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Industriell processtyrning – Referensförhållanden och metoder vid provning av mätgivare – Del 1: Allmänna metoder för alla typer av mätgivare

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

Som svensk standard gäller europastandarden EN IEC 62828-1:2018. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 62828-1:2018.

Nationellt förord

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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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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-12-15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).

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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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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	-

EN IEC 62828-1:2018 (E)

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- 2008 3	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)	-	-

CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	9
3 Terms, definitions and abbreviated terms	11
3.1 Terms and definitions.....	11
3.1.1 Terms related to accuracy	11
3.1.2 Terms related to the uncertainty	16
3.1.3 Terms regarding operation and practical installation	17
3.1.4 Terms related to test procedures	19
3.2 Abbreviated terms.....	19
3.3 Reference to CDD.....	19
4 General description of the PMT	20
5 Reference test conditions	20
5.1 General.....	20
5.2 Standard reference test conditions.....	21
5.2.1 General	21
5.2.2 Environmental test conditions	21
5.2.3 Power supply conditions	21
5.2.4 Load conditions	21
5.2.5 Mounting positions.....	21
5.3 Reference test conditions for ambient and process quantities influencing operation	22
5.3.1 General	22
5.3.2 Process conditions	22
5.3.3 Environmental atmospheric conditions	22
5.3.4 Mechanical vibration	23
5.3.5 Shock, drop and topple	24
5.3.6 Power supply.....	24
5.3.7 Electromagnetic compatibility (EMC)	24
5.4 Reference design criteria	25
5.4.1 General	25
5.4.2 Enclosure protection against solid, liquid (IP) and impact (IK).....	25
5.4.3 Enclosure protection against corrosive and erosive influences.....	25
5.4.4 Electrical safety (insulation resistance, dielectric strength)	25
5.4.5 Hazardous environment (for application in explosive atmosphere)	25
5.4.6 Functional safety	25
6 Test procedures	25
6.1 General.....	25
6.1.1 Overview	25
6.1.2 Classification of the tests.....	26
6.1.3 Preparation of the tests	27
6.1.4 Preliminary assessment.....	28
6.2 Type tests at standard reference test conditions	35
6.2.1 General	35
6.2.2 Accuracy and related factors	35

6.2.3	Static behaviour.....	41
6.2.4	Dynamic behaviour	44
6.3	Type tests at operating reference test conditions	49
6.3.1	General	49
6.3.2	Ambient temperature effects	49
6.3.3	Ambient relative humidity effects	50
6.3.4	Vibration effects	51
6.3.5	Shock, drop and topple	53
6.3.6	Accelerated operational life test.....	53
6.3.7	EMC tests.....	53
6.3.8	Further test procedures	54
6.3.9	Additional tests for digital transmitters	54
6.4	Routine tests.....	56
6.5	Acceptance, integration, periodic and maintenance tests	56
6.5.1	General	56
6.5.2	Periodical verification	56
6.5.3	Periodical calibration	56
7	Test report and technical documentation	56
7.1	Test report	56
7.2	Technical documentation	57
7.3	Total probable error	57
Annex A	(informative) General description of a PMT	58
A.1	General description of a PMT.....	58
A.2	Sensor subsystem	60
A.3	Data processing.....	60
A.4	Output subsystem	60
A.5	Human interface	60
A.6	External system interface.....	61
A.7	Power supply assembly.....	61
Annex B	(informative) Tests at the standard reference conditions	62
Annex C	(informative) Tests at ambient and process reference conditions for influence quantities.....	63
Annex D	(informative) Function block testing	64
D.1	General.....	64
D.2	General qualitative checks	64
D.3	Time-dependent function blocks.....	64
D.4	Time-independent function blocks	64
Annex E	(informative) Measurement uncertainty	65
E.1	Example of determination of the measurement uncertainty.....	65
E.2	Single values influencing the uncertainty measurement	65
E.3	Estimation of standard measurement uncertainty (u)	65
E.4	Combined standard measurement uncertainty (u_C).....	65
E.5	Expanded measurement uncertainty (U)	65
Annex F	(informative) Dependability testing method.....	66
F.1	General.....	66
F.2	Design analysis.....	66
F.3	Reference conditions	66
F.4	Fault injection test for internal PMT failures	68

