

---

**Plugs, socket-outlets and couplers for industrial purposes – Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories (IEC 60309-2:1997)**

Plugs, socket-outlets and couplers for industrial purposes -- Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories

Stecker, Steckdosen und Kupplungen für industrielle Anwendung - Teil 2: Stift- und Buchsensteckvorrichtungen mit genormten Anordnungen - Anforderungen und Hauptmaße für die Austauschbarkeit

Prises de courant pour usages industriels -- Partie 2: Règles d'interchangeabilité dimensionnelle pour les appareils à broches et alvéoles

**Ta slovenski standard je istoveten z: EN 60309-2:1998**

**ICS:**

29.120.30 Xã ãã } ã^ ã Plugs, socket-outlets, couplers

**SIST EN 60309-2:1999****en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 60309-2:1999

<https://standards.iteh.ai/catalog/standards/sist/fdfc2f6f-511d-4fa8-b293-9f868205d005/sist-en-60309-2-1999>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60309-2**

June 1998

ICS 29.120.30

Supersedes EN 60309-2:1992

Descriptors: Low-voltage equipment, industrial use, plug and socket-outlet, appliance coupler, pin and contact tube accessory, rating, dimension, interchangeability, construction, test

English version

**Plugs, socket-outlets and couplers for industrial purposes**  
**Part 2: Dimensional interchangeability requirements**  
**for pin and contact-tube accessories**  
(IEC 60309-2:1997)

Prises de courant pour usages  
industriels

Partie 2: Règles d'interchangeabilité  
dimensionnelle pour les appareils à  
broches et alvéoles  
(CEI 60309-2:1997)

Stecker, Steckdosen und Kupplungen  
für industrielle Anwendung

Teil 2: Stift- und  
Buchsensteckvorrichtungen mit  
genormten Anordnungen;  
Anforderungen und Hauptmaße für die  
Austauschbarkeit  
(IEC 60309-2:1997)

<https://standards.iteh.ai/catalog/standards/sist/9f868205d005/sist-en-60309-2-1999>

This European Standard was approved by CENELEC on 1997-10-01. 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, Czech Republic, 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 document 23H/71/FDIS, future edition 3 of IEC 60309-2, prepared by SC 23H, Industrial plugs and socket outlets, of IEC TC 23, Electrical accessories, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60309-2 on 1997-10-01.

This European Standard supersedes EN 60309-2:1992 and its corrigendum April 1993.

This part 2 is to be used in conjunction with part 1.

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) 1999-04-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1999-04-01

---

### Endorsement notice

The text of the International Standard IEC 60309-2:1997 was approved by CENELEC as a European Standard without any modification.

**(standards.iteh.ai)**

SIST EN 60309-2:1999

<https://standards.iteh.ai/catalog/standards/sist/fdfe2f6f-511d-4fa8-b293-9f868205d005/sist-en-60309-2-1999>

NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD

CEI  
IEC

60309-2

Troisième édition  
Third edition  
1997-10

**Prises de courant pour usages industriels –**

**Partie 2:  
Règles d'interchangeabilité dimensionnelle  
pour les appareils à broches et alvéoles**

**iTeh STANDARD PREVIEW**

**(standards.iteh.ai)  
Plugs, socket-outlets and couplers  
for industrial purposes –**

[SIST EN 60309-2:1999](https://standards.iteh.ai/catalog/standards/sist/fd6f511d-4fa8-b293-205d005/sist-en-60309-2-1999)

[https://standards.iteh.ai/catalog/standards/sist/fd6f511d-4fa8-b293-](https://standards.iteh.ai/catalog/standards/sist/fd6f511d-4fa8-b293-205d005/sist-en-60309-2-1999)

**Part 2:**

**Dimensional interchangeability requirements  
for pin and contact-tube accessories**

© IEC 1997 Droits de reproduction réservés — Copyright - all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'éditeur.

