

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Industrial- process measurement and control – Data structures and elements in process equipment catalogues –
Part 1: Generic structures for measuring equipment**

**Mesure et commande dans les processus industriels – Éléments et structures de données dans les catalogues d'équipements de processus –
Partie 1: Structures génériques pour équipements de mesure**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL-PROCESS MEASUREMENT AND CONTROL –
DATA STRUCTURES AND ELEMENTS IN
PROCESS EQUIPMENT CATALOGUES –****Part 1: Generic structures for measuring equipment**

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IEC 61987-1 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement and control. It is an International Standard.

This second edition cancels and replaces the first edition published in 2006. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Addition of a subclause “Digital communication” in Clause 5, in order to allow a more comprehensive description of the properties of such an interface;
- b) Alignment of clause headings, as described in the introduction, to correspond with those of the IEC CDD.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65E/1113/FDIS	65E/1136/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61987 series, published under the general title *Industrial-process measurement and control – Data structures and elements in process equipment catalogues*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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INTRODUCTION

In recent years, industry has become alert to the fact that a great deal of time and effort is wasted in the transposition of measuring equipment data from one form to another. The technical data of an instrument, for example, may exist at the manufacturer's facility as two separate data sets for paper and electronic presentation: the end-user requires much the same data for works standards, engineering data bases or commercial data bases. In most cases, however, the data cannot be automatically re-used because each application has its own particular data storage format.

A second problem that belies the re-use of technical data is the content of the product descriptions themselves. There is little agreement between manufacturers on what information a technical data sheet should contain, how it should be arranged, or how the results, for example of particular performance tests, should be presented. When transferring this information into a data base, an end-user will always find gaps and proprietary interpretations that make the task more difficult.

This part of IEC 61987 aims to solve these problems by defining a generic structure and its content for industrial process measuring and control equipment. It builds upon the assumption that, for a given class of measuring equipment, for example, pressure measuring equipment, temperature measuring equipment or electromagnetic flow-measuring equipment, a set of non-proprietary structures and product features can be specified. The resulting documents can not only be exchanged electronically, but they can also be presented to humans in an easily understandable form.

This part of IEC 61987 is applicable to electronic catalogues of process measuring equipment. The structure also contains a great many product features that are common to measuring equipment with binary output. Similarly, Annex B has been prepared with a view to future standardisation.

This part of IEC 61987 is not intended as a replacement for existing standards, but rather as a guiding document for all future standards which are concerned with the specifications of process measuring equipment. Every revision of an existing standard should take into account the structures and product features defined in Clause 5 or work towards a harmonisation.

Annex A contains a tabular overview of the classification and catalogue structure of process measuring equipment. Annex B contains tables with a further sub-classification for specific measured variables.

Wherever possible, existing terms from international standards have been used to name the product features within the structures. In accordance with ISO 10241, Clause 3 contains a list of terms, definitions and sources.

Documents created according to the standard are structured. A possible means of exchanging structured information free of layout information is given by SGML (Standard Generalised Mark-Up Language, ISO 8879) or XML (Extensible Mark-Up Language), which is derived from it.

This part of IEC 61987 could also provide the basis for arranging of properties (data element types) that conform to IEC 61360 or ISO 13584. This would require that the features, which in this part of IEC 61987 can be textual units, graphical and tabular representations etc., be broken down into properties (data element types) conformant to the said standards. For example, a range would be expressed as a lower range-limit (LRL) and upper range-limit (URL) with unit of measure; dimensions (L x B x H) as three separate elements, length, breadth and height with unit of measure; or a derating curve as an appropriate series of data element pairs.

This part of IEC 61987 conforms to ISO 15926-1 and -2 with respect to the data model and associated reference data library (ISO 15926-4), for example, as used for the limited classification structure. At the same time, it is also aligned to STEP: Standard for the Exchange of Product Model Data. The data model and definitions of ISO 10303-221 use the ISO 15926-4 TS Reference Data Library as "library". The current standard can reproduce the data fields as per this ISO 10303-221, including, for example, product structure data, dimensional data, electrical connection data and product properties such as measuring range or power supply.

