ICS 17.220.20 SLOVENSKÁ TECHNICKÁ NORMA Apríl 2025

STN	**Elektrické meracie prevodníky na prevod striedavých a jednosmerných elektrických veličín na analógové alebo digitálne signály**	**STN EN IEC 60688** 35 6215

Electrical measuring transducers for converting AC and DC electrical quantities to analogue or digital signals

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/25

Obsahuje: EN IEC 60688:2024, IEC 60688:2024

Oznámením tejto normy sa od 31.12.2027 ruší
STN EN 60688 (35 6215) z júna 2013

obsahuje farebné strany

140269

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60688

December 2024

ICS 17.220.20

Supersedes EN 60688:2013

English Version

Electrical measuring transducers for converting AC and DC electrical quantities to analogue or digital signals (IEC 60688:2024)

Transducteurs électriques de mesure convertissant les grandeurs électriques alternatives ou continues en signaux analogiques ou numériques
(IEC 60688:2024)

Elektrische Messumformer zur Umwandlung von elektrischen Wechselstromgrößen und Gleichstromgrößen in analoge oder digitale Signale
(IEC 60688:2024)

This European Standard was approved by CENELEC on 2024-10-16. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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

Ref. No. EN IEC 60688:2024 E

European foreword

The text of document 85/921/FDIS, future edition 5 of IEC 60688, prepared by TC 85 "Measuring equipment for electrical and electromagnetic quantities" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60688:2024.

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) 2025-12-31
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2027-12-31

This document supersedes EN 60688:2013 and all of its amendments and corrigenda (if any).

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.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60688:2024 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 standard indicated:

IEC 60051 (series)	NOTE	Approved as EN IEC 60051 (series)
IEC 60051-1	NOTE	Approved as EN 60051-1
IEC 60068-2-30	NOTE	Approved as EN 60068-2-30
IEC 60255-151	NOTE	Approved as EN 60255-151
IEC 60359	NOTE	Approved as EN 60359
IEC 60364-4-44	NOTE	Approved as HD 60364-4-444
IEC 60381-1:1982	NOTE	Approved as HD 452.1 S1:1984 (not modified)
IEC 60664-1	NOTE	Approved as EN IEC 60664-1
IEC 61000-4-7	NOTE	Approved as EN 61000-4-7
IEC 61010 (series)	NOTE	Approved as EN IEC 61010 (series)
IEC 61869 (series)	NOTE	Approved as EN IEC 61869 (series)
IEC 62052-11:2020	NOTE	Approved as EN IEC 62052-11:2021 (not modified) + A11:2022

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.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-11	-	Environmental testing - Part 2-11: Tests - Test Ka: Salt mist	EN IEC 60068-2-11	-
IEC 60068-2-27	-	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-52	2017	Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN IEC 60068-2-52	2018
IEC 60228	2023	Conductors of insulated cables	EN IEC 60228	2024
IEC/TR 61000-2-3	-	Electromagnetic compatibility (EMC) - Part 2: Environment - Section 3: Description of the environment - Radiated and non-network-frequency-related conducted phenomena	-	-
IEC 61010-1	2010	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements	EN 61010-1	2010
+ A1 (mod)	2016		+ A1	2019
IEC 61010-2-030	2023	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for equipment having testing or measuring circuits	-	-
IEC 61326-1	2020	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements	EN IEC 61326-1	2021

EN IEC 60688:2024 (E)

Publication	Year	Title	EN/HD	Year
IEC 61557-12	2018	Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC. - Equipment for testing, measuring or monitoring of protective measures - Part 12: Power metering and monitoring devices (PMD)	EN IEC 61557-12	2022
+ A1	2021		+ A1	2022
IEC 61558-1	2017	Safety of transformers, reactors, power supply units and combinations thereof - Part 1: General requirements and tests	EN IEC 61558-1	2019
IEC 60664-1	2020	Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests	EN IEC 60664-1	2020
IEC 62586-1	2017	Power quality measurement in power supply systems - Part 1: Power quality instruments (PQI)	EN 62586-1	2017
ISO 4628-3	-	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting	-	-

IEC 60688

Edition 5.0 2024-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Electrical measuring transducers for converting AC and DC electrical quantities to analogue or digital signals

Transducteurs électriques de mesure convertissant les grandeurs électriques alternatives ou continues en signaux analogiques ou numériques

IEC 60688:2024-08(en-fr)

IEC 60688

Edition 5.0 2024-08

INTERNATIONAL STANDARD

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
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INTERNATIONALE

ICS 17.220.20 ISBN 978-2-8322-9547-2

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL MEASURING TRANSDUCERS FOR CONVERTING AC AND DC ELECTRICAL QUANTITIES TO ANALOGUE OR DIGITAL SIGNALS

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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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60688 has been prepared by IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2021. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) updating normative references;
b) updating definitions;
c) updating structure;
d) adding DC power measurement.

