IEC TS 62196-3-1

Edition 1.0 2020-03

TECHNICAL SPECIFICATION

colour inside

Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles –
Part 3-1: Vehicle connector, vehicle inlet and cable assembly for DC charging intended to be used with a thermal management system

IEC TS 62196-3-1:2020-03(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

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

IEC TS 62196-3-1, which is a Technical Specification, has been prepared by subcommittee 23H: Plugs, Socket-outlets and Couplers for industrial and similar applications, and for Electric Vehicles, of IEC technical committee TC 23: Electrical accessories.

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

Draft TS	Report on voting
23H/448/DTS	23H/460/RVDTS

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

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 electrical vehicles*, can be found on the IEC website.

This document is to be read in conjunction with IEC 62196-1:2014 and IEC 62196-3:2014. The particular requirements in this document supplement or modify the corresponding clauses in Part 3, which, in turn, is based on Part 1. Where the text indicates an "addition" to or a "replacement" of the relevant requirement, test specification or explanation of Part 3, these changes are made to the relevant text of Part 3 or Part 1, which then becomes part of this document. Where no change is necessary, the words "Clause X of IEC 62196-3:2014 applies" are used.

Subclauses, figures, tables or notes which are additional to those in IEC 62196-3 are numbered starting from 101.

In this document, the following print types are used:

– requirements proper: in roman type;

– *test specifications: in italic type;*

– notes: in smaller roman type.

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

- transformed into an International Standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Responding to global challenges of CO_2 reduction and energy safety, the automobile industries have been accelerating the development and commercialization of electric vehicles (EV) and hybrid electric vehicles. In addition to the prevailing hybrid electric vehicles, battery electric vehicles including plug-in hybrid electric vehicles are going to be mass-marketed. To support the diffusion of such vehicles, this document provides the standard interface configurations of vehicle couplers and accessories to be used in conductive charging of electric vehicles, taking the most frequent charging situations into consideration.

To meet the market demand for increased electric vehicle ranges, batteries with larger capacities need to be integrated. To charge those batteries with larger capacity in similar times as existing charging times or even faster, the charging power needs to be increased. Besides increasing the charging voltage, the charging current also needs to be increased to boost the charging power. The larger charging current implies either larger conductor cross sections for the cable assembly according to existing standards or additional measures in the cable assembly.

The large conductor cross sections that are required according to the existing design requirements and test methods result in significantly thicker and heavier cable assemblies. These are difficult to handle and thus less desirable for public use. Therefore, to improve the usability of charging systems this document makes use of thermal management techniques to enhance the performance of the accessories.

This document provides definitions, requirements, and tests for EV couplers up to rated current according to IEC 62196-1, which supports backward compatibility to couplers according to IEC 62196-3:2014.

IEC 62196 is divided into several parts as follows:

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

– Part 2: Dimensional compatibility requirements for AC pin and contact-tube accessories.

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

– Part 4[1]: Dimensional compatibility requirements for DC pin and contact-tube accessories for Class II or Class III applications.

– Part 6[2]: Dimensional compatibility requirements for DC pin and contact-tube couplers for applications using a system of protective electrical separation.

[1] Under preparation.

[2] Under consideration.

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

Part 3-1: Vehicle connector, vehicle inlet and cable assembly for DC charging intended to be used with a thermal management system

1 Scope

This document applies to accessories and cable assemblies with the same configuration as specified in IEC 62196-3:2014 with rated operating voltage not exceeding 1 500 V DC and a rated current not exceeding 500 A that employ

– thermal sensing, or

– thermal transport and thermal sensing

with the system architecture described in 4.101.

These accessories and cable assemblies are intended to be used in conductive charging systems for circuits specified in IEC 61851-23.

NOTE Edition 2 of IEC 61851-23 is under development.

The accessories covered by this document are intended to be used in charging mode 4 according to IEC 61851-1. These accessories are intended to be connected to cables according to the IEC 62893 series for DC cables.

2 Normative references

Clause 2 of IEC 62196-3:2014 applies, except as follows:

Additional normative references:

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:—[3], *Electric vehicle conductive charging system – Part 23: DC electric vehicle supply equipment*

IEC 62196-1:2014, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 1: General requirements*

IEC 62196-2:2016, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 2: Dimensional compatibility and interchangeability requirements for AC pin and contact-tube accessories*

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3 Second edition under preparation. Stage at the time of publication: IEC CDV 61851-23:2020.