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# INTERNATIONAL STANDARD

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**Industrial-process measurement and control – Data structures and elements  
in process equipment catalogues –  
Part 10: Lists of properties (LOPs) for industrial-process measurement and  
control for electronic data exchange – Fundamentals**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

## Part 10: Lists of Properties (LOPs) for Industrial-Process Measurement and Control for Electronic Data Exchange – Fundamentals

## FOREWORD

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International Standard IEC 61987-10 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, controls and automation.

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

FDIS	Report on voting
65E/134/FDIS	65E/145/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.

This part of IEC 61987 has to be read in conjunction with IEC 61987-1.

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

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- withdrawn,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 version of this publication may be issued at a later date.

## INTRODUCTION

The exchange of product data between companies, business systems, engineering tools and, in the future, control systems (electrical, measuring and control technology) can run smoothly only when both the information to be exchanged and the use of this information have been clearly defined.

In the past, requirements on process control devices and systems were specified by customers in various ways when suppliers or manufacturers were asked to quote for suitable equipment. The suppliers in their turn described the devices according to their own documentation schemes, often using different terms, structures and media (paper, databases, CDs, e-catalogues, etc.). The situation was similar in the planning and development process, with device information frequently being duplicated in a number of different information technology (IT) systems.

Any method that is capable of recording all existing information once only during the planning and ordering process and making it available for further processing gives all parties involved an opportunity to concentrate on the essentials. A precondition for this is the standardization of both the descriptions of the objects and the exchange of information.

IEC 61987-1 makes an important step towards this goal by defining a generic structure in which product features of industrial process measurement and control equipment with analogue or digital output can be arranged. This facilitates the understanding of product descriptions when they are transferred from one party to another. Part 1 of this series of standards applies to the production of catalogues of process measuring and control equipment in paper form supplied by the manufacturer of the product.

The objective of IEC 61987-10 is to make processes involving measuring and control devices more efficient. This means that in addition to the device catalogue data of IEC 61987-1, information on operational and environmental aspects of the device is required. These aspects should be described and expressed in a form that can also be exchanged electronically and handled automatically.

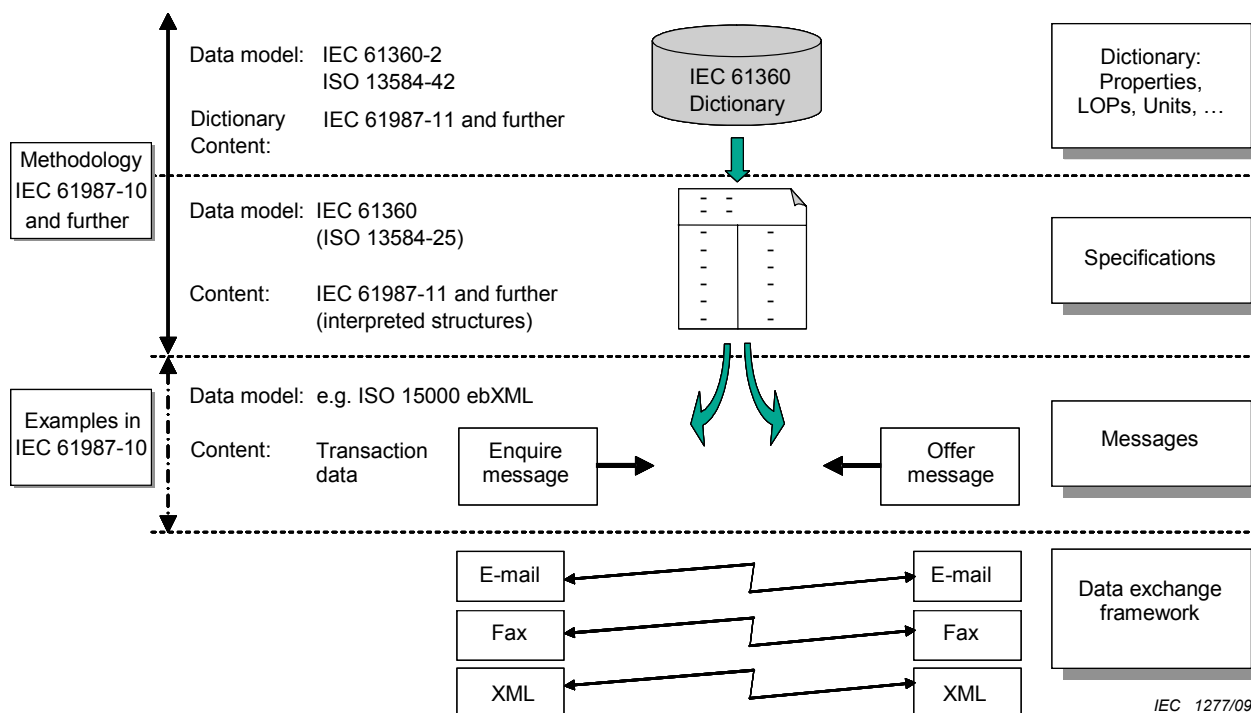
In IEC 61987-10, devices are specified by creating lists of properties (LOPs). The properties themselves are compiled into blocks that describe particular features of a device. By compiling blocks, it is possible to produce a list of properties that completely describe a particular device type or the surroundings in which the devices is or will be installed and operate.

