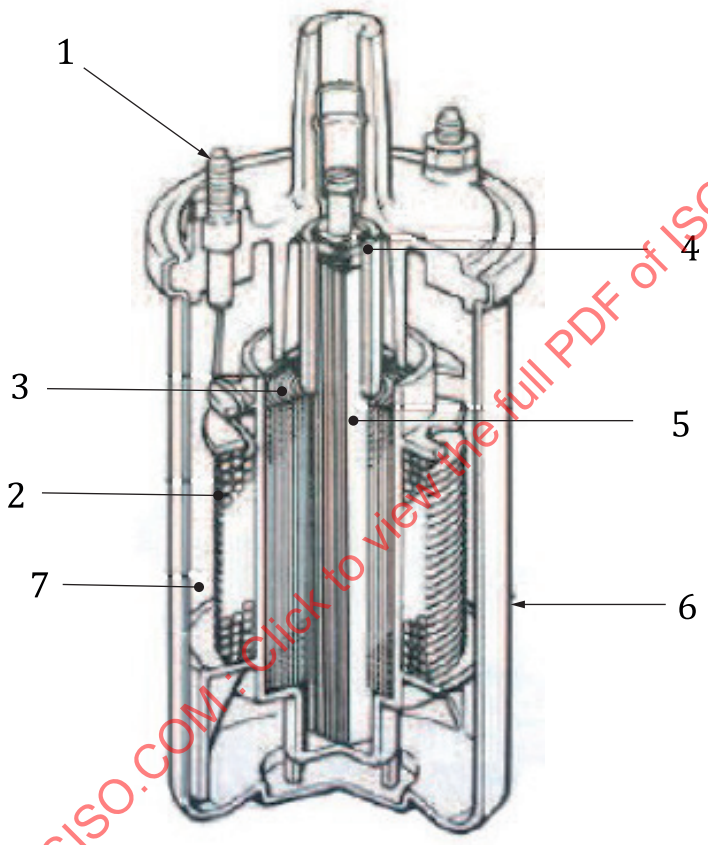
3.2.5
permanent magnet circuit
magnetic circuit which includes components such as permanent magnets and armatures

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.



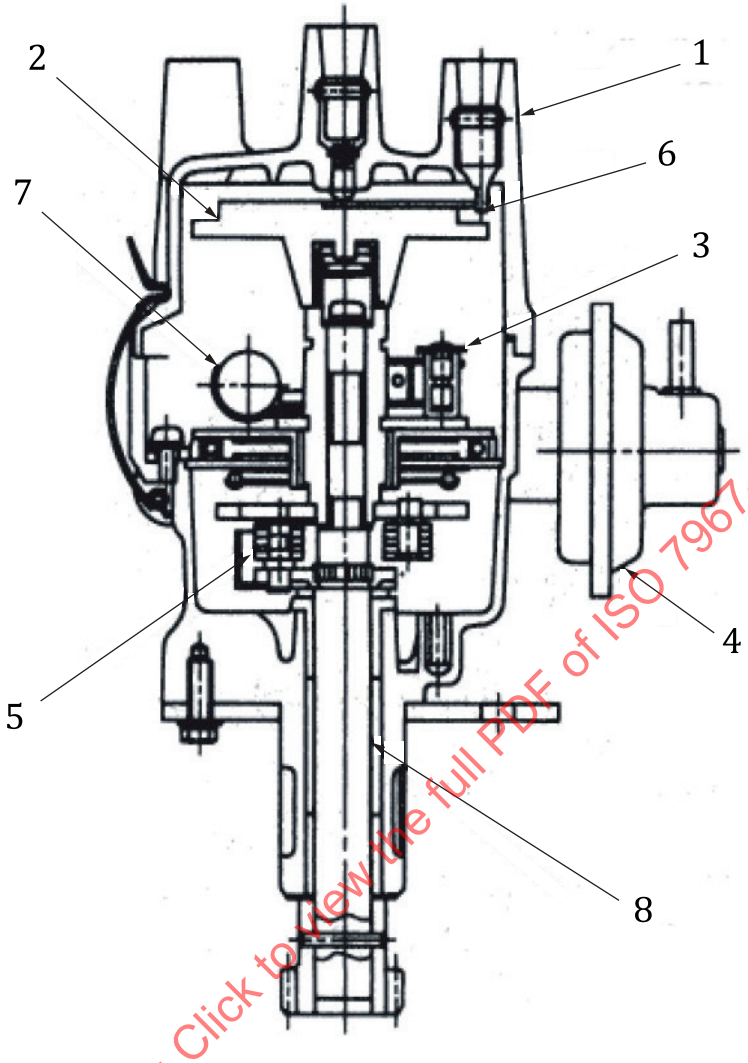
Key

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	distributer cap (3.2.10)	5	centrifugal timer (3.2.18)
2	distributer 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

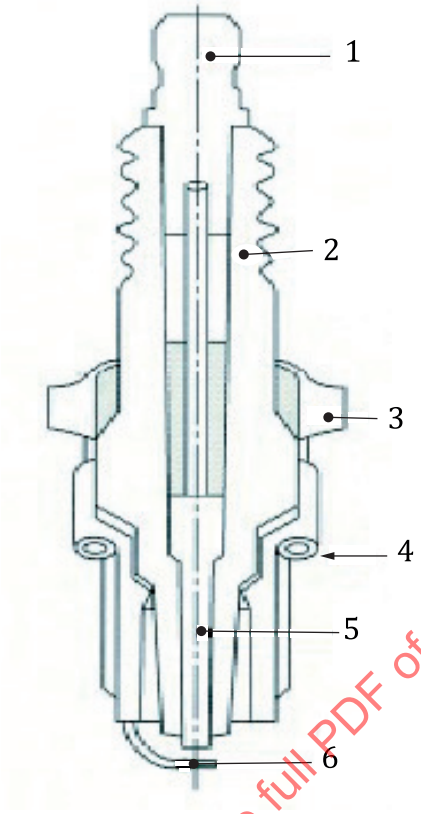
3.2.18
centrifugal timer
centrifugal control
centrifugal advance
auto-timer (3.2.17) working by centrifugal force

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
dwell 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