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Plugs and socket-outlets for household and similar purposes - Part 3-2: Particular requirements for accessories incorporating electronic components to perform additional functions

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CONTENTS

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IEC 60884-3-2 has been prepared by subcommittee 23B: Plugs, socket-outlets and switches, of IEC technical committee 23: Electrical accessories. It is an International Standard.

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

Draft	Report on voting
23B/1606/FDIS	23B/1609/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/publications.

This document shall be used in conjunction with IEC 60884-1:2022.

This document supplements or modifies the corresponding clauses in IEC 60884-1, so as to convert that publication into the IEC International Standard: Particular requirements for accessories incorporating electronic components to perform additional functions.

Where this document states "addition", "modification" or "replacement", the relevant requirement, test specifications or explanatory matter in IEC 60884-1 shall be adapted accordingly.

Subclauses, figures, tables or notes which are additional to those in IEC 60884-1 are numbered starting from 101. Additional annexes are lettered starting from AA.

A list of all parts in the IEC 60884 series, published under the general title *Plugs and socket-outlets for household and similar purposes*, can be found on the IEC website.

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– withdrawn, or
– revised.

INTRODUCTION

Standard plugs and socket-outlets are now available with various additional features such as Wi-Fi extenders, remote switching, energy saving, etc. For the purposes of this document, these features are called additional functions.

This part of the IEC 60884 series provides particular requirements for plugs and socket-outlets which incorporate electronic components for the purpose of providing additional functions.

The additional functions are categorised into 3 groups:

– additional functions that control the output of the accessory (these products are often called “smart sockets”, “smart socket-outlets” or “smart plugs”);

– additional functions being powered by the accessory which do not control the output;

– additional functions that have protective means (e.g. overvoltage protection) other than Residual Current Devices.

The requirements that are common to all three categories are given in the main part of this document. Specific requirements are given in Annex AA to Annex CC.

This part does not address additional functions that have already been covered by other parts of the IEC 60884 series, for example, socket-outlets incorporating USB power supply which are covered by IEC 60884-3-1.

It is recognised that provision of a dimming function in fixed and portable socket-outlets poses a considerable safety risk to the loads that can be connected to a socket-outlet. Therefore, provision should not be made for dimming function in fixed and portable socket-outlets.

1 Scope

IEC 60884-1:2022, Clause 1 is applicable except as follows:

Replace the first paragraph by the following:

This part of IEC 60884 applies to plugs and fixed or portable socket-outlets for AC only, incorporating electronic components to perform additional functions, with or without earthing contact, with a rated voltage greater than 50 V but not exceeding 440 V and a rated current not exceeding 32 A, intended for household and similar purposes, for use either indoors or outdoors.

This document covers safety and Electromagnetic Compatibility (EMC) requirements for plugs and socket-outlets incorporating electronic components to perform additional functions.

Addition after the third paragraph:

The rated current is limited to 16 A maximum for accessories incorporating electronic components which control the output.

Replace the fourth paragraph by the following:

This document covers only those requirements for mounting boxes which are necessary for the tests on the socket-outlet incorporating electronic components to perform additional functions.

Replace the dash text after NOTE 2 by the following dashes:

- accessories incorporating USB power supply which are covered by IEC 60884-3-1;
- mechanically switched socket-outlets without any electronic function which are covered by IEC 60884-2-3;
- accessories including RCD’s which are covered by IEC 62640 and IEC 61540;
- portable socket-outlets incorporating electronic switches validated according to IEC 61058-1-2;
- switched socket-outlets with interlock for fixed electrical installations, which are covered by IEC 60884-2-6.

Replace the eighth paragraph by the following:

This document applies to plugs and socket-outlets incorporating electronic components for use at ambient temperature not normally exceeding +25 °C but occasionally reaching +35 °C with a lower limit of the ambient air temperature of −5 °C.

Add the following paragraph after the eighth paragraph:

Functional safety aspects are not covered by this document.

Add the following paragraphs after the last paragraph:

This document gives additional tests and requirements for accessories incorporating electronic components for additional functions that control the output of the accessory, see Annex AA (Normative).

This document gives additional tests and requirements for accessories incorporating electronic components for additional functions being powered by the accessory which do not control the output, see Annex BB (Normative).

This document gives additional tests and requirements for accessories incorporating electronic components for additional functions that operate as a protection means, see Annex CC (Normative).

