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## **Elbilsdrift – Konduktiv laddning – Del 21-: Fordringar på fordonet – EMC-fordringar vid laddning med laddare i fordonet**

*Electric vehicle conductive charging system –*

*Part 21-1: Electric vehicle on-board charger EMC requirements for conductive connection to AC/DC supply*

Som svensk standard gäller europastandarden EN 61851-21-1:2017. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61851-21-1:2017.

### **Nationellt förord**

Europastandarden EN 61851-21-1:2017<sup>\*)</sup>

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 61851-21-1, First edition, 2017 - Electric vehicle conductive charging system - Part 21-1: Electric vehicle on-board charger EMC requirements for conductive connection to AC/DC supply**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61851-21, utgåva 1, 2002, gäller ej fr o m 2020-10-27.

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<sup>\*)</sup>Corrigendum November 2017 till EN 61851-21-1:2017 är inarbetat i standarden.

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English Version

**Electric vehicle conductive charging system -  
Part 21-1: Electric vehicle on-board charger EMC requirements  
for conductive connection to an AC/DC supply  
(IEC 61851-21-1:2017)**

Système de charge conductive pour véhicules électriques -  
Partie 21-1: Exigences relatives à la CEM concernant les  
chargeurs embarqués pour véhicules électriques pour la  
connexion conductive à une alimentation en courant  
alternatif ou continu  
(IEC 61851-21-1:2017)

Konduktive Ladesysteme für Elektrofahrzeuge -  
Teil 21-1: EMV-Anforderungen an Bordladegeräte für  
Elektrofahrzeuge mit Wechselstrom/Gleichstrom-  
Versorgung  
(IEC 61851-21-1:2017)

This European Standard was approved by CENELEC on 2017-07-24. 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.

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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**

## **European foreword**

The text of document 69/507/FDIS, future edition 1 of IEC 61851-21-1, prepared by IEC/TC 69 "Electric road vehicles and electric industrial trucks" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61851-21-1:2017.

The following dates are fixed:

- latest date by which the document has to be (dop) 2018-04-27  
implemented at national level by  
publication of an identical national  
standard or by endorsement
- latest date by which the national (dow) 2020-10-27  
standards conflicting with the  
document have to be withdrawn

This document supersedes EN 61851-21:2002 (partially).

The contents of the corrigendum of November 2017 have been included in this copy.

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

## **Endorsement notice**

The text of the International Standard IEC 61851-21-1:2017 was approved by CENELEC as a European Standard without any modification.

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

IEC 61851-21-2:— <sup>1</sup>	NOTE	Harmonized as EN 61851-21-2:— <sup>2</sup> .
ISO 15118-3	NOTE	Harmonized as EN ISO 15118-3.
CISPR 16-1-4:2010	NOTE	Harmonized as EN 55016-1-4:2010 (not modified).
CISPR 16-1-4:2010/A1:2012	NOTE	Harmonized as EN 55016-1-4:2010/A1:2012 (not modified).
CISPR 16-1-4:2010/A2:2017	NOTE	Harmonized as EN 55016-1-4:2010/A2:2017 (not modified).

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<sup>1</sup> Under preparation. Stage at the time of publication: IEC PRVC 61851-21-2:2017.

<sup>2</sup> Under preparation. Stage at the time of publication: FprEN 61851-21-2:2017.

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where 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 60038 (mod)	2009	IEC standard voltages	EN 60038 <sup>3</sup>	2011
IEC 61000-3-2	2014	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	EN 61000-3-2	2014
IEC 61000-3-3	2013	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection	EN 61000-3-3	2013
IEC 61000-3-11	2000	Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection	EN 61000-3-11	2000
IEC 61000-3-12	2011	Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase	EN 61000-3-12	2011
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2012
IEC 61000-4-5	2014	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2014
IEC 61000-6-3	2006	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	EN 61000-6-3	2007
+A1	2010		+A1	2011
IEC 61851-1	2010	Electric vehicle conductive charging system - Part 1: General requirements	EN 61851-1	2011

<sup>3</sup> The title of EN 60038 is "CENELEC standard voltages".

