SLOVENSKI STANDARD
oSIST prEN IEC 60309-2:2019

01-oktober-2019

Vtiči, fiksne ali prenosne vtičnice in vtičnice za industrijsko rabo - 2. del: Zahteve za dimenzijsko izmenljivost pribora s trni in pušami

Plugs, fixed or portable socket- outlets and appliance inlets for industrial purposes - Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories

Stecker, Steckdosen und Kupplungen für industrielle Anwendungen - Teil 2: Anforderungen und Hauptmaße für die Austauschbarkeit von Stift- und Buchsensteckvorrichtungen

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: **prEN IEC 60309-2:2019**

ICS:

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

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23H/457/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 60309-2 ED5**	
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IEC SC 23H : PLUGS, SOCKET-OUTLETS AND COUPLERS FOR INDUSTRIAL AND SIMILAR APPLICATIONS, AND FOR ELECTRIC VEHICLES

SECRETARIAT: France	SECRETARY: Mr Bertrand Doignon
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING ☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

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Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Plugs, fixed or portable socket-outlets and appliance inelts for industrial purposes - Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

1 CONTENTS

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PLUGS, FIXED OR PORTABLE SOCKET-OUTLETS AND APPLIANCE INLETS FOR INDUSTRIAL PURPOSES –

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

FOREWORD

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International Standard IEC 60309-2 has been prepared by subcommittee SC 23H: Plugs, socket-outlets and couplers for industrial and similar applications, and for electric vehicles, of IEC technical committee 23: Electrical accessories.

This fifth edition cancels and replaces the fourth edition published in 1999, Amendment 1:[2005] and Amendment 2:[2012]. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) addition of requirements and test for non-solid pins;

b) additional rating IPX9;

c) additional marking to indicate neutral terminal and/or earthing terminal.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
23H/---/FDIS	23H/---/RVD

94

95 Full information on the voting for the approval of this International Standard can be found in
96 the report on voting indicated in the above table.

97 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

98 The committee has decided that the contents of the base publication and its amendments will
99 remain unchanged until the stability date indicated on the IEC web site under
100 "http://webstore.iec.ch" in the data related to the specific publication. At this date, the
101 publication will be

102 • reconfirmed,
103 • withdrawn,
104 • replaced by a revised edition, or
105 • amended.

106

INTRODUCTION

A list of all the parts in the IEC 60309 series, under the general title *Plugs, fixed or portable socket-outlets, and appliance inlets for industrial purposes*, can be found on the IEC website.

Part 1 deals with general requirements and comprises all clauses of a general character.

Subsequent parts deal with the requirements of particular types of accessories. The clauses of these particular requirements supplement or modify the corresponding clauses in Part 1.

In this standard, the following print types are used:

– requirements proper: in roman type;
– *test specifications: in italic type*;
– notes: in smaller roman type.

PLUGS, FIXED OR PORTABLE SOCKET-OUTLETS AND APPLIANCE INLETS FOR INDUSTRIAL PURPOSES –

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

1 Scope

This international standard applies to plugs, fixed or portable socket-outlets, and appliance inlets, hereinafter referred to as accessories, with a rated operating voltage not exceeding 1 000 V DC or 1000 V AC not exceeding 500 Hz and a rated current not exceeding 125 A, primarily intended for industrial use, either indoors or outdoors.

These accessories are intended to be installed by instructed persons (IEV 195-04-02) or skilled persons (IEV 195-04-01) only.

NOTE 1 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 accessories with pins and contact-tubes of standardized configurations.

This standard applies to accessories, for use when the ambient temperature is normally within the range –25 °C to 40 °C.

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

This standard applies to accessories with screwless type terminals or insulation piercing terminals, with a rated current up to and including 32 A for series I and 30 A for series II.

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 2 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 Normative references

Clause 2 of IEC 60309-1:2020 applies except as follows:

Additional normative references:

IEC 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60617-2, *Graphical symbols for diagrams – Part 2: Symbol elements, qualifying symbols and other symbols having general application*

3 Terms and definitions

Clause 3 of IEC 60309-1:2020 applies except as follows:

Additional terms and definitions:

3. 201
phase inverter
a plug or an appliance inlet with operating means to interchange the position of two phase pins without disconnecting them from the conductors

3.202
solid pin
pin made from a single homogeneous material, without holes, slots, slits or similar outside the terminal area

4 General

Clause 4 of IEC 60309-1:2020 applies except as follows:

4.1 The last paragraph does not apply.

Add the following:

In this standard:

2P + E covers both 2P + E and 1P + N + E and

3P + E covers both 3P + E and 2P + N + E

unless specifically excluded (see Table 205).

Additional subclause:

4.201 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 N8 min., if not otherwise specified.

