

INTERNATIONAL STANDARD

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60073

Sixth edition
2002-05

BASIC SAFETY PUBLICATION

**Basic and safety principles for man-machine
interface, marking and identification –
Coding principles for indicators and actuators**

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*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**BASIC AND SAFETY PRINCIPLES FOR MAN-MACHINE INTERFACE,
MARKING AND IDENTIFICATION –****Coding principles for indicators and actuators**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60073 has been prepared by IEC technical committee 16: Basic and safety principles for man-machine interface, marking and identification.

This sixth edition cancels and replaces the fifth edition published in 1996 and constitutes a technical revision.

Compared to the fifth edition, the following substantial modifications have been made:

- the field of application has been extended to include displays on screens;
- the concept of “message” has been adopted from IEC 60050(721);
- clarifications are provided in 4.2.1 and 5.2.3.2.

It has the status of a Basic safety publication in accordance with IEC Guide 104.

The text of this standard is based on the following documents:

FDIS	Report on voting
16/402/FDIS	16/404/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annex A forms an integral part of this standard.

Annexes B and C are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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INTRODUCTION

This basic safety publication is intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 104 and in ISO/IEC Guide 51.

It should be noted that one of the responsibilities of a technical committee is, wherever possible, to include or refer to the requirements of basic safety publications in standards for equipment within its scope. Consequently, the requirements of this basic safety publication apply only if they are included, or are referred to in those standards.

Supervision and intervention are the principal tasks of personnel engaged in the monitoring and control of equipment or processes.

Indicator for the representation of conditions, and actuating devices to enable intervention under normal and fault conditions, are essential to this purpose.

The information presented should meet the needs of the users for the monitoring and control tasks which they are required to perform, for example, in extensive industrial processes.

Safety and ergonomic aspects should also be taken into account. The use of only a single means of coding is often insufficient to ensure unambiguous representation of information.

Apart from an unambiguous marking of the indicating and actuating devices, there is a requirement for a clear and consistent system of coding.

The choice of a code will depend on the information which it is intended to impart. This may relate to the state of equipment (or part of it), to the condition of a process, and/or to the effects which this condition has on persons, property and the environment.

The user is required to decide on which of these criteria the coding for the relevant application is to be based.

BASIC AND SAFETY PRINCIPLES FOR MAN-MACHINE INTERFACE, MARKING AND IDENTIFICATION –

Coding principles for indicators and actuators

1 Scope

This International Standard establishes general rules for assigning particular meanings to certain visual, acoustic and tactile indications in order to

- increase the safety of persons, property and/or the environment through the safe monitoring and control of the equipment or process;
- facilitate the proper monitoring, control and maintenance of the equipment or process;
- facilitate the rapid recognition of control conditions and actuator positions.

This standard is for general application:

- from simple cases such as single indicator lights, push-buttons, mechanical indicators, light emitting diodes (LEDs) or video display screens to extensive control stations which may include a wide variety of devices for controlling an equipment or process;

NOTE Application of the general coding principles for displays on screens should be carried out without modification.

- where the safety of persons, property and/or the environment is involved, and also where the above-mentioned codes are used to facilitate the proper monitoring and controlling of equipment;
- where a particular kind of coding is to be assigned by a technical committee to a special function.

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2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60050(441), *International Electrotechnical Vocabulary (IEV) – Chapter 441: Switchgear, controlgear and fuses*

IEC 60050(721), *International Electrotechnical Vocabulary (IEV) – Chapter 721: Telegraphy, facsimile and data communication*

IEC 60050(845), *International Electrotechnical Vocabulary (IEV) Lighting*

IEC 60417 (all parts), *Graphical symbols for use on equipment*

IEC 60447, *Man-machine interface (MMI) – Actuating principles*

IEC 60617 (all parts), *Graphical symbols for diagrams*

IEC 61310-1, *Safety of machinery – Indication, marking and actuation – Part 1: Requirements for visual, auditory and tactile signals*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO 3864, *Safety colours and safety signs*

