
Reciprocating internal combustion engines — Graphical symbols

Moteurs alternatifs à combustion interne — Symboles graphiques

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 8999 was prepared by Technical Committee ISO/TC 70, *Internal combustion engines*.

This second edition cancels and replaces the first edition (ISO 8999:1993), which has been technically revised.

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Reciprocating internal combustion engines — Graphical symbols

1 Scope

This International Standard specifies graphical symbols for operator controls, gauges, tell-tale indicators and instructions for reciprocating internal combustion (RIC) engines in order to provide necessary information on their use and operation.

It is applicable to RIC engines for land, rail traction and marine use, excluding engines used to propel road vehicles and aircraft.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3461-1:1988, *General principles for the creation of graphical symbols — Part 1: Graphical symbols for use on equipment*.

<https://standards.iteh.ai/catalog/standards/sist/a085d619-24c3-4930-9ae9-7254f9c6cc81/iso-8999-2001>

ISO 3864:1984, *Safety colours and safety signs*.

IEC 60073:1996, *Basic and safety principles for man-machine interface, marking and identification — Coding principles for indication devices and actuators*.

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

3.1

basic graphical symbol

symbol used individually or in combination to make a composite symbol

3.2

composite symbol

symbol made from combinations of symbol elements

4 Use of symbols

4.1 Symbols shall be as shown in clauses 5 to 7 of this International Standard. In general, symbols are shown in outline form. Where necessary, for legibility when reduced to a small size, enclosed areas within symbols or symbol elements may be filled in.

4.2 The symbols included in clause 5 are basic symbols which may be used for general application as well as to create composite symbols.

4.3 The composite symbols included in clauses 6 and 7 are developed using basic symbols from clause 5 as elements where applicable to provide families of symbols associated with functions and systems.

4.4 As required, additional composite symbols may be developed using the basic symbols from clause 5, provided that the characteristics specified in ISO 3461-1 be maintained.

4.5 Limitations inherent in some reproduction and display technologies may require increased line thickness or other minor modifications of symbols. Such modifications are acceptable provided the symbol remain unchanged in its basic graphical elements and remain easily discernible by the operator.

4.6 Additionally, to improve the appearance and perceptibility of a graphical symbol or to coordinate with the design of the equipment to which it is applied, it may be necessary to change the line thickness or to round off the corners of the symbol. The graphical designer is normally free to make such changes provided that the essential perceptual characteristics of the symbol be maintained. See 10.2 of ISO 3461-1:1988.

4.7 For actual use, all symbols shall be reproduced large enough to be easily discernible by the operator. See ISO 3461-1 for guidelines for proper sizing of symbols. Symbols shall be used in the orientations shown in this International Standard unless otherwise noted for individual symbols.

4.8 Symbols on controls and displays shall have good contrast to their background. A light symbol on a dark background is preferred for most controls. Displays may use either a light symbol on a dark background or a dark symbol on a light background, depending upon which alternative provides the best visual perception. When a symbol image is reversed (for example, black to white and vice versa) it shall be done for the entire symbol.

4.9 When using symbols with multifunction controls, understanding is improved and the presentation simplified where symbols are combined to the least extent possible. The example shown in Figure 1 is for a typical engine operation key switch, having separate positions for Off, On and Start.

4.10 The fonts shown in this International Standard are not intended to be restrictive; other fonts may be substituted, but care shall be taken that legibility is maintained.

4.11 Symbols in this International Standard are presented 32 % of original size. The grid marks "L" denote the corners of the 75 mm square of the graphic grid presented. The grid marks are not part of the symbol but are provided to ensure consistent presentation of all symbol graphics.

4.12 Microfiches of the symbols are available from the ISO/TC 145 Secretariat.

4.13 When used on optical indicators or tell-tales, the following colours have the meanings indicated:

- red: danger, unsafe or malfunction
- yellow or amber: caution
- green: safe or normal

NOTE Where practical, the indicators should be banded such that red is positioned above yellow/amber which is positioned above green.

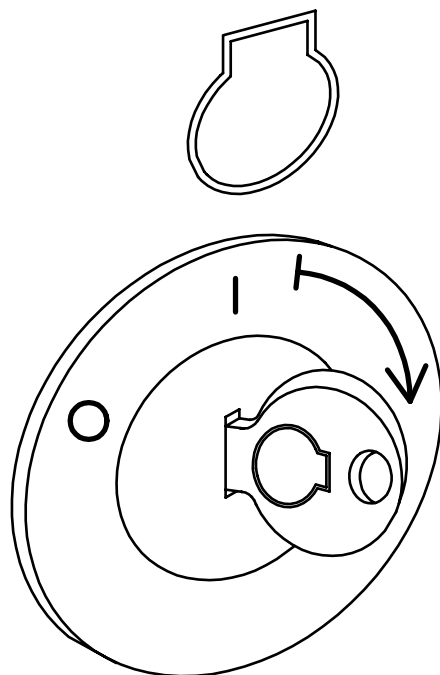
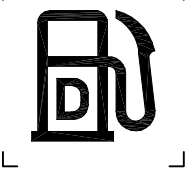
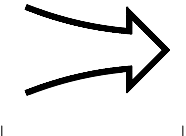
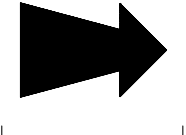
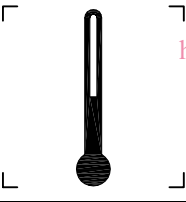
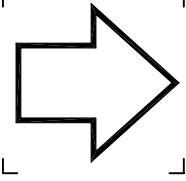
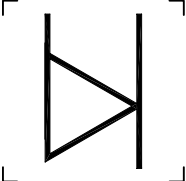
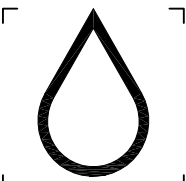


