

---

**Merjenje in nadzor v industrijskih procesih – Strukture podatkov in elementov v katalogih procesne opreme – 1. del: Merilna oprema z analognim in digitalnim izhodom (IEC 61987-1:2006)**

Industrial-process measurement and control - Data structures and elements in process equipment catalogues -- Part 1: Measuring equipment with analogue and digital output

Industrielle Leittechnik - Datenstrukturen und Elemente in Katalogen der Prozessleittechnik - Teil 1: Messeinrichtungen mit analogen und digitalen Ausgängen  
(standards.iteh.ai)

Mesure et commande dans les processus industriels - Structures et éléments de données dans les catalogues d'équipement de processus -- Partie 1: Equipement de mesure a sortie analogique et numérique

**Ta slovenski standard je istoveten z: EN 61987-1:2007**

---

**ICS:**

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
35.240.50	Uporabniške rešitve IT v industriji	IT applications in industry

**SIST EN 61987-1:2007**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 61987-1:2007

<https://standards.iteh.ai/catalog/standards/sist/6768c11b-9680-4841-987d-dfbf0c794a83/sist-en-61987-1-2007>

**Industrial-process measurement and control -  
Data structures and elements in process equipment catalogues -  
Part 1: Measuring equipment with analogue and digital output  
(IEC 61987-1:2006)**

Mesure et commande  
dans les processus industriels -  
Structures et éléments de données  
dans les catalogues d'équipement  
de processus -  
Partie 1: Equipement de mesure  
à sortie analogique et numérique  
(CEI 61987-1:2006)

Industrielle Leittechnik -  
Datenstrukturen und -elemente  
in Katalogen der Prozessleittechnik -  
Teil 1: Messeinrichtungen mit analogen  
und digitalen Ausgängen  
(IEC 61987-1:2006)

**STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 61987-1:2007](https://standards.iteh.ai/catalog/standards/sist/6768c11b-9680-4841-801c-010277ad3781-01-61987-1-2006)

[https://standards.iteh.ai/catalog/standards/sist/6768c11b-9680-4841-](https://standards.iteh.ai/catalog/standards/sist/6768c11b-9680-4841-801c-010277ad3781-01-61987-1-2006)

This European Standard was approved by CENELEC on 2007-02-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

The text of document 65B/599/FDIS, future edition 1 of IEC 61987-1, prepared by SC 65B, Devices & process analysis, of IEC TC 65, Industrial-process measurement and control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61987-1 on 2007-02-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2007-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2010-02-01

Annex ZA has been added by CENELEC.

---

## Endorsement notice

The text of the International Standard IEC 61987-1:2006 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068	NOTE	Harmonized in EN 60068 series (not modified).
IEC 60751	NOTE	Harmonized as EN 60751:1995 (not modified).
IEC 60770-2	NOTE	Harmonized as EN 60770-2:2003 (not modified).
IEC 61082	NOTE	Harmonized in EN 61082 series (not modified).
IEC 61326	NOTE	Harmonized in EN 61326 series (not modified).
IEC 61360	NOTE	Harmonized in EN 61360 series (not modified).
IEC 82045-1	NOTE	Harmonized as EN 82045-1:2001 (not modified).
ISO 8879	NOTE	Harmonized as EN 28879:1990 (not modified).
ISO 10303-21	NOTE	Harmonized as ENV ISO 10303-21:1995 (not modified).

