



SLOVENSKI STANDARD

SIST EN 60309-1:1992

01-december-1992

Vtiči, vtičnice in spojke za industrijske namene - 1. del: Splošne zahteve

Plugs, socket-outlets and couplers for industrial purposes -- Part 1: General requirements

Stecker, Steckdosen und Kupplungen für industrielle Anwendung -- Teil 1: Allgemeine Festlegungen

Prises de courant pour usages industriels -- Partie 1: Règles générales

Ta slovenski standard je istoveten z: EN 60309-1:1992

SIST EN 60309-1:1992
<https://standards.iteh.ai/catalog/standards/sist/695857cc-3eb4-415e-a642-184f46befa4d/sist-en-60309-1-1992>

ICS:

| | | |
|-----------|-------------------------|---------------------------------|
| 29.120.30 | Vtiči, vtičnice, spojke | Plugs, socket-outlets, couplers |
|-----------|-------------------------|---------------------------------|

SIST EN 60309-1:1992

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60309-1:1992

<https://standards.iteh.ai/catalog/standards/sist/b93857ce-3eb4-415e-a642-184f46befa4d/sist-en-60309-1-1992>

NORME EUROPEENNE

EUROPÄISCHE NORM

April 1992

UDC 621.316.541.11/.12:620.1

Supersedes HD 196 S1:1978

Descriptors: Low-voltage equipment, industrial use, plug and socket-outlet, appliance coupler, cable coupler, general requirement, rating, construction, test

ENGLISH VERSION

PLUGS, SOCKET-OUTLETS AND COUPLERS FOR INDUSTRIAL PURPOSES

PART 1: GENERAL REQUIREMENTS

(IEC 309-1:1988, modified)

Prises de courant pour usages industriels

Première partie: Règles générales

(CEI 309-1:1988, modifiée)

Stecker, Steckdosen und Kupplungen für industrielle Anwendung

Teil 1: Allgemeine Festlegungen
(IEC 309-2:1989, modifiziert)

ITeh STANDARD PREVIEW

This European Standard was approved by CENELEC on 1991-09-23. 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.

<https://standards.iteh.ai/catalog/standards/sist/b93857ce-3eb4-415e-a642-309-1:1992>

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

© 1992 Copyright reserved to CENELEC members

Ref. No. EN 60309-1:1992 E

92-04-30

FOREWORD

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 309-1:1988 could be accepted without textual changes, has shown that some common modifications were necessary for the acceptance as European Standard.

The reference document, as corrected by the corrigendum issued as IEC 23H(SEC)34, together with the common modifications prepared by the CENELEC Reporting Secretariat SR 23H, was submitted to the CENELEC members for formal vote.

The text of the draft was approved by CENELEC as EN 60309-1 on 23 September 1991.

This European Standard supersedes HD 196 S1:1978.

The following dates were fixed:

- latest date of publication of
an identical national standard (dop) 1992-10-01
- latest date of withdrawal of
conflicting national standards (dow) 1997-10-01

(standards.iteh.ai)

For products which have complied with HD 196 S1:1978 before 1997-10-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2002-10-01.

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 309-1:1988, as corrected by the corrigendum issued as IEC 23H(SEC)34, was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

- 4 **General notes on tests**
- 4.6 Replace "IEC Publications 227, 228 and 245-4" by
 "HD 21 S2, HD 383 S2 and HD 22.4 S2".
- 5 **Standard ratings**
- 5.2 Add under table 1:

 Note: Series I is preferred.
- 6 **Classification**
- 6.1.2 Replace "(IEC) Publication 529" by "HD 365 S3" (twice).
 Delete the second explanation paragraph.
- <https://standards.iteh.ai/catalog/standards/sist/b93857ce-3eb4-415e-a642-184f46befa4d/sist-en-60309-1-1992>
- 8 **Dimensions**
- 8.3 Replace "IEC Publication 320" by "EN 60320-1" (twice).
- 11 **Terminals**
- 11.4 In Table III delete the three columns "AWG/MCM" and the
 part of Note 3) corresponding to AWG/MCM.
- 12 **Interlocks**
- 12.2 Replace "IEC Publication 408" by "HD 422 S1" (twice).
- 18 **Degrees of protection**
- 18.2 Replace "IEC Publication 529" by "HD 365 S3".

