
Oprema za merjenje električne energije (a.c.) - 1. del: Splošne zahteve, preskušanje in preskusni pogoji - Merilna oprema (razredni indeksi A, B in C)

Electricity metering equipment (a.c.) -- Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)

Wechselstrom-Elektrizitätszähler -- Teil 1: Allgemeine Anforderungen, Prüfungen und Prüfbedingungen - Messeinrichtungen (Genauigkeitsklassen A, B und C)

Equipement de comptage d'électricité (c.a.) -- Partie 1: Prescriptions générales, essais et conditions d'essai - Equipement de comptage (classes de précision A, B et C)

[https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-](https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-8804216ff2e8/sist-en-50470-1-2007)

[8804216ff2e8/sist-en-50470-1-2007](https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-8804216ff2e8/sist-en-50470-1-2007)

Ta slovenski standard je istoveten z: EN 50470-1:2006

ICS:

| | | |
|-----------|---|---|
| 17.220.20 | Merjenje električnih in magnetnih veličin | Measurement of electrical and magnetic quantities |
| 91.140.50 | Sistemi za oskrbo z elektriko | Electricity supply systems |

SIST EN 50470-1:2007

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50470-1:2007

<https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-8804216ff2e8/sist-en-50470-1-2007>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 50470-1

October 2006

ICS 91.140.50

English version

**Electricity metering equipment (a.c.)
Part 1: General requirements, tests and test conditions -
Metering equipment (class indexes A, B and C)**

Équipement de comptage
d'électricité (c.a.)
Partie 1: Prescriptions générales,
essais et conditions d'essai -
Équipement de comptage
(classes de précision A, B et C)

Wechselstrom-Elektrizitätszähler
Teil 1: Allgemeine Anforderungen,
Prüfungen und Prüfbedingungen -
Messeinrichtungen
(Genauigkeitsklassen A, B und C)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2006-05-01. 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, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the 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

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 13, Equipment for electrical energy measurement and load control.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50470-1 on 2006-05-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2007-05-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-05-01

This EN 50470-1 is related to EN 62052-11:2003, *Electricity metering equipment (a.c.) – General requirements, tests and test conditions – Part 11: Metering equipment*.

The structure of the two standards is similar, modifications in this European Standard are provided in the perspective of compliance with the essential requirements of the Directive 2004/22/EC on Measuring Instruments (MID).

iteh STANDARD PREVIEW

This standard is to be used with:

(standards.iteh.ai)

- EN 50470-2:2006, *Electricity metering equipment (a.c.) – Part 2: Particular requirements – Electromechanical meters for active energy (class indexes A and B)* or <https://standards.iteh.ai/catalog/standards/sist/39571d5-080-43da-819-824316828c/sist-n-0470-2-2007>
- EN 50470-3:2006, *Electricity metering equipment (a.c.) – Part 3: Particular requirements – Static meters for active energy (class indexes A, B and C)*. <https://standards.iteh.ai/catalog/standards/sist/39571d5-080-43da-819-824316828c/sist-n-0470-3-2007>

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directives 89/336/EMC and 2004/22/EC. See Annex ZZ.

