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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

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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 3: Dimensional compatibility requirements for DC and AC/DC pin and contact-tube vehicle couplers

FOREWORD

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IEC 62196-3 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 third edition cancels and replaces the second 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) The content of IEC TS 62196-3-1 has been integrated into this document as normative Annex AA.
b) increased ratings for all configurations;

c) reference to new tests in IEC 62196-1:2025 (Clauses 34, 35, 36 and 37).

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

Draft	Report on voting
23H/588/FDIS	23H/595/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.

This document is to be read in conjunction with IEC 62196-1:2025. The clauses of the particular requirements in this document supplement or modify the corresponding clauses in IEC 62196-1:2025. Where the text indicates an "addition" to or a "replacement" of the relevant requirement, test specification or explanation of IEC 62196-1:2025, these changes are made to the relevant text of IEC 62196-1:2025, which then becomes part of this document. Where no change is necessary, the words "IEC 62196-1:2025, Clause X, applies" are used. Additional annexes are numbered Annex AA, Annex BB, etc. Subclauses, figures, tables, or notes which are additional to those in IEC 62196-1:2025 are numbered starting from 301.

Annex AA follows the numbering of IEC 62196-1:2025 and of this document. Additional figures and tables to this document in Annex AA are numbered starting from AA.100.

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 the 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 supply equipment.

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.

Charging using off-board DC charging equipment can be achieved by the direct connection of an electric vehicle to DC EV supply equipment incorporating control and communication circuits.

To support the connection of DC power for such vehicles, this document provides the standard interface configurations of DC vehicle couplers and accessories to be used in conductive charging of electric vehicles, taking the most frequent charging situations into consideration.

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 requirements for AC pin and contact-tube accessories;
– IEC 62196-3: Dimensional compatibility requirements for DC and AC/DC pin and contact-tube vehicle couplers;
– IEC TS 62196-4: Dimensional compatibility and interchangeability requirements for DC pin and contact-tube accessories for class II or class III applications;
– IEC 62196-6: Dimensional compatibility requirements for DC pin and contact-tube vehicle couplers intended to be used for DC EV supply equipment where protection relies on electrical separation.
– IEC TS 62196-7: Vehicle adapter

1 Scope

This part of IEC 62196 is applicable to vehicle couplers with pins and contact tubes of standardized configuration, herein also referred to as "accessories", intended for use in electric vehicle conductive charging systems which incorporate control means, with rated operating voltage and current in accordance with IEC 62196-1:2025.

This document applies to high power DC interfaces and combined AC/DC interfaces of vehicle couplers that are intended for use in conductive charging systems for circuits specified in IEC 61851-1 and IEC 61851-23.

This document applies to accessories and cable assemblies that employ

– thermal sensing, or

– thermal transport and thermal sensing with the system architecture described in AA.4.301.

The DC vehicle connectors and vehicle inlets covered by this document are used only in charging mode 4, case C, as shown in IEC 61851-1.

These vehicle couplers are intended to be used for circuits specified in IEC 61851-23 which operate at different voltages, and which can include ELV and communication signals.

This document applies to the vehicle couplers to be used in an ambient temperature between –30 °C and +40 °C.

NOTE 1 In some countries, other requirements can apply.

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

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

These accessories are intended to be connected to cables according to the IEC 62893 series for DC cables.

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 60364-5-54:2011, *Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors*

IEC 60811-501, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 501: Mechanical tests - Tests for determining the mechanical properties of insulating and sheathing compounds*

IEC 61851-23:2023, *Electric vehicle conductive charging system - part 23: DC electric vehicle supply equipment*

IEC 62196-1:2025, *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements*

IEC 62196-2:2025, *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 62893-4-1, *Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV - Part 4-1: Cables for DC charging according to mode 4 of IEC 61851-1 - DC charging without use of a thermal management system*

ISO 2719, *Determination of flash point - Pensky-Martens closed cup method*

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

ISO 5474-3:2024, *Electrically propelled road vehicles - Functional and safety requirements for power transfer between vehicle and external electric circuit - Part 3: DC power transfer*

ISO 25178-1, *Geometrical product specifications (GPS) - Surface texture: Areal - Part 1: Indication of surface texture*

Globally Harmonized System of Classification and Labelling of Chemicals (GHS), tenth edition, United Nations, 2023

OECD Guidelines for the Testing of Chemicals, Section 3, Test No. 301: Ready Biodegradability, 17 July 1992

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62196-1:2025 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

4 General

IEC 62196-1:2025, Clause 4, applies, except as follows.

