SLOVENSKI STANDARD
oSIST prEN IEC 62828-1:2024

01-maj-2024

Referenčni pogoji in postopki za preskušanje industrijskih in procesnih merilnih oddajnikov - 1. del: Splošni postopki za vse vrste oddajnikov

Reference conditions and procedures for testing industrial and process measurement transmitters - Part 1: General procedures for all types of transmitters

Referenzbedingungen und Testmethoden für Industrie- und Prozessmessgrößenumformer - Teil 1: Allgemeine Testmethoden für alle Arten von Messumformern

Conditions de référence et procédures pour l'essai des transmetteurs de mesure industrielle et de processus - Partie 1: Procédures générales pour tous les types de transmetteurs

Ta slovenski standard je istoveten z: **prEN IEC 62828-1:2024**

ICS:

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control

oSIST prEN IEC 62828-1:2024 **en,fr,de**

65B/1251/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62828-1 ED2**	
DATE OF CIRCULATION: **2024-03-08**	CLOSING DATE FOR VOTING: **2024-05-31**
SUPERSEDES DOCUMENTS: **65B/1239/RR**	

IEC SC 65B : MEASUREMENT AND CONTROL DEVICES	
SECRETARIAT: United States of America	SECRETARY: Mr Wallie Zoller
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

Reference conditions and procedures for testing industrial and process measurement transmitters - Part 1: General procedures for all types of transmitters

PROPOSED STABILITY DATE: 2029

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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REFERENCE CONDITIONS AND PROCEDURES FOR TESTING INDUSTRIAL AND PROCESS MEASUREMENT TRANSMITTERS
Part 1: General procedures for all types of transmitters

FOREWORD

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International Standard IEC 62828-1 has been prepared by Subcommittee 65B: Measurement and control devices, 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

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 stability 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.

The National Committees are requested to note that for this publication the stability date is 202X.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

INTRODUCTION

Most of the current IEC standards on industrial and process measurement transmitters are rather old and were developed having in mind devices based on analogue technologies. Today's digital industrial and process measurement transmitters are quite different from those analogue transmitters: they include more functions and newer interfaces, both towards the computing section (mostly digital electronic) and towards the measuring section (mostly mechanical). Even if some standards dealing with digital process measurement transmitters already exist, they are not sufficient, since some aspects of the performance are not covered by appropriate test methods.

In addition, existing IEC test standards for industrial and process measurement transmitters are spread over many documents, so that for manufacturers and users it is difficult, impractical and time-consuming to identify and select all the standards to be applied to a device measuring a specific process quantity (pressure, temperature, flow, level, etc.).

To help manufacturers and users, it was decided to review, complete and reorganize the relevant IEC standards and to create a more suitable, effective and comprehensive standard series that provides in a systematic way all the necessary specifications and tests required for different industrial and process measurement transmitters.

To solve the issues mentioned above and to provide an added value for the stakeholders, the new standard series on industrial and process measurement transmitters covers the following main aspects:

- Applicable normative references
- Specific terms and definitions
- Typical configurations and architectures for the various types of industrial and process measurement transmitters
- Hardware and software aspects
- Interfaces (to the process, to the operator, to the other measurement and control devices)
- Physical, mechanical and electrical requirements and relevant tests; clear definition of the test categories: type tests, acceptance tests and routine tests
- Performance (its specification, tests and verification)
- Environmental protection, hazardous areas application, functional safety, etc.
- Structure of the technical documentation.

To cover in a systematic way all the topics to be addressed, the standard series is organized in several parts. An updated list of all parts of the IEC 62828-x series, published under the general title "Reference conditions and procedures for testing industrial and process measurement transmitters", can be found on the IEC website. At the moment of the publication of this standard, the IEC 62828 consists of the following parts:

- Part 1: General procedures for all types of transmitters
- Part 2: Specific procedures for pressure transmitters
- Part 3: Specific procedures for temperature transmitters
- Part 4: Specific procedures for level transmitters
- Part 5: Specific procedures for flow transmitters

REFERENCE CONDITIONS AND PROCEDURES FOR TESTING INDUSTRIAL AND PROCESS MEASUREMENT TRANSMITTERS

Part 1: General procedures for all types of transmitters

1. Scope

This Part of IEC 62828 establishes a general framework for defining reference conditions and test procedures applicable for assessing the measurement performances of all types of industrial and process measurement transmitters (PMTs) used in measuring and control systems for industrial process and machinery.