Since the publication of Edition 1 (2006) of this document a great deal of work has been done on the development of the IEC Common Data Dictionary for equipment for industrial-process automation. This, published as further parts of IEC 61987, covers not only measuring instruments with a variety of inputs and outputs, but also final control elements, infrastructure devices and in future process analysers.

For this reason, the title has been adjusted and the scope has been revised to reflect the current content of the whole IEC 61987 standard series.

During the development of the IEC CCD a number of questions arose regarding the structure proposed in this document, in particular the assignment of any digital communication interface to the output. Although this is not strictly incorrect, it was thought that the properties of such an interface could be better described separately. For this reason, a clause "Digital communication" has been added to this Edition 2. In addition, the clause "Mechanical construction" has been renamed "Mechanical and electrical construction" to reflect its true content.

"Ordering information" is not found as a separate block in the IEC CDD, as it is assumed that the properties there describe the type and particular instance of an already purchased device. For an ordering process using IEC CDD properties, the necessary information is retrieved from the "Identification" which also includes the ordering information.

"Certificates and approvals" can be found both in the device list of properties (0112/2///61987#ABC156) and as a device aspect within the "device documents supplied" (0112/2///61987#ABH517). This is also the location of the information contained in "Documentation".

In preparing the current edition of this document all terms and definitions have been checked and where necessary the references updated. Since the publication of Edition 1 in 2006 a number of standards have been withdrawn. Where no suitable alternative source has been found, a note to this effect has been added, but the original term and definition have been left unchanged.

INDUSTRIAL-PROCESS MEASUREMENT AND CONTROL – DATA STRUCTURES AND ELEMENTS IN PROCESS EQUIPMENT CATALOGUES –

Part 1: Generic structures for measuring equipment

1 Scope

This part of IEC 61987 defines a generic structure in which product features of industrial process measurement devices shall be arranged, in order to facilitate the understanding of product descriptions when they are transferred from one party to another. It applies to the production of catalogues supplied by the manufacturer of such devices and helps the user to formulate their requirements.

This document will also serve as a reference document for all future standards which are concerned with process measuring equipment.

In addition, this document also provides a basic structure for the production of further standards listing the properties of process control equipment, for example, for actuators and infrastructure devices.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

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IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 60654-1:1993, *Industrial-process measurement and control equipment – Operating conditions – Part 1: Climatic conditions*

IEC 60721-3 (all parts), *Classification of environmental conditions – Classification of groups of environmental parameters and their severities*

IEC 60751:2022, *Industrial platinum resistance thermometers and platinum temperature sensors*

IEC TR 61000-1-1:2023, *Electromagnetic compatibility (EMC) – Part 1: General – Section 1: Application and interpretation of fundamental definitions and terms*

IEC 61069 (all parts), *Industrial-process measurement, control and automation – Evaluation of system properties for the purpose of system assessment*

IEC 61298 (all parts), *Process measurement and control devices – General methods and procedures for evaluating performance*

IEC 61326 (all parts), *Electrical equipment for measurement, control and laboratory use – EMC requirements*

IEC 61987-11, *Industrial-process measurement and control – Data structures and elements in process equipment catalogues – List of properties (LOPs) of measuring equipment for electronic data exchange – Generic structures*

ISO 3511-1:1977, *Process measurement control functions and instrumentation – Symbolic representation – Part 1: Basic requirements*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

accuracy

inaccuracy

<of a measuring instrument> quality which characterizes the ability of a measuring instrument to provide an indicated value close to a true value of the measured value under reference conditions

Note 1 to entry: This term is used in the "true value" approach.

Note 2 to entry: Accuracy is all the better when the indicated value is closer to the corresponding true value.

Note 3 to entry: Inaccuracy as defined in IEC 61298-2 includes the errors of non-linearity, non-repeatability and hysteresis.

