SLOVENSKI STANDARD
oSIST prEN IEC 62196-3:2020

01-marec-2020

Vtiči, vtičnice, konektorji in uvodnice na vozilih - Kabelsko napajanje električnih vozil - 3. del: Zahteve za dimenzijsko združljivost in izmenljivost za spojke na vozilih s trni in cevastimi kontakti za enosmerni (d.c.) in izmenični/enosmerni (a.c./d.c.) tok

Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility and interchangeability requirements for DC and AC/DC pin and contact-tube vehicle couplers

Stecker, Steckdosen und Fahrzeugsteckvorrichtungen - Konduktives Laden von Elektrofahrzeugen - Teil 3: Anforderungen an und Hauptmaße für Stifte und Buchsen für die Austauschbarkeit von Fahrzeugsteckvorrichtungen zum dedizierten Laden mit Gleichstrom und als kombinierte Ausführung zum Laden mit Wechselstrom/Gleichstrom

Fiches, socles de prise de courant, prises mobiles de vehicule et socles de connecteur de véhicule - Charge conductive des véhicules électriques - Partie 3: Exigences dimensionnelles de compatibilité et d'interchangeabilité pour les connecteurs de véhicule à broches et alvéoles pour courant continu et pour courants alternatif et continu

Ta slovenski standard je istoveten z: **prEN IEC 62196-3:2020**

ICS:

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

oSIST prEN IEC 62196-3:2020 **en,fr,de**

23H/462/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 62196-3 ED2	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2020-01-10	**2020-04-03**
SUPERSEDES DOCUMENTS:	
23H/446/CD,23H/451A/CC	

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

SECRETARIAT:	SECRETARY:
France	Mr Bertrand Doignon
OF INTEREST TO THE FOLLOWING COMMITTEES: 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 3: Dimensional compatibility and interchangeability requirements for DC and AC/DC pin and contact-tube vehicle couplers

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

If necessary, comments received will be reviewed in an MT 8 meeting in April 2020.

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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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This amendment of International Standard IEC 62196-3 has been prepared by subcommittee 23H: Plugs, socket-outlets and couplers foe industrial and similar applications, and for electric vehicles, of IEC technical committee 23: Electrical accessories.

This fourth edition cancels and replaces the third edition published in 2014 and constitutes a technical revision, with the following significant technical changes with respect to the previous edition:

a) Increased ratings for all configurations.

b) Reference to new tests in Part 1 (clauses 34, 35, 36 and 37)

105 The text of this amendment is based on the following documents:

FDIS	Report on voting
23H/---/FDIS	23H/---/RVD

106

107 Full information on the voting for the approval of this standard can be found in the report on
108 voting indicated in the above table.

109 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

110 A list of all the parts in the IEC 62196 series, under the general title *Plugs, socket-outlets,*
111 *vehicle connectors and vehicle inlets – Conductive charging of electric vehicles*, can be found
112 on the IEC website.

113 This document is to be read in conjunction with IEC 62196-1. The clauses of the particular
114 requirements in Part 3 supplement or modify the corresponding clauses in Part 1. Where the
115 text indicates an "addition" to or a "replacement" of the relevant requirement, test specification
116 or explanation of Part 1, these changes are made to the relevant text of Part 1, which then
117 becomes part of the standard.

118 Subclauses, figures, tables or notes which are additional to those in IEC 62196-1 are
119 numbered starting from 301.

120 In this standard, the following print types are used:

121 – requirements proper: in roman type;

122 – *test specifications: in italic type*;

123 – notes: in smaller roman type.

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

127 • reconfirmed,

128 • withdrawn,

129 • replaced by a revised edition, or

130 • amended.

131

132

133

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.

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 standard 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.

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 Publication pending

2 Under consideration.

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

1 Scope

This document 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 according to IEC 62196-1:2020[1].

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 61851-1:2017, and IEC 61851-23: 201X[2].

The DC vehicle connectors and inlets covered by this part of the standard are used only in charging mode 4, according to Clause 6.2.4, and case C, as shown in Figure 3, of IEC 61851-1:2017.

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

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

NOTE 1 In some countries, other requirements may apply.

NOTE 2 In the following country, –35 °C applies: SE.

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

2 Normative references

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

Additional normative reference:

IEC 62196-2:2020[3], *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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[1] IEC 62196-1:2020 at CDV stage

[2] IEC 61851-23:201X under development

[3] IEC 62196-2:2020 at CDV stage

ISO 17409:2015, Electrically propelled road vehicles – Connection to an external electric power supply – Safety specifications

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.

For configuration AA, control pilot contacts are rated 30 V, 10 A

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

6 Connection between the power supply and the electric vehicle

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

6.2 Basic interface

Not applicable.