For the purpose of this document, an analogue PMT is a process measurement transmitter with only analogue current and/or voltage output(s), irrespective the technology adopted and the complexity of the circuitry. All the other process measurement transmitters, with digital output(s) only or with hybrid analogue and digital output(s), are considered to be digital PMTs.

This part of IEC 62828 constitutes a common reference for the other parts of the series.

Specific test procedures and additional requirements for given types of PMTs (pressure, temperature, level, flow, etc.) are covered by other parts of this series.

Proximity devices according IEC 60947-series with analogue output are excluded from the scope of this standard.

Note 1: in industrial and process applications, to indicate the process measurement transmitters it is common also to use the terms “industrial transmitters”, or “process transmitters”.

Note 2: for better clarity, when the complete definition “industrial and process measurement transmitter” makes the sentence too long in this standard, the short term “transmitter”, or PMT, is used instead.

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 60050-300:2020, *International Electrotechnical Vocabulary (IEV)*
– Electrical and electronic measurements and measuring instruments
– Part 311: General terms relating to measurements
– Part 312: General terms relating to electrical measurements
– Part 313: Types of electrical measuring instruments
– Part 314: Specific terms according to the type of instrument

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests - Test Ea and guidance: Shock*

IEC 60068-2-31:2008, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-78:2012, *Environmental testing – Part 2-78:Tests – Test Cab: Damp heat, steady state*

IEC 60079 (all parts), *Electrical apparatus for explosive gas atmospheres*

IEC 60529:1989 + Amd1:1999 + Amd2:2013, *Degrees of protection provided by enclosures (IP code)*

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

IEC 60654-3:1983, *Operating conditions for industrial-process measurement and control equipment - Part 3: Mechanical influences*

IEC 60654-4:1987, *Operating conditions for industrial-process measurement and control equipment. Part 4: Corrosive and erosive influences.*

IEC 61158 *(all parts), Industrial communication networks – Fieldbus specifications*

IEC 61326-1:2020, *Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*

IEC 61499 series, *Function blocks*

IEC 61804 (all parts), *Function blocks (FB) for process control*

IEC 61918:2018 Industrial communication networks - Installation of communication networks in industrial premises

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*

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

IEC 61987-13:2016, *Industrial-process measurement and control - Data structures and elements in process equipment catalogues - Part 13: Lists of properties (LOP) for pressure measuring equipment for electronic data exchange*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK Code)*

IEC 62381:2012, *Automation systems in the process industry - Factory acceptance test (FAT), site acceptance test (SAT) and site integration test (SIT)*

ISO 10012:2004, *Measurement management systems - Requirements for measurement processes and measuring equipment*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement - Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO/IEC Guide 99:2007, *International Vocabulary of Metrology - Basic and general concepts and associated terms (VIM:2007)*

3. Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following address:

- IEC Electropedia; available at http//www.electropedia.org
- ISO Online browsing platform: available at http//www.iso.org/obp

The terms are divided in four groups for consistency.

3.1.1 Terms related to accuracy

3.1.1.1
accuracy (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 measurand

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.

[SOURCE: IEC 60050-311:2001, 311-06-08]

3.1.1.2
communication interface
Interface for input or output of variable parameters (e.g. correction of the characteristic curve) and data (e.g. measurement and calibration data, electronic nameplate, device status) of the pressure transmitter.

3.1.1.3
conformity
ability of a measuring instrument to provide an indication having a specified characteristic curve which can be linear, logarithmic, parabolic, etc.