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 12	2007	Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers	EN 55012	2007
+A1	2009		+A1	2009
CISPR 16-1-2	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements	EN 55016-1-2	2014
CISPR 16-2-1	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements	EN 55016-2-1	2014
CISPR 22 (mod)	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022 +AC	2010 <sup>4</sup> 2011 <sup>4</sup>
CISPR 25	2016	Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers	EN 55025	2017
ISO/TR 8713	2012	Electrically propelled road vehicles - Vocabulary	-	-
ISO 7637-2	2011	Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only	-	-
ISO 11451-1	2015	Road vehicles - Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 1: General principles and terminology	-	-
ISO 11451-2	2015	Road vehicles - Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 2: Off-vehicle radiation sources	-	-
ISO 11452-1	2015	Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 1: General principles and terminology	-	-
ISO 11452-2	2004	Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 2: Absorber-lined shielded enclosure	-	-
ISO 11452-4	2011	Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part-4: Harness excitation methods	-	-

<sup>4</sup> Superseded by EN 55032:2012 (CISPR 32:2012) and EN 50561-1:2013.

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM –****Part 21-1: Electric vehicle on-board charger EMC requirements  
for conductive connection to an AC/DC supply**

## 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.
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International Standard IEC 61851-21-1 has been prepared by subcommittee 69: Electric road vehicles and electric industrial trucks.

This first edition, together with IEC 61851-21-2, cancels and replaces IEC 61851-21:2001. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 61851-21:2001:

- a) this document addresses now only EMC tests instead of other electrical tests;
- b) test setups are defined more precisely;
- c) Annex A "Artificial networks, asymmetric artificial networks and integration of charging stations into the test setup" was added.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
69/507/FDIS	69/516/RVD

Full information on the voting for the approval of this International Standard 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 parts of the IEC 61851 series, under the general title: *Electric vehicle conductive charging system*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

**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.**

## **ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM –**

### **Part 21-1: Electric vehicle on-board charger EMC requirements for conductive connection to an AC/DC supply**

#### **1 Scope**

This part of IEC 61851, together with IEC 61851-1:2010, gives requirements for conductive connection of an electric vehicle (EV) to an AC or DC supply. It applies only to on-board charging units either tested on the complete vehicle or tested on the charging system component level (ESA – electronic sub assembly).

This document covers the electromagnetic compatibility (EMC) requirements for electrically propelled vehicles in any charging mode while connected to the mains supply.

This document is not applicable to trolley buses, rail vehicles, industrial trucks and vehicles designed primarily to be used off-road, such as forestry and construction machines.

NOTE 1 Specific safety requirements that apply to equipment on the vehicle during charging are treated in separate documents as indicated in the corresponding clauses of this document.

NOTE 2 Electric vehicle (EV) includes pure electric vehicles as well as plug-in hybrid electric vehicles with additional combustion engine.

#### **2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038:2009, *IEC standard voltages*

IEC 61000-3-2:2014, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current  $\leq 16$  A per phase)*

IEC 61000-3-3:2013, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current  $\leq 16$  A per phase and not subject to conditional connection*

IEC 61000-3-11:2000, *Electromagnetic compatibility (EMC) – Part 3-11 – Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current  $\leq 75$  A and subject to conditional connection*

IEC 61000-3-12:2011, *Electromagnetic compatibility (EMC) – Part 3-12 – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current  $> 16$  A and  $\leq 75$  A per phase*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-6-3:2006, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments*  
IEC 61000-6-3:2006/AMD1:2010

IEC 61851-1:2010, *Electric vehicle conductive charging system – Part 1: General requirements*

CISPR 12:2007, *Vehicles, boats and internal combustion engines – Radio disturbance characteristics – Limits and methods of measurement for the protection of off-board receivers*  
CISPR 12:2007/AMD1:2009

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements*

CISPR 16-2-1:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*

CISPR 22:2008, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

CISPR 25:2016, *Vehicles, boats and internal combustion engines – Radio disturbance characteristics – Limits and methods of measurement for the protection of on-board receivers*

ISO/TR 8713:2012, *Electrically propelled road vehicles – Vocabulary*

ISO 7637-2:2011, *Road vehicles – Electrical disturbances from conduction and coupling -- Part 2: Electrical transient conduction along supply lines only*

ISO 11451-1:2015, *Road vehicles – Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 1: General principles and terminology*

ISO 11451-2:2015, *Road vehicles – Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 2: Off-vehicle radiation sources*

ISO 11452-1:2015, *Road vehicles – Component test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 1: General principles and terminology*

ISO 11452-2:2004, *Road vehicles – Component test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 2: Absorber-lined shielded enclosure*

ISO 11452-4:2011, *Road vehicles – Component test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 4: Harness excitation methods*