SLOVENSKI STANDARD
oSIST prEN IEC 62196-2:2020

01-marec-2020

Vtiči, vtičnice, konektorji in uvodnice na vozilih - Kabelsko napajanje električnih vozil - 2. del: Zahteve za dimenzijsko skladnost za pribor s trni in cevastimi kontakti za izmenični tok (a.c.)

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

Stecker, Steckdosen, Fahrzeugkupplungen und Fahrzeugstecker - Konduktives Laden von Elektrofahrzeugen - Teil 2: Anforderungen und Hauptmaße für die Kompatibilität und Austauschbarkeit von Stift- und Buchsensteckvorrichtungen für Wechselstrom

Fiches, socles de prise de courant, prises mobiles et socles de connecteurs de véhicules - Charge conductive des véhicules électriques - Partie 2: Exigences dimensionnelles de compatibilité et d'interchangeabilité pour les appareils à broches et alvéoles pour courant alternatif

Ta slovenski standard je istoveten z: **prEN IEC 62196-2:2020**

ICS:

29.120.30	Vtiči, vtičnice, spojke	Plugs, socket-outlets, couplers
43.120	Električna cestna vozila	Electric road vehicles

oSIST prEN IEC 62196-2:2020 **en,fr,de**

23H/463/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62196-2 ED3**	
DATE OF CIRCULATION: **2020-01-10**	CLOSING DATE FOR VOTING: **2020-04-03**
SUPERSEDES DOCUMENTS: **23H/445/CD,23H/450A/CC**	

IEC SC 23H : PLUGS, SOCKET-OUTLETS AND COUPLERS FOR INDUSTRIAL AND SIMILAR APPLICATIONS, AND FOR ELECTRIC VEHICLES

SECRETARIAT: France	SECRETARY: Mr Bertrand Doignon
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 64,TC 69	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING ☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

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

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

If necessary, comments may be reviewed in an MT 8 meeting in April 2020

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62196-2 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.

This third edition cancels and replaces the second edition published in 2016. It aligns this edition with IEC 62196-1 and 62196-3, fourth editions and IEC 61851-1:2017.

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

CDV	Report on voting
23H/---/FDIS	23H/---/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.

This part of IEC 62196 is to be read in conjunction with IEC 62196-1:2020. The clauses of the particular requirements in Part 2 supplement or modify the corresponding clauses in Part 1. Where the text indicates "addition" to or "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 this standard. Where no change is necessary, the words "Clause X of IEC 62196-1:2020 is applicable" are used.

In this standard, 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 publication will remain unchanged until the stability date indicated on the IEC website 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 series specifies requirements for EV conductive supply equipment.

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

Some charging using on-board the vehicle chargers can be achieved by direct connection from an electric vehicle to an AC supply network using common socket-outlets or by the use of equipment incorporating control and communication circuits.

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

IEC 62196 series consists of the following parts:

– 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 3-1[2]: Vehicle connector, vehicle inlet and cable assembly intended to be used with a thermal management system for DC charging.

– 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 Publication pending

2 Under consideration.

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

1 Scope

This part of IEC 62196 applies to plugs, socket-outlets, vehicle connectors and vehicle inlets with pins and contact-tubes of standardized configurations, herein referred to as accessories. They have a nominal rated operating voltage not exceeding 480 V AC, 50 Hz to 60 Hz, and a rated current not exceeding 63 A three-phase or 70 A single phase, for use in conductive charging of electric vehicles.

This part of IEC 62196 covers the basic interface accessories for vehicle supply as specified in IEC 62196-1.

NOTE 1 Electric road vehicles (EV) implies all road vehicles, including plug-in hybrid road vehicles (PHEV), that derive all or part of their energy from RESS.

These accessories are intended to be used for circuits specified in IEC 61851-1:2017, which operate at different voltages and frequencies and which may include extra-low voltage (ELV) and communication signals.

These accessories may be used for bidirectional power transfer (under consideration in IEC 61851-1:2017).

This standard applies to accessories to be used in an ambient temperature between –30 °C and +40 °C.

NOTE 2 In the following country, other requirements regarding the lower temperature may apply: NO.

NOTE 3 In the following country, –35 °C applies: SE.

