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GB/T 11918.1-2014

Replacing GB/T 11918-2001

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

工业用插头插座和耦合器

第 1 部分: 通用要求

(IEC 60309-1:2012, MOD)

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Table of Contents

Foreword	4
1 Scope	10
2 Normative references	10
3 Terms and definitions	12
4 General	17
5 Standard ratings	18
6 Classification	19
7 Marking	20
8 Dimensions	24
9 Protection against electric shock	25
10 Provision for earthing	26
11 Terminals and terminations	27
12 Interlocks	41
13 Resistance to ageing of rubber and thermoplastic material	42
14 General construction	42
15 Construction of socket-outlets	43
16 Construction of plugs and connectors	45
17 Construction of appliance inlets	46
18 Degrees of protection	47
19 Insulation resistance and dielectric strength	49
20 Breaking capacity	50
21 Normal operation	52
22 Temperature rise	54
23 Flexible cables and their connection	56
24 Mechanical strength	60
25 Screws, current-carrying parts and connections	64
26 Creepage distances, clearances and distances through sealing compound	67
27 Resistance to heat, to fire and to tracking	69

28	Corrosion and resistance to rusting	70
29	Conditional short-circuit current withstand test	71
30	Electromagnetic compatibility	73
	Annex A (Normative) Guidance and description of test apparatus	88
	Annex B (Informative) List of the clause numbers that require re-testing	95
	Bibliography	96

Foreword

GB/T 11918 *Plugs, socket-outlets and couplers for industrial purposes* is planned to be divided into 4 parts.

- Part 1: General requirements;
- Part 2: Dimensional compatibility and interchangeability requirements for pin and contact - tube accessories;
- Part 3: (name to be determined);
- Part 4: Switched socket-outlets and connectors with or without interlock.

This Part is Part 1 of GB/T 11918.

This Part is drafted in accordance with the rules specified in GB/T 1.1-2009.

This Part replaces GB/T 11918-2001 *Plugs, socket-outlets and couplers for industrial purposes - Part 1: General requirements*.

Compared with GB/T 11918-2001, this Part has the following main changes:

- In chapter 1, rated operating voltage is changed from 690V to 1000V, and rated current is changed from 250A to 800A;
- In chapter 1, it clarifies that these accessories are intended to be installed and used by trained or skilled persons;
- In chapter 1, applicable scope for electrical device accessories with screw-less terminal or insulation piercing terminals is supplemented;
- In chapter 3, sub-clause 3.18.7 definition of screw-less terminal and sub-clause 3.18.8 definition of Insulation piercing terminals are added;
- Definition of integral switching device is amended according to definition of sub-clause 3.103.3 specified in GB/T 11918.4-2014;
- The minimum degree of protection is clarified as IP23; requirements for combination of plug, socket-outlet, appliance inlet socket-outlet and connectors are also specified;
- Sub-clause 4.2.1 specifies relevant provisions for parts or components;
- A provision requires that test in sub-clause 11.1.4 shall be carried out on a new group of additional samples is added in sub-clause 4.2.4;
- In sub-clause 5.1, 750V and 1000V are added as rated voltage;
- In sub-clause 5.2, preferred rated current 315 A, 400 A, 630 A, 800 A are added for series I; preferred rated current 300 A, 350 A, 500 A, 600 A are added for series II

while notes are also added;

- In table 1, text "series I is recommended in China" is added;
- Sub-clause 6.1.2 is changed to classification on the basis of protection degrees according to GB 4208;
- In chapter 6, sub-clause 6.1.6, 6.1.7, 6.1.8 are added;
- In sub-clause 7.1, indication requirements for code of this Part is added; it also stipulates that the code of this Part can be indicated on products or package unit;
- Sub-clause 7.6 specifies the composition of recommended petrol;
- Table 2 of sub-clause 7.7 specifies the colour of enclosure corresponding to 500 V~1 000 V rated operating voltage;
- In chapter 7, sub-clause 7.8, 7.9, 7.10 are added;
- In sub-clause 8.1, note " GB/T 11918.2 provides some standard sheets" is added;
- In sub-clause 8.2, connection conditions of single-phase or three-phases plugs inserting into socket-outlet with three-phases + neutral line are added;
- In table 3, sizes of connectable conductor which are used when rated current are 315 A, 400 A, 630 A, 800 A are added;
- Chapter 11 is re-complied; requirements as well as tests concerning screw-type terminal, screwless terminal and insulation piercing terminal (IPT) are added;
- In chapter 12, it clarifies that interlock shall be inspected according to GB/T 11918.4;
- Sub-clause 15.8 is changed to requirements of socket-outlet with rated operating voltage above 50V a.c or 120 d.c.;
- Sub-clause 16.9 is changed to requirements of plug and connector with rated operating voltage above 50V a.c or 120 d.c.;
- Sub-clause 17.3 is changed to requirements of appliance inlet socket-outlet with rated operating voltage above 50V a.c or 120 d.c.
- In sub-clause 18.2, requirements of accessories with 3 or 4 as the first characteristic number and protection degree less than IPX4 are added;
- Contents of sub-clause 18.3 and sub-clause 18.4 are removed;
- 3 notes concerning electric strength test are added in sub-clause 19.3;
- In table 12, cable models are adjusted according to IEC 60245-4:2011;

