

# TECHNICAL SPECIFICATION



**Direct current (DC) plugs and socket-outlets for information and communication technology (ICT) equipment installed in data centres and telecom central offices  
Part 1: Plug and socket-outlet system for 2,6 kW**

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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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INTERNATIONAL  
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## CONTENTS

FOREWORD .....	6
1 Scope .....	8
2 Normative references .....	9
3 Terms and definitions .....	10
4 General requirements .....	14
5 General notes on tests .....	14
6 Ratings .....	16
7 Classification .....	16
7.1 Accessory classifications .....	16
7.1.1 Classification according to the method of connecting the cable .....	16
7.1.2 Classification according to the type of terminals .....	16
7.2 Socket-outlet classifications .....	16
7.2.1 Classification according to the degree of protection against electric shock .....	16
7.2.2 Classification according to the existence of shutters .....	16
7.2.3 Classification according to the method of application/mounting of the socket-outlet .....	16
7.2.4 Classification according to the method of installation .....	17
8 Marking .....	17
8.1 General .....	17
8.2 Symbols .....	17
8.3 Visibility of markings .....	18
8.4 Marking for plugs .....	18
8.5 Marking of terminals .....	18
8.6 Durability of marking .....	19
9 Checking of dimensions .....	19
10 Protection against electric shock .....	19
11 Provision for earthing .....	22
12 Terminals and terminations .....	23
12.1 General .....	23
12.2 Terminals with screw clamping for external copper conductors .....	24
12.3 Screwless terminals for external copper conductors .....	29
12.4 Flat quick-connect terminations .....	35
12.4.1 General .....	35
12.4.2 Constructional requirements .....	35
12.4.3 Electrical requirements .....	36
12.5 Permanent connections .....	36
13 Construction of socket-outlets .....	36
14 Construction of plugs .....	43
15 Interlocked socket-outlets .....	48
16 Resistance to ageing, protection provided by enclosures, and resistance to humidity .....	48
16.1 Resistance to ageing .....	48
16.2 Protection provided by enclosures .....	49
16.2.1 General .....	49

16.2.2	Protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects .....	49
16.3	Resistance to humidity .....	50
17	Insulation resistance and electric strength .....	51
18	Operation of earthing contacts .....	52
19	Temperature rise .....	53
20	Breaking capacity .....	56
21	Normal operation .....	57
22	Force necessary to withdraw the plug .....	58
22.1	General .....	58
22.2	Verification of the maximum withdrawal force for socket-outlets .....	59
22.3	Verification of the minimum withdrawal force .....	59
23	Flexible cables and their connection .....	60
24	Mechanical strength .....	63
25	Resistance to heat .....	72
26	Screws, current-carrying parts and connections .....	73
27	Creepage distances, clearances and distances through sealing compound .....	75
28	Resistance of insulating material to abnormal heat and to fire .....	77
29	Resistance to rusting .....	78
Annex A (normative)	Safety-related routine tests for factory-wired accessories (protection against electric shock and correct polarity) .....	107
A.1	General remarks .....	107
A.2	Polarized systems, “+” and “-” – correct connection .....	107
A.3	Earth continuity .....	108
A.4	Short-circuit/wrong connection and reduction of creepage distance and clearances between “+” and “-” to earth ( ) .....	108
Annex B (normative)	Survey of specimens needed for tests .....	109
Annex C (informative)	Alternative gripping tests .....	110
C.1	Gripping test C1 .....	110
C.2	Gripping test C2 .....	112
Annex D (normative)	Standard sheets and gauges .....	114
D.1	Standard sheets .....	114
D.2	Gauges for checking the dimensions of the entry holes .....	118
Bibliography	.....	121
Figure 1	– Examples of accessories .....	80
Figure 2	– Pillar terminals .....	81
Figure 3	– Screw terminals and stud terminals .....	82
Figure 4	– Saddle terminals .....	83
Figure 5	– Mantle terminals .....	84
Figure 6	– Example of thread-forming screw .....	84
Figure 7	– Example of thread-cutting screw .....	84
Figure 8	– Arrangement for compression test of 10.2 and 24.6 .....	85
Figure 9	– Gauge for checking non-accessibility of live parts, through shutters .....	86
Figure 10	– Gauge for checking non-accessibility of live parts, through shutters, and of live parts of socket-outlets with increased protection .....	87

