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INTERNATIONAL STANDARD

COMMENTED VERSION

Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles -
Part 1: General requirements

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements

FOREWORD

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This commented version (CMV) of the official standard IEC 62196-1:2025 edition 5.0 allows the user to identify the changes made to the previous IEC 62196-1:2022 edition 4.0. Furthermore, comments from IEC SC 23H experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 62196-1 has been prepared by IEC subcommittee 23H: Plugs, socket-outlets and couplers for industrial and similar applications, and for electric vehicles, of IEC technical committee 23: Electrical accessories. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2022. This edition constitutes a technical revision.

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

a) addition of new tests for latching devices and retaining means;

b) inclusion of type 4 accessories.

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

Draft	Report on voting
23H/579/FDIS	23H/586/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.

Subsequent parts of IEC 62196 deal with the requirements of particular types of accessories. The clauses of those particular requirements supplement or modify the corresponding clauses in this document.

In this document, the following print types are used:

– requirements proper: in roman type;

– *test specifications: in italic type*;

– notes: in smaller roman type.

A list of all parts in the IEC 62196 series, published under the general title *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles*, 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

The IEC 61851 series specifies requirements for electric vehicle (EV) conductive charging systems.

The IEC 62196 series specifies the requirements for plugs, socket-outlets, vehicle connectors, vehicle inlets and cable assemblies as described in the IEC 61851 series and in IEC 62752.

~~Some charging can be achieved by direct connection from an electric vehicle to standard socket-outlets connected to a supply network (mains or electrical grid).~~

~~Some modes of charging require a dedicated supply and charging equipment incorporating control and communication circuits.~~

~~IEC 62196 (all parts) covers the mechanical, electrical and performance requirements for plugs, socket-outlets, vehicle connectors and vehicle inlets for the connection between the EV supply equipment and the electric vehicle.~~

In some situations, a cable assembly is used to directly connect an electric vehicle to a standard socket-outlet connected to a supply network (mains or electrical grid). In other situations, the electric vehicle is connected to a supply network through EV supply equipment that incorporates control and communication circuits. The IEC 62196 series covers the mechanical, electrical and performance requirements for

– vehicle connectors and vehicle inlets for the direct connection between an electric vehicle and a standard socket-outlet, and
– EV plugs, EV socket-outlets, vehicle connectors and vehicle inlets for the connection between the EV supply equipment and the electric vehicle.

The IEC 62196 series consists of the following parts:

– IEC 62196-1: General requirements, comprising clauses of a general character;
– IEC 62196-2: Dimensional compatibility ~~and interchangeability~~ requirements for AC pin and contact-tube accessories;
– IEC 62196-3: Dimensional compatibility ~~and interchangeability~~ requirements for DC and AC/DC pin and contact-tube vehicle couplers;
~~– Part 3-1: Vehicle connector, vehicle inlet and cable assembly intended to be used with a thermal management system for DC charging.~~
– IEC TS 62196-4[1]: Dimensional compatibility and interchangeability requirements for DC pin and contact-tube accessories for class II or class III applications;
– IEC 62196-6: Dimensional compatibility ~~and interchangeability~~ requirements for DC pin and contact-tube vehicle couplers intended to be used for ~~applications using a system of protective~~ DC EV supply equipment where protection relies on electrical separation.
– IEC TS 62196-7[2]: Vehicle adapter.

~~1 Pending publication.~~

2 Under preparation. Stage at the time of publication: IEC TS/ADTS 62196-7:2025.

1 Scope

This part of IEC 62196 is applicable to EV plugs, EV socket-outlets, vehicle connectors, vehicle inlets, herein referred to as "accessories", and to cable assemblies for electric vehicles (EV) intended for use in conductive charging systems which incorporate control means, with a rated operating voltage not exceeding

– 690 V AC 50 Hz to 60 Hz, at a rated current not exceeding 250 A, and
– 1 500 V DC at a rated current not exceeding 800 A.

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

These accessories and cable assemblies are intended to be used for circuits specified in the IEC 61851 series, which operate at different voltages and frequencies, and which can include extra-low voltage circuits, such as control and communication ~~signals~~ circuits.

These accessories and cable assemblies are ~~intended~~ anticipated to be used at an ambient temperature between −30 °C and +40 °C.

NOTE 1 In some countries, other requirements can apply.

NOTE 2 In the following country, −~~35~~40 °C applies: SE.

NOTE 3 The manufacturer can enlarge the temperature range on the condition that the specified range information is provided.

These accessories are intended to be connected only to cables with copper or copper-alloy conductors.

The accessories covered by this document are intended for use in electric vehicle supply equipment in accordance with IEC 61851 (all parts). **1**

This document does not apply to standard plugs and standard socket-outlets used for mode 1 and mode 2 according to IEC 61851-1:2017, 6.2.

NOTE 4 In the following countries, mode 1 is not allowed: UK, US, CA, SG.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-14, *Environmental testing - Part 2-14: Tests - Test N: Change of temperature*

IEC 60068-2-20, *Environmental testing - Part 2-20: Tests - Test Ta and Tb: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-30, *Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

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

IEC 60228:~~2004~~2023, *Conductors of insulated cables*

IEC 60245-4, *Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables*

IEC 60269-1, *Low-voltage fuses - Part 1: General requirements*

IEC 60269-2, *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 K*

IEC 60309-4:2021, *Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes - Part 4: Switched socket-outlets with or without interlock*

IEC 60352-5, *Solderless connections - Part 5: Press-in connections - General requirements, test methods and practical guidance*

IEC 60417, *Graphical symbols for use on equipment*, available at http://www.graphical-symbols.info/equipment

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

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

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

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 60695-10-2, *Fire hazard testing - Part 10-2: Abnormal heat - Ball pressure test method*

IEC 60947-3~~:2020~~, *Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 60947-5-1, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices*

IEC 61032:1997, *Protection of persons and equipment by enclosures - Probes for verification*

IEC 61058-1:2016, *Switches for appliances - Part 1: General requirements*

IEC 61851-1:2017, *Electric vehicle conductive charging system - Part 1: General requirements*

IEC 61851-23:~~—[3]~~2023, *Electric vehicle conductive charging system - Part 23: DC electric vehicle supply equipment*

~~[3] Second edition under preparation. Stage at the time of publication: IEC PRVC 61851-23:2022.~~

IEC 62196-2:~~2022~~2025, *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility requirements for AC pin and contact-tube accessories*

IEC 62196-3:~~2022~~—, *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility requirements for DC and AC/DC pin and contact-tube vehicle couplers*[4]

IEC 62752, *In-cable control and protection device (IC-CPD) for mode 2 charging of electric road vehicles*

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

~~ISO 2081, *Metallic and other inorganic coatings – Electroplated coatings of zinc with supplementary treatments on iron or steel*~~

~~ISO 2093, *Electroplated coatings of tin – Specification and test methods*~~

ISO 12103-1, *Road vehicles - Test contaminants for filter evaluation - Part 1: Arizona test dust*

ISO 4521:2008, *Metallic and other inorganic coatings - Electrodeposited silver and silver alloy coatings for engineering purposes - Specification and test methods*

ISO 5474 (all parts), *Electrically propelled road vehicles - Functional and safety requirements for power transfer between vehicle and external electric circuit*

4 Under preparation. Stage at the time of publication: IEC/AFDIS 62196-3:2025.