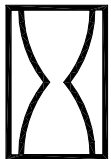
Figure 1 — Typical engine operation key switch

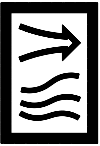
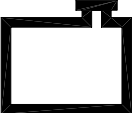
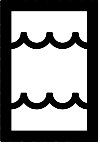
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5 Basic symbols

No.	Symbol	Description	Application	ISO/IEC Registration No.
5.1		Engine	To signify functions associated with the engine.	ISO 7000-1156
5.2		Malfunction/failure	To indicate a possible malfunction/failure. A red colour indicator with a basic symbol may be used alternatively to indicate a malfunction/failure.	Variant (description and application) of ISO 7000-1603
5.3		Fuel	To signify the fuel quantity indicator. To signify functions associated with fuel. At the fuel fill to indicate a petrol type fuel	ISO 7000-0245B
5.4		Unleaded petrol fuel	To signify functions associated with fuel. At the fuel fill to indicate unleaded petrol fuel.	Variant of ISO 7000-0237

No.	Symbol	Description	Application	ISO/IEC Registration No.
5.5		Diesel fuel	To signify functions associated with fuel. At the fuel fill to indicate diesel fuel.	ISO 7000-1541
5.6		Liquid coolant	To signify functions associated with liquid type coolant. NOTE Use symbols associated with lubricating oil for engines with combined lubricating/cooling systems.	ISO 7000-0536
5.7		Intake air	To signify functions associated with intake air.	ISO 7000-1604
5.8		Exhaust gas	To signify functions associated with exhaust gas.	ISO 7000-1605
5.9		Temperature	To signify functions associated with temperature.	ISO 7000-0034
5.10		Flow/direction	To indicate the direction of a function. To signify functions associated with controls.	ISO 7000-0251
5.11		Level indicator	To signify a liquid level. NOTE This symbol should be used in the orientation shown. When used in composite symbols to indicate fluid levels, the vertical line at the apex of the pointer may be replaced by the appropriate symbol.	Application of ISO 7000-0159
5.12		Oil (lubricating)	To identify functions associated with lubricating oil.	ISO 7000-1056

No.	Symbol	Description	Application	ISO/IEC Registration No.
5.13		Filter	To signify functions associated with filtering.	ISO 7000-1369
5.14		Cranking	To signify functions associated with starting or cranking.	ISO 7000-1365
5.15		Pressure	To signify functions associated with pressure. NOTE When used in composite symbols, the appropriate symbol is used between the arrows to indicate the medium pressurised.	ISO 7000-1701
5.16		Continuous adjustment linear increase/decrease	To identify a linear control which regulates a quantity. The quantity increases with the symbol width.	IEC 60417-5004
5.17		Continuous adjustment linear increase/decrease	To identify a rotary control which regulates a quantity. The quantity increases with the symbol width. Radius is dependent on control diameter.	ISO 7000-1364
5.18		Elapsed hours	To indicate the cumulative elapsed hours of operating time.	ISO 7000-1366
5.19		Clockwise rotation	To indicate engine or equipment rotation in a clockwise direction.	ISO 7000-0258
5.20		Anti-clockwise rotation	To indicate engine or equipment rotation in an anti-clockwise direction.	ISO 7000-0937

No.	Symbol	Description	Application	ISO/IEC Registration No.
5.21		Air-cooled lubricating oil cooler	To signify functions associated with lubricating oil coolers. Upper symbol is medium being cooled; lower symbol is cooling medium.	Variant (description and application) of ISO 7000-1542
5.22		Liquid-cooled lubricating oil cooler	To signify functions associated with lubricating oil coolers. Upper symbol is medium being cooled; lower symbol is cooling medium.	Variant (description and application) of ISO 7000-1543
5.23		Air-to-air charge air cooler	To signify functions associated with charge air coolers. Upper symbol is medium being cooled; lower symbol is cooling medium.	ISO 7000-1544
5.24		Air-to-water charge air cooler	To signify functions associated with charge air coolers. Upper symbol is medium being cooled; lower symbol is cooling medium.	ISO 7000-1545
5.25		Radiator	To signify functions associated with radiators for cooling engine coolant. Cooling medium is air.	ISO 7000-1390
5.26		Water-to-water heat exchanger (Keel cooler)	To signify functions associated with water-to-water heat exchangers. Upper symbol is medium being cooled; lower symbol is cooling medium.	ISO 7000-1546
5.27		Pneumatic system	To indicate a pneumatic system.	ISO 7000-0231
5.28		Air	To indicate functions associated with the use of ambient air.	ISO 7000-0537

6 Safety signs

Safety signs shall be in accordance with ISO 3864.

No.	Symbol	Description	Application
6.1		Caution/warning	To indicate a risk of personal injury.
6.2		Caution/warning: pressurized	To indicate a risk of personal injury from pressurized fluids.
6.3		Caution/warning: electrical hazard	To indicate a risk of personal injury from high voltage or current sources.
6.4		Caution/warning: temperature hazard	To indicate a risk of personal injury from high temperature.
6.5		No smoking	To indicate locations where smoking is hazardous and is therefore prohibited.
6.6		Fire risk	To indicate areas or materials which are a high fire risk.