

# INTERNATIONAL STANDARD



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



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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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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**

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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- withdrawn,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
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## 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 test 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*