
Symbols for alternating-current electricity meters (IEC 60387:1992)

Symbols for alternating-current electricity meters

Symbole für Wechselstromzähler

Symboles pour compteurs à courant alternatif

Ta slovenski standard je istoveten z: EN 60387:1992**SIST EN 60387:2002**

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ICS:

01.080.40	Grafični simboli za uporabo v risbah, diagramih, načrtih v elektrotehniki in elektroniki ter v ustrezni tehnični proizvodni dokumentaciji	Graphical symbols for use on electrical and electronics engineering drawings, diagrams, charts and in relevant technical product documentation
17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

SIST EN 60387:2002**en**

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EUROPEAN STANDARD
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English version

Symbols for alternating-current electricity meters

(IEC 387:1992)

Symboles pour compteurs à
courant alternatif
(CEI 387:1992)

Symbole für
Wechselstromzähler
(IEC 387:1992)

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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

The text of document 13(CO)1014, as prepared by IEC Technical Committee No. 13: Equipment for electrical energy measurement and load control, was submitted to the IEC-CENELEC parallel vote in April 1991.

The reference document was approved by CENELEC as EN 60387 on 10 December 1991.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1993-07-01
- latest date of withdrawal of conflicting national standards (dow) 1993-07-01

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

Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	3
3 Definitions	3
4 Symbols for the measuring elements	5
5 Symbols of principal units used for meters	8
6 Marking of the measured quantity	8
7 Symbols indicating the accuracy class, the meter constant and the insulating class	9
8 Symbols for transformer operated meters	9
9 Tariff device symbols	10
10 Symbols for auxiliary devices	12
11 Symbols for details of the suspension of the moving element	12
12 Warning symbols	12
Annex A (normative) Symbols for signal ports	13
Annex ZA (normative) Other international publications quoted in this standard with the references of the relevant European publications	14
Table 1 — Symbols for the measuring elements	6
Table 2 — Symbols of principal units used for meters	8
Table 3 — Marking of the measured quantity	8
Table 4 — Symbols indicating the accuracy class, the meter constant and the insulating class	9
Table 5 — Symbols for transformer operated meters	10
Table 6 — Symbols for tariff devices	11
Table 7 — Symbols for auxiliary devices	12
Table 8 — Symbols for details of the suspension of the moving element	12

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1 Scope

This International Standard applies to letter and graphical symbols for a.c. electricity meters and their auxiliary devices, independent of induction or static measurement elements.

All the symbols included in this standard may be marked on the name-plate, dial plate, external labels or accessories of the meter.

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 211:1966, *Maximum demand indicators, class 1,0.*

IEC 617-6:1983, *Graphical symbols for diagrams — Part 6: Production and conversion of electrical energy.*

3 Definitions

For the purpose of this International Standard, the following definitions apply.

Most of the following definitions have been taken from chapters 301, 302 and 303 of the International Electrotechnical Vocabulary (IEV), IEC 50(301, 302, 303). In such cases, the appropriate IEV reference is given.

3.1

induction meter

energy meter which operates by the rotation of the disc of an induction measuring element [IEV 302-04-03]

3.2

static energy meter

energy meter in which current and voltage act on solid state (electronic) elements to produce an output pulse frequency proportional to the energy

3.3

watt-hour meter

instrument intended to measure active energy by integrating active power with respect to time [IEV 301-04-17]

3.4

var-hour meter

instrument intended to measure reactive energy by integrating reactive power with respect to time [IEV 301-04-18]

3.5

volt-ampere-hour meter

instrument intended to measure apparent energy by integrating apparent power with respect to time [IEV 301-04-19]

3.6

multi-rate meter

energy meter provided with a number of registers, each becoming operative at specified time intervals corresponding to different tariffs [IEV 302-04-06]

- 3.7**
excess energy meter
energy meter intended to measure the excess energy when the power exceeds a pre-determined value [IEV 302-04-04]
- 3.8**
maximum demand indicator (for a meter)
attachment to a meter to indicate the highest value of the average power utilized during successive equal intervals of time
- 3.9**
maximum demand meter
meter fitted with a maximum demand indicator
- 3.10**
bidirectional meter
meter intended to measure the energy in both directions
- 3.11**
memory
element which stores digital information
- 3.12**
display
device which displays the content(s) of (a) memory(ies)
- 3.13**
register
electromechanical or electronic device comprising both memory and display which stores and displays information
a single display may be used with multiple electronic memories to form multiple registers
- 3.14**
primary register
register of an instrument transformer operated meter which takes into account the ratios of all the transformers (voltage and current transformers) to which the meter is connected
NOTE The value of the energy on the primary side of the transformers is obtainable from the direct reading of the register.
- 3.15**
half-primary register
register of an instrument transformer operated meter which takes into account either the ratio(s) of the current transformer(s) or the ratio(s) of the voltage transformer(s), but not both
NOTE The value of the energy on the primary side of the transformer(s) is obtainable from the reading of the register multiplied by an appropriate factor.
- 3.16**
secondary register
register of an instrument transformer operated meter which takes no account of the transformer ratio(s)
NOTE The value of the energy on the primary side of the transformer(s) is obtainable from the reading of the register multiplied by an appropriate factor.
- 3.17**
name-plate of a meter
easily readable plate, placed either inside or outside the meter, which states in particular the electrical quantities corresponding to the conditions of use and may also include the symbols
- 3.18**
dial
part of an indicating device carrying the scale or scales and generally including other information to characterize the instrument [IEV 301-07-04]
NOTE In some cases, the name-plate and the dial may be combined.