Note 4 to entry: Accuracy can be expressed as percentage of reading, span or full range etc. or as an absolute value

[SOURCE IEC 60050-311:—, 311-06-08, modified – measured value instead of measurand, under reference conditions added, Notes 3 and 4 added]

3.2

accuracy class

category of instruments or components thereof, all of which are intended to comply with a set of specifications regarding uncertainty

[SOURCE IEC 60050-311:—, 311-06-09 modified – "or components" added]

3.3

ambient temperature

temperature measured at a representative point within the local environment, including adjacent heat generating equipment, in which the measurement and control equipment will normally operate, be stored or transported

SEE: 3.15

3.4

ambient temperature limits

extreme values of ambient temperature to which a device may be subjected without permanent impairment of operating characteristics

Note 1 to entry: The performance characteristics may be exceeded in the range between the limits of normal operation and the operating temperature limits.

SEE: 3.3, 3.33

3.5

ambient temperature range

range of ambient temperatures within which a device is designed to operate within specified accuracy limits

SEE: 3.31, 3.33

3.6

analog signal

signal each information parameter of which directly represents the respective variable quantity

Note 1 to entry: An analog signal may be a continuous-value signal or a discrete-value signal as well as a continuous-time or a discrete-time signal. Examples may be the pressure in a pneumatic final controlling element with continuous-value and continuous-time information parameter (value of the pressure) as well as a position-modulated pulse signal as an output signal of a computer based controller.

[SOURCE: IEC 60050-351:2013, 351-41-24]

3.7

binary signal

discrete-value signal each information parameter of which may assume one of two values

[SOURCE: IEC 60050-351:2013, 351-41-21]

3.8

climate class

climatic conditions, i.e. ambient temperature, pressure and humidity, to which the measurement equipment can be subjected during operation (including shutdown), transport and storage (over land or sea)

3.9

degree of protection

extent of protection provided by an enclosure against access to hazardous parts, against ingress of solid foreign objects and/or ingress of water, and verified by standardized test methods

[SOURCE: IEC 60529:1989, 3.3]

3.10

dependability

extent to which a system can be relied upon to perform a required function under given conditions at a given instant of time or over a given time interval, assuming that the required external sources are provided

[SOURCE: IEC 61069-1:2016, 3.1.22]

**3.11
device**

material element or assembly of such elements intended to perform a required function

Note 1 to entry: A device may form part of a larger device.

[SOURCE: IEC 60050-151: 2001, 151-11-20]

**3.12
digital signal**

signal each information parameter of which represents the respective variable quantity in coded manner as a symbol of a character set

Note 1 to entry: In most technical cases a digital signal is discrete-value and discrete-time.

Note 2 to entry: A digital signal requires an agreement about the code between transmitter and receiver of the signal.

Note 3 to entry: In many technical cases the symbols may be interpreted as numbers.

[SOURCE: IEC 60050-351:2013, 351-41-25]

**3.13
drift**

change in the indication of a measuring system, generally slow, continuous, not necessarily in the same direction and not related to a change in the quantity being measured

[SOURCE: IEC 60050-311:—, 311-06-13, modified – quantity being measured for measurand]

**3.14
electromagnetic compatibility**

ability of equipment or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

[SOURCE: IEC 60050-161:1990, 161-01-07]

**3.15
environmental condition**

characteristics of the environment which may affect the performance of the device or system

Note 1 to entry: Examples of environmental conditions are pressure, temperature, humidity, vibration, radiation.

[SOURCE: IEC 60050-151:2001, 151-16-03]

**3.16
environmental condition class**

alphanumeric character sequence denoting a set of environmental conditions to which the equipment is or can be subjected to during operation

Note 1 to entry: The IEC 60721 series defines classes for climatic, mechanical and other environmental influences.

**3.17
environmental influence**

change in the output of an instrument caused solely by the departure of one of the specified environmental conditions from its reference value, all other conditions being held constant

SEE: 3.21, 3.39