Figure 11 – Arrangement for checking damage to conductors .....	88
Figure 12 – Information for deflection test .....	89
Figure 13 – Device for checking the resistance to lateral strain .....	90
Figure 14 – Example of apparatus for breaking capacity and normal operation test.....	91
Figure 15 – Circuit diagram for breaking capacity and normal operation tests .....	92
Figure 16 – Apparatus for verification of maximum withdrawal force .....	92
Figure 17 – Apparatus for testing cord retention.....	93
Figure 18 – Apparatus for flexing test .....	94
Figure 19 – Sketches showing the application of the blows according to Table 20.....	95
Figure 20 – Apparatus for impact test at low temperature of 24.5 .....	96
Figure 21 – Example of test arrangement to verify the fixation of pins in the body of the plug .....	97
Figure 22 – Arrangement for test on covers or cover-plates .....	97
Figure 23 – Gauge (thickness about 2 mm) for the verification of the outline of covers or cover-plates.....	98
Figure 24 – Examples of application of the gauge of Figure 23 on covers fixed without screws on a mounting surface or supporting surface .....	99
Figure 25 – Examples of application of the gauge of Figure 23 in accordance with the requirements of 24.16 .....	100
Figure 26 – Gauge for verification of grooves, holes and reverse tapers .....	101
Figure 27 – Sketch showing the direction of application of the gauge of Figure 26 .....	101
Figure 28 – Ball pressure test apparatus.....	101
Figure 29 – Apparatus for compression test for the verification of resistance to heat of 25.5 .....	102
Figure 30 – Test procedures for normal operation (see Clause 21) .....	103
Figure 31 – Clamping unit for the temperature rise test of Clause 19 .....	104
Figure 32 – The profile of the inrush current for the test of Clause 20 .....	105
Figure 33 – Annex to Figure 32 with additional information on a possible circuit to produce the inrush current as given in Figure 32.....	105
Figure 34 – Circuit diagram for testing socket-outlets and plugs according to 18.2.....	106
Figure 35 – Possible test setup for the temperature rise test for Clauses 19 and 21 .....	106
Figure C.1 – Reference plug for gripping test.....	111
Figure C.2 – Example of the test apparatus for plug gripping test .....	112
Figure D.1 – Standard sheet 1: 2,6 kW / 294 V to 400 V d.c. socket-outlet for class I equipment.....	115
Figure D.2 – Standard sheet 2: 2,6 kW / 294 V to 400 V d.c. plug for class I equipment.....	116
Figure D.3 – Standard sheet 3: positioning of the “+” and “-” pins/socket-contacts .....	117
Figure D.4 – Minimum gauges for checking the dimensions of the entry holes: C1 .....	118
Figure D.5 – Maximum gauges for checking the dimensions of the entry holes: C2 .....	118
Figure D.6 – Gauge for checking the first point of contact: C3.....	119
Figure D.7 – Gauges for checking the minimum withdrawal force (see 22.3) .....	119
Figure D.8 – Gauge for checking the maximum withdrawal force: C4max (see 22.2) .....	120
Table 1 – Relationship between rated power and connectable nominal cross-sectional areas or American Wire Gauge (AWG) size of copper conductors .....	24
Table 2 – Values for pull test for screw-type terminals .....	26

Table 3 – Composition of conductors .....	27
Table 4 – Tightening torques for the verification of the mechanical strength of screw-type terminals .....	28
Table 5 – Relationship between rated power and connectable cross-sectional areas or AWG size of copper conductors for screwless terminals .....	30
Table 6 – Value for pull test for screwless-type terminals .....	32
Table 7 – Values for flexing under mechanical load test for copper conductors .....	32
Table 8 – Test current for the verification of electrical and thermal stresses in normal use for screwless terminals .....	33
Table 9 – Nominal cross-sectional areas or AWG size of rigid copper conductors for deflection test of screwless terminals .....	34
Table 10 – Deflection test forces .....	35
Table 11 – Forces to be applied to tabs .....	36
Table 12 – Relationship between tab size and maximum current .....	36
Table 13 – Forces to be applied to covers, cover-plates or actuating members whose fixing is not dependent on screws .....	38
Table 14 – External cable dimension limits for surface-type socket-outlets .....	40
Table 15 – Nominal cross-sectional areas of copper conductors and test currents for the temperature rise test .....	54
Table 16 – Maximum and minimum withdrawal force for plugs and socket-outlets .....	60
Table 17 – External dimensions of flexible cables to be accommodated by cord anchorages .....	60
Table 18 – Torque test values for cord anchorages .....	61
Table 19 – Maximum dimensions of flexible cables to be accommodated in rewirable accessories .....	62
Table 20 – Height of fall for impact tests .....	65
Table 21 – Torque test values for glands .....	68
Table 22 – Resistance to heat of different types or parts of accessories .....	72
Table 23 – Creepage distances, clearances and distances through insulating sealing compound .....	76
Table B.1 – Number of specimens needed for the tests according to 5.5 .....	109