Contents

| | | |
|--------|---|----|
| 1 | Scope | 6 |
| 2 | Normative references | 6 |
| 3 | Terms and definitions | 9 |
| 3.1 | General definitions | 9 |
| 3.2 | Definitions related to the functional elements | 11 |
| 3.3 | Definitions of mechanical elements | 13 |
| 3.4 | Definitions related to insulation | 14 |
| 3.5 | Definitions of meter quantities | 15 |
| 3.6 | Definitions of influence quantities | 17 |
| 3.7 | Definitions of tests | 20 |
| 3.8 | Definitions related to electromechanical meters | 20 |
| 3.9 | Abbreviations | 21 |
| 4 | Standard electrical values | 21 |
| 4.1 | Standard reference voltages | 21 |
| 4.2 | Standard currents and current ranges | 21 |
| 4.3 | Standard reference frequency | 22 |
| 5 | Mechanical requirements and tests | 22 |
| 5.1 | General mechanical requirements | 22 |
| 5.2 | Case | 23 |
| 5.2.1 | Requirements | 23 |
| 5.2.2 | Mechanical strength tests of meter case | 23 |
| 5.3 | Window | 24 |
| 5.4 | Terminals, Terminal block(s), Protective earth terminal | 24 |
| 5.5 | Terminal cover(s) | 25 |
| 5.6 | Clearance and creepage distances | 25 |
| 5.7 | Insulating encased meter of protective class II | 26 |
| 5.8 | Resistance to heat and fire | 26 |
| 5.9 | Protection against penetration of dust and water | 27 |
| 5.10 | Display of measured values | 27 |
| 5.11 | Output device and operation indicator | 28 |
| 5.11.1 | General | 28 |
| 5.11.2 | Mechanical and electrical characteristics | 28 |
| 5.11.3 | Optical characteristics | 29 |
| 5.12 | Marking of meter | 29 |
| 5.12.1 | Name-plates | 29 |
| 5.12.2 | Connection diagrams and terminal marking | 31 |
| 5.13 | Accompanying information | 31 |
| 6 | Climatic conditions | 31 |
| 6.1 | Temperature ranges | 31 |
| 6.2 | Relative humidity | 32 |
| 6.3 | Tests of the effect of the climatic environments | 32 |
| 6.3.1 | General | 32 |
| 6.3.2 | Dry heat test (Test B) | 32 |
| 6.3.3 | Cold test (Test A) | 33 |
| 6.3.4 | Damp heat cyclic test (Test Db) | 33 |
| 6.3.5 | Protection against solar radiation (Test Sa) | 33 |

| | | |
|------------------------|--|----|
| 7 | Electrical requirements | 34 |
| 7.1 | Voltage range | 34 |
| 7.2 | Heating | 34 |
| 7.3 | Insulation | 34 |
| 7.3.1 | Requirements | 34 |
| 7.3.2 | General test conditions | 34 |
| 7.3.3 | Impulse voltage test | 35 |
| 7.3.4 | AC voltage test | 36 |
| 7.4 | Electromagnetic compatibility (EMC) | 36 |
| 7.4.1 | Electromagnetic environment | 36 |
| 7.4.2 | General requirements and test conditions | 37 |
| 7.4.3 | Critical change value | 37 |
| 7.4.4 | Immunity to voltage dips and short interruptions | 38 |
| 7.4.5 | Immunity to electrostatic discharges | 38 |
| 7.4.6 | Immunity to radiated RF electromagnetic fields | 39 |
| 7.4.7 | Immunity to electrical fast transients/bursts | 39 |
| 7.4.8 | Immunity to conducted disturbances, induced by RF fields | 40 |
| 7.4.9 | Immunity to surges | 40 |
| 7.4.10 | Immunity to damped oscillatory waves | 41 |
| 7.4.11 | Immunity to continuous magnetic fields of external origin | 41 |
| 7.4.12 | Immunity to power frequency magnetic fields of external origin | 41 |
| 7.4.13 | Radio interference suppression | 42 |
| 8 | Type test | 42 |
| 8.1 | Test conditions | 42 |
| Annex A (normative) | Relationship between ambient air temperature and relative humidity | 43 |
| Annex B (normative) | Optical test output | 44 |
| Annex C (normative) | Voltage waveform for the tests of the effect of voltage dips and short interruptions | 45 |
| Annex D (informative) | Test set-up for electromagnetic compatibility (EMC) tests | 46 |
| Annex E (normative) | Electromagnet for testing the influence of continuous magnetic fields of external origin | 48 |
| Annex F (informative) | Test schedule - Recommended test sequences | 49 |
| Annex ZZ (informative) | Coverage of Essential Requirements of EC Directives | 51 |
| Index | | 52 |