F.5	Observations	69
F.5.1	General	69
F.5.2	Reporting and ranking of fault behaviour	69
F.6	Human faults	71
F.6.1	Mis-operation test	71
F.6.2	Maintenance error test	71
F.6.3	Expectations and reporting	72
Annex G (informative)	Throughput testing for digital PMT	73
G.1	General	73
G.2	PMT throughput in stand-alone conditions	74
G.2.1	Reference conditions	74
G.2.2	Test conditions	74
G.2.3	Observations and measurements	74
G.3	Throughput in a fieldbus configuration	75
G.3.1	Reference conditions	75
G.3.2	Test conditions	75
G.3.3	Observations and measurements	76
G.3.4	Precautions	76
Annex H (informative)	FAT, SAT and SIT	77
H.1	General	77
H.2	Factory acceptance tests FAT (accuracy measurement and others)	77
H.3	Site acceptance tests SAT (visual inspection and calibration test)	77
H.4	Site integration tests SIT (additional test for communications)	77
Annex I (informative)	Technical documentation	78
I.1	General	78
I.2	Technical datasheet	78
I.3	User manual	81
I.4	Safety manual	81
I.5	Commissioning, periodic and maintenance tests	81
I.5.1	General	81
I.5.2	Storage conditions	81
I.5.3	Transportation conditions	81
I.5.4	Mounting position	81
I.5.5	Process connections	82
I.5.6	Mechanical connections	82
I.5.7	Output connections	82
I.6	EC declaration of conformity	82
I.7	Certificates for application in hazardous area	82
I.8	Calibration certificates	82
I.9	Spare parts list	82
I.10	Marking	82
Annex J (informative)	Total Probable Error calculation	83
Bibliography	84

Figure 1 – Example of limit operation region in terms of output load resistance versus supply voltage.....	18
Figure 2 – Block diagram of a generic PMT.....	20
Figure 3 – Error curves corresponding to the example of Table 17.....	39

Figure 4 – Example of responses to a step input with overshoot	45
Figure 5 – Example of responses to a step input without overshoot	46
Figure 6 – Example 1 of frequency response	47
Figure 7 – Example 2 of frequency response	48
Figure 8 – Example of diagram of the compensation options	50
Figure 9 – Levels of device compatibility from IEC 61804-2	55
Figure A.1 – Schematic block diagram of an analogue industrial and process measurement transmitter (example)	58
Figure A.2 – Schematic block diagram of an intelligent industrial and process measurement transmitter (example)	59
Figure F.1 – Schematic block diagram of an intelligent industrial and process measurement transmitter (example)	67
Figure F.2 – Test tool for low impedance circuits and shared circuits	68
Figure F.3 – Matrix for reporting fault behaviour	70
Figure F.4 – Ranking of various types of failure modes	71
Figure G.1 – PMT in stand-alone configuration	73
Figure G.2 – Example of a PMT as a participant in a fieldbus installation	74
Table 1 – Environmental test conditions	21
Table 2 – Common ambient temperatures ranges	23
Table 3 – Common ambient relative humidity ranges	23
Table 4 – Vibration test levels	24
Table 5 – Power supply ranges for voltage and frequency	24
Table 6 – Example of number of measurement cycles and number and position of test points	27
Table 7 – Example of settings of span and lower range value adjustments for analogue devices	27
Table 8 – Checklist for assessing functionality	29
Table 9 – Checklist for assessing configurability	30
Table 10 – Checklist for assessing hardware configuration	31
Table 11 – Checklist for assessing adjustment and tuning procedures	31
Table 12 – Checklist for assessing operability	32
Table 13 – Checklist for assessing dependability	33
Table 14 – Checklist for assessing manufacturer's support	34
Table 15 – Example of functions listing for a temperature compensated single variable PMT (differential pressure)	34
Table 16 – Example of functions listing for a temperature compensated multi-variable PMT (differential pressure plus pressure and temperature)	35
Table 17 – Example table of PMT errors	38
Table B.1 – Summary of the tests at the reference conditions	62
Table C.1 – Summary of the tests for influence quantities at the operating conditions	63
Table I.1 – Example of compilation of technical data for a generic PMT	79

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 1: General procedures for all types of 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 62828-1 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*

IEC 60079-10 (all parts), *Explosive atmospheres – Part 10: Classification of areas*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

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 60721-3-1, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 1: Storage*

IEC 60721-3-2, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 2: Transportation*

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

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

IEC 61298-1:2008, *Process measurement and control devices – General methods and procedures for evaluating performance – Part 1: General considerations*

IEC 61298-4:2008, *Process measurement and control devices – General methods and procedures for evaluating performance – Part 4: Evaluation report content*

IEC 61499 (all parts), *Function blocks*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 61511 (all parts), *Functional safety – Safety instrumented systems for the process industry sector*

IEC 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

IEC 61784-2, *Industrial communication networks – Profiles – Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3*

IEC 61784-5 (all parts), *Industrial communication networks – Profiles – Part 5: Installation of fieldbuses*

IEC 61804-2, *Function blocks (FB) for process control – Part 2: Specification of FB concept*

IEC 61918, *Industrial communication networks – Installation of communication networks in industrial premises*

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

IEC 62061:2005, *Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*

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/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)*