This part of IEC 61987 deals with the following.

- It concerns both properties that may be used in an inquiry and a quotation. It also addresses detailed properties required for integration of a process control device in systems for other tasks, such as planning (for example in Computer Aided Engineering (CAE) systems), maintenance and Enterprise Resource Planning (ERP) systems.
- It provides a method for standardization that helps both suppliers and users of process control equipment and systems to optimize workflows, both within their own companies and in their exchanges with other companies. Depending on their role in the process, engineering, procurement and construction (EPC) contractors may be considered to be either users or suppliers.
- It ensures the clarity of the information provided, as the data and structures are described in unambiguous terms.

It should also be noted that the component data dictionary might also be used for other applications, for example the generation of parts lists. It is also possible to generate legacy specifications from the same source.

## Layers of electronic data exchange



**Figure 1 – Layers of electronic exchange procedures considered in this standard**

The individual layers of data exchange considered in this part of IEC 61987 are described as follows (see also Figure 1).

**Dictionary:** To achieve standardized, distributed, common semantics of the devices, this standard describes a concept dictionary that captures terms, definitions and relationships of the devices. The basis is an IEC component data dictionary for industrial process measurement and control devices that uses the data models of IEC 61360-2 and ISO 13584-42. The dictionary content comprises the properties and blocks which will be defined in future IEC 61987-11, etc. The same standards also define lists of properties for process measurement and control devices.

**NOTE 1** Not all devices will be included in the first edition of the dictionary, and it is possible that other devices will be added as new devices and technologies are developed.

**Specifications:** A process engineer planning a particular area in a plant uses an electronic specification sheet which draws its content from the component data dictionary. Similarly, a manufacturer quoting for an industrial process measuring device that fulfils the conditions defined in the specification sheet defines his device according to another specification sheet, which again draws its content from the component data dictionary. In interpretation of the specifications, the patterns of cardinality or polymorphism are evaluated.

**Messages:** Communication messages containing information about sender, receiver and transport protocol are generated from specifications.

**NOTE 2** The generation of messages is not in the scope of this standard.

**Data exchange framework:** The messages are sent from one business partner to the other using data exchange frameworks. These can be conventional (e-mail, fax) using templates as described in Annex C of this standard, or XML message based distribution frameworks.

EXAMPLE: One example of a XML message distribution framework is ISO 15000 (ebXML).

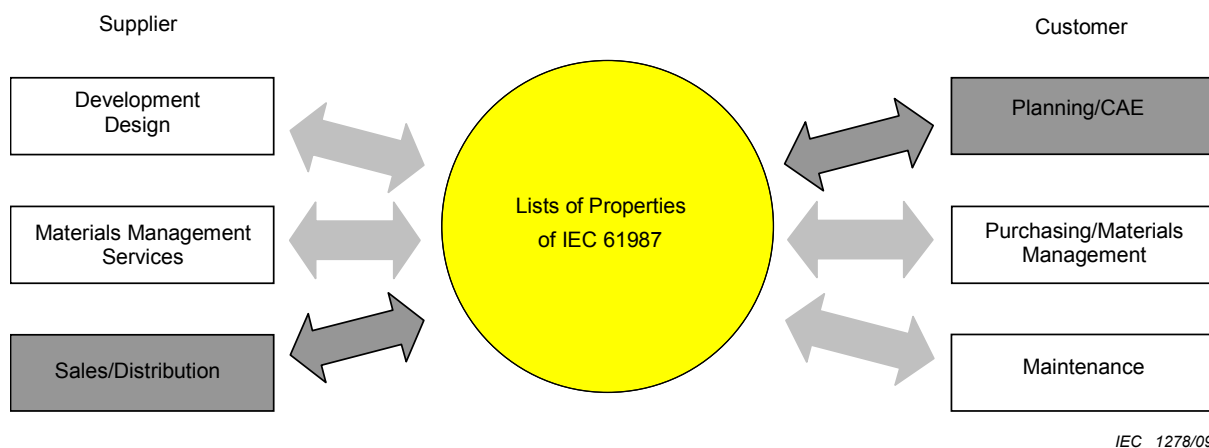
The methodology to create these specifications and the description of the mechanisms that are required to compile meaningful data into such specifications are defined in this standard. Several aspects of the devices are also the subject of standardisation in this standard. For example, one aspect describes the operating environment at the installation point, that is the conditions under which a process measuring device must operate, and another describes the device specification which meets these conditions.

