

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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

**Fiches, socles de prise de courant, prises mobiles et socles de connecteur de véhicule – Charge conductive des véhicules électriques –  
Partie 1: Règles générales**



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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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International Standard IEC 62196-1 has been prepared by IEC subcommittee 23H: Industrial plugs and socket-outlets, of IEC technical committee 23: Electrical accessories.

This second edition cancels and replaces the first edition published in 2003 and constitutes a technical revision. The main changes from the previous edition are as follows:

- increase in d.c.voltage for accessories;
- permitted use of accessories with vehicles complying with Subclause 7.2.3.1 of 61851-1:2010;
- minor changes to definitions;
- additional voltage and current ratings (Clause 5) and test values (Clause 12, 13,) ;
- removal of markings to identify generic types of vehicle inlets and connectors;
- addition of a “high power d.c.” to the type of accessories covered by the Standard;

- modification of the description of “universal” and “basic” interfaces based on changes to 61851-1:2010;
- simplification of the marking requirements (Clause 8);
- additional requirements for accessories with shutters;
- division of Clause 9 to create Clauses 9 and 11;
- Clause 9: specific requirements for inlet, plug and socket–outlet;
- Clause 11: EVSE (Electric Vehicle Supply Equipment) requirements: the basic generic requirements for charging stations;
- renumbering of annexes.

The text of this standard is based on the following documents:

FDIS	Report on voting
23H/266/FDIS	23H/269/RVD

Full information on the voting for the approval of this standard 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 the parts in the IEC 62196 series, under the general title *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles*, can be found on the IEC website.

In this standard, the following print types are used:

- *compliance statements: in italic type.*

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

## INTRODUCTION

IEC 61851-1:2010 specifies Electric Vehicle Conductive Charging Equipment. This International Standard, referred to as IEC 62196 series in IEC 61851-1:2010, specifies the requirements for plugs, socket-outlets, vehicle connectors, vehicle inlets and cable assemblies as described in IEC 61851-1:2010. Some charging can be achieved by direct connection from an electric vehicle to common mains socket-outlets. Some modes of charging require a dedicated supply and charging equipment incorporating control and communication circuits. This standard covers the mechanical, electrical and performance requirements for dedicated plugs, socket outlets, vehicle connectors and vehicle inlets for interfacing between such dedicated charging equipment and the electric vehicle.

This standard may be divided into several parts as necessary, as follows:

- Part 1: General requirements, comprising clauses of a general character.

Subsequent parts: Particular requirements dealing with particular types of accessories. The clauses of these particular requirements supplement or modify the corresponding clauses in Part 1. Where the text of subsequent parts indicates an "addition" to or a "replacement" of the relevant requirement, test specification or explanation of Part 1, these changes are made to the relevant text of Part 1, which then becomes part of the standard. Where no change is necessary, the words "This clause of Part 1 is applicable" are used.

- Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories.
- Part 3: Dimensional compatibility and interchangeability requirements for pin and contact-tube accessories for dedicated d.c. charging or for combined a.c./d.c. charging (under consideration)



# **PLUGS, SOCKET-OUTLETS, VEHICLE CONNECTORS AND VEHICLE INLETS – CONDUCTIVE CHARGING OF ELECTRIC VEHICLES –**

## **Part 1: General requirements**

### **1 Scope**

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

- 690 V a.c. 50 Hz – 60 Hz, at a rated current not exceeding 250 A,
- 1 500 V d.c. at a rated current not exceeding 400 A.

These accessories and cable assemblies are intended to be used for circuits specified in IEC 61851-1:2010 which operate at different voltages and frequencies and which may include ELV and communication signals.

The accessories covered by this standard are intended only to be used with vehicles that comply with the requirements of 7.2.3.1 of IEC 61851-1:2010.

These accessories and cable assemblies are to be used in an ambient temperature of between –30 °C and +50 °C.

NOTE In some countries, other requirements may apply.

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

The accessories covered by this standard are for use in certain modes of charging EVs. These modes are defined in IEC 61851-1:2010. These definitions and a description of the types of connection (cases A, B and C), also described in IEC 61851-1:2010, are reproduced herein as Annex A.

NOTE In the following country, Mode 1 will not be allowed: UK.

This standard does not apply to those standardised accessories used in charging systems where the use of such accessories constructed to the requirements of other standards is permitted (e.g. in mode 1 and mode 2). Such standardized accessories may be used for those situations (mode and case) identified in IEC 61851-1:2010.

This standard can be used as a guide for accessories with a lesser number of contacts and lower ratings for use with light duty vehicles.

### **2 Normative references**

The following referenced documents are indispensable for the application 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 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*  
Amendment 1 (2009)<sup>1</sup>

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

IEC 60228:2004, *Conductors of insulated cables*

IEC 60245-4:1994, *Rubber insulated cables of rated voltages up to and including 450/750 V – Part 4: Cords and flexible cables*  
Amendment 1 (1997)  
Amendment 2 (2003)<sup>2</sup>

IEC 60269-1:2006, *Low-voltage fuses – Part 1: General requirements*  
Amendment 1 (2009)<sup>3</sup>

IEC 60269-2:2010, *Low-voltage fuses – Part 2: Supplementary requirements for fuses for use by authorised persons (fuses mainly for industrial application) – Examples of standardized systems of fuses A to J*

IEC 60309-4, *Plugs, socket-outlets and couplers for industrial purposes – Part 4: Switched socket-outlets and connectors with or without interlock*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*  
Amendment 1 (1999)<sup>4</sup>

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60695-2-11:2004, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

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

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60999 -1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for conductors from 0,2 mm<sup>2</sup> up to 35 mm<sup>2</sup> (included)*

IEC 60999 -2:2003, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 2: Particular requirements for clamping units for conductors above 35 mm<sup>2</sup> up to 300 mm<sup>2</sup> (included)*

<sup>1</sup> There exists a consolidated edition (2009) that includes IEC 60112 (1993) and its Amendment 1 (2009).

<sup>2</sup> There exists a consolidated edition (2004) that includes IEC 60245-4 (1994) and its Amendments 1 (1997) and 2 (2003).

<sup>3</sup> There exists a consolidated edition (2009) that includes IEC 60269-1 (2006) and its Amendment 1 (2009).

<sup>4</sup> There exists a consolidated edition (2001) that includes IEC 60529 (1989) and its Amendment 1 (1999).