ISO 7000, *Graphical symbols for use on equipment – Index and synopsis*

ISO 8201, *Acoustics – Audible emergency evacuation signal*

ISO 11429, *Ergonomics – System of auditory and visual danger and information signals*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

CIE (International Commission on Illumination): Publication No. 2-2 (TC 1.6), *Colours of light signals*

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1

coding

systematic representation of specific signals or values by another set of signals, which has to conform to a definite set of rules

[IEC 61310-1: 1995, definition 3.22]

3.2

indicator

mechanical, optical or electrical device or a part of device providing visual, acoustic or tactile information

3.2.1

acoustic signal

message conveyed by means of tone, frequency and intermittency, emanating from a sound source

3.2.2

tactile signal

message conveyed by means of vibration, force, surface roughness, contour or position

3.2.3

visual signal

message conveyed by means of brightness, contrast, colour, shape, size or position

3.3**actuator**

part of the actuating system which receives a human actuating action

[IEC 60447: 1993, definition 3.1]

NOTE For the purposes of this standard, the actuator in the case of an interactive screen display is considered to be that part of the screen display which represents the actuator function.

3.4**mechanical indicator**

indicator which forms an integral part of a mechanical or electromechanical switching device (e.g. circuit-breaker) and which indicates whether it is in the OPEN or CLOSED position or an intermediate position (e.g. star position of a star-delta starter) but which is not intended as a manual actuator

3.5**man-machine interface (MMI)**

parts of the equipment intended to provide a direct means of communication between the operator and the equipment, and which enable the operator to control and monitor the operation of the equipment

NOTE Such parts may include manually operated actuators, indicators and screens.

[IEC 60447: 1993, definition 3.3]

3.6**signal light**

object or apparatus designed to emit a light signal

[IEV 845-11-05]

3.7**light emitting diode (LED)**

solid-state device embodying a p-n junction, emitting optical radiation when excited by an electric current

[IEV 845-04-40]

3.8**illuminated actuator**

actuator with an integrated light source giving visual indication by illumination. The operation of the light source may be related to or independent of the actuator action

3.9**hue**

attribute of a visual sensation according to which an area appears to be similar to one of the perceived colours, red, yellow, green, and blue, or to a combination of two of them

[IEV 845-02-35]

3.10**brightness**

attribute of a visual sensation according to which an area appears to emit more or less light

[IEV 845-02-28]

3.11

saturation

chromaticness, colourfulness, of an area judged in proportion to its brightness

NOTE For given viewing conditions and at luminance levels within the range of photopic vision, a colour stimulus of a given chromaticity exhibits approximately constant saturation for all luminance levels, except when the brightness is very high.

[IEV 845-02-41]

3.12

contrast

- a) In the perceptual sense: assessment of the difference in appearance of two or more parts of a field seen simultaneously or successively (*hence: brightness contrast, lightness contrast, colour contrast, simultaneous contrast, successive contrast, etc.*)
- b) In the physical sense: quantity intended to correlate with the perceived brightness contrast, usually defined by one of a number of formulae which involve the luminances of the stimuli considered, for example: $\Delta L/L$ near the luminance threshold, or L_1/L_2 for much higher luminances.

[IEV 845-02-47]

3.13

message

group of characters and function control sequences which is transferred as an entity from a transmitter to a receiver, where the arrangement of the characters is determined at the transmitter

[IEV 721-09-01]

4 Coding principles

4.1 General

Coding principles shall be established at an early stage of system design and shall be consistent with those used for other equipment within the same plant or process.

The choice of a certain code will depend on the tasks of the personnel and the associated service conditions in which these tasks have to be fulfilled.

It is recommended to apply one or more of the following means of indication coding:

Visual codes:

- by colour;
- by shape;
- by position;
- by changing characteristics over time (flashing).

Acoustic codes:

- by type of sound;
- by pure tone;
- by changing characteristic over time.

Tactile codes:

- by shape;