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

Vehicle inlet and vehicle connector to this standard are intended to be used for charging in modes 1, 2 and 3, cases B and C. The socket-outlets and plugs covered by this standard are intended to be used for charging mode 3 only, case A and B.

The modes and permissible connections are specified in IEC 61851-1:2017.

2 Normative references

Clause 2 of IEC 62196-1:2020 applies, except as follows:

Addition:

IEC 62196-1:2020, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 1: General requirements*

3 Terms and definitions

Clause 3 of IEC 62196-1:2020 applies.

4 General

Clause 4 of IEC 62196-1:2020 applies.

5 Ratings

Clause 5 of IEC 62196-1:2020 applies, except as follows:

5.1 *Replacement:*

Rated operating voltages:

30 V (signal or control purposes only);
250 V AC
480 V AC

5.2 *Replacement:*

The rated currents are:

2 A (signal or control purposes only)
13 A single phase
16 A single and three-phase
20 A single and three-phase
30 A or 32 A single and three-phase
60 A or 63 A single and three-phase
70 A single phase only

NOTE 1 In the following countries, the branch circuit overcurrent protection device is based upon 125 % of the accessory rating: US.

NOTE 2 Reference to "30 A or 32 A" and "60 A or 63 A" rating is made in accordance with National requirements.

6 Connection between the power supply and the electric vehicle

Clause 6 of IEC 62196-1:2020 applies, except as follows:

6.1 *Replacement:*

This Clause provides a description of the physical conductive electrical interface requirements between the vehicle and the power supply, which allows the following design at the vehicle interface:

– a basic interface that provides for current ratings up to 63 A AC three-phase and up to 70 A AC single phase.

Different configuration types for the basic interface may allow different application of mode and current ratings. See introduction to relevant standard sheets for more details.

6.2 *Replacement:*

There is one type of vehicle inlet:

– basic

6.3 *Replacement:*

There is one type of vehicle connector:

– basic

6.4 *Replacement:*

The basic interface may contain up to 7 power or signal contacts, with unique physical configurations of contact positions for single or three phases. The electrical ratings and their function are described in Tables 201 and 202. The electrical ratings and their function are described in the Standard Sheets.

Each vehicle inlet shall only mate with the corresponding type of vehicle connector. Each plug shall only mate with the corresponding type of socket-outlet.

The accessories, configuration types 1, 2 or 3 are rated as follows:

– configuration type 1 vehicle coupler is rated 250 V, 32 A single phase;
– configuration type 2 vehicle coupler, socket-outlet and plug are rated:
  - 250 V, 13 A or 20 A or 32 A or 63 A or 70 A single phase,
  - 480 V, 13 A or 20 A or 32 A or 63 A, three-phase.
– configuration type 3 vehicle coupler, socket-outlet and plug are rated:
  - 250 V, 16 A or 32 A, single phase,
  - 480 V, 32 A or 63 A three-phase.

Table 201 – Overview of the basic vehicle interface, configuration type 1, single phase

Position number [a]	AC	Functions [c]
1	250 V 32 A[b]	L1 (mains 1)
2	250 V 32 A	L2 (mains 2) / N (neutral)
3	Rated for fault	PE (ground/earth)
4	30 V 2 A	CP (Control pilot)
5	30 V 2 A	CS (Connection switch)

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

[b] In the following countries, the branch circuit overcurrent protection is based upon 125 % of the device rating: US.

[c] For contacts 4 and 5, environmental conditions may demand larger conductor cross-sections.

Table 202 – Overview of the basic vehicle interface, configuration types 2 and 3, three-phase or single phase

Position number [f]	U_{max}	Three phase		Single phase		Functions
		I_{max} [a]		I_{max} [a]		
	V AC	A		A		
		Type 2	Type 3	Type 2 [b]	Type 3	
1	480	63		70	63	L1 (mains 1) [b]
2	480	63		- [c]	- [c]	L2 (mains 2)
3	480	63		- [c]	- [c]	L3 (mains 3)
4	480	63		70	63	N (neutral) [b, e]
5	—	Rated for fault				PE (ground/earth)
6	30	2				CP (Control pilot)
7	30	2				PP (Proximity) [d] or CS (Connection switch) [d]

[a] In the following countries, the branch circuit overcurrent protection is based upon 125 % of the device rating: US.

