



SLOVENSKI STANDARD

SIST EN 62196-1:2015

01-april-2015

Nadomešča:

SIST EN 62196-1:2012

SIST EN 62196-1:2012/A12:2014

Vtiči, vtičnice, konektorji in uvodnice na vozilih - Kabelsko napajanje električnih vozil - 1. del: Splošne zahteve (IEC 62196-1:2014, spremenjen)

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62196-1:2015](https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015>

Ta slovenski standard je istoveten z: EN 62196-1:2014

ICS:

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

SIST EN 62196-1:2015

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62196-1:2015

<https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015>

EUROPEAN STANDARD

EN 62196-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2014

ICS 29.120.30; 43.120

Supersedes EN 62196-1:2012

English Version

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

Fiches, socles de prise de courant, prises mobiles de
véhicule et socles de connecteur de véhicule - Charge
conductive des véhicules électriques - Partie 1: Règles
générales
(CEI 62196-1:2014 , modifiée)

Stecker, Steckdosen, Fahrzeugkupplungen und
Fahrzeugstecker - Konduktives Laden von
Elektrofahrzeugen - Teil 1: Allgemeine Anforderungen
(IEC 62196-1:2014 , modifiziert)

This European Standard was approved by CENELEC on 2014-10-06. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

SIST EN 62196-1:2015

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 62196-1:2014

Foreword

The text of document 23H/302/FDIS, future edition 3 of IEC 62196-1, prepared by IEC/SC 23H "Plugs, socket-outlets and couplers for industrial and similar applications, and for electric vehicles" of IEC/TC 23 "Electrical accessories" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62196-1:2014.

A draft amendment, which covers common modifications to IEC 62196-1, was prepared by CLC/TC 23BX "Switches, boxes and enclosures for household and similar purposes, plugs and socket outlets for d.c. and for the charging of electrical vehicles including their connectors" and approved by CENELEC.

This document supersedes EN 62196-1:2012.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-10-06
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2019-10-06

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62196-1:2014 are prefixed "Z"

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or IEC] shall not be held responsible for identifying any or all such patent rights.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD, 2006/95/EC).

Endorsement notice

The text of the International Standard IEC 62196-1:2014 was approved by CENELEC as a European Standard with agreed common modifications.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-75:1997	NOTE Harmonized as EN 60068-2-75:1997 (not modified).
IEC 60309-1	NOTE Harmonized as EN 60309-1.
IEC 60947-1	NOTE Harmonized as EN 60947-1.
IEC 60999-1:1999	NOTE Harmonized as EN 60999-1:2000 (not modified).
IEC 60999-2:2003	NOTE Harmonized as EN 60999-2:2003 (not modified).
IEC 61008-1	NOTE Harmonized as EN 61008-1.
IEC 61009-1	NOTE Harmonized as EN 61009-1.
IEC 61300-2-4	NOTE Harmonized as EN 61300-2-4.
IEC 61300-2-6	NOTE Harmonized as EN 61300-2-6.
IEC 61300-2-7	NOTE Harmonized as EN 61300-2-7.
IEC 62752	NOTE Harmonized as EN 62752.

COMMON MODIFICATIONS

9 Dimensions

Addition to subclause 9.2:

9.2.Z1 If other non-EV standardized accessories may be physically joined together with the EV accessories, these shall not be able to function.

EXAMPLE No function can be achieved by switching off the main contacts when no appropriate EV plug and vehicle inlet is inserted (see EN 61851-1).

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62196-1:2015

<https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015>

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-14	-	Environmental testing -- Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60112	-	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	-
IEC 60227	series	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750	-	-
IEC 60228	2004	Conductors of insulated cables	EN 60228	2005
			+corrigendum May 2005	2005
IEC 60245-4	-	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables	-	-
IEC 60269-1	-	Low-voltage fuses -- Part 1: General requirements	EN 60269-1	-
IEC 60269-2	-	Low-voltage fuses -- Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) - Examples of standardized systems of fuses A to K	HD 60269-2	-
IEC 60309-4 (mod)	2006	Plugs, socket-outlets and couplers for industrial purposes -- Part 4: Switched socket-outlets and connectors with or without interlock	EN 60309-4	2007
IEC 60449	-	Voltage bands for electrical installations of buildings	HD 193 S2	-
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
			+corrigendum May 1993	1993
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems -- Part 1: Principles, requirements and tests	EN 60664-1	2007