5 Standard ratings

Clause 5 of IEC 60309-1:2020 applies except as follows:

5.1 *Replacement*

Preferred rated operating voltage range or rated operating voltage
20 V to 25 V
40 V to 50 V
100 V to 130 V
200 V to 250 V
277 V
380 V to 415 V
440 V to 460 V
480 V to 500 V
600 V to 690 V
750 V
1 000 V

5.2 *Replacement:*

Standard rated currents are given in Table 201.

Table 201 – Rated currents

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

Additional subclause:

5.201 The standard IP ratings according to IEC 60529 are:

– IP44,
– IP67,
– IP66/IP67.
– IP67/IP69,
– IP66/IP67/IP69

6 Classification

Clause 6 of IEC 60309-1:2020 applies except as follows:

6.1.2 Not applicable.

7 Marking

Clause 7 of IEC 60309-1:2020 applies except as follows:

7.1 The note does not apply.

Additional paragraphs:

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:

215 For series I:

16 A - 9 h/400 V~	16 - 9 h/400~	16 - $\frac{9\ h}{400\ \sim}$
16 A - 9 h/380-415 V~	16 - 9 h/380-415~	16 - $\frac{9\ h}{380 - 415\ \sim}$
32 A - 6 h/230/400 V~	32 - 6 h/230/400~	32 - $\frac{6\ h}{230\ /\ 400\ \sim}$
32 A - $\frac{6\ h\ /\ 220\ /\ 380\ V\ \sim}{240\ /\ 415\ V\ \sim}$	32 - $\frac{6\ h\ /\ 220\ /\ 380\ \sim}{240\ /\ 415\ V\ \sim}$	32 $\frac{6h}{200/346\sim\ 240/415\sim}$

216

217 For series II

20 A - 7 h/480 V AC	20 A - 7 h/480~	20 A - $\frac{7\ h}{480\ \sim}$
30 A - 7 h/480 V	3 Phase, or 30 A - 7 h/480, 3Φ	30 A - $\frac{7\ h}{480\ V,\ 3\Phi}$
60 A - 7 h/277/480 V, 3 Phase Y	60 A - 7 h/277/480, 3ΦY	60 A - $\frac{7\ h}{277\ /\ 480\ V,\ 3\Phi\ Y}$

218 It is allowed to put the symbols for AC (~) [IEC 60417-5032 (2002-10)] and DC (⎓)
219 [IEC 60417-5031 (2002-10)] or (⎓) [IEC 60417-5006 (2002-10)] after the values.

220 The drawings of standard sheets 2-I, 2-II, 2-III and 2-IV show accessories with the symbol 6 h
221 and those of standard sheets 2-VIII and 2-IX accessories with the symbol 12 h.

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

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

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

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

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

233 Contact tubes of socket-outlets shall be positioned in the clockwise order when viewed from
234 the front as shown in the standard sheets (see also 7.5).

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

237

7.4 *Replacement*

For plugs and portable socket-outlet, 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.

NOTE 1 The term "ready for use" does not imply that the plug or portable socket-outlet is engaged with its complementary accessory.

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, (⏚) (preferred) [IEC 60417-5019 (2006-08)] or ⏚ [IEC 60417-5017 (2006-08)]

  except for Series II clock position 4 h and 5 h which are marked:

  N, unmarked, (⏚) or ⏚
- for accessories with four contacts (three-phase + earth):

  L1, L2, L3, (⏚) or ⏚, or alternatively 1, 2, 3, (⏚) or ⏚

  except for Series II clock position 12 h (phase + centre tap + phase + earth) which is marked:

  L1, N, L2, (⏚) or ⏚
- for accessories with five contacts (three-phase + neutral + earth):

  L1, L2, L3, N, (⏚) or ⏚, or alternatively 1, 2, 3, N (⏚) or ⏚
- for accessories having a rated operating voltage not exceeding 50 V, 8 h clock position for portable electric incubator: +12, +24.

These symbols shall be placed close to the relevant terminals; they shall not be placed on screws, removable washers or other removable parts.

For phase inverters these symbols shall conform in one position with the requirements of 7.1. In the other position of the inverting means, the phase marking need not conform.

Additional marking to indicate neutral terminal and/or earthing terminal may be used as follows:

- letter W and/or white colour for neutral
- letter G and/or green colour for earthing

The terminals for pilot conductors are not required to be indicated. In the case they are marked it is recommended to use the marking P or PILOT

The figures used with the letters may be written as an index. It is recommended that where practicable the symbol (⏚) be used.

Compliance is checked by inspection.

