BS EN IEC 62828-1:2018

BSI Standards Publication

Reference conditions and procedures for testing industrial and process measurement transmitters

Part 1: General procedures for all types of transmitters (IEC 62828-1:2017)

bsi.

National foreword

This British Standard is the UK implementation of EN IEC 62828-1:2018. It is identical to IEC 62828-1:2017.

The UK participation in its preparation was entrusted to Technical Committee GEL/65/2, Elements of systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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EUROPEAN STANDARD

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English Version

Reference conditions and procedures for testing industrial and process measurement transmitters - Part 1: General procedures for all types of transmitters (IEC 62828-1:2017)

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 (IEC 62828-1:2017)

Referenzbedingungen und Testmethoden für Industrie- und Prozessmessgrößenumformer - Teil 1: Allgemeine Testmethoden für alle Arten von Messumformern (IEC 62828-1:2017)

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 65B/1100/FDIS, future edition 1 of IEC 62828-1, prepared by IEC/TC 65B "Measurement and control devices, of IEC technical committee 65: Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62828-1:2018.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2018-09-15
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-12-15

EN IEC 62828 (series) supersedes EN 60770 (series).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62828-1:2017 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 61360-4:2005 DB	NOTE	Harmonized as EN 61360-4:2005 (not modified) corrigendum Dec. 2005.
IEC 61987-14:2016	NOTE	Harmonized as EN 61987-14:2016 (not modified).
IEC 62382:2012	NOTE	Harmonized as EN 62382:2013 (not modified).
CISPR 11:2015	NOTE	Harmonized as EN 55011:2016 (modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-1	-	Environmental testing -- Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing -- Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-6	-	Environmental testing -- Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-27	-	Environmental testing -- Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-31	-	Environmental testing -- Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	-
IEC 60068-2-78	-	Environmental testing -- Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60079-10	series	Electrical apparatus for explosive gas atmospheres -- Part 10: Classification of hazardous areas	EN 60079-10	series
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
			+EN 60529:1991/corrigendum May 1993	1993
IEC 60529 AMD 1	1999	Degrees of protection provided by enclosures (IP_code); Amendment_1	-	-
IEC 60529 AMD 2	2013	Degrees of protection provided by enclosures (IP_code); Amendment_2	-	-
IEC 60654-1	1993	Industrial-process measurement and control equipment - Operating conditions -- Part 1: Climatic conditions	EN 60654-1	1993
IEC 60654-3	1983	Operating conditions for industrial-process measurement and control equipment -- Part 3: Mechanical influences	EN 60654-3	1997
IEC 60654-4	1987	Operating conditions for industrial-process measurement and control equipment -- Part 4: Corrosive and erosive influences	EN 60654-4	1997
IEC 60721-3-1	-	Classification of environmental conditions - - Part 3: Classification of groups of environmental parameters and their severities -- Section 1: Storage	EN 60721-3-1	-
IEC 60721-3-2	-	Classification of environmental conditions - - Part 3: Classification of groups of environmental parameters and their severities -- Section 2: Transportation	EN 60721-3-2	-

IEC 61010-1	2010	Safety requirements for electrical equipment for measurement, control and laboratory use -- Part 1: General requirements	EN 61010-1	2010
IEC 61158	series	Industrial communication networks - Fieldbus specifications - Part 1: Overview and guidance for the IEC 61158 and IEC 61784 series	EN 61158	series
IEC 61298-1	2008	Process measurement and control devices - General methods and procedures for evaluating performance -- Part 1: General considerations	EN 61298-1	2008
IEC 61298-4	2008	Process measurement and control devices - General methods and procedures for evaluating performance -- Part 4: Evaluation report content	EN 61298-4	2008
IEC 61499	series	Function blocks -- Part 1: Architecture	EN 61499	series
IEC 61508	series	Functional safety of electrical/electronic/programmable electronic safety-related systems -- Part 1: General requirements	EN 61508	series
IEC 61511	series	Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and application programming requirements	EN 61511	series
IEC 61784-1	-	Industrial communication networks - Profiles -- Part 1: Fieldbus profiles	EN 61784-1	-
IEC 61784-2	-	Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3	EN 61784-2	-
IEC 61784-5	series	Industrial communication networks - Profiles -- Part 5-1: Installation of fieldbuses - Installation profiles for CPF 1	EN 61784-5	series
IEC 61804-2	-	Function Blocks (FB) for process control -- Part 2: Specification of FB concept	EN 61804-2	-
IEC 61918	-	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918	-
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	EN 61987-11	2017
IEC 62061	2005	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems	EN 62061	2005
			+EN 62061:2005/corrigendum Feb. 2010	2010
IEC 62262	2002	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)	EN 62262	2002
IEC 62381	2012	Automation systems in the process industry - Factory acceptance test (FAT), site acceptance test (SAT) and site integration test (SIT)	EN 62381	2012

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)	-	-

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CONTENTS

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 IEC 62828 series cancels and replaces the IEC 60770 series and proposes revisions for the IEC 61298 series.

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

FDIS	Report on voting
65B/1100/FDIS	65B/1107/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62828 series, published under the general title *Reference conditions and procedures for testing industrial and process measurement transmitters*, 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 "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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. At the moment of the publication of this document, 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*

In preparing the IEC 62828 series many test procedures were taken, with the necessary improvements, from the IEC 61298 series. As the actual IEC 61298 series is applicable to all process measurement and control devices, when the IEC 62828 series is completed the IEC 61298 series will be revised to harmonise it with the IEC 62828 series, taking out from its scope the industrial and process measurement transmitters. During the time when 61298 scope is being updated, the new series IEC 62828 takes precedence for industrial and process measurement transmitters.

When the IEC 62828 series is published, the IEC 60770 series will be withdrawn.

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 to all types of industrial and process measurement transmitters (PMTs) used in measuring and control systems for industrial process and machinery. These reference test conditions are divided into “standard reference conditions”, which apply when determining the accuracy of measurement, and “ambient and process reference conditions”, which are used to assess the influence of external quantities on the measurement.

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

For general test procedures, reference is made to IEC 62828-1, which is applicable to all types of industrial and process measurement transmitters.

Additional specific test procedures for given types of PMTs (pressure, temperature, level, flow) are covered by other parts of this series.

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 document, the short term “transmitter” is used instead.

Proximity devices with analogue output are excluded from the scope of this document.

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.

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

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

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

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

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

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