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DIRECT CURRENT (DC) PLUGS AND SOCKET-OUTLETS FOR  
INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) EQUIPMENT  
INSTALLED IN DATA CENTRES AND TELECOM CENTRAL OFFICES****Part 1: Plug and socket-outlet system for 2,6 kW**

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Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62735-1, which is a Technical Specification, has been prepared by IEC technical committee 23: Electrical accessories.



In this standard, the following print types are used:

- compliance statements: in *italic* type

The text of this Technical Specification is based on the following documents:

Enquiry draft	Report on voting
23/692/DTS	23/708A/RVC

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

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

A list of all parts in the IEC 62735 series, published under the general title *Direct current (DC) plugs and socket-outlets for information and communication technology (ICT) equipment installed in data centres and telecom central offices*, can be found on the IEC website.

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# DIRECT CURRENT (DC) PLUGS AND SOCKET-OUTLETS FOR INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) EQUIPMENT INSTALLED IN DATA CENTRES AND TELECOM CENTRAL OFFICES

## Part 1: Plug and socket-outlet system for 2,6 kW

### 1 Scope

This part of IEC 62735, which is a Technical Specification, applies to plugs and fixed socket-outlets for class I equipment with two active contacts plus an earthing contact, a rated power of 2,6 kW and a rated voltage range from 294 V to 400 V d.c. They are intended to power d.c. information and communication technology equipment only, products according to IEC 60950.

The accessories according to this part of IEC 62735 are intended to be used by ordinary persons in data centres only where the value of the d.c. voltage distribution system is defined as follows:

- 380 V with a tolerance of  $\pm 20$  V for installations with no backup battery or with a voltage regulation system;
- 380 V with a voltage range of 294 V to 400 V for installations with a backup battery where voltage regulation is not guaranteed;
- the voltage value between each live conductor and earth does not exceed 200 V d.c. during normal operation;
- there are two abnormal voltage ranges (duration below 10 min):
  - 260 V up to 294 V, and
  - above 400 V to 410 V.

The maximum current of the plug and the socket-outlet is

- 6,5 A when the voltage between live contacts is 400 V d.c.,
- 8,8 A when the voltage between live contacts is 294 V d.c.

and can rise up to 10 A when the voltage between live contacts decreases to 260 V d.c. for 10 min maximum.

The voltage between live conductors can fall down to 260 V d.c. when the voltage discharge value of the battery reaches the disconnecting level. The consequence is that the current increases accordingly.

The accessories according to this part of IEC 62735 do not require maintenance.

Plugs and socket-outlets covered by this part of IEC 62735 are intended for use in circuits where

- basic protection,
- an overcurrent protection (of 8,8 A or less for each socket-outlet or multiple socket-outlet),
- the fault protection (indirect contact protection), and
- additional protection

are already assured.

This part of IEC 62735 does not cover requirements for flush mounting boxes: however, it covers only those requirements for surface-type mounting boxes which are necessary for the tests on the socket-outlet.

NOTE 1 General requirements for mounting boxes are given in IEC 60670.

This part of IEC 62735 also applies to

- plugs incorporated in cord sets,
- plugs and socket-outlets incorporated in cord extension sets for data centres to be fixed to a wall or a rack,
- the cord extension set and multiple socket-outlets for data centres intended to be fixed to a wall or a rack, and
- socket-outlets which are a component of an assembly,

unless otherwise stated in the standard for the relevant assembly.