This document is not intended to cover standalone devices within the scope of the IEC 60730 series.

2 Normative references

IEC 60884-1:2022, Clause 2 is applicable except as follows:

Addition:

IEC 60068-2-78, *Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state*

IEC 60127 (all parts), *Miniature fuses*

IEC 60384-14:2023, *Fixed capacitors for use in electronic equipment - Part 14: Sectional specification - Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests*

IEC 60664-3:2016, *Insulation coordination for equipment within low-voltage systems - Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60670 (all parts), *Boxes and enclosures for electrical accessories for household and similar fixed electrical installations*

IEC 60884-1:2022, *Plugs and socket-outlets for household and similar purposes - Part 1: General requirements*

IEC 60898-1, *Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 1: Circuit-breakers for a.c. operation*

IEC 60990, *Methods of measurement of touch current and protective conductor current*

IEC 60934, *Circuit breakers for equipment (CBE)*

IEC 60998 (all parts), *Connecting devices for low-voltage circuits for household and similar purposes*

IEC 60999 (all parts), *Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units*

IEC 61000-3-2, *Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)*

IEC 61000-4-2:2025, *Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61051-2, *Varistors for use in electronic equipment - Part 2: Sectional specification for surge suppression varistors*

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and combinations thereof - Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers for general applications*

IEC 61558-2-16, *Safety of transformers, reactors, power supply units and combinations thereof - Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units for general applications*

IEC 61643-331:2020, *Components for low-voltage surge protection - Part 331: Performance requirements and test methods for metal oxide varistors (MOV)*

IEC 62479, *Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)*

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment - Emission requirements*
CISPR 32:2015/AMD1: 2019

3 Terms and definitions

IEC 60884-1:2022, Clause 3 is applicable except as follows:

Replacement:

NOTE 3 The term "accessory" is used as a general term covering plugs and socket-outlets incorporating electronic components to perform additional functions; the term "portable accessory" covers plugs and portable socket-outlets incorporating electronic components to perform additional functions.

Additional terms and definitions:

3.101
electronic control function
ECF
electronic components for additional functions that control the output of the accessory

3.102
electronic powered function
EPF
electronic components for additional functions being powered by the accessory which do not control the output

Note 1 to entry: A WIFI repeater is an example of an EPF.

3.103
electronic protective means
EPM
electronic components for additional functions that operate as a protection means

3.104
extra low voltage
ELV
nominal voltage in the electrical installation of buildings according to the voltage band I specified in IEC 61140:2016

Note 1 to entry: Voltage band I according to IEC 61140 is a voltage below or equal to 50 V AC or 120 V DC.

[SOURCE: IEC 63044-3:2017, 3.1.7, modified – The publication IEC 61140 has been dated.]

3.105
safety extra low voltage network
SELV network
electrical network in which the nominal voltage cannot exceed ELV

– under normal conditions;
– under single fault conditions, including earth fault in other networks.

Note 1 to entry: SELV has simple separation from SELV systems, and earth and protective separation from all other networks.

Note 2 to entry: Under normal conditions and single-fault conditions in a dry location inside a building, a SELV network with a voltage not higher than 25 V AC or 60 V DC is safe to touch.

[SOURCE: IEC 63044-3:2017 and IEC 63044-3:2017/AMD1:2021, 3.1.10, modified – In Note 1 to entry, replacement of "from PELV and other SELV systems" with "from SELV systems".]

3.106
hazardous live part
live part with a voltage higher than 25 V AC or 60 V DC ripple free in dry conditions or 12 V AC or 30 V DC in wet conditions

Note 1 to entry: Ripple free is conventionally an RMS ripple voltage not more than 10 % of the DC component.

3.107
protective impedance
impedance connected between hazardous live parts and accessible conductive parts, of such value that the current, in normal use and under likely fault conditions in the accessory with incorporated electronic components, is limited to a safe value, and which is so constructed that the reliability is maintained throughout the life of the accessory

[SOURCE: IEC 60050-442:1998, 442-04-24, modified – Replacement of "accessible" with "exposed", "electronic switch" with "accessory with incorporated electronic components" and "electronic switch" with "accessory".]

3.108
rated power
electric power assigned by the manufacturer to the accessory

Note 1 to entry: The rated power is expressed in Watts.

