BSI Standards Publication

Reference conditions and procedures for testing industrial and process measurement transmitters

Part 4: Specific procedures for level transmitters

bsi.

National foreword

This British Standard is the UK implementation of EN IEC 62828-4:2020. It is identical to IEC 62828-4:2020. Together with BS EN IEC 62828-1:2018, BS EN IEC 62828-2:2018, BS EN IEC 62828-3:2018 and BS EN IEC 62828-5:2020, it supersedes BS EN 60770-1:2011, BS EN 60770-2:2010 and BS EN 60770-3:2014, which will be withdrawn on 23 May 2021.

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 committee manager.

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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Reference conditions and procedures for testing industrial and process measurement transmitters - Part 4: Specific procedures for level transmitters (IEC 62828-4:2020)

Conditions de référence et procédures pour l'essai des transmetteurs de mesure industriels et de processus - Partie 4: Procédures spécifiques pour les transmetteurs de niveau (IEC 62828-4:2020)

Referenzbedingungen und Testmethoden für Industrie- und Prozessmessgrößenumformer - Teil 4: Spezielle Testmethoden für Füllstandmessumformer (IEC 62828-4:2020)

This European Standard was approved by CENELEC on 2020-09-22. 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.

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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/1178(F)/FDIS, future edition 1 of IEC 62828-4, prepared by SC 65B "Measurement and control devices" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62828-4:2020.

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) 2021-06-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-09-22

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 62828-4:2020 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 60529:1989	NOTE Harmonized as EN 60529:1991 (not modified)
IEC 60947-5-6:1999	NOTE Harmonized as EN 60947-5-6:2000 (not modified)
IEC 61140:2016	NOTE Harmonized as EN 61140:2016 (not modified)
IEC 61298-1:2008	NOTE Harmonized as EN 61298-1:2008 (not modified)
IEC 61298-2:2008	NOTE Harmonized as EN 61298-2:2008 (not modified)
IEC 61298-3:2008	NOTE Harmonized as EN 61298-3:2008 (not modified)
IEC 61987-1:2006	NOTE Harmonized as EN 61987-1:2007 (not modified)
IEC 61987-11:2016	NOTE Harmonized as EN 61987-11:2017 (not modified)
IEC 61987-15	NOTE Harmonized as EN 61987-15
IEC 62683-1:2017	NOTE Harmonized as EN 62683-1:2017 (not modified)

(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 60068-2-6	2007	Environmental testing - Part 2–6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	2008
IEC 60068-2-27	2008	Environmental testing - Part 2–27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	2009
IEC 60068-2-64	2008	Environmental testing - Part 2–64: Tests - Test Fh: Vibration, broadband random and guidance	EN 60068-2-64	2008
IEC 61326-2-3	2012	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2–3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning	EN 61326-2-3	2013
IEC 62828-1	2017	Reference conditions and procedures for testing industrial and process measurement transmitters - Part 1: General procedures for all types of transmitters	EN IEC 62828-1	2018
IEC 62828-2	2017	Reference conditions and procedures for testing industrial and process measurement transmitters - Part 2: Specific procedures for pressure transmitters	EN IEC 62828-2	2018

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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REFERENCE CONDITIONS AND PROCEDURES FOR TESTING INDUSTRIAL AND PROCESS MEASUREMENT TRANSMITTERS –

Part 4: Specific procedures for level transmitters

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.
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International Standard IEC 62828-4 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/1178/FDIS	65B/1182/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.

This International Standard is to be used in conjunction with IEC 62828-1:2017.

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 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) and towards the measuring section (mostly mechanical). Even if some standards dealing with digital transmitters already exist, they are not sufficient, since some aspects of the performance are not covered by appropriate test methods.

In addition, the existing IEC test standards for industrial and process measurement transmitters are spread over many documents, so that for manufacturers and users it was 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, level, flow, etc.).

To help the manufacturers and users, it was decided to review, complete and reorganize the existing IEC standards on the industrial and process measurement transmitters and to create a more suitable, effective and comprehensive standard series that provides, in a systematic way, all the needed specifications and tests for the 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 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;
- performances (their 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 time of publication of this document IEC 62828 consists of the following parts:

- IEC 62828-1: *General procedures for all types of transmitters*
- IEC 62828-2: *Specific procedures for pressure transmitters*
- IEC 62828-3: *Specific procedures for temperature transmitters*
- IEC 62828-4: *Specific procedures for level transmitters*
- IEC 62828-5: *Specific procedures for flow transmitters*

In preparing the IEC 62828 series (all parts), many test procedures were taken, with the necessary improvements, from the IEC 61298 series. As the IEC 61298 series is currently applicable to all process measurement and control devices, when the IEC 62828 series is completed, the IEC 61298 series will be revised to harmonize it with the IEC 62828 series, taking out from its scope the industrial and process measurement transmitters. During the time when the scope of the IEC 61298 series is being updated, the new IEC 62828 series 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 4: Specific procedures for level transmitters

1 Scope

This part of IEC 62828 establishes specific procedures for testing level transmitters used in measuring and control systems for industrial process and machinery control systems. For general test procedures, reference is to be made to IEC 62828-1:2017, applicable to all types of transmitters.

Throughout this document, the term "industrial transmitters" covers all types of transmitters used in measuring and control systems for industrial processes and for machinery.

The requirements of this document are applicable to all level measurement principles.

Detailed description of transmitters is given for two main principles for improved clarity.

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 60068-2-6:2007, *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 60068-2-64:2008, *Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance*

IEC 61326-2-3:2012, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-3: Particular requirements – Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning*

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

IEC 62828-2:2017, *Reference conditions and procedures for testing industrial and process measurement transmitters – Part 2: Specific procedures for pressure transmitters*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62828-1 and the following apply.

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

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