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(JSA)

**Industrial systems, installations and
equipment and industrial products —
Structuring principles and reference
designations — Part 2 : Classification of
objects and codes for classes**

ICS 01.080.40 ; 01.110 ; 29.020

Reference number : JIS C 0452-2 : 2005 (E)

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal of establishing a Japanese Industrial Standard from the Japanese Standards Association (JSA), with a draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

This Standard has been made based on IEC 61346-2:2000 *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 2 : Classification of objects and codes for classes* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

JIS C 0452 consists of the following two parts under the general title. *Industrial system, installations and equipment and industrial products—Structuring principles and reference designations*:

Part 1 : Basic rules

Part 2 : Classification of objects and codes for classes

In addition, IEC 61346 series has the following parts as the related standards:

IEC/TR 61346-3 : 2001 *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 3 : Application guidelines* (Technical Report)

IEC/TR 61346-4 : 1998 *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 4 : Discussion of concepts* (Technical Report)

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Industrial systems, installations and equipment and industrial products— Structuring principles and reference designations— Part 2 : Classification of objects and codes for classes

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **IEC 61346-2** *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 2 : Classification of objects and codes for classes* published in 2000 without modifying the technical contents.

The portions given sidelines or dotted underlines are the matters not stated in the original International Standard.

The purpose of this Standard is to establish the classification system and the corresponding letter codes of objects applicable through all the technical fields for realizing by reference designations the object and structuring between objects of products described in the document among the standard group which specify the technical document in the electricity and electricity-related field of International Standard. In **JIS C 0452-1** which specifies the basic principles on reference designation, the letter codes used in former **IEC 60750** are compiled as Annex E and have been maintained unless they conflict with these basic principles. Although the specification on letter codes is replaced by this specification, efforts have been made so that modifications from the former standard are reduced to the minimum.

Information : In IEC 61346-1, the basic principles on structuring principles and reference designations are specified as part 1, and the letter codes specified in former IEC 60750 are referred to in Annex E. However, former IEC 60750 is replaced by IEC 61346-2 which is newly published and the original International Standard of this Standard, and is made invalid. On the occasion of the establishment of IEC 61346-2, study was performed so that the content of former IEC 60750 might be covered in IEC 61346-2.

1 Scope This part of **JIS C 0452** defines object classes and associated letter codes for these classes to be used in reference designations.

The classification schemes are applicable for objects in all technical areas and may be applied at any position in a tree-like structure set up in accordance with **JIS C 0452-1**.

NOTES 1 The classification of objects that are of interest from the location aspect only is not considered in the present edition of **JIS C 0452-2**.

2 The International Standard corresponding to this Standard is as fol-

lows.

In addition, 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.

IEC 61346-2 : 2000 *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 2 : Classification of objects and codes for classes* (IDT)

Information : There are three kinds of product, function, and location as an aspect for information of reference designation (see Annex 1).

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS C 0452-1 *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 1 : Basic rules*

Remarks : IEC 61346-1 : 1996 *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 1 : Basic rules* is identical with the said standard.

ISO 14617-6 *Graphical symbols for diagrams—Part 6 : Measurement and control functions*

3 Definitions For the purposes of this Standard, the definitions given in JIS C 0452-1 apply.

Information : The supplement of terms in JIS C 0452-1 is given in Annex 1. Since many terms used in the original IEC Standard and Annex 1 are new terms not specified in the conventional JIS, have abstract meanings, and are used being mutually related, publishing only the translated Japanese provisions may cause technical ambiguity. For this reason, for the purpose of making understanding easier, English terms of original IEC Standard and terms translated into Japanese of this original are described in Annex 3 in order of appearance.

4 Classification principle The principle of classification of objects is based on viewing each object as being part of a process with an input and an output (see figure 1).