IEC 60664-3	-	Insulation coordination for equipment within low-voltage systems -- Part 3: Use of coating, potting or moulding for protection against pollution	EN 60664-3	-
IEC 60695-2-11	-	Fire hazard testing -- Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products (GWEPT)	EN 60695-2-11	-
IEC 60695-10-2	-	Fire hazard testing -- Part 10-2: Abnormal heat - Ball pressure test method	EN 60695-10-2	-
IEC 61851-1	2010	Electric vehicle conductive charging system -- Part 1: General requirements	EN 61851-1	2011
IEC 61851-23	2014	Electric vehicle conductive charging system -- Part 23: D.C. electric vehicle charging station	EN 61851-23	2014
ISO 1456	-	Metallic and other inorganic coatings - Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and of copper plus nickel plus chromium	EN ISO 1456	-
ISO 2081	-	Metallic and other inorganic coatings - Electroplated coatings of zinc with supplementary treatments on iron or steel	EN ISO 2081	-
ISO 2093	-	Electroplated coatings of tin; Specification and test methods	-	-

iTeH STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62196-1:2015
<https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62196-1:2015

<https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015>



IEC 62196-1

Edition 3.0 2014-06

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 de véhicule et socles de connecteur de véhicule – Charge conductive des véhicules électriques – Partie 1: Règles générales

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XC**
CODE PRIX

ICS 29.120.30, 43.120

ISBN 978-2-8322-1666-8

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	11
4 General	19
4.1 General requirements	19
4.2 General notes on tests	19
5 Ratings.....	20
5.1 Preferred rated operating voltage ranges	20
5.2 Preferred rated currents.....	20
5.2.1 General	20
5.2.2 Rated current for signal or control purposes	20
5.2.3 Accessories not suitable for making and breaking an electrical circuit under load	21
5.2.4 Accessories suitable for, or not suitable for, making and breaking an electrical circuit under load.....	21
6 Connection between the power supply and the electric vehicle.....	21
6.1 General.....	21
6.2 Types of vehicle inlets	21
6.3 Types of vehicle connectors.....	21
6.4 Universal interface.....	22
6.5 Basic interface.....	23
6.6 D.C. configurations	24
6.7 Combined interface.....	25
6.8 Contact sequencing	26
7 Classification of accessories.....	26
7.1 According to purpose	26
7.2 According to the method of connecting the conductors.....	27
7.3 According to serviceability	27
7.4 According to electrical operation	27
7.5 According to interface	27
7.6 According to use with cable management systems.....	27
7.7 According to the locking and interlock functions:.....	27
7.7.1 According to locking facilities.....	27
7.7.2 According to interlock facilities:	27
7.8 According to the presence of shutter(s).....	27
8 Marking	27
9 Dimensions	29
10 Protection against electric shock	30
11 Size and colour of protective earthing conductors.....	35
12 Provisions for protective earthing	35
13 Terminals	37
13.1 Common requirements	37
13.2 Screw type terminals.....	40

13.3	Mechanical tests on terminals	43
14	Interlocks.....	45
14.1	Accessories with interlock.....	45
14.2	Accessories with integral switching device	49
14.3	Control circuit devices and switching elements	49
14.4	Pilot contacts and auxiliary circuits	49
15	Resistance to ageing of rubber and thermoplastic material	50
16	General construction	50
17	Construction of socket-outlets	53
17.1	General.....	53
17.2	Contact tubes	53
18	Construction of plugs and vehicle connectors	55
19	Construction of vehicle inlets	56
20	Degrees of protection	56
21	Insulation resistance and dielectric strength	58
22	Breaking capacity	59
23	Normal operation	62
24	Temperature rise	63
25	Flexible cables and their connection	65
25.1	Strain relief	65
25.2	Requirements for plugs and vehicle connectors	65
25.2.1	Non-rewirable plugs and vehicle connectors	65
25.2.2	Rewirable plugs and vehicle connectors	65
25.3	Plugs and vehicle connectors provided with a flexible cable	66
26	Mechanical strength	67
26.1	General.....	67
26.2	Degree of protection	68
26.3	Rewirable plugs and vehicle connectors.....	69
26.4	Non-rewirable accessories	70
26.5	Cable glands.....	72
26.6	Shutters	72
26.7	Insulated end caps.....	72
26.8	Change of temperature test.....	73
26.9	Pull test	73
27	Screws, current-carrying parts and connections.....	73
28	Creepage distances, clearances and distances	76
29	Resistance to heat, to fire and to tracking.....	77
30	Corrosion and resistance to rusting	79
31	Conditional short-circuit current withstand test.....	79
31.1	General.....	79
31.2	Ratings and test conditions	79
31.3	Test circuit.....	80
31.4	Calibration	83
31.5	Test procedure.....	83
31.6	Behaviour of the equipment under test.....	83
31.7	Acceptance conditions	84

