# SLOVENSKI STANDARD
# SIST EN 60521:1995

**01-avgust-1995**

---

**Števci električne delovne energije izmeničnega toka, razredi 0.5, 1 in 2**

Class 0,5, 1 and 2 alternating-current watt-hour meters

Wechselstrom-Wirkverbrauchzähler der Klassen 0,5, 1 und 2

Compteurs d'énergie active à courant alternatif des classes 0,5, 1 et 2



**Ta slovenski standard je istoveten z:** **EN 60521:1995**

---



**ICS:**

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

**SIST EN 60521:1995** **en**

# EUROPEAN STANDARD
# NORME EUROPÉENNE
# EUROPÄISCHE NORM

# EN 60521

ICS 17.220.20

Supersedes HD 309.1 S1:197

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, annexes ZA and ZB are normative and annex A is informative.
Annexes ZA and ZB have been added by CENELEC.



## Endorsement notice

The text of the International Standard IEC 521:1988 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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

NOTE : 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 |
|---|---|---|---|---|
| 28 | 1925 | International standard of resistance for copper | - | - |
| 38 (mod) | 1983 | IEC Standard voltages* | HD 472 S1 | 1989 |
| 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 | - | - |
| 60 | series | High-voltage test techniques | HD 588.1 S1<br>EN 60060-2 | 1991<br>1994 |
| 85 | 1984 | Thermal evaluation and classification of electrical insulation | HD 566 S1 | 1990 |
| 145 | 1963 | Var-hour (reactive energy) meters | - | - |
| 185 | 1966* | Current transformers | - | - |
| 211 | 1966 | Maximum demand indicators, Class 1.0. | - | - |
| 387 | 1972* | Symbols for alternating-current electricity meters | - | - |
| 414 (mod) | 1973 | Safety requirements for indicating and recording electrical measuring instruments and their accessories | HD 215 S1 | 1974 |



* The title of HD 472 S1 is: Nominal voltages for low voltage public electricity supply systems
* IEC 185:1987 + A1:1990 are harmonized as HD 553 S2:1993
* IEC 387:1992 is harmonized as EN 60387:1992

| IEC Publication | Date | Title | EN/HD | Date |
|---|---|---|---|---|
| 514 (mod) | 1975 | Acceptance inspection of Class 2 alternating current watthour meters | EN 60514 | 1995 |
| 529 | 1976* | Classification of degrees of protection provided by enclosures | - | - |
| 695-2-1 | 1980 | Fire hazard testing - Part 2: Test methods - Glow-wire test and guidance | HD 444.2.1 S1 | 1983 |
| 817 | 1984 | Spring-operated impact-test apparatus and its calibration | HD 495 S1 | 1987 |

Other publication:

ISO 75:1974 - Plastics and ebonite - Determination of temperature of deflection under load



* IEC 529:1989 is harmonized as EN 60529:1991 + Corrigendum May 1993

## Annex ZB (normative)

## Special national conditions

**Special national condition:** National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions. If it affects harmonization, it forms part of the European Standard or Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

| Clause | Special national condition |
|---|---|
| 8 | **Austria, Germany and Netherlands** |

Additional subclause:

8.8 Immunity to earth fault
(Only for meters to be used in networks equipped with earth fault neutralizers)

For three-phase four-wire transformer-operated meters, connected to distribution networks which are equipped with earth fault neutralizers or in which the star point is isolated (in the case of an earth fault and with 10 % overvoltage the line to earth voltages of the two lines which are not affected by the earth fault will rise to 1,9 times the nominal voltage), the following requirements apply:



During a test under simulated earth fault condition in one of the three lines, all voltages are increased to 1,1 times the nominal voltages during 4 hours. The neutral terminal of the meter under test is disconnected from the ground terminal of the meter test equipment (MTE) and is connected to the MTE's line terminal at which the earth fault has to be simulated. In this way the two voltage terminals of the meter under test which are not affected by the earth fault are connected to 1,9 times the nominal phase voltages. During this test the current circuits are set to 50 % of rated current $I_n$, power factor 1 and symmetrical load. After the test, the meter shall show no damage and shall operate correctly.

The change of error measured when the meter is back at nominal working temperature must not exceed the limits given in table ##, even after repeated earth faults.

**Table ## - Change of error due to earth fault**

| Value of current | Power factor | Limits of variation in percentage error for meters of class | | |
|---|---|---|---|---|
| | | 0,5 | 1 | 2 |
| $I_n$ | 1 | ± 0,3 | ± 0,7 | ± 1,0 |

# NORME INTERNATIONALE
# INTERNATIONAL STANDARD

CEI
IEC
521

Deuxième édition
Second edition
1988

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

## Compteurs d'énergie active à courant alternatif des classes 0,5, 1 et 2



## Class 0.5, 1 and 2 alternating-current watthour meters



Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembé Genève, Suisse

Code prix
Price code 25

*Pour prix, voir catalogue en vigu*
*For price, see current catalogue*

CONTENTS





TABLES

INTERNATIONAL ELECTROTECHNICAL COMMISSION

# CLASS 0.5, 1 AND 2 ALTERNATING-CURRENT WATTHOUR METERS

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.



PREFACE

This standard has been prepared by IEC Technical Committee No. 13: Equipment for electrical energy measurement and load control.



This second edition replaces the first edition of IEC Publication 521 (1976).

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

| Six Months' Rule | Report on Voting |
|---|---|
| 13(CO)1002 | 13(CO)1004 |

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

*The following IEC publications are quoted in this standard:*

Publications Nos. 28 (1925): International standard of resistance for copper.

38 (1983): IEC standard voltages.

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.

60: High-voltage test techniques.

85 (1984): Thermal evaluation and classification of electrical insulation.

145 (1963): Var-hour (reactive energy) meters.

185 (1966): Current transformers.

211 (1966): Maximum demand indicators, Class 1.0.

387 (1972): Symbols for alternating-current electricity meters.

414 (1973): Safety requirements for indicating and recording electrical measuring instruments and their accessories.

514 (1975): Acceptance inspection of Class 2 alternating-current watthour meters.

529 (1976): Classification of degrees of protection provided by enclosures.

695-2-1 (1980): Fire-hazard testing, Part 2: Test Methods: Glow-wire test and guidance.

817 (1984): Spring-operated impact-test apparatus and its calibration.



*Other publication quoted:*

ISO Standard 75 (1974): Plastics and ebonite - Determination of temperature of deflection under load.

# CLASS 0.5, 1 AND 2 ALTERNATING-CURRENT WATTHOUR METERS

---

## 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 only*.

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.

---

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