This part of IEC 62735 does not apply to

- single or multiple portable socket-outlets not fixed to a wall or a rack;
- plugs, socket-outlets and couplers for industrial purposes;
- plugs, socket-outlets and vehicle couplers for electric vehicles according to the IEC 61851 and IEC 62196 series;
- plugs and socket-outlets for household;
- appliance couplers;
- plugs, fixed and portable socket-outlets for extra-low voltage (ELV);

NOTE 2 ELV values are specified in IEC 60364-4-41.

- fixed socket-outlets combined with fuses, automatic switches, etc.

Socket-outlets with pilot lights are allowed provided that pilot lights comply with the relevant standard, if any.

Plugs and socket-outlets complying with this part of IEC 62735 are only suitable for use at ambient temperatures not normally exceeding +40 °C, but their average over a period of 24 h does not exceed +35 °C, with a lower limit of the ambient air temperature of –5 °C.

Socket-outlets complying with this part of IEC 62735 are only suitable for incorporation or mounting in equipment in such a way and in such a place that it is unlikely that the surrounding temperature exceeds 35 °C.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-151:2001, *International Electrotechnical Vocabulary – Part 151: Electrical and magnetic devices* (available at: [www.electropedia.org](http://www.electropedia.org))

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60352-2, *Solderless connections – Part 2: Crimped connections – General requirements, test methods and practical guidance*

IEC 60423, *Conduit systems for cable management – Outside diameters of conduits for electrical installations and threads for conduits and fittings*

IEC 60512-12-1, *Connectors for electronic equipment – Tests and measurements – Part 12-1: Soldering tests – Test 12a: Solderability, wetting, solder bath method*

IEC 60512-12-2, *Connectors for electronic equipment – Tests and measurements – Part 12-2: Soldering tests – Test 12b: Solderability, wetting, soldering iron method*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 61032, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61210, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

ISO 1456, *Metallic coatings – Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and of copper plus nickel plus chromium*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-151 and the following apply.

NOTE 1 Where the terms "voltage" and "current" are used, they imply r.m.s. values, unless otherwise specified.

NOTE 2 Throughout this part of IEC 62735, the word "earthing" is used for "protective earthing".

NOTE 3 The term "accessory" is used as a general term covering plugs and socket-outlets; the term "portable accessory" covers plugs. Examples of the use of accessories are shown in Figure 1a.

#### 3.1 plug

accessory having pins designed to engage with the contacts of a socket-outlet, also incorporating means for the electrical connection and mechanical retention of flexible cable

#### 3.2 socket-outlet

accessory intended for frequent use by ordinary persons, having socket contacts designed to engage with the pins of a plug and having terminals, terminations or other means for the connection of cable and the like

Note 1 to entry: Throughout this part of IEC 62735, socket-outlets cover fixed socket-outlets, single and multiple socket-outlets for data centres to be fixed to a wall or a rack.

### 3.3

#### **fixed socket-outlet**

socket-outlet intended to be connected to fixed wiring

Note 1 to entry: An example is shown in Figure 1a.

### 3.4

#### **single socket-outlet for data centres to be fixed to a wall or a rack**

one socket-outlet for assemblies with or without cable

### 3.5

#### **multiple socket-outlet for data centres to be fixed to a wall or a rack**

combination of two or more socket-outlets for assemblies with or without cable

Note 1 to entry: An example is shown in Figure 1d.

### 3.6

#### **socket-outlet for assemblies**

socket-outlet intended to be built in, or fixed to assemblies

Note 1 to entry: Examples of assemblies are power strips, multiple socket-outlets to be fixed to a wall or a rack, power distribution units (PDUs), rectifier, d.c. power supply, and test equipment.

### 3.7

#### **rewirable plug**

plug so constructed that the flexible cable can be replaced

### 3.8

#### **rewirable multiple socket-outlet for data centres intended to be fixed to a wall or a rack**

multiple socket-outlet for data centres intended to be fixed to a wall or a rack so constructed that the flexible cable can be replaced

### 3.9

#### **non-rewirable plug**

plug so constructed that it forms a complete unit with the flexible cable after connection and assembly by the manufacturer of the accessory

Note 1 to entry: See also 14.1.

### 3.10

#### **non-rewirable multiple socket-outlet for data centres intended to be fixed to a wall or a rack**

multiple socket-outlet for data centres intended to be fixed to a wall or a rack so constructed that it forms a complete unit with the flexible cable after connection and assembly by the manufacturer of the accessory

Note 1 to entry: See also 14.1.

