

Class 0.5, 1 and 2 alternating-current watthour meters

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British Standard

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PEL/13, Insulators for power systems, upon which the following bodies were represented:

- BEAMA Metering Association (BMA)
- Building Automation and Mains Signalling Association (BAMSA) (BEAMA Ltd.)
- Electricity Association
- Electricity Pool of England and Wales
- Energy Systems Trade Associations
- Flag Association
- Institution of Electrical Engineers
- Office of Electricity Regulation (OFFER)
- United Kingdom Automatic Meter Reading Association

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Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 60521	3
List of references	Inside back cover

National foreword

This British Standard has been prepared by Technical Committee PEL/13 and is the English language version of EN 60521:1995 *Class 0,5, 1 and 2 alternating-current watthour meters*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 521:1988 published by the International Electrotechnical Commission (IEC).

The foreword of the EN makes reference to the “date of withdrawal” (dow) of the relevant national standard. In this case the relevant national standard is BS 5685-1:1979 which will be withdrawn on 1995-07-15. Certificates and Marks will not be awarded after this date with respect to the withdrawn British Standard. However, such Certificates and Marks, already awarded, may continue to apply to production until 2000-07-15.

Cross-references

Publication referred to	Corresponding British Standard
HD 472 S1:1989 (IEC 38:1983)	BS 7697:1993 <i>Nominal voltages for low voltage public electricity supply systems</i>
IEC 50(301):1983 IEC 50(302):1983 IEC 50(303):1983	BS 4727 <i>Glossary of electrotechnical, power, telecommunication, electronics, lighting and colour terms</i> Part 1 <i>Terms common to power, telecommunications and electronics</i> Group 04:1986 <i>Measurement terminology</i>
HD 588.1 S1:1991 (IEC 60-1:1989)	BS 923 <i>Guide on high-voltage testing techniques</i> Part 1:1990 <i>General</i>
EN 60060-2:1994 (IEC 60-2:1994)	BS EN 60060 <i>High-voltage testing techniques</i> Part 2:1995 <i>Measuring systems</i>
HD 566:1990 (IEC 85:1984)	BS 2757:1986 <i>Method for determining the thermal classification of electrical insulation</i>
HD 215:1974 (IEC 414:1973)	BS 5458:1977 <i>Specification for safety requirements for indicating and recording electrical measuring instruments and their accessories</i>
EN 60514:1995	BS EN 60514:1995 <i>Acceptance inspection of Class 2 alternating current watthour meters</i>
HD 444.2.1:1983 IEC 695-2-1:1980)	BS 6458 <i>Fire hazard testing for electrotechnical products</i> Part 2 <i>Test methods</i> Section 2.1:1984 <i>Glow-wire test</i>
HD 495:1987 (IEC 817:1984)	BS 7003:1988 <i>Specification for spring-operated impact-test apparatus and its calibration</i>

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 24, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Descriptors: Watthour meters, induction type meters, alternating-current meters, class 0,5, class 1, class 2

English version

Class 0,5, 1 and 2 alternating-current watthour meters

(IEC 521:1988)

Compteurs d'énergie active à courant
alternatif des classes 0,5, 1 et 2
(CEI 521:1988)

Wechselstrom-Wirkverbrauchzähler der
Klassen 0,5, 1 und 2
(IEC 521:1988)

This European Standard was approved by CENELEC on 1994-07-05. 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

Foreword

The text of the International Standard IEC 521:1988, prepared by IEC TC 13, Equipment for electrical energy measurement and load control, was submitted to the formal vote and was approved by CENELEC as EN 60521 on 1994-07-05 without any modification.

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) 1995-07-15
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1995-07-15

For products which have complied with HD 309.1 S1:1979 before 1995-07-15, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2000-07-15.

Annexes designated “normative” are part of the body of the standard. Annexes designated “informative” are given for information only. In this standard, Annex ZA and Annex ZB are normative and Annex A is informative. Annex ZA and Annex ZB have been added by CENELEC.

Contents

	Page
Foreword	2
Explanatory foreword in relation to Class 0.5 meters	3
1 Scope	3
2 Units	3
3 Definitions	3
4 Classification	8
5 Mechanical requirements	8
6 Electrical requirements	11
7 Marking of meters	15
8 Accuracy	16
9 Starting and running with no-load	20
10 Adjustment	21
Appendix A Graphical symbols for watthour meters	22

Annex ZA (normative) Other international publications quoted in this standard with the references of the relevant European publications	23
Annex ZB (normative) Special national conditions	24
Table I — Clearances and creepage distances	9
Table II — Standard basic currents	11
Table III — Standard reference voltages	11
Table IV — Power loss	11
Table V — Apparent power loss	11
Table VI — Heating	12
Table VII — A.C. voltage tests	14
Table VIII — Voltage marking	15
Table IX — Voltage and current balance	16
Table X — Reference conditions	17
Table XI — Percentage error limits (single-phase meters and polyphase meters with balanced loads)	17
Table XII — Percentage error limits (polyphase meters carrying a single-phase load, but with balanced polyphase voltages applied to voltage circuits)	18
Table XIII — Interpretation of test results	18
Table XIV — Temperature coefficient	19
Table XV — Influence quantities	19
Table XVI — Variations due to short-time overcurrents	20
Table XVII — Variations due to self-heating	20
Table XVIII — Starting currents	20
Table XIX — Minimum range of adjustment	21
Table ## — Change of error due to earth fault	24

Explanatory foreword in relation to class 0.5 meters

1. Class 0.5 alternating-current watthour meters are employed chiefly for the measurement of very large amounts of energy, but where the load range is small.
 2. This class of meter constitutes a particular category which is not entirely in line with the series Class 1 and Class 2.
 3. The effect of influence factors (frequency, voltage, etc.) is generally less than for Class 1 and Class 2, but not necessarily in strict proportion to the class indices.
 4. The testing of this class of meter requires the use of reference standards of high accuracy, low distortion supply sources and highly qualified and experienced personnel for its operation.
- Owing to the large quantities of energy to be measured with Class 0.5 alternating-current watthour meters, it is necessary for them to be verified more frequently than Class 1 and Class 2 meters.
5. The installation of these meters should be carried out with great care, eliminating or reducing to a minimum external influence factors such as magnetic fields, non-verticality and the range of ambient temperature.