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission  
Telefax: +41 22 919 0300

3, rue de Varembé Geneva, Switzerland  
e-mail: [inmail@iec.ch](mailto:inmail@iec.ch) IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

X

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

## CONTENTS

	Page
FOREWORD .....	5
INTRODUCTION .....	7
Clause	
1 Scope.....	9
2 Definitions .....	9
3 Normative references .....	9
4 General .....	9
5 Standard ratings .....	11
6 Classification .....	11
7 Marking .....	11
8 Dimensions .....	17
9 Protection against electric shock.....	27
10 Provision for earthing.....	27
11 Terminals .....	27
12 Interlocks and retaining devices .....	35
13 Resistance to ageing of rubber and thermoplastic material .....	35
14 General construction .....	37
15 Construction of socket-outlets .....	37
16 Construction of plugs and connectors .....	41
17 Construction of appliance inlets .....	41
18 Degrees of protection .....	41
19 Insulation resistance and dielectric strength .....	41
20 Breaking capacity .....	43
21 Normal operation .....	43
22 Temperature rise .....	43
23 Flexible cables and their connection .....	43
24 Mechanical strength.....	43
25 Screws, current-carrying parts and connections .....	43
26 Creepage distances, clearances and distances through sealing compound.....	45
27 Resistance to heat, fire and tracking .....	45
28 Corrosion and resistance to rusting .....	45
29 Conditional short-circuit current withstand test .....	45
30 Electromagnetic compatibility.....	45
Standard sheets .....	46
Figures.....	79

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PLUGS, SOCKET-OUTLETS AND COUPLERS FOR INDUSTRIAL PURPOSES –  
Part 2: Dimensional interchangeability requirements for  
pin and contact-tube accessories**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60309-2 has been prepared by subcommittee 23H: Industrial plugs and socket-outlets, of IEC technical committee 23: Electrical accessories.

This third edition cancels and replaces the second edition published in 1989.

This part 2 shall be used in conjunction with part 1.

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

FDIS	Report on voting
23H/71/FDIS	23H/80/RVD

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

## 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.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 60309-2:1999

<https://standards.iteh.ai/catalog/standards/sist/fdfe2f6f-511d-4fa8-b293-9f868205d005/sist-en-60309-2-1999>



# PLUGS, SOCKET-OUTLETS AND COUPLERS FOR INDUSTRIAL PURPOSES –

## Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories

### 1 Scope

#### *Replacement:*

This standard applies to plugs and socket-outlets, cable couplers and appliance couplers with a rated operating voltage not exceeding 690 V, 500 Hz and a rated current not exceeding 125 A, primarily intended for industrial use, either indoors or outdoors.

NOTE – All references for accessories with a rated current of more than 125 A in part 1 are not applicable to this part 2;

This standard applies to plugs and socket-outlets, cable couplers and appliance couplers with pins and contact tubes of standardized configurations.

This standard applies to plugs and socket-outlets, cable couplers and appliance couplers, hereinafter referred to as accessories, for use when the ambient temperature is normally within the range  $-25\text{ °C}$  to  $40\text{ °C}$ .

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.

NOTE – 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

This clause of part 1 is applicable.

### 3 Normative references

This clause of part 1 is applicable.

### 4 General

This clause of part 1 is applicable except as follows:

*Additional subclause:*

4.101 If gauges are used, they shall be of hardened steel, all corners shall be slightly rounded-off with a maximum radius of 0,1 mm, and the surface finish for all measurement surfaces shall be  $\sqrt{\frac{NB}{\text{min}}}$  min, if not otherwise specified.

## 5 Standard ratings

This clause of part 1 is applicable except as follows:

### 5.2 Replacement:

Standard rated currents are given in table 101.

**Table 101**

Series I A	Series II A
16	20
32	30
63	60
125	100

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

## 6 Classification

This clause of part 1 is applicable except as follows:

<https://standards.iteh.ai/catalog/standards/sist/fdfe26f5-11d-4fa8-b293-9f868205d005/sist-en-60309-2-1999>

### 6.1.2 Replacement:

According to degrees of protection:

- either in accordance with IEC 60529: IP44, IP67
- or according to degree of protection against moisture:
  - splash-proof accessories;
  - watertight accessories.