- In chapter 20, metal support for device accessories connection with rated voltage of 380 V~415 V is removed;
- In table 9, breaking capacity corresponding to 315 A, 400 A, 630 A, 800 A is added;
- In chapter 21, wipe-clean maintenance operation requirement after every 500 strokes is added; provision that bolt and plug bush of device accessories shall have no position correction, lubricating or other adjustments is also stipulated;
- In table 10, normal operation cycles corresponding to 315 A, 400 A, 630 A, 800 A are added;
- In table 11, test current of temperature rise test and conductor cross section area corresponding to 315 A, 400 A, 630 A, 800 A are added;
- In chapter 22, duration of temperature rise test when rated current is over 250A is added;
- In table 12, nominal cross section area corresponding to 315 A, 400 A, 630 A, 800 A are added;
- in table 13, approximate value of cable outer diameter corresponding to 315 A, 400 A, 630 A, 800 A are added;
- In table 14, tension and torque bore by cable corresponding to 315 A, 400 A, 630 A, 800 A are added;
- In table 15, impact energy corresponding to 315 A, 400 A, 630 A, 800 A are added;
- In table 16, column of "above 30A" is removed;
- In table 19, creepage distance, electrical clearance and distance through sealant for "500V to 600V" and "690V to 100V" are added;
- Sub-clause 27.3 cites GB/T 5169.21 directly and simplifies the relevant description;
- Sub-clause 27.5 cites GB/T 4207 directly and simplifies the relevant description;
- Gauges for testing insertability of round unprepared conductors having the maximum specified cross-section of 185 mm², 240 mm², 300 mm², 400 mm², 500 mm², 630 mm² are added in figure 13.
- Annex B is added.

This Part is re-drafted by modifying IEC 60309-1:2012 "Plugs, socket-outlets and couplers for industrial purposes - Part 1: General requirements".

The technical difference and the causes between this Part and IEC 60309-1:2012 are as follows:

- GB 17465 Appliance couplers for household and similar general purposes (all the parts) [IEC 60320 (all the parts)] is used to replace IEC 60320 (all the parts).
- Indication requirements of the code of this Part: Refer to requirements of other standards and relevant stipulations; indication requirements of the code of this Part are added in sub-clause 7.1.
- According to IEC 60245-4:2011, corresponding wire models are added in table 12 and table 13.

The domestic documents, corresponding to the international documents cited normatively in this Part, are as follows:

- GB/T 5013.4-2008 Rubber insulated cables of rated voltages up to and including 450/750V - Part 4: Cords and flexible cables (IEC 60245-4:2004, IDT).

This Part makes the following editorial amendments:

- Text "This Part of GB/T 11918 specifies the technical requirements concerning structure, mechanical and electrical performance etc. of Plugs, socket-outlets and couplers for industrial purposes" is supplemented to chapter 1;
- The sequence of chapter 3 and chapter 2 in IEC 60309-1:2012 is changed. "Normative references" is edited as chapter 2 and "Terms and definitions" is edited as chapter 3;
- Explanation of standard structure in foreword of IEC 60309-1:2012 is moved to the foreword of this Part; foreword of IEC is removed;
- Introduction of "Terms and definitions" is amended;

To ensure the consistency of GB/T 11918, definition of integral switching device in sub-clause 3.8 is supplemented according to sub-clause 3.103.3 in GB/T 11918.4-2014.

- For convenience of use, note "GB/T 11918.2 provides some standard sheets" is added in sub-clause 8.1.
- Serial number of table 4.1 in IEC 60309-1:2012 is changed to table 4; table 4-2 is changed to table 5; table 4-3 is changed to table 6; and table 4-4 is changed to table 7 while the serial numbers of left tables is changed accordingly;
- Referring to electric strength test requirements in other device accessories standards, note 2, note 3 and note 4 are added in sub-clause 19.3.
- Annex B "list of clause numbers that require re-testing" is adjusted according to IEC 60309-1 edition corresponded to GB/T 11918-2001.
- Bibliography are added.