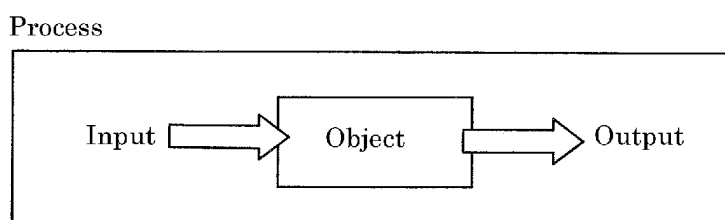


Figure 1 The basic process concept

Each object which is part of a process can be characterized by the purpose or the task with respect to its input and output. This implies that it is not important how the object is built up internally. Purpose and task are the main characteristics for establishing a classification scheme in this Standard (see also Annex B).

5 Classification of objects according to purpose or task and associated letter codes If, irrespective of its position in any tree-like structure, an object interacts or is intended to interact with a flow (for example of electrical energy, information or material), the purpose- or task-related classification scheme and the letter codes presented in table 1 shall be used.

Information : In this Standard, “HURÔ” refers to not only the flow of energy, fluid, etc. but also the object related to the input side of object. Furthermore, “MOKUTEKI” corresponds to “purpose” in the original International Standard, and “TASUKU” corresponds to “task”.

In principle, it is possible to classify any object according to table 1. It is recommended that this table be used wherever appropriate.

In Annex B, figure 1 shows the classes of table 1 related to a generic process model.

For the classification of objects according to the classification scheme given in table 1, the following applies:

- the relevant object shall be viewed with regard to how it acts on the flow but without taking into account how this is implemented;

Example 1 The desired purpose of an object is “heating”. According to table 1, this object is clearly related to Class E. It is not of importance, or simply not known at an early stage of a design process, how the required purpose is realized. This may be done by using a gas or oil burner or an electric heater. In the case of an electric heater, the heat may be produced by an electric resistor. A resistor may, in other cases, be classified by its purpose, “restricting a flow”, according to Class R. The purpose of the object in the process is, however, to produce heat, so Class E, not Class R, should be used.

- there may be cases where more than one purpose or task is identified. In these cases, a main purpose or task shall be taken into account;

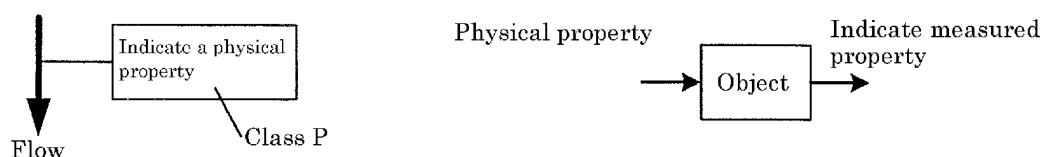
Example 2 A flow-rate recorder stores measured values for later use but, at the same time, delivers an output in visible form. If storing is regarded as the main purpose, the object is related to Class C of table 1. If the indication of measured values is regarded as the main purpose, the object is related to Class P.

- there may be cases where no main purpose or task can be identified. Only in these cases should Class A be used;

Example 3 A touch screen at a cash dispenser of a bank serves as a means for manual input of information and, at the same time, as a device for indicating information. Both purposes can be regarded as equally valid. Therefore Class A may be chosen.

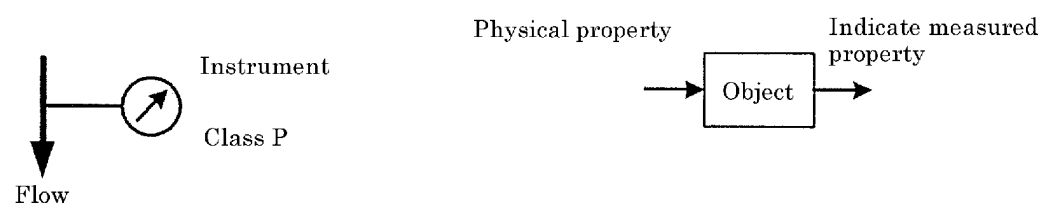
Figure 2 illustrates the principle of assigning classes and relevant letter codes to objects in the case of a measuring circuit. On the left-hand side, the used products are shown. The right-hand side illustrates how the products are viewed as objects with an input and an output.