Figures

| | | |
|------------|---|----|
| Figure A.1 | – Relationship between ambient air temperature and relative humidity | 43 |
| Figure B.1 | – Test arrangement for the test output | 44 |
| Figure B.2 | – Waveform of the optical test output | 44 |
| Figure C.1 | – Voltage interruptions of $\Delta U = 100 \%$, 1 s | 45 |
| Figure C.2 | – Voltage interruptions of $\Delta U = 100 \%$, one cycle at rated frequency | 45 |
| Figure C.3 | – Voltage dips of $\Delta U = 50 \%$ | 45 |
| Figure D.1 | – Test set-up for immunity to radiated RF electromagnetic fields | 46 |
| Figure D.2 | – Test set-up for immunity to electrical fast transients/bursts: voltage circuits | 46 |
| Figure D.3 | – Test set-up for immunity to electrical fast transients/bursts: current circuits | 47 |

| | |
|--|----|
| Figure E.1 – Electromagnet for testing the influence of continuous magnetic fields of external origin..... | 48 |
|--|----|

Tables

| | |
|--|----|
| Table 1 – Standard reference voltages..... | 21 |
| Table 2 – Standard values of I_{tr} , I_{ref} and I_n | 21 |
| Table 3 – Current ranges..... | 22 |
| Table 4 – Clearances and creepage distances for insulating encased meter of protective class I..... | 26 |
| Table 5 – Clearances and creepage distances for insulating encased meter of protective class II..... | 26 |
| Table 6 – Voltage marking..... | 30 |
| Table 7 – Upper and lower temperature limits..... | 31 |
| Table 8 – Preferred upper and lower temperature limits corresponding to IEC environmental classes..... | 32 |
| Table 9 – Relative humidity..... | 32 |
| Table 10 – Voltage range..... | 34 |

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 50470-1:2007

<https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-8804216ff2e8/sist-en-50470-1-2007>

1 Scope

This European Standard applies to newly manufactured watt-hour meters, measuring active electrical energy, intended for residential, commercial and light industrial use, for use on 50 Hz electrical networks. It specifies general requirements and type tests methods.

It applies to electromechanical or static watt-hour meters for indoor and outdoor application, consisting of a measuring element and register(s) enclosed in a meter case. It also applies to operation indicator(s) and test output(s).

If the meter has (a) measuring element(s) for more than one type of energy (multi-energy meters), or when other functional elements, like maximum demand indicators, electronic tariff registers, time switches, ripple control receivers, data communication interfaces, etc. are enclosed in the meter case (multi-function meters) then this standard applies only for the active energy metering part.

This standard distinguishes between:

- electromechanical and static meters;
- meters of class indexes A, B and C;
- direct connected and transformer operated meters;
- protective class I and protective class II meters;
- meters intended to be used indoors and outdoors.

It does not apply to:

- watt-hour meters where the voltage across the connection terminals exceeds 600 V (line-to-line voltage for meters for polyphase systems);
- portable meters;
- reference meters.

For rack-mounted meters, the mechanical properties are not covered in this standard.

The test levels are regarded as minimum values to guarantee the proper functioning of the meter under normal working conditions. For special applications, other test levels might be necessary and should be agreed on between the user and the manufacturer.

2 Normative references

The following referenced documents are indispensable for the application 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.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> |
|--------------------|-------------|---|
| EN 50470-2 | 2006 | <i>Electricity metering equipment (a.c.) – Particular requirements – Part 2: Electromechanical meters for active energy (class indexes A and B)</i> |
| EN 50470-3 | 2006 | <i>Electricity metering equipment (a.c.) – Particular requirements – Part 3: Static meters for active energy (class indexes A, B and C)</i> |
| EN 55022 | 2006 | <i>Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 22:2005, mod.)</i> |
| EN 60044-1 | 1999 | <i>Instrument transformers – Part 1: Current transformers</i> |
| + A1 | 2000 | (IEC 60044-1:1996, mod. + A1:2000 + A2:2002) |
| + A2 | 2003 | |