4.1 General requirements

Addition after the second paragraph:

Accessories of the combined interface for AC/DC type intended for use with AC shall comply with the ratings and requirements of IEC 62196-2:2025.

The term "rated continuous current" from IEC 61851-23 relates to the term "rated current" in this document. The use of the term "rated boost current" from IEC 61851-23 is under consideration.

Annex BB provides guidance in relation to a coordinate system and packaging space for the automatic docking and undocking of vehicle connectors and vehicle inlets. The systems governing automatic docking and undocking are covered in IEC TS 61851-26.

Annex CC provides guidance on the recommended arrangement of the AC and DC portions of the configuration GG inlet. This guidance is provided to pair the configuration GG DC portion with existing configuration AC portions.

5 Ratings

IEC 62196-1:2025, Clause 5, applies, except as follows.

5.2.1 General

Replacement:

The maximum rated currents are as shown in Table 301 and Table 302.

5.2.2 Rated current for signal or control purposes

Addition:

For configuration AA, control pilot contacts are rated 30 V, 10 A. The auxiliary power supply can consist of a safety extra-low voltage system circuit.

5.2.4 Accessories suitable or, not suitable for, making and breaking an electrical circuit under load

IEC 62196-1:2025, 5.2.4, does not apply.

Additional subclause:

5.301 Rated current for auxiliary power supply contacts

For configuration BB, auxiliary power supply contacts are rated 30 V, 20 A. The auxiliary power supply can consist of a safety extra-low voltage system circuit.

6 Connection between the power supply and the electric vehicle

IEC 62196-1:2025, Clause 6 applies, except as follows.

6.2 Basic interface

IEC 62196-1:2025, 6.2, does not apply.

6.3 DC interface

Replacement:

The DC interface may contain up to 12 power or signal contacts, with only one physical configuration of contact positions. The electrical ratings and contact functions are described in Table 301.

Table 301 – Overview of the DC vehicle interface

Position number[a]	Configuration							
	AA		BB		GG			
	U_{max} V	I_{max} A	U_{max} V	I_{max} A	U_{max}	I_{max}	Symbol	Function
1	1 000	400	950	250	1 500	600[d]	DC+	DC+
2	1 000	400	950	250	1 500	600[d]	DC−	DC−
3	30	10	30	2	30	2	CP	Control pilot 1
4	30	10	30	2	30	2	CP2	Control pilot 2
5	30	10	-	-	-	-	CP3	Control pilot 3
6	30	2	30	2	30	2	COM1	Communication 1 (+)
7	30	2	30	2	30	2	COM2	Communication 1 (−)
8	30	2	-	-	-	-	IM	Isolation monitor
9	-	-	-	-	-	[b]	PE	Protective earth
10	30	2	-	-	-	-	PP or CS	Proximity detection or connection switch
11	30[c]	10[c]	30	20	-	-	AUX1	Auxiliary power Supply 1 (+)
12	-	-	30	20	-	-	AUX2	Auxiliary power Supply 1 (−)

[a] The position number does not refer to the location and/or identification of the contact in the accessory.

[b] Conductor size dependent upon system requirements.

[c] For configuration AA, position 11 is optional.

[d] Products deployed according to Annex AA can exceed 600 A; for maximum rating, see Table 303.

DC vehicle interfaces shall be used in a system according to IEC 61851-23:2023, Annex AA or Annex BB. See the corresponding standard sheets for additional interface details.

NOTE Configuration GG will be part of system D in the next edition of IEC 61851-23[1].

For use with non-isolated DC EV supply equipment, the interface shall be provided with a contact for protective earthing conductors.

For use with isolated DC EV supply equipment, the interface may be provided with a contact for protective earthing conductors.

6.4 Combined interface

Replacement:

A combined interface includes both an AC interface and a DC interface.

[1] Third edition under preparation. Stage at the time of publication: IEC/CD 61851-23:2025.