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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Industrial-process measurement and control – Data structures and elements in process equipment catalogues – Part 16: Lists of properties (LOPs) for density measuring equipment for electronic data exchange

Mesure et commande des processus industriels – Éléments et structures de données dans les catalogues d'équipements de processus – Partie 16: Listes de propriétés (LOP) pour équipement de mesure de densité pour l'échange électronique de données

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

Part 16: Lists of properties (LOPs) for density measuring equipment for electronic data exchange

FOREWORD

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International Standard IEC 61987-16 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

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

FDIS	Report on voting
65E/512/FDIS	65E/520/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.

A list of all parts in the IEC 61987, 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 publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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.

INTRODUCTION

The exchange of product data between companies, business systems, engineering tools, data systems within companies 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 has been clearly defined.

Prior to this document, 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 only once 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 series proposes a method for standardization which will help both suppliers and users of measuring equipment to optimize workflows both within their own companies and in their exchanges with other companies. Depending on their role in the process, engineering firms may be considered here to be either users or suppliers.

The method specifies measuring equipment by means of blocks of properties. These blocks are compiled into lists of properties (LOPs), each of which describes a specific equipment (device) type. The IEC 61987 series covers both properties that may be used in an inquiry or a proposal and detailed properties required for integration of the equipment in computer systems for other tasks.

IEC 61987-10 defines structure elements for constructing lists of properties for electrical and process control equipment in order to facilitate automatic data exchange between any two computer systems in any possible workflow, for example engineering, maintenance or purchasing workflow and to allow both the customers and the suppliers of the equipment to optimize their processes and workflows. IEC 61987-10 also provides the data model for assembling the LOPs.

IEC 61987-11 specifies the generic structure for operating and device lists of properties (OLOPs and DLOPs). It lays down the framework for further parts of IEC 61987 in which complete LOPs for device types measuring a given physical variable and using a particular measuring principle will be specified. The generic structure may also serve as a basis for the specification of LOPs for other industrial-process control instrument types such as control valves and signal processing equipment.

IEC 61987-16 concerns density measuring equipment. It provides one operating LOP for all types of density transmitters which can be used, for example, as a request for various sorts of quotation. The DLOPs for the various density transmitter types provided in this part of IEC 61987 can be used in very different ways in the computer systems of equipment manufacturers and suppliers, in CAE and similar systems of EPC contractors and other engineering companies and especially different plant maintenance systems of the plant owners. The OLOP and the DLOPs provided correspond to the guidelines specified in IEC 61987-10 and IEC 61987-11.

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

Part 16: Lists of properties (LOPs) for density measuring equipment for electronic data exchange

1 Scope

This part of IEC 61987 provides an

- operating list of properties (OLOP) for the description of the operating parameters and the collection of requirements for a density measuring equipment, and
- device lists of properties (DLOP) for a range of density measuring equipment types describing them.

The structures of the OLOP and the DLOP correspond with the general structures defined in IEC 61987-11 and agree with the fundamentals for the construction of LOPs defined in IEC 61987-10.

Aspects other than the OLOP, needed in different electronic data exchange processes described in IEC 61987-10, will be published in IEC 61987-921.

Libraries of properties and of blocks used in the concerned LOPs are listed in Annex C and Annex D.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 61987-10:2009, *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*

IEC 61987-11:2016, *Industrial-process measurement and control – Data structures and elements in process equipment catalogues – Part 11: Lists of Properties (LOPs) of measuring equipment for electronic data exchange – Generic structures*

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1 Under preparation.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61987-10 and IEC 61987-11 apply.

4 General

4.1 Overview

The LOPs provided by this document are intended for use in electronic data exchange processes performed between any two computer systems. The two computer systems can both belong to the same company or they can belong to different companies as described in Annex C of IEC 61987-10:2009.

The OLOP for the family of density measuring equipment is to be found in Annex A while the DLOPs of the individual density device types are to be found in Annex B.

Structural elements such as LOP type, block and property defined in this document are available in electronic form in the “Process automation (IEC 61987 series)” domain of the IEC Common Data Dictionary (CDD).

4.2 Depiction of OLOP and DLOPs

The properties of the OLOP and DLOPs used in this part of IEC 61987 have been created in conformance with the requirements of the IEC 61360 series. As such, the structural elements, properties and attributes to be found in the IEC Common Data Dictionary are normative.

4.3 Examples of DLOP block usage

A general specification of a vibrating tube density transmitter is shown in Table 1.