The properties contained in the component data dictionary however, may also serve other purposes, for example, the precise location of the production unit or control loop might form part of administrative and commercial exchanges. Similarly, more precise engineering data such as the designation of terminals or device calibration data might also be exchanged by means of additional specification sheets or by supplementing the device specification sheets.

Beyond the scope of this standard is the specification of transactional data required to exchange electronic specification sheets between companies, as shown in the messages layer of Figure 1. Similarly, no particular framework for data exchange is specified.

Each device type is defined by an LOP containing the properties that apply to it. This is a basic requirement for exchanging device information between different information technology (IT) systems.

The use of the LOPs therefore supports data exchange between systems in a business-to-business relationship and between systems within an organization, for example, CAE or ERP systems (see Figure 2). This standard also makes provision for the storage of device data as LOPs in process control systems or field devices.



**Figure 2 – Support for business-to-business relationships through the use of Lists of Properties**

#### **IEC 61987-10, IEC 61987-11 and further**

IEC 61987-10 defines the approach for structuring lists of properties for electrical and process control equipment, for example measuring devices, actuators, motors, low-voltage switchgear, etc., in order to facilitate fully automatic engineering workflows in the planning and maintenance of industrial plants and to allow both the customers and the suppliers of the devices to optimize their processes and workflows.

Future IEC 61987-11 will contain lists of properties for measuring device types commonly used in the process industry.



Subsequent parts of IEC 61987 are already planned. These will contain lists of properties for other device families, such as actuators or signal conversion devices.

The properties themselves are to be found in the IEC Component Data Dictionary and follow the semantics and the structure of the IEC 61360 and ISO 13584 series of standards.

The concept of properties and structured lists is the subject of various standards. The data model described in the IEC 61360 and ISO 13584 series of standards is used in this standard. The structure defined for industrial-process measuring equipment in IEC 61987-1 is used, with some additions and modifications, to organise the contents of Device LOPs into blocks.

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

## **Part 10: Lists of Properties (LOPs) for Industrial-Process Measurement and Control for Electronic Data Exchange – Fundamentals**

### **1 Scope**

This part of IEC 61987 provides a method of standardizing the descriptions of process control devices, instrumentation and auxiliary equipment as well as their operating environments and operating requirements (for example, measuring point specification data). The aims of this standard are

- to define a common language for customers and suppliers through the publication of Lists of Properties (LOPs),
- to optimize workflows between customers and suppliers as well as in processes such as engineering, development and purchasing within their own organizations,
- to reduce transaction costs.

The standard describes industrial-process device types and devices using structured lists of properties and makes the associated properties available in a component data dictionary.

The intention is to produce a reference dictionary which allows a description of the inquiry, offer, company internal and other descriptions of process control systems, instrumentation and auxiliary equipment based on list of properties.

### **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 60529:1989, *Degrees of protection provided by enclosures (IP Code)*  
Amendment 1 (1999)

IEC 61346-1:1996, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules*

IEC 61360 (all parts), *Standard data element types with associated classification scheme for electric components*

IEC 61360-1, *Standard data element types with associated classification scheme for electric components – Part 1: Definitions – Principles and methods*

IEC 61360-2, *Standard data element types with associated classification scheme for electric components – Part 2: EXPRESS dictionary schema*

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

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

ISO 13584 (all parts), *Industrial automation systems and integration – Parts library*

ISO 13584-42, *Industrial automation systems and integration – Parts library – Part 42: Description methodology: Methodology for structuring part families*