Function required:

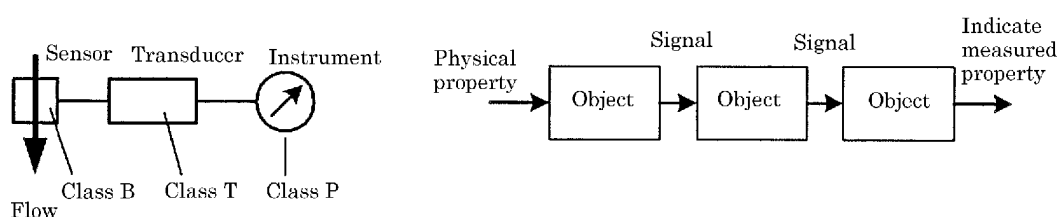


Different possible realizations

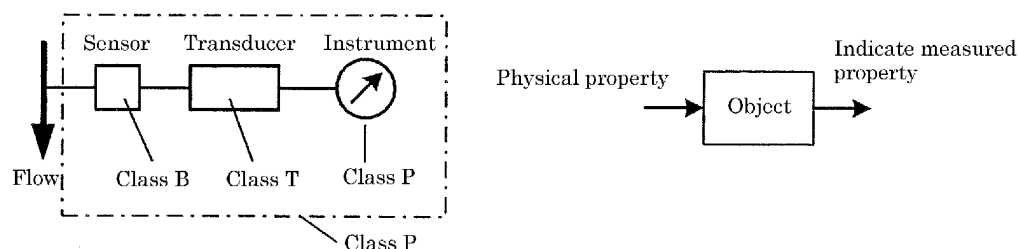
a) **Direct measuring and indication**



b) **Measuring circuit consisting of discrete components**



c) **One product for combined purposes**



d) **One product for combined purposes;
two outputs, one property considered to be of major importance**

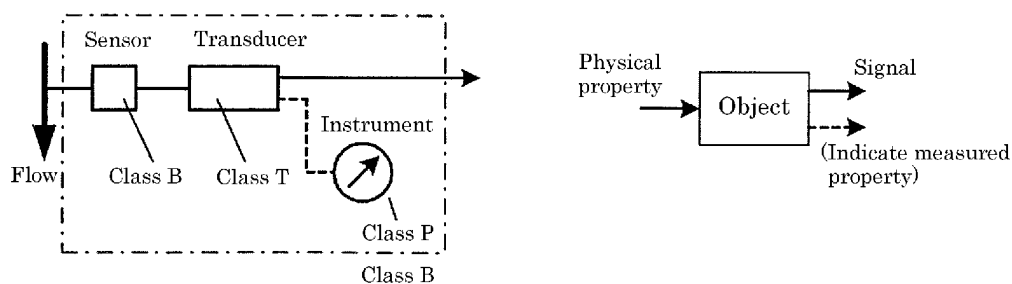


Figure 2 Classification of objects and relevant letter codes in a measuring circuit

Table 1 Classes of objects according to their purpose or task and associated letter codes

Information : For the example of terms, the terms in the original standard are added since they are available for the main criterion of judgement of classes.

Code	Purpose or task of object	Examples of terms describing purpose or task of objects and functions	Examples of typical mechanical/fluid products	Examples of typical electrical products
A	Two or more purposes or tasks NOTE : This class is only for objects for which no main purpose or task can be identified.	—	—	Touch screen
B	Converting an input variable (physical property, condition or event) into a signal for further processing	Detecting measuring (picking-up of values) Monitoring Sensing Weighing (picking-up of values)	Orifice plate (for measuring) Sensor	Buchholz relay Detector Fire detector Gas detector Measuring element Measuring relay Measuring shunt Measuring transformer Microphone Movement detector Photocell Pilot switch Position switch Proximity switch Proximity sensor Protective relay Sensor Smoke sensor Tachogenerator Temperature sensor Thermal overload relay Video camera
C	Storing material, energy, or information	Recording Storing	Barrel Buffer Cistern Container Hot water accumulator Paper reel stand Pressure accumulator Steam accumulator Tank Vessel	Buffer (store) Buffer battery Capacitor Event recorder (mainly storing) Hard disk Memory RAM Storage battery Tape recorder (mainly storing) Video recorder (mainly storing) Voltage recorder (mainly storing)

