

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes –

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

[IEC 60309-2:2021](#)

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Fiches, socles fixes de prise de courant, prises mobiles et socles de connecteur pour usages industriels –

Partie 2: Exigences dimensionnelles de compatibilité pour les appareils à broches et alvéoles



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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.120.30

ISBN 978-2-8322-0000-0

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**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/481/FDIS	23H/487/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This document is to be read in conjunction with IEC 60309-1:2021.

In this document, the following print types are used:

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

IEC 60309-1:2021 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 IEC 60309-1:2021.

Clauses, subclauses, figures, tables and notes which are additional to those in IEC 60309-1:2021 are numbered starting from 201.

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

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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 document 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 1 000 V AC with a frequency 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 or skilled persons only.

NOTE 1 All references for accessories with a rated current of more than 125 A in IEC 60309-1 are not applicable to this document.

This document applies to accessories with pins and contact-tubes of standardized configurations.

This document 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 document 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 document. This document also applies to accessories intended to be used in extra-low voltage installations.

NOTE 2 This document 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 can be necessary.

2 Normative references

Clause 2 of IEC 60309-1:2021 applies except as follows:

Additional normative references:

IEC 60309-1:2021, *Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes – Part 1: General requirements*

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

3 Terms and definitions

Clause 3 of IEC 60309-1:2021 applies except as follows:

Additional terms and definitions:

3.201

phase inverter

plug or 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 *Replace the fifth paragraph by the following:*

In this document:

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 208).

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, if not otherwise specified, the surface finish for all measurement surfaces shall be $\sqrt{\text{Ra}}$ minimum.

5 Standard ratings

Clause 5 of IEC 60309-1:2021 applies except as follows:

5.1 Replace the existing text with the following:

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 Replace the existing text and Table 1 with the following:

Standard rated currents are given in Table 201.

Table 201 – Rated currents
(standards.iteh.ai)

Series I	Series II
A	A
16	20
32	30
63	60
125	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 of accessories

Clause 6 of IEC 60309-1:2021 applies except as follows:

6.2 Not applicable.

7 Marking

Clause 7 of IEC 60309-1:2021 applies except as follows:

7.1 *Replace the sentence before the compliance statement at the end of the subclause by the following paragraphs:*

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

These markings shall be placed after the marking 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 value for the rated operating voltage.

If a symbol for nature of supply is used, it shall be placed after 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.

Table 202 – Examples of marking for series I

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

Table 203 – Examples of marking for series II

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

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

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 show 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 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 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.

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

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

7.4 *Replace the existing text with the following:*

For plugs and portable socket-outlets, 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 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 *Replace the existing text with the following:*

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.

No marking is required for terminals for pilot conductors. If they are marked, it is recommended to use the marking P or PILOT.

The values 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 Add the following footnote reference to Table 2:

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

8 Dimensions

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Clause 8 of IEC 60309-1:2021 applies except as follows:

8.1 Replace the existing text with the following:

[https://standards.iteh.ai/catalog/standards/sist/a6b786a8-1dbb-4719-b026-](https://standards.iteh.ai/catalog/standards/sist/a6b786a8-1dbb-4719-b026-853884211654/iec-60309-2-2021)

Accessories shall comply with the relevant standard sheets as specified below. For accessories having rated operating voltages exceeding 50 V, Table 204 applies.

Table 204 – Accessories with 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

For accessories having rated operating voltages not exceeding 50 V, Table 205 applies.