### 3.11

#### **moulded-on plug**

non-rewirable plug, the manufacture of which is completed by insulating material moulded around pre-assembled component parts and the terminations for the flexible cable or cord

[SOURCE: IEC 60050-442:1998, 442-01-14, modified – "accessory" has been replaced by "plug".]

### 3.12

#### **mounting box**

box intended for mounting in or on a wall, floor or ceiling, etc., for flush or surface application, intended for use with fixed socket-outlet(s)

**3.13****cord extension set for data centres intended to be fixed to a wall or a rack**

assembly consisting of one flexible cable fitted with one plug and one single socket-outlet for equipment or multiple socket-outlet for data centres to be fixed to a wall or a rack

**3.14****terminal**

insulated or non-insulated connecting device intended for reusable electrical connection of the external conductors

**3.15****termination**

insulated or non-insulated connecting device intended for non-reusable electrical connection of the external conductors

**3.16****clamping unit**

part or parts of a terminal necessary for the mechanical clamping and the electrical connection of the conductor(s) for test purposes

**3.17****screw-type terminal**

terminal for the connection and subsequent disconnection of a conductor or the interconnection of two or more conductors, capable of being dismantled, the connection being made, directly or indirectly, by means of screws or nuts of any kind

**3.18****pillar terminal**

screw-type terminal in which the conductor is inserted into a hole or cavity, where it is clamped under the end of the screw or screws

Note 1 to entry: The clamping pressure may be applied directly by the end of the screw or through an intermediate clamping member to which pressure is applied by the end of the screw.

Note 2 to entry: Examples of pillar terminals are shown in Figure 2.

**3.19****screw terminal**

screw-type terminal in which the conductor is clamped under the head of the screw

Note 1 to entry: The clamping pressure may be applied directly to the head of a screw or through an intermediate part, such as a washer, clamping plate or anti-spread device.

Note 2 to entry: Examples of screw terminals are shown in Figure 3.

**3.20****stud terminal**

screw-type terminal in which the conductor is clamped under a nut

Note 1 to entry: The clamping pressure may be applied directly by a suitably shaped nut or through an intermediate part, such as a washer, clamping plate or anti-spread device.

Note 2 to entry: Examples of stud terminals are shown in Figure 3.

**3.21****saddle terminal**

screw-type terminal in which the conductor is clamped under a saddle by means of two or more screws or nuts

Note 1 to entry: Examples of saddle terminals are shown in Figure 4.

### **3.22 mantle terminal**

screw-type terminal in which the conductor is clamped against the base of a slot in a threaded stud by means of a nut

Note 1 to entry: The conductor is clamped against the base of the slot by a suitably shaped washer under the nut, by a central peg if the nut is a cap nut, or by an equally effective means for transmitting the pressure from the nut to the conductor within the slot.

Note 2 to entry: Examples of mantle terminals are shown in Figure 5.

### **3.23 screwless terminal**

connecting device for the connection and subsequent disconnection of a rigid (solid or stranded) or flexible conductor or the interconnection of two or more conductors, capable of being dismantled, the connection being made, directly or indirectly, by means of springs, parts of angled, eccentric or conical form, etc., without special preparation of the conductor concerned, other than removal of insulation

### **3.24 thread-forming screw**

screw having an uninterrupted thread, which by screwing in, forms a thread by displacing material

Note 1 to entry: An example of a thread-forming screw is shown in Figure 6.

### **3.25 thread-cutting screw**

screw having an interrupted thread, which by screwing in, forms a thread by removing material

Note 1 to entry: An example of a thread-cutting screw is shown in Figure 7.

### **3.26 rated power**

power assigned to the plug or socket-outlet

### **3.27 rated voltage range**

voltage range assigned to the plug or socket-outlet

### **3.28 shutter**

movable part incorporated into a socket-outlet arranged to shield at least the live socket-outlet contacts automatically when the plug is withdrawn

### **3.29 type test**

test of one or more devices made to a certain design to show that the design meets certain specifications

### **3.30 routine test**

test to which each individual device is subjected during and/or after manufacture to ascertain whether it complies with certain criteria

### **3.31 base**

part of the socket-outlet supporting the socket-contacts