

PISTIKUD, PISTIKUPESAD, SÕIDUKI-PISTIKÜHENDUSED  
JA SÕIDUKISISENDID. ELEKTRISÕIDUKITE JUHTIVUSLIK  
LAADIMINE. OSA 1: ÜLDNÕUDED

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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 62196-1:2014 sisaldab Euroopa standardi EN 62196-1:2014 ingliskeelset teksti.	This Estonian standard EVS-EN 62196-1:2014 consists of the English text of the European standard EN 62196-1:2014.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 28.11.2014.	Date of Availability of the European standard is 28.11.2014.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 29.120.30, 43.120

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

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.

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

## 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 CEN] 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).

## 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](http://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 +corrigendum May 2005	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 +corrigendum May 1993	1991 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	-	-

This document is a preview generated by EVS

## 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

This document is a preview generated by EVS