For new designs, degrees of protection according to IEC 60529 shall be used.

## 7 Marking

This clause of part 1 is applicable except as follows:

### 7.1 Modification:

*Delete the note*

*Addition:*

The symbol indicating the position of the earthing contact or of the minor key or keyway shall be placed before or above the figure for the rated operating voltage, and separated from it by a line.

These markings shall be placed after that for rated current, separated from it by a dash if an oblique line separates the symbol indicating the position of the earthing contact or of the minor key or keyway from the figure for the rated operating voltage.

If a symbol for nature of supply is used, it shall be placed next to or below the marking for rated operating voltage.

For three-phase accessories it is not necessary to mark the voltage phase to neutral, if any.

The marking for rated current(s), position of the earthing contact or the minor key, keyway, rated operating voltage(s) and nature of supply accordingly may be as follows:

For series I:

16 A - 9 h/400 V~, or 16 A - 9 h/400~, or 16 A -  $\frac{9 \text{ h}}{400 \sim}$ , or

16 A - 9 h/380-415 V~, or 16 A - 9 h/380-415~, or 16 A -  $\frac{9 \text{ h}}{380 - 415 \sim}$

32 A - 6 h/230/400 V~, or 32 A - 6 h/230/400~, or 32 A -  $\frac{6 \text{ h}}{230 - 400 \sim}$ , or

32 A -  $\frac{6 \text{ h} / 220 / 380 \text{ V} \sim}{240 / 415 \text{ V} \sim}$ , or 32 A -  $\frac{6 \text{ h} / 220 / 380 \sim}{240 / 415 \text{ V} \sim}$ , or 32 A -  $\frac{6 \text{ h}}{220 / 380 \sim}$   
 $\frac{6 \text{ h}}{240 / 415 \sim}$

For series II

SIST EN 60309-2:1999

<https://standards.iteh.ai/catalog/standards/sist/fdfe2f6f-511d-4fa8-b293-9f868205d005/sist-en-60309-2-1999>

20 A - 7 h/480 V a.c. or 20 A - 7 h/480~, or 20 A -  $\frac{7 \text{ h}}{480 \sim}$

30 A - 7 h/480 V, 3 Phase, or 30 A - 7 h/480, 3Φ, or 30 A -  $\frac{7 \text{ h}}{480 \text{ V}, 3\Phi}$

60 A - 7 h/277/480 V, 3 Phase Y, or 60 A - 7 h/277/480, 3ΦY, or 60 A -  $\frac{7 \text{ h}}{277 / 480 \text{ V}, 3\Phi Y}$

It is allowed to put the symbols for a.c. (~) and d.c. (----- or ———) after the values (IEC 60617-2).

The drawings of Standard Sheets 2-I, 2-II, 2-III and 2-IV show accessories with the symbol 6 h and those of Standard Sheets 2-VIII and 2-IX accessories with the symbol 12 h.

For accessories having rated operating voltages exceeding 50 V, the symbol indicating the position of the earthing contact shall be a numeral followed by the letter h.

The numeral is derived from the position of the earth contact tube, when compared with the face of a clock, the socket-outlet or connector being viewed from the front with the keyway at the sixth hour.

For accessories having rated operating voltages not exceeding 50 V, the symbol indicating the position of the minor key shall be a numeral followed by the letter h.

The numeral is derived from the position of the minor key, when compared with the face of a clock, the socket-outlet or connector being viewed from the front with the major key at the sixth hour.

For plugs and appliance inlets, the symbol indicating the position of the earthing contact or the minor keyway shall be the same as that for the corresponding socket-outlet or connector.

Contact tubes of socket-outlets and connectors with a rated operating voltage exceeding 50 V shall be positioned in the clockwise order when viewed from the front.

Pins of plugs and appliance inlets shall be positioned in the opposite order viewed from the front.