This Part was proposed by China Electrical Equipment Industrial Association.

This Part shall be under the jurisdiction of National Electrical Accessory Standardization Technical Committee (SAC/TC 67).

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Previous versions replaced by this Part are as follows:

— GB/T 11918-1989, GB/T 11918-2001.

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

1 Scope

This Part of GB/T 11918 defines the technical requirements for plugs, socket-outlets and couplers for industrial purposes, such as structures, mechanical properties and electric properties.

This Part applies to plugs and socket-outlets, cable couplers and appliance couplers, with a rated operating voltage not exceeding 1 000 V d.c. or a.c. and 500 Hz a.c., and a rated current not exceeding 800 A, primarily intended for industrial use, either indoors or outdoors.

These accessories are intended to be installed by trained persons (GB/T 2900.73-2008, definition 195-04-02) or skilled persons (GB/T 2900.73-2008, 195-04-01) only.

The list of preferred ratings is not intended to exclude other ratings.

This Part 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 of -25 °C to +40 °C. These accessories are intended to be connected to cables of copper or copper alloy only.

This Part 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.

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

This Part 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

The articles contained in the following documents have become part of this document when they are quoted herein. For the dated documents so quoted, all the modifications

(including all corrections) or revisions made thereafter shall be applicable to this document.

GB/T 3956-2008 Conductors of insulated cables (IDT IEC 60228:2004)

GB/T 4207-2012 Method for the determination of the proof and the comparative tracking indices of solid insulating materials (IEC 60112:2009, IDT)

GB 4208-2008 Degrees of protection provided by enclosure (IP code) (IDT IEC 60529:2001)

GB/T 5023 (All parts) Polyvinyl chloride insulated cables of rated voltages up to and including 450/750V (IEC 60227 (All parts))

GB/T 5169.11-2006 Fire hazard testing for electric and electronic products - Part 11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products (IEC 60695-2-11-2000, IDT)

GB/T 5169.21 Fire hazard testing for electric and electronic products - Part 21: Abnormal heat - Ball pressure test (GB/T 5169.21-2006, IEC 60695-10-2-2003, IDT)

GB/T 9797 Metallic coatings - Electroplated coatings of nickel plus chromium and of copper plus nickel plus chromium (GB/T 9797-2005, ISO 1456:2003, IDT)

GB/T 9799 Metallic and other inorganic coatings—Electroplated coatings of zinc with supplementary treatments on iron or steel (GB/T 9799-2011, ISO 2081:2008 IDT)

GB/T 11918.4 Plugs, socket-outlets and couplers for industrial purposes - Part 4: Switches, socket-outlets and connectors with or without interlock (GB/T 11918.4-2014, IEC 60309-4:2012, MOD)

GB/T 12599 Metallic coatings - Electroplated coatings of tin - Specification and test methods (GB/T 12599-2002, ISO 2093-1986, MOD)

GB 13539.1-2008 Low-voltage fuses - Part 1: General requirements (IDT IEC 60269-1:2006)

GB 13539.2-2008 Low-voltage fuses - Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) - Examples of standardized systems of fuses A to I (IDT IEC 60269-2:2006)

GB/T 16935.1-2008 Insulation coordination for equipment within low-voltage systems - Part 1: Principles requirements and tests (IDT IEC 60664-1:2007)

GB 17465 (All parts) Appliances couplers for household and similar general purposes (IEC 60320 (All parts))

IEC 60083 Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC

IEC 60245-4:2011 Rubber insulated cables of rated voltages up to and including 450/750V - Part 4: Cords and flexible cables

3 Terms and definitions

For the purpose of this Part, the following terms and definitions shall apply.

NOTE 1: Where the terms voltage and current are used, they imply the d.c. or the a.c. r.m.s. values.

NOTE 2: The application of accessories is shown in Figure 1.

3.1

plug and socket-outlet

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

3.1.1

socket-outlet

the part intended to be installed with the fixed wiring or incorporated in equipment.

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

3.1.2

plug

the part integral with or intended to be attached directly to one flexible cable connected to the equipment or to a connector

3.2

cable coupler

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

3.2.1

connector

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

NOTE: In general, a connector has the same contact arrangement as a socket-outlet.

3.2.2

- the covers or enclosures to be fixed easily after connection of the conductors.

Compliance is checked by inspection and by an installation test with conductors of the largest cross-sectional area specified in Table 3.

15.4 Enclosures and parts of a socket-outlet providing protection against electric shock shall have adequate mechanical strength; they shall be securely fixed in such a way that they will not work loose in normal use. It shall not be possible to remove these parts without the aid of a tool.