3.19**constant**

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

for induction meters, it is usually expressed either in revolutions of the rotor per measuring unit or per measuring units per revolution

if this value is a number of pulses, the constant should be either pulses per measuring unit or measuring units per pulse

3.20**reading factor C of a maximum demand indicator**

factor by which it is necessary to multiply the reading in units of power (active or reactive) in order to obtain the value of the corresponding power expressed in the same units

3.21**constant K of a maximum demand indicator**

coefficient by which the reading must be multiplied to obtain the value of the corresponding power (active or reactive)

4 Symbols for the measuring elements

In the following symbols, which are given as examples, each voltage circuit is represented by a line and each current circuit by a small circle.

At the end of each line representing a voltage circuit, a circle(s) is (are) placed to represent (a) current circuit(s), arranged to have a point of common connection with that voltage circuit.

If a current circuit and a voltage circuit having such a common point of connection are not part of the same electro-magnet, the circle representing the current circuit is joined to the mid-point of the line representing the voltage circuit by means of a guide line not more than half the thickness of the first line.

If an electro-magnet carries two current circuits whose number of turns are in the ratio $1/k$, the diameters of the representative circles shall be in approximately the same ratio.

The angle between two lines of a symbol represents the phase angle between the corresponding voltages provided the positive direction be accepted as that going towards the common point in two-line symbols (e.g. symbols 4.9 and 4.10), and in the trigonometrical direction in the case of triangular symbols (e.g. symbol 4.8).

In order to distinguish the direction of the voltage acting on each current, a current influenced by a positive direction of voltage shall be indicated by a black circle and a current influenced by a negative direction of voltage shall be indicated by a white circle.

Table 1 — Symbols for the measuring elements






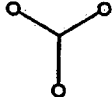

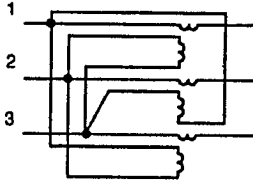
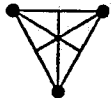
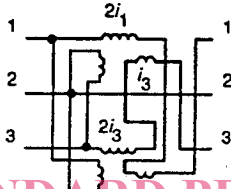

No.	Designation	Symbol
4.1	Watt-hour or var-hour meter with one measuring element, having one current circuit and one voltage circuit (for one-phase 2-wire circuits)	
4.2	Watt-hour or var-hour meter with one measuring element, having one voltage circuit and two current circuits (for one-phase, 2-wire or 3-wire circuits, when the voltage circuit is connected across the outer conductors)	
4.3	Watt-hour or var-hour meter with two measuring elements, each having a voltage circuit and a current circuit, each of which is connected in the outers of a one-phase 3-wire circuit, the corresponding voltage circuits being connected between the outers and the mid-wire	
4.4	Watt-hour or var-hour meter with two measuring elements, each having a voltage circuit and a current circuit, the latter being inserted in a phase conductor of a three-phase circuit, the voltage circuit of each measuring element being connected between the neutral and the phase conductor in which its current circuit is inserted	
4.5	Watt-hour or var-hour meter with two measuring elements, each having a voltage circuit and a current circuit, and connected for the 2-wattmeter method (for three-phase 3-wire circuits)	
4.6	Watt-hour or var-hour meter with three measuring elements, each having a voltage circuit and a current circuit, and connected for the 3-wattmeter method (for three-phase 4-wire circuits)	
4.7	Watt-hour or var-hour meter with two measuring elements, each having a voltage circuit and a current circuit, and are connected in the two-phase conductors of a two-phase 3-wire circuit	
4.8	<p>Var-hour meter with three measuring elements, each having a voltage circuit and a current circuit, each of which is arranged to have a common point with the voltage circuits of the two other measuring elements. The voltage circuit of each measuring element is fed by the voltage between the phase conductors which do not contain its current circuit</p> <p>As can be seen, symbol 4.8 corresponds to Figure 1, and is applicable to three-phase 3- or 4- wire circuits</p> 	

Table 1 — Symbols for the measuring elements

No.	Designation	Symbol
4.9	<p>Var-hour meter with two measuring elements, each having a voltage circuit and two current circuits with a number of turns in the ratio 1 : 2 (n and $2n$ turns); each circuit of n turns has a common point with the voltage circuit of the same measuring element, whilst each current circuit of $2n$ turns has a common point with the voltage circuit of the other measuring element</p> <p>The circuit of n turns of one of the measuring element and that of $2n$ turns of the other are subject to positive voltages in contrast to the circuit of $2n$ turns of the first and that of n turns of the second, which are subject to negative voltages</p> <p>Symbol 4.9 corresponds to Figure 2, and is applicable to three-phase 3-wire circuits</p> 	
4.10	<p>Var-hour meter with two measuring elements, each having a voltage circuit and a current circuit, one of the current circuits has a common point with the voltage circuit of the other measuring element, whilst the current circuit of the latter has a common point with the voltage circuits of the two measuring elements</p> <p>Symbol 4.10 corresponds to Figure 3, and is applicable to three-phase 3-wire circuits</p> 