COMMON MODIFICATIONS (concluded)

23 Flexible cables and their connection

23.2.1 Replace "IEC Publication 245-4" by "HD 22.4 S2".

In table IX, replace the third column by:

| Type of cable |
|---|
| HD 22 |
| HO5RR-F ²⁾ , HO5RN-F ²⁾ , HO7RN-F HO5RN-F ²⁾ , HO7RN-F HO7RN-F HO7RN-F ³⁾ HO7RN-F ⁴⁾ |

23.3 Replace "IEC Publication 245-4" by "HD 22.4 S2".

In table X, replace in the fourth column, "IEC 245" by "HD 22" and replace "66" by "HO7RN-F" and "53" by "HO5RR-F".

In Note 1), replace "IEC Publication 245-4" by "HD 22.4 S2".

<http://standards.iteh.ai/catalog/standards/sist/b93857ce-3eb4-415e-a642-184f46befa4d/sist-en-60309-1-1992>

27 Resistance to heat, fire and tracking

27.4 Replace "Publication 695-2-1" by "HD 444.2.1 S1".

Appendix A Delete.

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 |
|--------------------|------|--|---|----------------------|
| 83 | 1975 | Plugs and socket-outlets for domestic and similar use-Standards | - | - |
| 227 | 1979 | Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V | HD 21 | series |
| 228 (mod) | 1978 | Conductors of insulated cables | HD 383 S2 + A1 | 1986 1989 |
| 245-4 (mod) | 1980 | Rubber insulated cables of rated voltages up to and including 450/750 V Part 4: Cords and flexible cables | HD 22.4 S2 + A1 + A2 + A3 + A4 | 1982 1989 1990 |
| 320 (mod) | 1981 | Appliance couplers for household and similar general purposes | EN 60320-1* + A1 | 1987 1989 |
| 408 (mod) | 1985 | Low-voltage air-break switches, air-break disconnectors, air-break switch disconnectors and fuse-combination units | HD 422 S1 | 1982 |
| 529 | 1976 | Classification of degrees of protection provided by enclosures | HD 365 S3* | 1985 |
| 695-2-1 | 1980 | Fire hazard testing Part 2: Test methods, Glow-wire test and guidance | HD 444.2.1 S1 | 1983 |

* EN 60320-1 includes A1:1984 + A2:1985 to IEC 320:1981;
EN 60320-1/A1:1989 is based on A3:1987 to IEC 320

HD 365 S3 is superseded by EN 60529:1991 which is based on IEC 529:1989

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60309-1:1992

<https://standards.iteh.ai/catalog/standards/sist/b93857ce-3eb4-415e-a642-184f46befa4d/sist-en-60309-1-1992>

4

NORME INTERNATIONALE INTERNATIONAL STANDARD

CEI
IEC
309-1

Deuxième édition
Second edition
1988



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

Prises de courant pour usages industriels

Première partie: Règles générales

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60309-1:1992

<https://standards.iteh.ai/catalog/standards/sist/b93857ce-3eb4-415e-a642-184f46befa4d/sist-en-60309-1-1992>

Plugs, socket-outlets and couplers for industrial purposes

Part 1: General requirements

Révision de la présente publication

Le contenu technique des publications de la CEI est constamment revu par la Commission afin d'assurer qu'il reflète bien l'état actuel de la technique.

Les renseignements relatifs à ce travail de révision, à l'établissement des éditions révisées et aux mises à jour peuvent être obtenus auprès des Comités nationaux de la CEI et en consultant les documents ci-dessous :

- Bulletin de la CEI
- Annuaire de la CEI
- Catalogue des publications de la CEI
Publié annuellement

Terminologie

En ce qui concerne la terminologie générale, le lecteur se reportera à la Publication 50 de la CEI: Vocabulaire Electrotechnique International (VEI), qui est établie sous forme de chapitres séparés traitant chacun d'un sujet défini, l'Index général étant publié séparément. Des détails complets sur le VEI peuvent être obtenus sur demande.

Les termes et définitions figurant dans la présente publication ont été soit repris du VEI, soit spécifiquement approuvés aux fins de cette publication.

Symboles graphiques et littéraux

Pour les symboles graphiques, symboles littéraux et signes d'usage général approuvés par la CEI, le lecteur consultera :

- la Publication 27 de la CEI: Symboles littéraux à utiliser en électrotechnique;
- la Publication 617 de la CEI: Symboles graphiques pour schémas.

Les symboles et signes contenus dans la présente publication ont été soit repris des Publications 27 ou 617 de la CEI, soit spécifiquement approuvés aux fins de cette publication.

Publications de la CEI établies par le même Comité d'Etudes

L'attention du lecteur est attirée sur le deuxième feuillet de la couverture, qui énumère les publications de la CEI préparées par le Comité d'Etudes qui a établi la présente publication.

