SLOVENSKI STANDARD
SIST EN 60688:1995

01-avgust-1995

Električni merilni pretvorniki za pretvarjanje izmeničnih električnih veličin v analogne ali digitalne signale (IEC 60688:1992)

Electrical measuring transducers for converting a.c. electrical quantities to analogue or digital signals

Elektrische Messumformer zur Umwandlung von Wechselstromgrößen in analoge oder digitale Signale

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

Ta slovenski standard je istoveten z: **EN 60688:1992**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

SIST EN 60688:1995 **en**

EUROPEAN STANDARD

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ENGLISH VERSION

Electrical measuring transducers for converting a.c. electrical quantities to analogue or digital signals (IEC 688:1992)

Transducteurs électriques de mesure convertissant les grandeurs électriques alternatives en signaux analogiques ou numériques (CEI 688:1992)

Meßumformer für die Umwandlung von Wechselstromgrößen in analoge oder digitale Signale (IEC 688:1992)

This European Standard was approved by CENELEC on 1992-03-24. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

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FOREWORD

The text of document IEC 85(C.O.)17, as prepared by IEC/TC 85, was submitted to the IEC-CENELEC parallel vote in June 1991.

The reference document was approved by CENELEC as EN 60688 on 24 March 1992.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1993-01-15
- latest date of withdrawal of conflicting national standards	(dow)	1993-01-15

For products which have complied with the relevant national standard before 1993-01-15, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1998-01-15.

Annexes designated "normative" are part of the body of the standard. In this standard, annex ZA is normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 688:1992 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC Publication	Date	Title	EN/HD	Date
50(301)	1983	International Electrotechnical Vocabulary (IEV) - Chapter 301: General terms on measurements in electricity	-	-
50(302)	1983	Chapter 302: Electrical measuring instruments	-	-
50(303)	1983	Chapter 303: Electronic measuring instruments	-	-
68-2-3	1985	Basic Safety Publication - Environmental testing - Part 2: Tests methods Test Ca: Damp heat, steady state (second impression)	HD 323.2.3 S2	1987
255-4	1976	Electrical relays - Part 4: Single input energizing quantity measuring relays with dependent specified time	-	-
414, mod	1973	Safety requirements for indicating and recording electrical measuring instruments and their accessories	HD 215 S1	1974
521	1988*	Class 0.5, 1 and 2 alternating-current watt-hour meters	-	-

* IEC 521:1976, modified, was harmonized as HD 309.1 S1:1979

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

Electrical measuring transducers for converting a.c. electrical quantities to analogue or digital signals

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL MEASURING TRANSDUCERS FOR CONVERTING A.C. ELECTRICAL QUANTITIES TO ANALOGUE OR DIGITAL SIGNALS

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

This International Standard has been prepared by IEC Technical Committee No. 85: Measuring equipment for basic electrical quantities. It cancels and replaces IEC 688-1 and IEC 688-2 and forms the second edition of IEC 688.

The text of this standard is based on the following documents:

DIS	Report on Voting
85(CO)17	85(CO)20 & 20A

Full information on the voting for the approval of this standard can be found in the Voting Report indicated in the above table.

In this standard, the following print types are used:

- requirements and definitions: in roman type;
- NOTES: in smaller roman type;
- *compliance: in italic type;*
- terms used throughout this standard which have been defined in clause 3: **in bold roman type.**

INTRODUCTION

The **class index** system of classification used in this standard is based upon IEC 51: Direct acting indicating analogue electrical measuring instruments and their accessories. Under this system, the permitted variations of the **output signal** due to varying **influence quantities** - ambient temperature, voltage, frequency, etc., - are implicit in the classification.

For those unfamiliar with the **class index** system, a word of warning is necessary. If, for example, a **transducer** is classified as Class 1, it does not follow that the **error** under practical conditions of use will be within 1 % of the actual value of the output or 1 % of the full output value. It means that the **error** should not exceed 1 % of the **fiducial value** under closely specified conditions. If the **influence quantities** are varied between the limits specified by the **nominal ranges** of use, a variation of amount comparable with the value of the **class index** may be incurred for each **influence quantity**.

The permissible **error** of a **transducer** under working conditions is the sum of the permissible **intrinsic error** and of the permissible variations due to each of the **influence quantities**. However, the actual **error** is likely to be much smaller because not all of the **influence quantities** are likely to be simultaneously at their most unfavourable values and some of the variations may cancel one another. It is important that these facts be taken into consideration when specifying **transducers** for a particular purpose.

Furthermore, some of the terms used in this standard are different from those used in IEC 51 due to the fundamental differences between indicating instruments and measuring **transducers**.

All statements of performance are related to the output which is governed by two basic terms:

– "the **nominal value**", which may have a positive or a negative sign or both,

– "the **span**", which is the range of values of the **output signal** from maximum positive to maximum negative, if appropriate.

ELECTRICAL MEASURING TRANSDUCERS FOR CONVERTING A.C. ELECTRICAL QUANTITIES TO ANALOGUE OR DIGITAL SIGNALS

1 Scope

This International Standard applies to **transducers** with electrical inputs and outputs for making measurements of a.c. electrical quantities. The **output signal** may be in the form of an analogue direct current or in digital form. In this instance, that part of the **transducer** utilized for communication purposes will need to be compatible with the external system.

This standard applies to measuring **transducers** used for converting alternating electrical quantities such as:

- current
- voltage
- active power
- reactive power
- power factor
- phase angle
- frequency

to an **output signal**.

Within the **measuring range**, the **output signal** is a function of the measurand. An **auxiliary supply** may be needed.

This standard applies:

a) if the nominal frequency of the input(s) lies between 5 Hz and 1 500 Hz;

b) if a measuring **transducer** is part of a system for the measurement of a non-electrical quantity, this standard may be applied to the **electrical measuring transducer**, if it otherwise falls within the scope of this standard;

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 International Standard is intended:

- to specify the terminology and definitions relating to **transducers** whose main application is in electrical power engineering, especially for the purposes of process control and telemetry systems;
- to unify the test methods used in evaluating **transducer** performance;
- to specify **accuracy** limits and output values for **transducers**.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50 (301, 302, 303): 1983, *International Electrotechnical Vocabulary (IEV). Chapter 301: General terms on measurements in electricity. Chapter 302: Electrical measuring instruments. Chapter 303: Electronic measuring instruments.*

IEC 68-2-3: 1985, *Environmental testing – Part 2: Tests – Test Ca: Damp heat, steady state.*

IEC 255-4: 1976, *Electrical relays – Part 4: Single input energizing quantity measuring relays with dependent specified time.*

IEC 414: 1973, *Safety requirements for indicating and recording electrical measuring instruments and their accessories.*

IEC 521: 1988, *Class 0,5, 1 and 2 alternating-current watt-hour meters.*

NOTE - Refer to annex A for the list of informative references.

3 Definitions

For the purpose of this International Standard the following definitions apply:

3.1 *General terms*

3.1.1 **electrical measuring transducer** (hereinafter designated "**transducer**"): A device for converting an a.c. measurand to a direct current, a direct voltage or a digital signal for measurement purposes.

3.1.2 **auxiliary supply**: An a.c. or d.c. electrical supply, other than the measurand, which is necessary for the correct operation of the **transducer**.

3.1.3 **auxiliary circuit**: A circuit which is usually energized by the **auxiliary supply**.

NOTE - The **auxiliary circuit** is sometimes energized by one of the input quantities.

3.1.4 **transducer with offset zero** (live zero): A **transducer** which gives a pre-determined **output signal** other than zero when the measurand is zero.

3.1.5 **transducer with suppressed zero**: A **transducer** for which zero **output signal** corresponds to a measurand greater than zero.

3.1.6 **distortion factor**: The ratio of the r.m.s. value of the harmonic content to the r.m.s. value of the non-sinusoidal quantity.

3.1.7 **output load** (for analogue signals only): The total resistance of the circuits and apparatus connected externally across the output terminals of the **transducer**.

3.1.8 **ripple content (of an analogue output signal)**: With steady state input conditions, the peak-to-peak value of the fluctuating component of the output.

3.1.9 **output signal**: An analogue or digital representation of the measurand.

3.1.10 **output power**: The power at the **transducer** output terminals.

3.1.11 **output current (voltage)** (for analogue signals only): The current (voltage) produced by the **transducer** which is an analogue function of the measurand.

3.1.12 **reversible output current (voltage)** (for analogue signals only): An **output current** (voltage) which reverses polarity in response to a change of sign or direction of the measurand.

3.1.13 **measuring element of a transducer**: A unit or module of a **transducer** which converts the measurand, or part of the measurand, into a corresponding signal.

3.1.14 **single element transducer**: A **transducer** having one measuring element.