15.5 Cable entries shall allow the introduction of the conduit or the protective covering of the cable so as to afford complete mechanical protection.

Compliance is checked by inspection and by an installation test with conductors of the largest cross-sectional area specified in Table 3.

15.6 Insulating linings, barriers and the like shall have adequate mechanical strength and shall be fixed to the metal casing or the body in such a way that either they cannot be removed without being seriously damaged or be so designed that they cannot be replaced in an incorrect position.

Compliance is checked by inspection and by the tests of 18.2 and clause 24.

NOTE: The use of self-setting varnish is allowed for fixing insulating linings.

15.7 When a plug is not engaged, socket-outlets shall be totally enclosed when fitted with screwed conduits, or sheathed cables. Polyvinyl chloride sheathed cables are not excluded. The means for achieving total enclosure and that for ensuring the marked degree of protection, if any, shall be securely fixed to the socket-outlet. In addition, when a plug is completely engaged, the socket-outlet shall incorporate means for ensuring the marked degree of protection.

Lid springs, if any, shall be of corrosion-resistant material such as bronze, stainless steel or other suitable material adequately protected against corrosion.

Socket-outlets, up to and including IPX4 designed for only one mounting position may have | provision for opening a drain-hole at least 5 mm in diameter or 20 mm² in area with a width of at least 3 mm which is effective when the socket-outlet is in the mounting position.

Compliance is checked by inspection, by measurement and by the tests of clauses 18, 19 and 21.

NOTE: The total enclosure and the marked degree of protection may be achieved by means of a cover.

A drain-hole in the back of the enclosure of a socket-outlet, up to and including IPX3 or IPX4 intended to be mounted on a vertical wall is deemed to be effective only if the design of the enclosure ensures a clearance of at least 5 mm from the wall, or provides a drainage channel of at least the size specified.

15.8 Socket-outlets having a rated operating voltage exceeding 50 V a.c. or 120 V d.c. shall be provided with an earthing contact.

Compliance is checked by inspection.

16 Construction of plugs and connectors

16.1 The enclosure of plugs and connectors shall completely enclose the terminals and the ends of the flexible cable.

The construction of rewirable plugs and connectors shall be such that the conductors can be properly connected and the cores kept in place so that there is no risk of contact between them from the point of separation of the cores to the terminals.

Accessories shall be so designed that they can only be reassembled so as to ensure the correct relationship between the components as originally assembled.

Compliance is checked by inspection and, if necessary, by manual test.

16.2 The various parts of a plug or connector shall be reliably fixed to one another in such a way that they will not work loose in normal use. It shall not be possible to dismantle plugs or connectors without the aid of a tool.

Compliance is checked by manual test and by the test of 24.3.

16.3 If an insulating lining is provided, it shall have adequate mechanical strength and shall be secured to the enclosure in such a way that either it cannot be removed without being seriously damaged, or it is so designed that it cannot be replaced in an incorrect position.

Compliance is checked by inspection and by the tests of 18.2 and 24.3.

NOTE: The use of self-setting varnish is allowed for fixing insulating linings.

16.4 Plug contacts shall be locked against rotation and shall not be removable without dismantling the plug.

Compliance is checked by inspection and by manual test.

NOTE: Contacts of plugs may be either floating or fixed.

16.5 Contacts of connectors shall be self-adjusting so as to ensure adequate contact pressure.

Contacts other than the earth contact shall be floating.

Earth contacts need not be floating provided that they have the necessary resilience in all directions.

Annex B

(Informative)

List of the clause numbers that require re-testing

B.1 To comply with the requirements of this Part, accessories previously inspected and tested according to GB/T 11918-2001 require re-examination and/or re-testing for the following clauses according to GB/T 11918.1-2014:

6.1.2
7.2
7.9
7.10
11.5.2
12
15.8
16.9
17.3
18.2
24.2
11.2.1

Bibliography

- 1) GB/T 2900.18-2008 Electrotechnical terminology - Low voltage apparatus
- 2) GB/T 2900.73-2008 Electrotechnical terminology - Earthing and protection against electric shock
- 3) GB/T 13140.3-2008 Connecting devices for low voltage circuits for household and similar purposes - Part 2: Particular requirements for connecting devices as separate entities with screwless-type clamping units
- 4) IEC 60352-7 Solder less connections - Part 7: Spring clamp connections - General requirements, test methods and practical guidance
- 5) HD 22.16 S2-2007 Cables of rated voltages up to and including 450/750V and having cross-linked insulation - part 16: Water resistant polychloroprene or equivalent synthetic elastomer sheathed cables

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