**Annex ZA**  
(normative)

**Normative references to international publications  
with their corresponding European publications**

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May A1	1991 1993 2000
A1	1999			
IEC 60559	1989	Binary floating-point arithmetic for microprocessor systems	HD 592 S1	1991
IEC 60654-1	1993	Industrial-process measurement and control equipment - Operating conditions - Part 1: Climatic conditions	EN 60654-1	1993
IEC 60770-1	1999	Transmitters for use in industrial-process control systems - Part 1: Methods for performance evaluation	EN 60770-1	1999
IEC 61000-4	Series	Electromagnetic compatibility (EMC)	EN 61000-4	Series
IEC 61069	Series	Industrial-process measurement and control - Evaluation of system properties for the purpose of system assessment	EN 61069	Series
IEC 61298	Series	Process measurement and control devices - General methods and procedures for evaluating performance	EN 61298	Series
ISO 3511-1	1977	Process measurement control functions and instrumentation - Symbolic representation - Part 1: Basic requirements	-	-

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 61987-1:2007

<https://standards.iteh.ai/catalog/standards/sist/6768c11b-9680-4841-987d-dfbf0c794a83/sist-en-61987-1-2007>

# INTERNATIONAL STANDARD

# IEC 61987-1

First edition  
2006-12

---

---

## Industrial-process measurement and control – Data structures and elements in process equipment catalogues –

### Part 1: Measuring equipment with analogue and digital output

iteh STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN 61987-1:2007

<https://standards.iteh.ai/catalog/standards/sist/6768c11b-9680-4841-987d-dfbf0c794a83/sist-en-61987-1-2007>

© IEC 2006 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: [inmail@iec.ch](mailto:inmail@iec.ch) Web: [www.iec.ch](http://www.iec.ch)



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE

X

*For price, see current catalogue*

## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions .....	7
4 Metadocuments .....	15
4.1 General .....	15
4.2 Metadocument chapters and features .....	16
4.3 Nomenclature .....	18
5 Metadocument for process measuring equipment.....	18
5.1 Identification.....	18
5.2 Application.....	19
5.3 Function and system design.....	19
5.4 Input.....	20
5.5 Output.....	20
5.6 Performance characteristics .....	21
5.7 Operating conditions.....	22
5.8 Mechanical construction.....	24
5.9 Operability.....	25
5.10 Power supply.....	25
5.11 Certificates and approvals.....	26
5.12 Ordering information.....	26
5.13 Documentation .....	26
 Annex A (normative) Classification of features as a function of measuring equipment.....	27
Annex B (informative) Classification of features as a function of measurement principle .....	29
 Bibliography.....	49
 Figure 1 – Classification scheme for process measuring equipment.....	16
 Table A.1 – Classification and documentation structure of measuring equipment. ....	27
Table B.1 – Classification and documentation structure of flow measuring equipment .....	30
Table B.2 – Classification and documentation structure of level measuring equipment .....	34
Table B.3 – Classification and documentation structure of pressure measuring equipment.....	38
Table B.4 – Classification and documentation structure of temperature measuring equipment.....	43
Table B.5 – Classification and documentation structure of temperature measuring equipment.....	46



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

**Part 1: Measuring equipment with analogue and digital output**

**FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61987-1 has been prepared by subcommittee 65B: Devices, of IEC technical committee 65: Industrial-process measurement and control.

This standard cancels and replaces IEC/PAS 61987-1 published in 2002. This first edition constitutes a technical revision.

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

FDIS	Report on voting
65B/599/FDIS	65B/602/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 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

A bilingual edition of this standard may be issued at a later date.

## **iTeh STANDARD PREVIEW (standards.iteh.ai)**

SIST EN 61987-1:2007

<https://standards.iteh.ai/catalog/standards/sist/6768c11b-9680-4841-987d-dfbf0c794a83/sist-en-61987-1-2007>

## 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 standard aims at solving 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 cannot only be exchanged electronically, they can also be presented to humans in an easily understandable form.

### iTeh STANDARD PREVIEW

This standard is applicable to electronic catalogues of process measuring equipment with analogue and digital output. Further parts with similar classification structures will be produced for measuring equipment with binary output and interface equipment in the future. (The structure already 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 standardization.

This standard 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 of this standard or work towards a harmonization.

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 of this standard 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 Standard Generalized Mark-Up Language (SGML) described in ISO 8879 or Extensible Mark-Up Language (XML), which is derived from it.