| <u>Publication</u> | <u>Year</u> | <u>Title</u> |
|------------------------------|----------------------|--|
| EN 60044-2 + A1 + A2 | 1999 2000 2003 | <i>Instrument transformers – Part 2: Inductive voltage transformers</i> (IEC 60044-2:1997, mod. + A1:2000 + A2:2002) |
| EN 60068-2-1 + A1 + A2 | 1993 1993 1994 | <i>Environmental testing – Part 2: Tests – Tests A: Cold</i> (IEC 60068-2-1:1990 + A1:1993 + A2:1994) |
| EN 60068-2-2 + A1 + A2 | 1974 1993 1994 | <i>Environmental testing – Part 2: Tests – Tests B: Dry heat</i> (IEC 60068-2-2:1974 + IEC 60068-2-2A:1976 + A1:1993 + A2:1994) |
| EN 60068-2-5 | 1999 | <i>Environmental testing – Part 2: Tests – Test Sa: Simulated solar radiation at ground level</i> (IEC 60068-2-5:1975) |
| EN 60068-2-6 | 1995 | <i>Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)</i> (IEC 60068-2-6:1995 + corrigendum Mar. 1995) |
| EN 60068-2-11 | 1999 | <i>Environmental testing – Part 2: Tests – Test Ka: Salt mist</i> (IEC 60068-2-11:1981) |
| EN 60068-2-27 | 1993 | <i>Environmental testing – Part 2: Tests – Test Ea and guidance: Shock</i> (IEC 60068-2-27:1987) |
| EN 60068-2-30 | 1999 | <i>Environmental testing – Part 2: Tests – Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)</i> (IEC 60068-2-30:1980 + A1:1985) |
| EN 60068-2-75 | 1997 | <i>Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests</i> (IEC 60068-2-75:1997) |
| EN 60085 | 2004 | <i>Electrical insulation – Thermal classification</i> (IEC 60085:2004) |
| EN 60359 | 2002 | <i>Electrical and electronic measurement equipment – Expression of performance</i> (IEC 60359:2001) |
| EN 60529 + A1 | 1991 2000 | <i>Degrees of protection provided by enclosures (IP Code)</i> (IEC 60529:1989 + A1:1999) |
| EN 60695-2-10 | 2001 | <i>Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure</i> (IEC 60695-2-10:2000) |
| EN 60695-2-11 | 2001 | <i>Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products</i> (IEC 60695-2-11:2000) |
| EN 60721-3-1 | 1997 | <i>Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 1: Storage</i> (IEC 60721-3-1:1997) |
| EN 60721-3-2 | 1997 | <i>Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 2: Transportation</i> (IEC 60721-3-2:1997) |
| EN 60721-3-3 | 1995 | <i>Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weatherprotected locations</i> (IEC 60721-3-3:1994) |
| EN 61000-4-1 | 2000 | <i>Electromagnetic compatibility (EMC) – Part 4-1: Testing and measurement techniques – Overview of IEC 61000-4 series</i> (IEC 61000-4-1:2000) |
| EN 61000-4-2 + A1 + A2 | 1995 1998 2001 | <i>Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test</i> (IEC 61000-4-2:1995 + A1:1998 + A2:2000) |
| EN 61000-4-3 | 2002 | <i>Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test</i> (IEC 61000-4-3:2002) |