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

Draft	Report on voting
85/921/FDIS	85/932/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

In this document, the following print types are used:

– requirements and definitions: in roman type;

– NOTES: in smaller roman type;

– *compliance: in italic type*.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document 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

Energy distribution systems need to guarantee energy efficiency, availability, and network performance to address the following challenges:

- meet sustainable development requirements, where energy measurement is necessary to identify sources of energy savings, and to improve the energy performance of manufacturing, commercial organisations, and public services;
- adjust to technological evolutions (electronic loads, electronic measuring methods, etc.);
- address end-user needs (cost saving, compliance building regulations, etc.) regarding electrical energy management;
- ensure safety and continuity of service;
- adjust to the evolution of installation standards;
- meet the needs of new applications for DC systems (photovoltaic, electrical vehicle, DC distribution, etc.).

Monitoring electrical quantities in internal networks contributes to addressing these challenges.

To set up this monitoring, transducers:

- perform the measurement of different types of electrical quantities,
- convert AC and DC electrical quantities to analogue or digital signals,
- can be combined with measuring equipment to monitor and analyse electrical quantities.

NOTE Some of the terms used in this document are different from those used in IEC 60051 (all parts) due to the fundamental differences between indicating instruments and measuring transducers.

ELECTRICAL MEASURING TRANSDUCERS FOR CONVERTING AC AND DC ELECTRICAL QUANTITIES TO ANALOGUE OR DIGITAL SIGNALS

1 Scope

This document applies to transducers (TRD) with electrical inputs and outputs for making measurements of AC or DC electrical quantities. The output signal can be in the form of an analogue or digital signal.

This document applies to measuring transducers used for converting electrical quantities such as:

– current,
– voltage,
– active power,
– reactive power,
– power factor,
– phase angle,
– frequency,
– harmonics or total harmonic distortion,
– apparent power, and
– DC power

to an output signal.

NOTE The above electrical quantities include AC and/or DC components.

This document applies

a) if the fundamental frequency of the input(s) lies between 0 Hz and 1 500 Hz,
b) to the electrical measuring transducer if it is part of a system for the measurement of an electrical or non-electrical quantity,
c) to transducers for use in a variety of applications such as telemetry and process control and in one of a number of defined environments.

This document is not applicable for:

– instrument transformers that comply with IEC 61869 (all parts),
– transmitters for use in an industrial process application that comply with IEC 60770 (all parts),
– power metering and monitoring devices (PMD) that comply with IEC 61557-12,
– meters that comply with the IEC 62053 series,
– handheld sensors,
– residual current monitoring devices (RCMs) that comply with IEC 62020-1,
– residual current detecting devices (RDC-DD) that comply with IEC 62955,
– in-cable control and protection devices (IC-CPDs) that comply with IEC 62752,
– modular residual current devices (MRCDs) that comply with IEC 60947-2:2016/AMD1:2019, Annex M.

Within the measuring range, the output signal is a function of the measurand. An auxiliary supply can be required.

This document is intended:

– to specify the terminology and definitions relating to transducers whose main application is in industry,
– to unify the test methods used in evaluating transducer performance,
– to specify accuracy limits and output values for transducers.

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

IEC 60068-2-11, *Environmental testing – Part 2-11: Tests – Test Ka: Salt mist*

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

IEC 60068-2-52:2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60228:2023, *Conductors of insulated cables*

IEC TR 61000-2-3, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 3: Description of the environment – Radiated and non-network-frequency-related conducted phenomena*

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-1:2010/AMD1:2016

IEC 61010-2-030:2023, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for equipment having testing or measuring circuits*

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

IEC 61557-12:2018, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 12: Power metering and monitoring devices (PMD)*
IEC 61557-12:2018/AMD1:2021

IEC 61558-1:2017, *Safety of transformers, reactors, power supply units and combinations thereof – Part 1: General requirements and tests*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

IEC 62586-1:2017, *Power quality measurement in power supply systems – Part 1: Power quality instruments (PQI)*

ISO 4628-3:2016, *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3: Assessment of degree of rusting*