Contact tubes of socket-outlets and connectors with rated operating voltage not exceeding 50 V shall be positioned as shown in Standard Sheet 2-VIII.

#### 7.2 Modification:

Delete the following:

IPXX (relevant figures)..... degree of protection according to IEC 60529

Add the following:

[SIST EN 60309-2:1999](https://standards.iteh.ai/catalog/standards/sist/en-60309-2-1999)

[https://standards.iteh.ai/catalog/standards/sist/fdfe26f511d-4fa8-b293-](https://standards.iteh.ai/catalog/standards/sist/fdfe26f511d-4fa8-b293-9f868205d005/sist-en-60309-2-1999)

[9f868205d005/sist-en-60309-2-1999](https://standards.iteh.ai/catalog/standards/sist/en-60309-2-1999)

Where IP Code is used only the following are permitted:

- IP44..... degree of protection according to IEC 60529
- IP67..... degree of protection according to IEC 60529

#### 7.4 Replacement

For plugs and connectors, the marking specified in 7.1 shall be easily discernible when the accessory is wired ready for use.

The marking for insulation voltage shall be on the main part; it shall not be visible when the accessory is mounted and wired as in normal use.

*Compliance is checked by inspection.*

### 7.5 Replacement

For rewirable accessories, the contacts shall be indicated by the following symbols.

- for accessories with three contacts (phase + neutral + earth, or, phase + phase + earth):  
L / +, unmarked,  $\text{Ⓛ}$  or  $\text{Ⓜ}$   
except for Series II clock position 4 h and 5 h which are marked:  
N, unmarked,  $\text{Ⓝ}$  or  $\text{Ⓞ}$
- for accessories with four contacts (three phase + earth):  
L1, L2, L3,  $\text{Ⓛ}$  or  $\text{Ⓜ}$  or alternatively 1, 2, 3,  $\text{Ⓛ}$  or  $\text{Ⓜ}$   
except for Series II clock position 12 h (phase + centre tap + phase + earth) which is marked:  
L1, N, L2,  $\text{Ⓛ}$  or  $\text{Ⓜ}$
- for accessories with five contacts (three phase + neutral + earth)  
L1, L2, L3, N,  $\text{Ⓛ}$  or  $\text{Ⓜ}$  or alternatively 1, 2, 3, N  $\text{Ⓛ}$  or  $\text{Ⓜ}$

*Compliance is checked by inspection.*

### 7.7 Modification:

This subclause of part 1 is applicable except for the following addition:

Add:

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

The 2P + N + earth, 12 h, Series II accessories shall use the indicating colour orange.

## 8 Dimensions

<https://standards.iteh.ai/catalog/standards/sist/fdfe2f6f-511d-4fa8-b293-9f868205d005/sist-en-60309-2-1999>

This clause of part 1 is applicable except as follows:

### 8.1 Replacement:

Accessories shall comply with the relevant standard sheets as specified below:

- accessories having rated operating voltages exceeding 50 V:
  - 16/20 A and 32/30 A:..... Sheets 2-I and 2-II;
  - 63/60 A and 125/100 A, without pilot contact:..... Sheets 2-III and 2-IV;
  - 63/60 A and 125/100 A, with pilot contact:..... Sheets 2-IIIa and 2-IVa;
  - mechanical interlock for 16 A to 125 A accessories:..... Sheet 2-V
- accessories having rated operating voltage not exceeding 50 V:
  - 16/20 A and 32/30 A:..... Sheets 2-VIII and 2-IX.

Deviations from the dimensions specified in the standard sheets may be made, but only if they provide a technical advantage and do not adversely affect the purpose and safety of the accessories complying with the standard sheets, especially with regard to interchangeability and non-interchangeability.