3.109
home and building electronic system/ building automation and control system HBES/BACS
system consisting of control devices, processing equipment, network interfaces and gateways, where the functions are distributed and linked through a common communication process, managing multiple applications in the home and building premises

Note 1 to entry: Examples of applications are heating, alarming, shading and lighting.

Note 2 to entry: The term “managing” includes one or more activities such as measuring, monitoring and controlling.

Note 3 to entry: Other terms that are used in the market to refer to HBES/BACS include the following: “home control network”, “home control system”, ”smart home”, “building system” and “building automation system”.

Note 4 to entry: The principles of HBES/BACS can also be used for single application systems if no specific standards are available.

Note 5 to entry: A common communication process is a process using a common data-model (such as KNX, LON, Bacnet, Dotdot, etc...), independent of the physical layer.

Note 6 to entry: An application can comprise of individual products or systems.

Note 7 to entry: The controlled device is not part of HBES/BACS except for the interface to the HBES/BACS network.

[SOURCE: IEC 63044-1:2017 and IEC 63044-1:2017/AMD1:2021, 3.1.3, modified – Addition of a new entry " home and building electronic system/ building automation and control system".]

3.110
looping through function
function of the line terminal or both the line and the neutral terminals to power other devices in the circuit of the installation

3.111
operation
transfer of the moving contacts from one operating position to another or from one operating state to another

3.112
simple separation
separation between networks or between a network and earth by means of basic insulation

[SOURCE: IEC 63044-3:2017, 3.1.12, modified – Replacement of "circuit" with "network".]

3.113
protective separation
separation of one electric network from another by means of

– double insulation, or
– basic insulation and protective screening (shielding), or
– reinforced insulation

[SOURCE: IEC 63044-3:2017, 3.1.13]

3.114
basic insulation
insulation of hazardous-live-parts which provides basic protection

Note 1 to entry: This concept does not apply to insulation used exclusively for functional purposes.

[SOURCE: IEC 63044-3:2017, 3.1.14, modified – The note has been added.]

3.115
supplementary insulation
independent insulation applied in addition to basic insulation for fault protection

[SOURCE: IEC 63044-3:2017, 3.1.16]

3.116
double insulation
insulation comprising both basic insulation and supplementary insulation

[SOURCE: IEC 63044-3:2017, 3.1.15]

3.117
reinforced insulation
insulation of hazardous-live-parts which provides a degree of protection against electric shock equivalent to double insulation

Note 1 to entry: Reinforced insulation may comprise several layers which cannot be tested individually as basic insulation or supplementary insulation.

[SOURCE: IEC 63044-3:2017, 3.1.18, modified – The note has been added.]

3.118
surge protective device
SPD
device that is intended to protect the electrical apparatus from transient overvoltages and to divert surge currents

Note 1 to entry: A surge protective device contains at least one non-linear component

[SOURCE: IEC 60050-614:2016, 614-03-48 modified – Addition of the acronym "SPD".]

3.119
reference test voltage
U_{REF}
RMS value of voltage used for testing which depends on the mode of protection of the SPD, the nominal system voltage, the system configuration and the voltage regulation within the system

3.120
maximum continuous operating voltage
U_C
maximum RMS voltage, which may be continuously applied to the SPD's mode of protection

Note 1 to entry: The U_c value covered by this document can exceed 1 000 V.

4 General requirements

IEC 60884-1:2022, Clause 4 is applicable.

5 General remarks on tests

IEC 60884-1:2022, Clause 5 is applicable except as follows:

5.1 General

Addition after the second paragraph:

Voltage and current measuring instruments used shall indicate true RMS values and shall not be affected by factors such as waveform.

If the electronic circuitry is so enclosed that the short-circuiting or disconnecting of components is impossible or difficult, the manufacturer shall provide one additional test specimen with leads connected for measurements, short-circuiting, etc.

The term "live part" used in IEC 60884-1 is considered as "hazardous live part", with the exception of non-hazardous live parts of SELV networks.

In this document the term instructions is understood to mean manufacturer's instructions.

NOTE Instructions can be on paper or in electronic format.

5.2 Products arrangement during test

Add the following after the third paragraph:

Unless otherwise stated, accessories having provisions for integration of additional functions shall be tested with all functions mounted and configured as for normal use according to the instructions.

5.4 Additional samples

Replace the third paragraph by the following:

The number of specimens needed for the tests, identified by e.g. ABC for a set of 3 specimens, are given in Table 1.