3.1.1.4
dead band (dead zone)
finite range of values within which a variation of the input variable does not produce any measurable change in the output variable

Note 1 to entry: When this type of characteristic is intentional, it is sometimes called neutral zone

Note 2 to entry: This entry was numbered 351-24-14 in IEC 60050-351:2006.

Note 3 to entry: This value is usually insignificant for the actual instruments.

[SOURCE: IEC 60050-351:2013, 351-45-15, modified (Note 3 added)]

3.1.1.5
error
discrepancy between a computed, observed or measured value or condition, and the true, specified or theoretically correct value or condition

Note to entry: An error within a system may be caused by failure of one or more of its components, or by activation of a systematic fault.

[SOURCE: IEC 60050-192:2015, 192-03-02]

3.1.1.6
hysteresis
phenomenon represented by a characteristic curve which has a branch, called ascending branch, for increasing values of the input variable, and a different branch, called descending branch, for decreasing values of the input variable

Note to entry: the CDD code of this entry for Electronic Data Exchange is ABB661 and the hysteresis is defined as the difference between consecutive upscale and downscale outputs for any single test cycle at the same input test point

[SOURCE: IEC 60050-351:2013, 351-45-16, modified (Note to entry added)]

3.1.1.7
inaccuracy
maximum positive and negative deviation from the specified characteristic curve observed in testing a device under specified conditions and by a specified procedure

Note to entry: Accuracy is defined in IEC 60050-300, definition 311-06-08.

3.1.1.8
linearity
ability of a measuring instrument to provide an indication having a linear relationship with a defined quantity other than an influence quantity

Note to entry: The method of expression of lack of linearity is different for different kinds of instrument and is established in each particular instance.

[SOURCE: IEC 60050-311:2001, 311-06-05]

3.1.1.9
long term drift
drift in output monitored for 30 days at 90 % of span

[SOURCE: IEC 61987-1:2008, 3.22]

3.1.1.10
long term stability
drift of zero output signal in percent of full scale limit after a given period of normal operating conditions

Note 1 to entry: the long term stability can be evaluated over a different period of time, e.g. 6 months, 1, 2 or 5 years. Sometime manufacturers declare a life-time stability.

Note 2 to entry: depending the type of PMT, the drift can be referred to an upper range limit (e.g. digital pressure PMTs), a fixed value (e.g. certain level PMTs), a full scale (e.g. some analogue PMTs), etc.

Note 3 to entry: the CDD code of this entry for Electronic Data Exchange is ABB551, modified (time period)

3.1.1.11
measured error
largest positive or negative value of errors of the average upscale or downscale values at each point of measurement

3.1.1.12
measuring range
range defined by two values of the measurand, or quantity to be supplied, within which the limits of uncertainty of the measuring instrument are specified

Note to entry: An instrument can have several measuring ranges

[SOURCE: IEC 60050-311:2001, 311-03-12]

3.1.1.13
non-conformity
deviation from ideal behavior for devices that have a non-linear input/output relationship (which can be linear, logarithmic, parabolic, etc.), determined from the curve plotted using the overall average of corresponding upscale and downscale errors

Note 1 to entry: Non-conformity can be calculated and expressed in one of three ways:

– independent: curve positioned so as to minimize the maximum deviation;

– terminal-based: curve positioned so as to coincide with the actual characteristic curve at the upper and lower range-values;

– zero-based: curve positioned so as to coincide with the actual characteristic curve at the lower range-value.

Note 2 to entry: The corresponding properties are to be found in the CDD.

[SOURCE: IEC 61987-13:2016, modified]

3.1.1.14
non-linearity
deviation from ideal behavior for devices that have a linear input/out relationship, determined from the curve plotted using the overall average of corresponding upscale and downscale errors

Note 1 to entry: Non-linearity can be calculated and expressed in one of three ways:

– independent: line positioned so as to minimize the maximum deviation;

– terminal-based: line positioned so as to coincide with the actual characteristic curve at the upper and lower range-values;

– zero-based: line positioned so as to coincide with the actual characteristic curve at the lower range-value.

Note 2 to entry: The corresponding properties are to be found in the CDD.