| <u>Publication</u> | <u>Year</u> | <u>Title</u> |
|----------------------------|----------------------|---|
| EN 61000-4-4 | 2004 | <i>Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test (IEC 61000-4-4:2004)</i> |
| EN 61000-4-5 | 1995 | <i>Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test (IEC 61000-4-5:1995)</i> |
| EN 61000-4-8 + A1 | 1993 2001 | <i>Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test (IEC 61000-4-8:1993 + A1:2000)</i> |
| EN 61000-4-11 | 2004 | <i>Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004)</i> |
| EN 61000-4-12 + A1 | 1995 2001 | <i>Electromagnetic compatibility (EMC) – Part 4-12: Testing and measurement techniques – Oscillatory waves immunity test (IEC 61000-4-12:1995 + A1:2000)</i> |
| EN 62052-11 | 2003 | <i>Electricity metering equipment (a.c.) – General requirements, tests and test conditions – Part 11: Metering equipment (IEC 62052-11:2003)</i> |
| EN 62053-31 | 1998 | <i>Electricity metering equipment (a.c.) – Particular requirements – Part 31: Pulse output devices for electromechanical and electronic meters (two wires only) (IEC 62053-31:1998)</i> |
| EN 62053-52 | 2005 | <i>Electricity metering equipment (a.c.) – Particular requirements – Part 52: Symbols (IEC 62053-52:2005)</i> |
| EN ISO 75-2 | 1996 | <i>Plastics – Determination of temperature of deflection under load – Part 2: Plastic and ebonite (ISO 75-2:1993)</i> |
| HD 588.1 S1 | 1991 | <i>High-voltage test techniques – Part 1: General definitions and test requirements (IEC 60060-1:1989 + corrigendum Mar. 1990)</i> |
| IEC 60038 + A1 + A2 | 1983 1994 1997 | <i>IEC standard voltages</i> ¹⁾ |
| IEC 60050-300 | 2001 | <i>International Electrotechnical Vocabulary – Electrical and electronic measurements and measuring instruments – Part 311: General terms relating to measurements – Part 312: General terms relating to electrical measurements – Part 313: Types of electrical measuring instruments – Part 314: Specific terms according to the type of instrument</i> |
| IEC 60417-DB ²⁾ | 2002 | <i>Graphical symbols for use on equipment</i> |
| IEC 61000-4-6 + A1 | 2003 2004 | <i>Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields</i> |
| ISO/IEC VIM | 1993 | <i>International vocabulary of basic and general terms in metrology</i> |

¹⁾ IEC 60038:1983 (mod.) without its amendments is harmonized as HD 472 S1:1989 "Nominal voltages for low-voltage public electricity supply systems".

²⁾ "DB" refers to the IEC on-line database.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

Expressions of the performance of electrical and electronic measuring equipment have been taken from EN 60359.

Where there is a difference between the definitions in this glossary and those contained in product standards produced by TC 13, then the latter shall take precedence in applications of the relevant standard.

3.1 General definitions

3.1.1

electromechanical meter

meter in which currents in fixed coils react with the currents induced in the conducting moving element, generally (a) disk(s), which causes their movement proportional to the energy to be measured [EN 62052-11, 3.1.1]

3.1.2

static meter

meter in which current and voltage act on solid state (electronic) elements to produce an output proportional to the energy to be measured [EN 62052-11, 3.1.2]

3.1.3

watt-hour meter

active energy meter

instrument intended to measure active energy by integrating active power with respect to time [IEV 313-06-01]

iTech STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-8804216ff2e8/sist-en-50470-1-2007>

3.1.4

direct connected meter

meter intended for use by direct connection to the electricity supply

3.1.5

transformer operated meter

meter intended for use by connection via one or more external instrument transformers to the electricity supply

3.1.6

active power

under periodic conditions, mean value, taken over one period T , of the instantaneous power p

$$P = \frac{1}{T} \int_0^T p \cdot dt$$

NOTE 1 Under sinusoidal conditions, the active power is the real part of the complex power.

NOTE 2 The SI unit for active power is the watt.

[IEV 131-11-42]

3.1.7**apparent power**

product of the r.m.s. voltage U between the terminals of a two-terminal element or two-terminal circuit and the r.m.s. electric current I in the element or circuit:

$$S = U \cdot I$$

NOTE 1 Under sinusoidal conditions, the apparent power is the modulus of the complex power.