32	Electromagnetic compatibility	84
32.1	Immunity	84
32.2	Emission	84
33	Vehicle driveover	84
	Bibliography.....	86
Figure 1	– Diagram showing the use of the accessories	11
Figure 2	– Examples of terminals	16
Figure 3	– Standard test finger.....	31
Figure 4	– Gauge “A” for checking shutters	33
Figure 5	– Gauge “B” for checking shutters	34
Figure 6	– Gauges for testing insertability of round unprepared conductors having the maximum specified cross-section.....	41
Figure 7	– Equipment test arrangement	43
Figure 8	– Apparatus for checking the withdrawal force	47
Figure 9	– Verification of the latching device.....	48
Figure 10	– Circuit diagrams for breaking capacity and normal operation tests	61
Figure 11	– Apparatus for testing the cable anchorage	66
Figure 12	– Ball Impact test.....	68
Figure 13	– Arrangement for mechanical strength test for plugs and vehicle connectors	70
Figure 14	– Apparatus for flexing test	71
Figure 15	– Diagram of the test circuit for the verification of short-circuit current withstand of a two-pole equipment on a single-phase a.c. or d.c.	81
Figure 16	– Diagram of the test circuit for the verification of short-circuit current withstand of a three-pole equipment	82
Figure 17	– Diagram of the test circuit for the verification of short-circuit current withstand of a four-pole equipment	83
Table 1	– Compatibility of mating accessories at vehicle.....	22
Table 2	– Overview of the universal vehicle interface.....	23
Table 3	– Overview of the basic vehicle interface.....	24
Table 4	– Overview of the d.c. vehicle interface	25
Table 5	– Overview of the combined a.c./d.c. vehicle interface	26
Table 6	– Short-time test currents	36
Table 7	– Size for conductors	37
Table 8	– Values for flexing under mechanical load test.....	44
Table 9	– Value for terminal pull test.....	45
Table 10	– Withdrawal force with respect to ratings	49
Table 11	– Cable length used to determine pull force on retaining means	51
Table 12	– Gauges to measure withdrawal force	54
Table 13	– Diameter of pins of the test plug.....	54
Table 14	– Maximum withdrawal force	55
Table 15	– Test voltage for dielectric strength test.....	59
Table 16	– Breaking capacity.....	62

Table 17 – Normal operation.....	63
Table 18 – Test current and nominal cross-sectional areas of copper conductors for temperature rise test.....	64
Table 19 – Pull force and torque test values for cable anchorage.....	67
Table 20 – Impact energy for ball impact test.....	69
Table 21 – Mechanical load flexing test	71
Table 22 – Torque test values for glands	72
Table 23 – Pulling force on insulated end caps	73
Table 24 – Tightening torque for verification of mechanical strength of screw-type terminals.....	74

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62196-1:2015](https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PLUGS, SOCKET-OUTLETS, VEHICLE
CONNECTORS AND VEHICLE INLETS –
CONDUCTIVE CHARGING OF ELECTRIC VEHICLES –****Part 1: General requirements**

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 62196-1 has been prepared by 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 2011 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) addition of a preferred operating voltage of 1 000 V d.c.;
- b) addition of a preferred rated current of 80 A d.c.;
- c) addition of a provision for a combined interface a.c./d.c.;
- d) description of d.c. configurations (previously under consideration);

- e) addition of requirements pertaining to the locking mechanism, the interlock and the latching device;
- f) addition of a test for accessories not suitable for making and breaking an electrical circuit under load;
- g) addition of requirements and tests for insulated end caps.

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

FDIS	Report on voting
23H/302/FDIS	23H/305/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.

Subsequent parts of IEC 62196 deal with the requirements of particular types of accessories. The clauses of these particular requirements supplement or modify the corresponding clauses in Part 1.

In this standard, the following print types are used:

- requirements proper: in roman type; [SIST EN 62196-1:2015](https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015)
- *test specifications*: in italic type; <https://standards.iteh.ai/catalog/standards/sist/8bbae11f-b687-4c6f-a1e3-84d45085759c/sist-en-62196-1-2015>
- 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 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.