Revision of this publication

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology.

Information on the work of revision, the issue of revised editions and amendment sheets may be obtained from IEC National Committees and from the following IEC sources:

- IEC Bulletin
- IEC Yearbook
- Catalogue of IEC Publications
Published yearly

Terminology

For general terminology, readers are referred to IEC Publication 50: International Electrotechnical Vocabulary (IEV), which is issued in the form of separate chapters each dealing with a specific field, the General Index being published as a separate booklet. Full details of the IEV will be supplied on request.

The terms and definitions contained in the present publication have either been taken from the IEV or have been specifically approved for the purpose of this publication.

Graphical and letter symbols

For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to:

- IEC Publication 27: Letter symbols to be used in electrical technology;
- IEC Publication 617: Graphical symbols for diagrams.

The symbols and signs contained in the present publication have either been taken from IEC Publications 27 or 617, or have been specifically approved for the purpose of this publication.

IEC publications prepared by the same Technical Committee

The attention of readers is drawn to the back cover, which lists IEC publications issued by the Technical Committee which has prepared the present publication.

CONTENTS

| | Page |
|---|------|
| FOREWORD | 5 |
| PREFACE | 5 |
| INTRODUCTION | 7 |
| Clause | |
| 1. Scope | 7 |
| 2. Definitions | 9 |
| 3. General requirements | 15 |
| 4. General notes on tests | 15 |
| 5. Standard ratings | 17 |
| 6. Classification | 17 |
| 7. Marking | 19 |
| 8. Dimensions | 23 |
| 9. Protection against electric shock | 25 |
| 10. Provision for earthing | 27 |
| 11. Terminals | 29 |
| 12. Interlocks | 39 |
| 13. Resistance to ageing of rubber and thermoplastic material | 39 |
| 14. General construction | 41 |
| 15. Construction of socket-outlets | 41 |
| 16. Construction of plugs and connectors | 45 |
| 17. Construction of appliance inlets | 47 |
| 18. Degrees of protection | 49 |
| 19. Insulation resistance and electric strength | 51 |
| 20. Breaking capacity | 55 |
| 21. Normal operation | 59 |
| 22. Temperature rise | 61 |
| 23. Flexible cables and their connection | 63 |
| 24. Mechanical strength | 69 |
| 25. Screws, current-carrying parts and connections | 75 |
| 26. Creepage distances, clearances and distances through sealing compound | 81 |
| 27. Resistance to heat, fire and tracking | 83 |
| 28. Resistance to rusting | 87 |
| FIGURES | 88 |
| APPENDIX A — Metric and AWG/MCM conductor size equivalents | 103 |

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PLUGS, SOCKET-OUTLETS AND COUPLERS FOR INDUSTRIAL PURPOSES

Part 1: General requirements

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.
- 4) The IEC has not laid down any procedure concerning marking as an indication of approval and has no responsibility when an item of equipment is declared to comply with one of its recommendations.

PREFACE

This standard has been prepared by Sub-Committee 23H: Industrial Plugs and Socket-outlets, of IEC Technical Committee No. 23: Electrical Accessories.

It forms the second edition of IEC Publication 309-1 and replaces the first edition (1979) and Amendment No. 1 (1983).

The text of this standard is based upon the first edition and its amendment and the following documents:

| Six Months' Rule | Report on Voting |
|------------------|------------------|
| 23H(CO)11 | 23H(CO)13+A |

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

Note. — In this standard, the following print types are used:

- Requirements proper: in roman type;
- *Test specifications: in italic type;*
- Explanatory matter: in smaller roman type.

The following IEC publications are quoted in this standard:

- Publications Nos. 83 (1975): Plugs and socket-outlets for domestic and similar general use. Standards.
 227 (1979): Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V.
- 228 (1978): Conductors of insulated cables.
 245-4 (1980): Rubber insulated cables of rated voltages up to and including 450/750 V, Part 4: Cords and flexible cables.
 320 (1981): Appliance couplers for household and similar general purposes.
 408 (1985): Low-voltage air-break switches, air-break disconnectors, air-break switch disconnectors and fuse-combination units.
 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.

PLUGS, SOCKET-OUTLETS AND COUPLERS FOR INDUSTRIAL PURPOSES

Part 1: General requirements

INTRODUCTION

This standard is divided into several parts:

Part 1: General requirements, comprising clauses of a general character.