6.3 DC interface

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 U_{max} V	Configuration AA I_{max} A	Configuration BB U_{max} V	Configuration BB I_{max} A	Symbol	Function
1	1 000	400	950	250	DC +	DC +
2	1 000	400	950	250	DC –	DC –
3	30	10	30	2	CP	Control Pilot 1
4	30	10	30	2	CP2	Control Pilot 2
5	30	10	-	-	CP3	Control Pilot 3
6	30	2	30	2	COM1	Communication 1 (+)
7	30	2	30	2	COM2	Communication 1 (–)
8	30	2	-	-	IM	Isolation Monitor
9	-	-	950	Rated for fault [b]	PE	Protective earth
10	30	2	-	-	PP or CS	Proximity detection or connection switch
11	-	-	30	20	AUX1	Auxiliary Power Supply 1 (+)
12	-	-	30	20	AUX2	Auxiliary Power Supply 1 (–)

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

[b] "Rated for fault" means "rated for the highest fault current".

They shall be used in a system according to IEC 61851-23:201X, Annex AA "DC EV supply equipment of System A" or Annex BB "DC EV supply equipment of System B" respectively. See the corresponding standard sheets for additional interface details.

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.

Additional subclause:

6.6 Combined interface

A combined interface extends the use of a basic interface for AC and DC charging.

The combined interface permits the electric vehicle to receive/conduct AC or DC energy using separate power contacts. The electrical ratings and their function are described in Table 302.

Table 302 – Overview of the combined AC/DC vehicle interface,

Position number [a]	Configuration EE U_{max} V	Configuration EE I_{max} A	Configuration EE Symbol	Configuration EE Function	Configuration FF U_{max} V	Configuration FF I_{max} A	Configuration FF Symbol	Configuration FF Function
1	250 [b]	32 [b]	L1	L1	480 [c]	63 [c,e]	L1	L1

2	250 [b]	32 [b]	L2	L2/N	480 [c]	63 [c]	L2	L2
3	—	—	—	—	480 [c]	63 [c]	L3	L3
4	—	—	—	—	480 [c]	63 [c,e]	N	Neutral
5	1000	-- [f]	PE	Protective earth	1000	-- [f]	PE	Protective earth
6	30 [d]	2 [d]	CP	Control Pilot	30 [d]	2 [d]	CP	Control Pilot
7	30 [d]	2 [d]	PP or CS	Proximity detection or connection switch	30 [d]	2 [d]	PP or CS	Proximity detection or connection switch
8	1000	400	DC+	DC+	1000	400	DC+	DC+
9	1000	400	DC-	DC-	1000	400	DC-	DC-

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

[b] These contacts are is only available in Configuration EE single phase vehicle inlet. They may be used as portion of basic interface, see IEC 62196-2: Ed.3.0, Standard Sheets 2-I.

[c] These contacts are optional in Configuration FF. They may be used as portion of basic interface, see IEC 62196-2: Ed.3.0, Standard Sheets 2-II.

[d] These contacts may be used as basic interface. For requirements for basic interface see IEC 62196-2: Ed.3.0, Standard Sheets 2-I and 2-II.

[e] Contacts 1 and 4 for single phase rated I_{max} = 70 A.

[f] Conductor size dependent upon system requirements.

The basic portion of the combined vehicle inlet can be used with a basic connector for either AC or with a combined vehicle connector for DC charging.

Combined couplers shall only be used for DC charging with the “DC EV supply equipment of System C” described in IEC 61851-23:201X, Annex CC.

NOTE 1: Implementation of all aspects (i.e. topology and communication) according to Annex CC ensures that:

This system allows DC charging but prevents AC and DC charging at the same time.

– AC chargeable EVs with a basic vehicle inlet do not need any means to protect themselves against DC voltage at the inlet. This protection is provided by the DC charging system.

– Vehicle protection against mischarging in case of fault is provided in accordance with ISO 17409:2015.

NOTE 2: If the AC or DC ratings of a mating connector and inlet differ, the coupler (mating pair) is used at the lower rating of either the vehicle connector or vehicle inlet of the mating accessory.

Accessories of the combined AC/DC type intended for use with AC shall comply with the ratings and requirements of IEC 62196-2: 201X.

7 Classification of accessories

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

7.1.1 *Replacement:*

– Vehicle connectors,

– Vehicle inlets.

7.1.5 *Replacement:*

As specified in Clause 6 and in IEC 61851-1:2017:

– Combined interface

– DC interface

Additional subclause:

7.301 According to the standard sheets used:

– Configuration AA
– Configuration BB
– Configuration EE and AC corresponding to Type 1 in IEC 62196-2: Ed.3.0
– Configuration FF and AC corresponding to Type 2 in IEC 62196-2: Ed.3.0.