NOTE 2 The SI unit for apparent power is the volt-ampere.

[IEV 131-11-41]

3.1.8**active energy**

the electrical energy transformable into some other form of energy [IEV 601-01-19]

3.1.9**power factor**

under periodic conditions, ratio of the absolute value of the active power P to the apparent power S

$$\lambda = \frac{|P|}{S}$$

NOTE Under sinusoidal conditions, the power factor is the absolute value of the active factor.

[IEV 131-11-46]

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.1.10**multi-rate meter**

energy meter provided with a number of registers, each becoming operative for specified time intervals corresponding to different tariff rates [IEV 313-06-09 modified]

<https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-8804216ff2e8/sist-en-50470-1-2007>

3.1.11**meter type (for electromechanical meter)**

a particular design of meter, manufactured by one manufacturer, having:

- a) similar metrological properties;
- b) the same uniform construction of parts determining these properties;
- c) the same ratio of the maximum current to the reference current;
- d) the same number of ampere-turns for the current winding at reference current and the same number of turns per volt for the voltage winding at reference voltage.

The type may have several values of reference current and reference voltage.

Meters are designated by the manufacturer by one or more groups of letters or numbers, or a combination of letters and numbers. Each type has one designation only.

NOTE 1 The type is represented by the sample meter(s) intended for the type tests, whose characteristics (reference current and reference voltage) are chosen from the values given in the tables proposed by the manufacturer.

NOTE 2 Where the number of ampere-turns would lead to a number of turns other than a whole number, the product of the number of turns of the windings by the value of the reference current may differ from that of the sample meter(s) representative of the type.

It is advisable to choose the next number immediately above or below in order to have whole numbers of turns.

For this reason only may the number of turns per volt of the voltage windings differ, but by not more than 20 % from that of the sample meters representative of the type.

NOTE 3 The ratio of the highest to the lowest reference speed of the rotors of each of the meters of the same type shall not exceed 1,5.

[EN 62052-11, 3.1.8.1 modified]

3.1.12**meter type (for static meter)**

a particular design of meter, manufactured by one manufacturer, having:

- a) similar metrological properties;
- b) the same uniform construction of parts (hardware and software) determining these properties;
- c) the same ratio of the maximum current to the reference current.

The type may have several values of reference current and reference voltage.

Meters are designated by the manufacturer by one or more groups of letters or numbers, or a combination of letters and numbers. Each type has one designation only.

NOTE 1 The type is represented by the sample meter(s) intended for the type tests, whose characteristics (reference current and reference voltage) are chosen from the values given in the tables proposed by the manufacturer.

NOTE 2 A specific meter design with identical elements in the current circuit may be suitable for more than one current range.

[EN 62052-11, 3.1.8.2 modified]

3.1.13**reference meter**

a meter used to measure the unit of electric energy. It is usually designed and operated to obtain the highest accuracy and stability in a controlled laboratory environment [EN 62052-11, 3.1.9]

3.2 Definitions related to the functional elements**3.2.1****metrologically relevant**

a function or property of the meter, (subject to control by a legal metrology body)

3.2.2**measuring element**

part of the meter which produces an output proportional to the energy [EN 62052-11, 3.2.1]

3.2.3**test output device (of an energy meter)**

device which can be used for determining the meter error

NOTE This device can be, for electromechanical induction meters, a mark on the disk, where the passage of the mark is detected by an external photoelectric device, or, for static meters, an internal electronic pulse output device.