[b] For single phase charging, contacts 1 and 4 shall be used.

[c] Unused contacts need not to be installed. Not provided for standard sheets 2-IIIa and 2-IIIb.

[d] Not provided for standard sheet 2-IIIa.

[e] For single phase system supply phase to phase this contact can be used for L2 (mains 2).

[f] Position number does not refer to the location and/or identification of the contact in the accessory.

6.5 *Not applicable.*

6.6 *Not applicable.*

6.201 Communication and control pilot function

The control pilot and proximity detection or connection contacts are intended to be used in accordance with IEC 61851-1:2017.

7 Classification of accessories

Clause 7 of IEC 62196-1:2020 applies, except as follows:

7.4 According to electrical operation

Replacement:

– Suitable for making and breaking an electrical circuit under load for 32 A configurations types 1 and 3;

– Not suitable for making and breaking an electrical circuit under load for configurations type 2;

– Not suitable for making and breaking an electrical circuit under load for 63 A configuration type 3.

NOTE Communication circuits according to this standard are deemed not to make or break load as a result of this clause.

7.5 According to interface

Replacement:

Interface is specified in Clause 6.

– Basic type.

7.201 According to the Standard Sheet used

– Configuration type 1;
– Configuration type 2;
– Configuration type 3.

8 Marking

Clause 8 of IEC 62196-1:2020 applies.

9 Dimensions

Clause 9 of IEC 62196-1:2020 applies, except as follows:

Additional subclause:

9.201 Standard sheets

Accessories shall comply with the relevant standard sheets as specified below and in Table 203:

Configuration type 1

– 32 A, 250 V single-phase vehicle couplers: standard sheet 2-I.
– Optional latching system: standard sheet 2-Ia.

NOTE In the following countries, the standard sheets 2-I and 2-Ia may be applied to vehicle couplers with rated current up to 80 A: US, KR.

Configuration type 2

– 63 A, 480 V three-phase or 250 V, 70 A single-phase accessories: standard sheets 2-II, IIa, IIb, IIc, IId, IIe, IIf, IIg and IIh, as specified in Table 204.

Configuration type 3

– 16 A, 250 V single-phase accessories with one pilot: standard sheet 2-IIIa;
– 32 A, 250 V single-phase accessories with two pilots: standard sheet 2-IIIb;
– 63 A, 480 V three-phase accessories with two pilots: standard sheet 2-IIIc;
– Latching means and packaging room: standard sheet 2-IIId.

298 **Table 203 – Configuration types and standard sheets**

Configuration type	Standard Sheet	Applicable accessories	Rated voltage V	Rated current A	Phase
1	2-I	Vehicle couplers	250	32	Single-phase
2	2-II	Accessories	250	70	Single-phase
			480	63	Three-phase
3	2-III	Accessories	250	16	Single-phase
			250	32	Single-phase
			480	63	Three-phase

299

300 ## 10 Protection against electric shock

301 Clause 10 of IEC 62196-1:2020 applies.

302 ## 11 Size and colour of protective earthing conductors

303 *Replacement:*

304 The core connected to the earthing terminal shall be identified by the colour combination
305 green-and-yellow. The nominal cross/sectional area of the earthing conductor and of the
306 neutral conductor, if any, shall be at least equal to that of the phase conductors.

307 NOTE In the following countries, the colour green may be used to identify the earthing conductor: JP, US, CA, KR.

308 ## 12 Provision for earthing

309 Clause 12 of IEC 62196-1:2020 applies.

310 ## 13 Terminals

311 Clause 13 of IEC 62196-1:2020 applies, except as follows.

312 *Additional subclause:*

313 **13.201** Wire connection of components, for example coding resistors, may be rewireable or
314 non-rewireable.

315 ## 14 Interlocks

316 Clause 14 of IEC 62196-1:2020 applies.

317 ## 15 Resistance to ageing of rubber and thermoplastic material

318 Clause 15 of IEC 62196-1:2020 applies.

319 ## 16 General construction

320 Clause 16 of IEC 62196-1:2020 applies.