*Compliance is checked by means of gauges or by measurement for those dimensions not covered by gauges,*

- for accessories having rated operating voltages exceeding 50 V according to:
  - figures 101 and 102 for socket-outlets and connectors;
  - figures 107 and 108 for plugs and appliance inlets;

- for accessories having rated operating voltages not exceeding 50 V according to:
- figures 110 and 112 for 16/20 A and 32/30 A accessories

The gauges shall be moved axially to the centre line of the accessory with a force as shown in the table 102, applied for 1 min.

**Table 102**

Rated operating voltage V	Rated current A		Force (max.) for "GO" gauge N	Force (max.) for "NOT GO" gauge N $\begin{pmatrix} 0 \\ -1 \end{pmatrix}$
	Series I	Series II		
Not exceeding 50 V	16	20	150	30
	32	30	150	30
Exceeding 50 V	16	20	60	20
	32	30	90	30
	63	60	165	55
	125	100	240	80

Before the test, the test specimen of insulating material shall be stored at a temperature of  $(20 \pm 5)$  °C and a relative humidity between 45 % and 75 % for four weeks.

For accessories having rated operating voltages not exceeding 50 V, the position of the minor key or keyway shall be as shown in table 103.

For accessories having rated operating voltages exceeding 50 V, the position of the earthing contact shall be as shown in table 104.

Compliance is checked by inspection.

<https://standards.iteh.ai/catalog/standards/sist/fdfe2f6f-511d-4fa8-b293-9f868205d005/sist-60309-2-1999>

**Table 103**

Rated operating voltage V	Frequency Hz	Minor key or keyway position*
20 to 25	50 and 60	No minor key or keyway
40 to 50	50 and 60	12
20 to 25 and 40 to 50	100 up to and including 200	4
	300	2
	400	3
	Over 400 up to and including 500	11
	Direct current	10

\* The minor key or keyway position is indicated by the relevant number (see 7.1).

Positions 1, 8, and 9 are reserved for future standardization. For constructional reasons, positions 5, 6 and 7 cannot be used.

Table 104

Number of contacts	Type	Frequency Hz	Rated operating voltage V	Accessories earthing-contact position <sup>1)</sup>	
				16/20 A 32/30 A	63/60 A 125/100 A
3 contacts	1P+N+ $\perp$ Series II	50 and 60	100 to 130	4	4
		60	277	5	5
	2P+ $\perp$ Series I and II	50 and 60	100 to 130	4	4
			200 to 250	6	6
		50 and 60	380 to 415	9	9
			480 to 500	7	7
			Supply from an isolating transformer	12	12
		100 up to and including 300	Over 50	-	-
		Over 300 up to and including 500	Over 50	2	-
		Direct current	Over 50 up to and including 250	3	3
Over 250	8		8		
4 contacts	2P+N+ $\perp$ Series II	50 and 60	125/250 single phase	12	12
		3P+ $\perp$ Series I and II	50 and 60	100 to 130	4
	200 to 250			9	9
	380 to 415			6	6
	60		440 to 460 <sup>2)</sup>	11	11
	50 and 60		480 to 500	7	7
			600 to 690	5	5
	50 60		380 440 <sup>3)</sup>	3	-
	100 up to and including 300		Over 50	10	-
	Over 300 up to and including 500	Over 50	2	-	
5 contacts	3P+N+ $\perp$ Series I and II	50 and 60	57/100 to 75/130	4	4
			120/208 to 144/250	9	9
			200/346 to 240/415	6	6
			277/480 to 288/500	7	7
			347/600 to 400/690	5	5
		60	250/440 to 265/460 <sup>2)</sup>	11	11
		50 60	220/380 250/440 <sup>3)</sup>	3	-
		100 up to and including 300	Over 50	-	-
		Over 300 up to and including 500	Over 50	2	-
		All types	All rated operating voltage and/or frequencies not covered by other configurations.		1
<sup>1)</sup> The earthing-contact position is indicated by the relevant numeral (see 7.1) <sup>2)</sup> Mainly for marine installations. <sup>3)</sup> Only for refrigerated containers (standardized ISO)					
NOTE – The positions shown by a dash (–) are not standardized.					