[IEV 314-07-12 modified]

3.2.4**operation indicator**

device which gives a visible signal of the operation of the meter [IEV 314-07-13]

3.2.5**pulse**

wave that departs from an initial level for a limited duration of time and ultimately returns to the original level [EN 62052-11, 3.2.2.3]

3.2.6**pulse device (for electricity metering)**

functional unit for emitting, transmitting, retransmitting or receiving pulses, representing finite quantities, such as energy units [EN 62052-11, 3.2.2.4 modified]

3.2.7**pulse output device****pulse output**

pulse device for emitting pulses [EN 62052-11, 3.2.2.5]

3.2.8**optical test output**

optical pulse output device that is used for testing the meter [EN 62052-11, 3.2.2.6]

3.2.9**electrical test output**

electrical pulse output device that is used for testing the meter [EN 62052-11, 3.2.2.7]

3.2.10**receiving head**

functional unit for receiving pulses emitted by an optical pulse output [EN 62052-11, 3.2.2.8]

3.2.11**memory** (for static meters)

element which stores digital information [IEV 314-07-10 modified]

3.2.12**non-volatile memory**

memory which can retain information in the absence of power [EN 62052-11, 3.2.3.1]

3.2.13**display**

device which displays the content(s) of (a) memory(ies) [IEV 314-07-11]

3.2.14**register**

the part of the meter which enables the measured value to be determined

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 50470-1:2007](https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-8804216ff2e8/sist-en-50470-1-2007)

<https://standards.iteh.ai/catalog/standards/sist/6d9a7dd5-0c80-4ada-bd9a-8804216ff2e8/sist-en-50470-1-2007>

NOTE It can be an electromechanical device or an electronic device comprising both memory and display which stores and displays information. A single electronic display may be used with multiple electronic memories to form multiple electronic registers.

[IEV 314-07-09 modified]

3.2.15**current circuit**

internal connections of the meter and part of the measuring element through which flows the current of the circuit to which the meter is connected [EN 62052-11, 3.2.6]

3.2.16**voltage circuit**

internal connections of the meter, part of the measuring element and in the case of static meters, part of the power supply, supplied with the voltage of the circuit to which the meter is connected [EN 62052-11, 3.2.7]

3.2.17**auxiliary device**

a device within the meter intended to perform a particular function additional to the basic metrology function, like tariff- and load control, or reception or transmission of data

3.2.18**auxiliary circuit**

elements and connections of an auxiliary device within the meter case intended to be connected to an external device [EN 62052-11, 3.2.8 modified]

3.2.19**constant (for electromechanical watt-hour meters)**

value expressing the relation between the energy registered by the meter and the corresponding number of revolutions of the rotor for example, either in revolutions per kilowatt-hour (rev/kWh) or watt-hours per revolution (Wh/rev) [EN 62052-11, 3.2.9.1]

3.2.20**constant (for static watt-hour meters)**

value expressing the relation between the energy registered by the meter and the corresponding value of the test output

NOTE If this value is a number of pulses, the constant should be either pulses per kilowatt-hour (imp/kWh) or watt-hours per pulse (Wh/imp)

[IEV 314-07-08 modified]

3.3 Definitions of mechanical elements**3.3.1****indoor meter**

meter which can only be used in areas offering additional protection against environmental influences (e.g. in a house or in a cabinet) [IEV 314-07-20]

3.3.2**outdoor meter**

meter which can be used without additional protection in an exposed environment [IEV 314-07-21]

3.3.3**base**

back of the meter by which it is generally fixed and to which are attached the measuring element(s), the terminals or the terminal block, and the cover

NOTE For a flush-mounted meter, the meter base may include the sides of the case.

[IEV 314-07-14 modified]

3.3.4**socket**

base with jaws to accommodate terminals of a detachable meter and which has terminals for connection to the supply line. It may be a single-position socket for one meter or a multiple-position socket for two or more meters [IEV 314-07-15 modified]

3.3.5**cover**

enclosure on the front of the meter, made either wholly of transparent material or of opaque material provided with window(s) through which the operation indicator (if fitted) and the display can be read [IEV 314-07-16]

3.3.6**case**

set that comprises the base and the cover [IEV 314-07-17]

3.3.7**accessible conductive part**

conductive part which can be touched by the standard test finger, when the meter is installed and ready for use [IEV 442-01-15 modified]