1 Scope

This standard applies only to newly manufactured induction type watthour meters of accuracy Classes 0.5, 1 and 2, for the measurement of alternating current electrical active energy of a frequency in the range 45 Hz to 65 Hz and it applies to their type tests only¹⁾.

It applies to the assembly of meters and accessories, including current transformers, when enclosed in the meter case. It does not apply to maximum demand indicators (see IEC Publication 211).

It does not apply to any kind of measuring device such as those used for telemetering electrical energy.

It does not apply to meters for testing purposes or to special types of watthour meters (e.g. excess meters), except for multi-rate meters.

It does not apply to watthour meters where the voltage across the connection terminals exceeds 600 V (line-to-line voltage for meters for polyphase systems).

NOTE 1 For portable meters and meters for outdoor use, additional requirements may be necessary.

NOTE 2 For var-hour meters, see IEC Publication 145.

2 Units

The units employed in this standard are those used by the International Electrotechnical Commission.

3 Definitions

The majority of the following definitions have been taken from those given in Chapters 301, 302 and 303 of the International Electrotechnical Vocabulary (IEV) [IEC Publication 50 (301, 302, 303)]. In such cases, the appropriate IEV reference is given. Certain new definitions or amplifications of IEV definitions have been added in this standard in order to facilitate understanding.

3.1

watt-hour meter

an instrument intended to measure active energy by integrating active power with respect to time (IEV 301-04-17 modified)

3.2

induction meter

a 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

3.3

multi-rate meter

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

¹⁾ The subject of acceptance testing of Class 2 watthour meters is dealt with in IEC Publication 514.

3.4

meter rotor

the moving element of the meter upon which the magnetic fluxes of fixed windings and of braking elements act and which operates the register

3.5

meter driving element

a working part of the meter which produces a torque by the action of its magnetic fluxes upon the currents induced in the moving element. It generally comprises electromagnets with their control devices

3.6

meter braking element

the part of the meter which produces a braking torque by the action of its magnetic flux upon the currents induced in the moving element. It comprises one or more magnets and their adjusting devices

3.7

register of a meter (counting mechanism)

the part of a meter which enables the measured value to be determined (IEV 302-06-03 modified)

3.8 Meter base

The back of the meter by which it is generally fixed and to which are attached the frame, the terminals or the terminal block and the cover.

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

3.8.1

meter socket

an enclosure with jaws to accommodate terminals of a detachable watthour meter and which has connectors from the termination of the circuit conductors. It may be a single-position socket for one meter or a multiple-position socket for two or more meters

3.9

meter cover

the enclosure on the front of the meter, made either wholly of transparent material, or of opaque material provided with window(s) through which the movement of the rotor can be seen and the register can be read

3.10

meter case

this comprises the base and the cover

3.11

meter frame

the part to which are affixed the driving elements, the rotor bearings, the register, usually the braking element, and sometimes the adjusting devices

3.12

accessible conducting part

a conducting part which can be touched by the standard test finger, when the meter is installed ready for use

3.13

protective earth terminal

the terminal connected to accessible conducting parts of a meter, for safety purposes

3.14

terminal block

a support made of insulating material on which all or some of the terminals of the meter are grouped together

3.15**terminal cover**

a cover which covers the meter terminals and, generally, the ends of the external wires of cables connected to the terminals

3.16**current circuit**

the winding of the driving element and the internal connections of the meter through which flows the current of the circuit to which the meter is connected

NOTE When the meter incorporates a current transformer, the current circuit also includes the transformer windings.

3.17**voltage circuit**

the winding of the driving element and internal connections of the meter, supplied with the voltage of the circuit to which the meter is connected

3.18**auxiliary circuit**

the elements (windings, lamps, contacts, etc.) and connections of an auxiliary device within the meter case intended to be connected to an external device, clock, relay, impulse counter

3.19**basic current²⁾ (I_b)**

the value of current in accordance with which the relevant performance of the meter is fixed

3.20**rated maximum current²⁾ (I_{max})**

the highest value of current at which the meter purports to meet the accuracy requirements of this standard

3.21**reference voltage²⁾**

the value of voltage in accordance with which the relevant performance of the meter is fixed

3.22**reference frequency**

the value of frequency in accordance with which the relevant performance of the meter is fixed

3.23**basic speed**

the nominal speed of rotation of the rotor expressed in revolutions per minute when the meter is under reference conditions and carries basic current at unity power-factor

3.24**basic torque**

the nominal value of the torque on the rotor when at rest, when the meter is under reference conditions and carries basic current at unity power-factor

3.25**meter constant**

constant expressing the relation between the energy registered by the meter and the corresponding number of revolutions of the rotor, either in revolutions per kilowatthour (rev/kWh) or watthours per revolution (Wh/rev)

3.26**reference temperature**

the ambient temperature specified for reference conditions

²⁾ The terms voltage and current indicate r.m.s. values unless otherwise specified.