7.7 *Addition:*

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

8 Dimensions

Clause 8 of IEC 60309-1:2020 applies 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:

Accessory	Degree of protection	Standard sheet
16/20 A and 32/30 A	IP44	2-I 2-I continuation 1 2-II 2-II continuation 1
	IP67 IP67/IP69 IP66/IP67 IP66/IP67/IP69	2-I 2-I continuation 2 2-II 2-II continuation 2
63/60 A, without pilot contact	IP44	2-III 2-III continuation 1 2-IV 2-IV continuation 1
63/60 A and 125/100 A, without pilot contact	IP67 IP67/IP69 IP66/IP67 IP66/IP67/IP69	2-III 2-III continuation 2 2-IV 2-IV continuation 2
63/60 A, with pilot contact	IP44	2-IIIa 2-III continuation 1 2-IVa 2-IV continuation 1
63/60 A and 125/100 A, with pilot contact	IP67 IP67/IP69 IP66/IP67 IP66/IP67/IP69	2-IIIa 2-III continuation 2 2-IVa 2-IV continuation 2
Mechanical interlock for 16 A to 125 A accessories	IP44 IP67 IP67/IP69 IP66/IP67 IP66/IP67/IP69	2-V

– accessories having rated operating voltages not exceeding 50 V:

Accessory	Degree of protection	Standard sheet
16/20 A and 32/30 A	IP44	2-VIII 2-VIIIa 2-VIII continuation 1 2-IX 2-IXa 2-IX continuation 1
	IP67 IP67/IP69 IP66/IP67 IP66/IP67/IP69	2-VIII 2-VIIIa 2-VIII continuation 2 2-IX 2-IXa 2-IX continuation 2

285 - retaining device as indicated in Table 209

286 **Table 209 – Retaining devices**

Rated current of the accessory A	Classification according to degree of protection against moisture	Socket-outlets			Plugs and appliance inlets		
		Retaining means	Standard sheet		Retaining means	Standard sheet	
			Rated operating voltage exceeding 50 V	Rated operating voltage not exceeding 50 V		Rated operating voltage exceeding 50 V	Rated operating voltage not exceeding 50 V
16/20 and 32/30	IP44	Lid	2-I (continuation 1)	2-VIII (continuation 1)	Lug or cavity	2-II (continuation 1)	2-IX (continuation 1)
	IP66/IP67 and IP67	Two-ramp system	2-I (continuation 2)	2-VIII (continuation 2)	Lug or cavity and bayonet ring	2-II (continuation 2)	2-IX (continuation 2)
63/60	IP44	Lid and two-ramp system	2-III (continuation 1)	–	Lug or cavity	2-IV (continuation 1)	–
	IP66/IP67 and IP67	Two-ramp system	2-III (continuation 2)	–	Bayonet ring	2-IV (continuation 2)	–
125/100	IP66/IP67 and IP67[a)]	Two-ramp system	2-III (continuation 2)	–	Bayonet ring	2-IV (continuation 2)	–

a) When 125/100 A fixed socket-outlets are mounted on or integrated with enclosures, the whole unit can also be IP44.

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

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

293 – *for accessories having rated operating voltages exceeding 50 V according to:*

294 • *Figures 201 and 202 for socket-outlets;*

295 • *Figures 203 and 204 for plugs and appliance inlets;*

296 – *for accessories having rated operating voltages not exceeding 50 V according to:*

297 • *Figures 205 and 206 for 16/20 A and 32/30 A accessories.*

298 *The gauges shall be moved axially to the centre line of the accessory with a force as shown in*
299 *the Table 202, applied for 1 min.*

300 **Table 202 – Forces applied to "GO"/"NO GO" gauges**

Rated operating voltage V	Rated current A		Force (max.) for "GO" gauge N	Force (max.) for "NO GO" gauge N $(^{0}_{-1})$
	Series I	Series II		
Not exceeding 50	16 32	20 30	150 150	30 30
Exceeding 50	16 32 63 125	20 30 60 100	60 90 165 240	20 30 55 80

301 *Before the test, the test specimen of insulating material shall be stored at a temperature of*
302 *(20 ± 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 Tables 203-1 or 203-2

For accessories having rated operating voltages exceeding 50 V, the position of the earthing contact shall be as shown in Table 205.

Compliance is checked by inspection.

Table 203 – General purpose accessories with rated operating voltage not exceeding 50 V

Rated operating voltage V	Frequency Hz	Minor key or keyway position [a)]
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
a) The minor key or keyway position is indicated by the relevant number (see 7.1).		

Table 204 – Special application accessories with rated operating voltage not exceeding 50 V

Rated operating voltage	Rated current	Numbers of poles	Other characteristics and application	Minor key or keyway position [a)]
25 V	32 A	3	Portable electric incubators – use at 12 V DC or 24 V DC on ambulances or helicopters	8
a) The minor key or keyway is indicated by the relevant number.				

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