Table 1 – Example for a vibrating tube density transmitter

Name of LOP type, block or property[2]	Assigned value	Unit
Identification		
manufacturer	Name of company	
name of product	Density Meter 2.0	
code of product	dimf2.0tvs-i-d15-m-1-h	
article number	3-60-83221-107	
software version	4	
hardware version	2.0	
serial number	10045999	
date of manufacture	2014-11-10	
number of device tag plates	1	
Device tag plate		
height of tag plate	37	mm
width of tag plate	80	mm
thickness of tag plate	1,5	mm
colour of tag plate	Silver	
material of tag plate	Stainless steel	
style of tag plate mounting	Riveted	
number of tag plate lines	6	
Text line tag plate_1		
line number of tag plate text	1	
content of text line	<type of device>	
colour of text	Blue	
font of text	Sans serif	
font size of text	6	pt
style of text	standard	
Text line tag plate_2		
line number of tag plate text	2	
content of text line	<qmax and serial number>	
colour of text	Blue	
font of text	sans serif	
font size of text	6	pt
line number of tag plate text	3	
Text line tag plate_3		
content of text line	<tmax, nominal size and nominal rating>	
colour of text	Blue	
font of text	Sans serif	pt
font size of text	6	
Text line tag plate_4		
line number of tag plate text	4	

2 In the CDD, block names start with a capital letter, property names with a lower case letter.

Name of LOP type, block or property[2]	Assigned value	Unit
content of text line	<name of transmitter and explosion protection>	
colour of text	Blue	
font of text	Sans serif	pt
font size of text	4	
Text line tag plate_5		
line number of tag plate text	5	
content of text line	<safety instruction>	
colour of text	Blue	
font of text	Sans serif	
font size of text	4	pt
Text line tag plate_6		
line number of tag plate text	6	
content of text line	<article number, ce marking, logo>	
colour of text	Blue	
font of text	Sans serif	
font size of text	4	pt
Application		
application description	Volume fraction measurement	
Function and system design		
measuring principle	Vibrating tube	
operating frequency	800	Hz
equipment architecture	Compact device	
software configuration	Via HART or buttons	
Input		
number of measured values	1	
Measured variable		
Type of measured value		
measured variable type	Volume fraction measurement	
Volume fraction measurement		
measuring principle	Calculated from measured density	
Measuring range for volume fraction		
lower range-limit of volume fraction	0	%
upper range-limit of volume fraction	100	%
minimum span for volume fraction	1	%
maximum turndown ratio	100	
base temperature	20	°C
number of outputs	1	
Output		
output type	Analog current output	
Analog current output		
Assigned variable		
assigned variable type	Volume fraction range	

Name of LOP type, block or property[2]	Assigned value	Unit
Assigned volume fraction range		
lower range-value of volume fraction	0	%
upper range-value of volume fraction	80	%
set span for volume fraction	80	%
calibrated span for volume fraction	80	%
Analog current output parameters		
type of current output	4/20 mA	
lower range end-value of current output	4	mA
upper range end-value of current output	20	mA
Explosion protection parameters for intrinsic safety		
Safety related properties for passive behaviour		
maximum input power (Pi)	825	mW
maximum input voltage (Ui)	30	V
maximum input current (Ii)	110	mA
maximum internal capacitance (Ci)	34	nF
maximum internal inductance (Li)	0,6	mH
Performance		
Reference conditions of the device		
reference ambient temperature	20	°C
Reference process conditions		
reference density	800; 1 000; 1 150	kg/m^3
Performance variable		
Type of performance variables		
performance variable type	Absolute performance for density	
Absolute performance for density		
accuracy of density measuring instrument	0,2	kg/m^3
Rated operating conditions		
Installation conditions		
Deployment conditions		
mounting orientation	Horizontal	
type of density measuring device mounting	Mounted in bypass	
recommended minimum volume flow rate	1	l/min
special process conditions	See manual	
installation instruction	See manual	
Environmental design ratings		
Normal environmental conditions		
minimum ambient temperature	–10	°C
maximum ambient temperature	+50	°C
Limiting environmental conditions		
minimum limiting value of ambient temperature	–15	°C
maximum limiting value of ambient temperature	+58	°C
minimum limiting value of storage temperature	–40	°C
maximum limiting value of storage temperature	+70	°C

Name of LOP type, block or property[2]	Assigned value	Unit
Process design ratings		
Normal process conditions		
maximum process absolute pressure	100	bar
minimum process temperature	–40	°C
maximum process temperature	+150	°C
minimum actual density	700	kg/m^3
maximum actual density	1 100	kg/m^3
Internal cleaning in place conditions		
maximum absolute pressure of cleaning fluid	100	bar
maximum temperature of cleaning fluid	+150	°C
Pressure-temperature design ratings		
maximum allowable absolute pressure	100	bar
maximum allowable temperature	+150	°C
Mechanical and electrical construction		
Overall dimensions and weight		
installation length of device	250	mm
weight	4,2	kg
length	250	mm
width	155	mm
height	468	mm
Structural design		
Flowtube assembly		
internal diameter of measuring tube	10	mm
material code	1.4571	
designation of wetted inner seal	none	
Transmitter body		
Process connection		
type of process connection	Flange	
nominal rating	PN 40	
nominal size	DN 15	
style of sealing surface	B2	
design code	EN 1092-1	
Material of construction		
material code	1.4571	
Transmitter housing		
material of housing	Diecast Aluminium	
type of protecting coating	Epoxy coating	
degree of protection	IP67	
Connection facility		
Cable/conduit entry		
cable gland	M10, metal	
provision of cable gland	By manufacturer due to EMC	
Connection cable		
type of cable	Twisted pair, shielded	