Subsequent parts: Particular requirements dealing with particular types. The clauses of these particular requirements supplement or modify the corresponding clauses in Part 1. Where the text of subsequent parts indicates an "addition" to or a "replacement" of the relevant requirement, test specification or explanation of Part 1, these changes are made to the relevant text of Part 1, which then becomes part of the standard. Where no change is necessary, the words "This clause of Part 1 is applicable" are used.

1. Scope

iTeh STANDARD PREVIEW

This standard applies to plugs and socket-outlets, cable couplers and appliance couplers, with a rated operating voltage not exceeding 690 V d.c. or a.c. and 500 Hz a.c. and a rated current not exceeding 250 A, primarily intended for industrial use, either indoors or outdoors.

<https://standards.iteh.ai/catalog/standards/sist/b93857ce-3eb4-415e-a642-184f46befa4d/sist-en-60309-1-1992>

The list of preferred ratings is not intended to exclude other ratings, requirements for which are under consideration.

This standard applies to plugs and socket-outlets, cable couplers and appliance couplers, hereinafter referred to as accessories, for use when the ambient temperature does not normally exceed 40 °C.

The use of these accessories on building sites and for agricultural, commercial and domestic applications is not precluded.

Socket-outlets or appliance inlets incorporated in or fixed to electrical equipment are within the scope of this standard. This standard also applies to accessories intended to be used in extra-low voltage installations.

This standard does not apply to accessories primarily intended for domestic and similar general purposes.

In locations where special conditions prevail, for example on board ship or where explosions are liable to occur, additional requirements may be necessary.

2. Definitions

Where the terms voltage and current are used, they imply the d.c. or the a.c. r.m.s. values.

The following definitions apply for the purpose of this standard.

The application of accessories is shown in Figure 1.

2.1 Plug and socket-outlet

A means enabling the connection at will of a flexible cable to fixed wiring. It consists of two parts:

2.1.1 Socket-outlet

The part intended to be installed with the fixed wiring.

A socket-outlet may also be incorporated in the output circuit of an isolating transformer.

2.1.2 Plug

The part integral with or intended to be attached to the flexible cable connected to the equipment or to a connector.

2.2 Cable coupler

A means enabling the connection at will of two flexible cables. It consists of two parts:

2.2.1 Connector

The part integral with or intended to be attached to the flexible cable connected to the supply.

2.2.2 Plug

The part integral with or intended to be attached to the flexible cable connected to the equipment or to a connector.

The plug of a cable coupler is identical to the plug of a "plug and socket-outlet". In general, a connector has the same contact arrangement as a socket-outlet.

2.3 Appliance coupler

A means enabling the connection at will of a flexible cable to the equipment. It consists of two parts:

2.3.1 Connector

The part integral with, or intended to be attached to, the flexible cable connected to the supply.

2.3.2 Appliance inlet

The part incorporated in, or fixed to, the equipment or intended to be fixed to it.

In general, the connector of an appliance coupler is identical to the connector of a cable coupler and an appliance inlet has the same contact arrangement as a plug.

2.4 *Rewirable plug or connector*

An accessory so constructed that the flexible cable can be replaced.

2.5 *Non-rewirable plug or connector*

An accessory so constructed that the flexible cable cannot be separated from the accessory without making it permanently useless.

2.6 *Mechanical switching device*

A switching device designed to close and open one or more electric circuits by means of separable contacts.

2.7 *Switched socket-outlet*

A socket-outlet with an associated switching device to disconnect the supply from the socket-outlet contacts.

2.8 *Integral switching device*

A mechanical switching device constructed as a part of an accessory covered by this standard.

2.9 *Interlock*

A device, either electrical or mechanical, which prevents the contacts of a plug from becoming live before it is in proper engagement with a socket-outlet or connector, and which either prevents the plug from being withdrawn while its contacts are live or makes the contacts dead before separation.

2.10 *Retaining device*

A mechanical arrangement which holds a plug or connector in position when it is in proper engagement, and prevents its unintentional withdrawal.

2.11 *Rated current*

The current assigned to the accessory by the manufacturer.

2.12 *Insulation voltage*

The voltage assigned to the accessory by the manufacturer and to which dielectric tests, clearances and creepage distances are referred.

2.13 *Rated operating voltage*

The nominal voltage of the supply for which the accessory is intended to be used.

2.14 *Basic insulation*

The insulation necessary for the proper functioning of the accessory and for basic protection against electric shock.

2.15 *Supplementary insulation (protective insulation)*

An independent insulation provided in addition to the basic insulation, in order to ensure protection against electric shock in the event of a failure of the basic insulation.