Table 1 (continued)

Code	Purpose or task of object	Examples of terms describing purpose or task of objects and functions	Examples of typical mechanical/fluid products	Examples of typical electrical products
D	Reserved for future standardization	—	—	—
E	Providing radiant or thermal energy	Cooling Heating Lighting Radiating	Boiler Freezer Heater Gas lamp Heat exchanger Nuclear reactor Paraffin lamp Radiator Refrigerator	Boiler Fluorescent lamp Heater Lamp Lamp bulb Laser Luminaire Maser Radiator
F	Direct protection (self-acting) of a flow of energy, signals, personnel or equipment from dangerous or unwanted conditions Including systems and equipment for protective purposes	Absorbing Guarding Preventing Protecting Securing Shielding	Air bag Buffer Fence Guard Pipe-break valve Rupture disc Safety belt Safety valve Shield Vacuum valve	Cathodic protection Anode Faraday cage Fuse Miniature circuit-breaker Surge diverter Thermal overload release
G	Initiating a flow of energy or material Generating signals used as information carriers or reference source Producing a new kind of energy, material or product	Assembling Crushing Disassembling Generating Fractionating Material removing Milling Mixing Producing Pulverizing	Blower Component insertion machine Conveyor, (driven) Crusher Fan Mixer Pump Vacuum pump Ventilator	Dry cell battery Dynamo Fuel cell Generator Power generator Rotating generator Signal generator Solar cell Wave generator
H	Reserved for future standardization	—	—	—
I	Not to be applied	—	—	—
J	Reserved for future standardization	—	—	—
K	Processing (receiving, treating and providing) signals or information (excluding objects for protective purposes, see Class F)	Closing (control circuits) Continuous controlling Delaying Opening (control circuits) Postponing Switching (control circuits) Synchronizing	Fluid feedback Controller Pilot valve Valve positioner	All-or-nothing relay Analogue integrated circuit Automatic paralleling device Binary integrated circuit Contactor relay CPU Delay element Delay line Electronic valve Electronic tube Feedback controller Filter Induction stirrer Microprocessor Process computer Programmable controller Synchronizing device Time relay Transistor

Table 1 (continued)

Code	Purpose or task of object	Examples of terms describing purpose or task of objects and functions	Examples of typical mechanical/fluid products	Examples of typical electrical products
L	Reserved for future standardization	—	—	—
M	Providing mechanical energy (rotational or linear mechanical motion) for driving purposes	Actuating Driving	Combustion engine Fluid actuator Fluid cylinder Fluid motor Heat engine Mechanical actuator Spring-loaded actuator Turbine Water turbine Wind turbine	Actuator Actuating coil Electric motor Linear motor
N	Reserved for future Standardization	—	—	—
O	Not to be applied	—	—	—
P	Presenting information	Alarming Communicating Displaying Indicating Informing Measuring (presentation of quantities) Presenting Printing Warning	Acoustical signal device Balance (for weighing) Bell Clock Display unit Flow meter Gas meter Glass gauge Manometer Mechanical indicator Printer Sight glass Thermometer Water meter	Acoustical signal device Ammeter Bell Clock Continuous line recorder Display unit Electromechanical indicator Event counter Geiger counter LED Loudspeaker Optical signal device Printer Recording voltmeter Signal lamp Signal vibrator Synchronoscope Voltmeter Wattmeter Watt-hour meter
Q	Controlled switching or varying a flow of energy, of signals or of material (For signals in control circuits, see Classes K and S)	Opening (energy, signals and material flow) Closing (energy, signals and material flow) Switching (energy, signals and material flow) Clutching	Brake Control valve Clutch Door Flap Gate Shut-off valve Shutter Sluice-gate Lock	Circuit-breaker Contractor (for power) Disconnecter Fuse switch Fuse-switch-disconnector Motor starter Power transistor Slip-ring short-circuiter Switch (for power) Thyristor (If main purpose is protection, see Class F)