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(JMF)

**Safety of machinery—
Indication, marking and actuation—
Part 1: Requirements for visual,
acoustic and tactile signals**

ICS 13.110

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Health, Labour and Welfare, and the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Machinery Federation (JMF) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 9706-1 : 2001** is replaced with this Standard.

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JIS B 9706 consists of the following three parts under the general title “*Safety of machinery—Indication, marking and actuation*”

Part 1: Requirements for visual, acoustic and tactile signals

Part 2: Requirements for marking

Part 3: Requirements for the location and operation of actuators

Safety of machinery— Indication, marking and actuation— Part 1: Requirements for visual, acoustic and tactile signals

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **IEC 61310-1** published in 2007 without any modifications of the technical contents.

The portions underlined with dots are the matters not given in the corresponding International Standard.

At human-machine interfaces, warning and danger signals need to convey safety-related meanings for the safe use and monitoring of machinery for exposed persons and operators.

It is via the human-machine interface that the operator interacts with the machinery or process in an open-loop system (see figure 1). This interface consists of actuators, by means of which the operator initiates actions, and indicating devices, through which the operator receives information. In many applications, the information is represented by a signal which is encoded by a distinct set of rules and the operator has then to interpret the signal according to these rules. Different types of coding such as colour, shape or time are used as appropriate to the demands of the task of the operator.

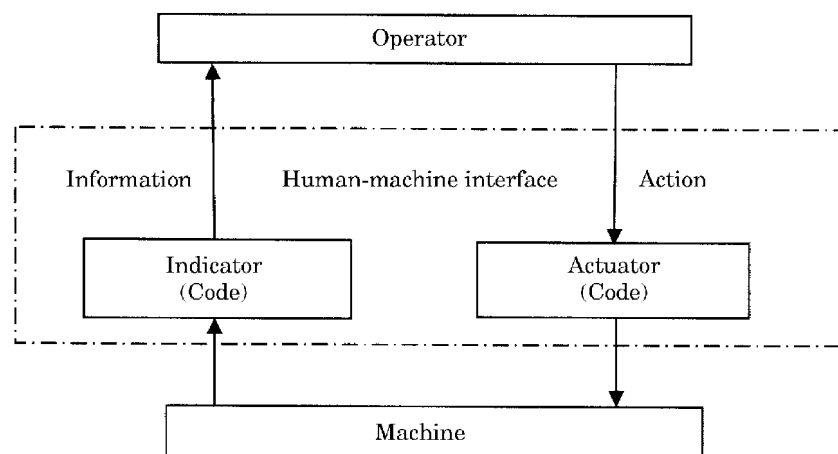


Figure 1 HMI (human-machine interface)

The reasons for using codes are:

- to permit the spatial separation of the machinery from centralized control stations;
- to increase the perceptible amount of information given by an indicating device, for example, per display area unit, per unit of time;
- to decrease the mental work-load of an operator and/or exposed persons.

1 Scope

This Standard specifies requirements for visual, acoustic and tactile methods of indicating safety-related information, at the human-machine interface and to exposed persons.

It specifies a system of colours, safety signs, markings and other warnings, intended for use in the indication of hazardous situations and health hazards and for meeting certain emergencies. It also specifies ways of coding visual, acoustic and tactile signals for indicators and actuators to facilitate the safe use and monitoring of the machinery.

This Standard is based on **IEC 60073** with regard to coding by colour and alternative means, but is not limited to electrotechnical aspects.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows:

IEC 61310-1:2007 *Safety of machinery—Indication, marking and actuation—Part 1: Requirements for visual, acoustic and tactile signals* (IDT)

The symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For standards with the year indication, only the editions of the indicated year shall apply but the revisions (including amendments) made thereafter shall not apply. The normative references without the indication of the year shall apply only to the most recent edition (including amendments).

JIS B 9703 *Safety of machinery—Emergency stop—Principles for design*

NOTE : Corresponding International Standard: ISO 13850 *Safety of machinery—Emergency stop—Principles for design* (IDT)

JIS B 9960-1:2008 *Safety of machinery—Electrical equipment of machines—Part 1: General requirements*

NOTE : Corresponding International Standard: IEC 60204-1:2005 *Safety of machinery—Electrical equipment of machines—Part 1: General requirements* (MOD)

JIS Z 9101:2005 *Safety colours and safety signs—Design principles for safety signs in workplaces and public areas*

NOTE : Corresponding International Standard: ISO 3864-1:2002 *Graphical symbols—Safety colours and safety signs—Part 1: Design principles for safety signs in workplaces and public areas* (IDT)

ISO 7000:2004 *Graphical symbols for use on equipment—Index and synopsis*

ISO 7010:2003 *Graphical symbols—Safety colours and safety signs—Safety signs used in workplaces and public areas*

ISO 7731:2003 *Ergonomics—Danger signals for public and work areas—Auditory danger signals*

IEC 60417 *Graphical symbols for use on equipment*

IEC 60073:2002 *Basic and safety principles for man-machine interface, marking and identification—Coding principles for indicators and actuators*

3 Terms and definitions

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

NOTE : The terms are sorted in alphabetical order.

3.1 actuator

part of the actuating system which receives a human actuating action

[IEV¹⁾ 441-15-22, modified]

NOTE : The actuator may take the form of a handle, knob, pedal, push-button, roller, plunger, mouse, light pen, keyboard, touch sensitive screen, etc.

Note ¹⁾ “IEV” is the abbreviation of International Electrotechnical Vocabulary.
IEV is specified in **IEC 60050** series.

3.2 brightness

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

(See **03012** in **JIS Z 8113**.)

3.3 coding

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

3.4 contrast

- a) **in the perceptual sense:** difference in appearance of two or more parts of a field seen simultaneously or successively

NOTE 1 Examples of types of contrast are brightness 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

NOTE 2 For example: contrast is given by $\Delta L/L$ near the luminance threshold²⁾, or by L_1/L_2 for much higher luminances.

Note ²⁾ “Luminance threshold” means the lowest luminance of a stimulus which enables it to be perceived (see **JIS Z 8113, 02022**).

(See **02024** in **JIS Z 8113**.)

3.5 exposed person

any person wholly or partially in a danger zone³⁾