This standard could also provide the basis for arranging properties (data element types) that conform to IEC 61360 or ISO 13584. This would require that the features which, in this standard, can be textual units, graphical and tabular representations, etc., be broken down into properties (data element types) conforming 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 × B × 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 standard conforms to ISO 15926-1 and ISO 15926-2 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 the Standard for the Exchange of Product Model Data (STEP). The data model and definitions of ISO 10303-21 uses the ISO 15926-4 TS reference data library as “library”. The current standard can reproduce the data fields according to this standard, including, for example, product structure data, dimensional data, electrical connection data and product properties such as measuring range or power supply.

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

SIST EN 61987-1:2007

<https://standards.iteh.ai/catalog/standards/sist/6768c11b-9680-4841-987d-dfbf0c794a83/sist-en-61987-1-2007>

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

## Part 1: Measuring equipment with analogue and digital output

### 1 Scope

This part of IEC 61987 defines a generic structure in which product features of industrial-process measurement and control equipment with analogue or digital output should 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 of process measuring equipment supplied by the manufacturer of the product and helps the user to formulate his requirements.

This standard also serves as a reference document for all future standards which are concerned with process measuring equipment catalogues. In addition, it is intended as a guide for the production of further standards on process equipment documentation for similar systems, for example, for other measuring equipment and actuators.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

### 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 60529:2001, *Degrees of protection provided by enclosures (IP Code)*

IEC 60559:1989, *Binary floating-point arithmetic for microprocessor systems*

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

IEC 60770-1:1999, *Transmitters for use in industrial-process control systems – Part 1: Methods for performance evaluation*

IEC 61000-4 (all parts), *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques*

IEC 61069 (all parts), *Industrial-process measurement and control – 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*

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.

**3.1  
ambient conditions  
environmental conditions**

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

NOTE Examples of ambient conditions are pressure, temperature, humidity, vibration, radiation.

[IEV 151-16-03]

**3.2  
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 3.1)

**3.3  
ambient temperature limits**

extreme values of ambient temperature to which a device may be subjected without permanent impairment of operating characteristics (see 3.18 and 3.19)

NOTE The performance characteristics may be exceeded in the range between the limits of normal operation and the operating temperature limits.

**3.4  
ambient temperature range**

range of ambient temperatures within which a device is designed to operate within specified accuracy limits (see 3.29 and 3.31)

**3.5  
analogue signal**

signal whose information parameter may assume any value within a given continuous range

[IEV 351-12-18]

**3.6  
binary signal**

digital signal whose information parameter may assume one out of two discrete values

[IEV 351-12-20]

**3.7  
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)

[IEC 60654-1, Clause 4]

**3.7.1  
class A: air-conditioned location**

location in which both air temperature and humidity are controlled within specific limits

**3.7.2  
class B: heated and/or cooled enclosed location**

location where only air temperature is controlled within specific limits

**3.7.3  
class C: sheltered location**

location where neither air temperature nor humidity are controlled. The equipment is protected against direct exposure to sunlight, rain or other precipitation and full wind pressure

**3.7.4****class D: outdoor location**

location where neither air temperature nor humidity are controlled. The equipment is exposed to outdoor atmospheric condition such as direct sunlight, rain, hail, sleet, snow, icing, wind and blown sand

**3.8****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

[IEC 60529, 3.3]

**3.9****dependability**

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

[IEC 61069-5, 3.1]

**3.10****digital signal**

signal, the information parameter of which may assume one out of a set of discrete values

[IEV 351-12-19]

**3.11****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

[IEV 311-06-13, modified]

**3.12****electromagnetic compatibility**

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

[IEV 161-01-07, modified]

**3.13****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 3.16 and 3.52)

**3.14****hysteresis**

property of a device or instrument whereby it gives different output values in relation to its input values depending on the directional sequence in which the input values have been applied

[IEC 61298-2, 3.13]