8 Marking

Clause 8 of IEC 62196-1:2020 applies.

9 Dimensions

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

9.1 *Replacement:*

The vehicle connector and vehicle inlet shall comply with the relevant configuration shown in Table 303:

Table 303 – Interface Overview

Configuration	Dimensions described in	Max. Rated Voltage V DC	Max. Rated Current A DC	Shall only be used with DC charging station according to
AA	Standard Sheets 3-I	1 000	400	IEC 61851-23: Ed.2.0, Annex AA
BB	Standard Sheets 3-II	950	250	IEC 61851-23: Ed.2.0, Annex BB
EE[a]	Standard Sheets 3-III	1 000	400	IEC 61851-23: Ed.2.0, Annex CC
FF[b]	Standard Sheets 3-IV	1 000	400	IEC 61851-23: Ed.2.0, Annex CC

[a] AC ratings are in accordance with 62196-2:2016, clause 6.5, type 1

[b] AC ratings are in accordance with 62196-2:2016, clause 6.5, type 2

10 Protection against electric shock

Clause 10 of IEC 62196-1:2020 applies, except as follows:

10.3 Contact sequencing

Replacement:

For all DC interfaces, the contact sequence during the connection process shall be:

– Protective Earth (if any)
– DC power contacts
– Isolation monitor contacts:

NOTE 1 if provided, isolation monitor contacts shall mate before or simultaneously with the control pilot contact.

– Proximity detection or connection switch contact

NOTE 2 if provided, proximity detection or connection switch contacts shall mate before or simultaneously with the control pilot contact.

– Control pilot contact

During disconnection the order shall be reversed.

Accessories shall be so designed that

a) when inserting the vehicle connector,
   1) the protective earth connection is made before the DC power contacts, if any, are made;
   2) the control pilot connection, if any, is made after the DC power contacts are made;
   3) the proximity contact or connection switch contact, if any, is made after the protective earth contact and before or simultaneously the control pilot are made.
b) when withdrawing the vehicle connector,
   4) the DC power contacts are broken before the protective earth connection is broken;
   5) the control pilot connection, if any, is broken before the DC power contacts are broken;
   6) the proximity contact or connection switch contact, if any, is broken before the protective earth contact and after or simultaneously the control pilot are opened.

Compliance is checked by inspection and manual test, if required.

11 Size and colour of earthing conductors

Clause 11 of IEC 62196-1:2020 applies.

Additional subclauses:

11.301 The earthing conductor may be sized smaller than defined if the conductor can fulfil the requirements of 12.3 of IEC 62196-1:201X.

12 Provision for earthing

Clause 12 of IEC 62196-1:2020 applies, except as follows:

12.1 *Replacement:*

Accessories shall be provided with a protective earthing contact and earthing terminal. Protective earthing contacts shall be directly and reliably connected to the protective earthing terminals.

13 Terminals

Clause 13 of IEC 62196-1:2020 applies.

14 Interlocks

Clause 14 of IEC 62196-1:201X applies, except as follows:

Additional subclause:

14.301 Latching function

Accessories shall be provided with a latching device to prevent the connection to be separated unintentionally or by unauthorized persons.

The interlock function shall be performed by the proper functioning of the latching device.

A means shall be provided to indicate that the interlock is properly engaged.

Compliance is checked by inspection and manual test.

15 Resistance to aging of rubber and thermoplastic material

Clause 15 of IEC 62196-1:2020 applies.

16 General construction

Clause 16 of IEC 62196-1:2020 applies, except as follows.

16.16 *Replacement of the first paragraph by:*

The force to insert and withdraw a vehicle connector shall be less than 100 N. Means to facilitate the insertion and withdrawal of the vehicle connector from the vehicle inlet may be provided. If a vehicle coupler is equipped with an assist device to reduce this force (e.g. mechanical assist device), the operating force of assist device shall be less than 100 N.

17 Construction of socket-outlets

Clause 17 of IEC 62196-1:2020 does not apply.

18 Construction of plugs and vehicle connectors

Clause 18 of IEC 62196-1:2020 applies.

19 Construction of vehicle inlets

Clause 19 of IEC 62196-1:2020 applies.

20 Degrees of protection

Clause 20 of IEC 62196-1:2020 applies.

21 Insulation resistance and dielectric strength

Clause 21 of IEC 62196-1:2020 applies.

22 Breaking capacity

Clause 22 of IEC 62196-1:2020 applies, except as follows:

22.3 *Replacement:*

This clause is not applicable for DC accessories or the DC portions of combined AC/DC accessories.

23 Normal operation

Clause 23 of IEC 62196-1:2020 applies, except as follows: