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Edition 1.0 2023-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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Electric vehicle wireless power transfer (WPT) systems – Part 2: Specific requirements for MF-WPT system communication and activities

Systèmes de transfert de puissance sans fil (WPT) pour véhicules électriques – Partie 2: Exigences spécifiques pour la communication et les activités des systèmes MF-WPT



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ELECTRIC VEHICLE WIRELESS POWER TRANSFER (WPT) SYSTEMS –

Part 2: Specific requirements for MF-WPT system communication and activities

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

Draft	Report on voting
69/881/FDIS	69/896/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

In this document, the following print types are used:

- compliance statement: *italic type*;
- transitions in the state diagrams for infrastructure and vehicle: **bold type**;
- states: **bold type**.

A list of all parts of the IEC 61980 series, published under the general title *Electric vehicle wireless power transfer (WPT) systems*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

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- replaced by a revised edition, or
- amended.

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INTRODUCTION

The IEC 61980 series is published in separate parts according to the following structure:

– IEC 61980-1 covers general requirements for electric road vehicle (EV) wireless power transfer (WPT) systems including general background and definitions. (e.g. efficiency, electrical safety, EMC, EMF);

– IEC 61980-2 specifically applies to magnetic field wireless power transfer (MF-WPT) for electric road vehicles (EV) and covers specific system requirements including activities and communication between the electric road vehicle side and the off-board side including general background and definitions;

– IEC 61980-3 covers specific power transfer requirements for the off-board side of magnetic field wireless power transfer systems for electric road vehicles (e.g. efficiency, electrical safety, EMC, EMF).

Requirements for on-board side of MF-WPT for electric road vehicles are covered in ISO 19363.

This document has a structure that is independent of IEC 61980-1.

Reference to "technology specific parts" always refer to other parts of the IEC 61980 series.

ELECTRIC VEHICLE WIRELESS POWER TRANSFER (WPT) SYSTEMS –

Part 2: Specific requirements for MF-WPT system communication and activities

1 Scope

This part of IEC 61980 addresses communication and activities of magnetic field wireless power transfer (MF-WPT) systems.

The requirements in this document are intended to be applied for MF-WPT systems according to IEC 61980-3 and ISO 19363.

The aspects covered in this document include

– operational and functional characteristics of the MF-WPT communication system and related activities, and

– operational and functional characteristics of the positioning system.

The following aspects are under consideration for future documents:

– requirements for two- and three-wheel vehicles;

– requirements for MF-WPT systems supplying power to EVs in motion;

– requirements for bidirectional power transfer.

NOTE Any internal communication at supply device or EV device is not in the scope of this document.

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 61980-1, *Electric vehicle wireless power transfer (WPT) systems – Part 1: General requirements*

IEC 61980-3:2022, *Electric vehicle wireless power transfer (WPT) systems – Part 3: Specific requirements for magnetic field wireless power transfer systems*

ISO 15118-20, *Road vehicles – Vehicle to grid communication interface – Part 20: 2nd generation network layer and application layer requirements*

ISO 15118-8:2020, *Road vehicles – Vehicle to grid communication interface – Part 8: Physical layer and data link layer requirements for wireless communication*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61980-1, IEC 61980-3 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
alignment
relative position in X- and Y-direction of the secondary device to the primary device for a given secondary device ground clearance

3.2
centre alignment point
geometrical centre of the alignment tolerance area

Note 1 to entry: The centre alignment point is always relative to the primary and secondary device combination and is dependent upon magnetic characteristics.

3.3
collision avoidance code
CAC
temporary identifier of each antenna to distinguish a P2PS signal from the P2PS signals sent by other antennas or other vehicles

3.4
compatibility class A WPT system
compatibility class A supply device in combination with a compatibility class A EV device

Note 1 to entry: For class A supply device, see IEC 61980-3, and for class A EV device, see ISO 19363.

3.5
compatibility class B WPT system
compatibility class B supply device in combination with a compatibility class A EV device or compatibility class B EV device

Note 1 to entry: For class B supply device, see IEC 61980-3, and for class A EV device or compatibility class B EV device, see ISO 19363.

3.6
electric vehicle communication controller
EVCC
embedded system, within the vehicle, that implements the communication between the vehicle and the SECC in order to support specific functions

Note 1 to entry: Such specific functions could be, e.g., controlling input and output channels, encryption or data transfer between the vehicle and the SECC.

[SOURCE: ISO 15118-1:2019, 3.1.31]

3.7
EV device
on-board component assembly comprising the components necessary for WPT

Note 1 to entry: Ancillary systems used for supporting the operation of MF-WPT are also included (e.g., positioning).

3.8
EV device P2PS controller
on-board equipment that controls the EV device's P2PS

3.9
EV power circuit
EVPC
on-board component assembly, comprising the secondary device and EV power electronics, as well as the electrical and mechanical connections

Note 1 to entry: EVPC in this document is defined specifically for MF-WPT systems.

3.10
foreign object
object that is not an attached part of the vehicle or the WPT system

3.11
low frequency
LF
directed magnetic field operating in the very low frequency or low frequency ITU radio bands (LF and VLF, i.e., from 3 kHz to 300 kHz) as described in Clause B.4

3.12
low power excitation
LPE
energizing of the primary device as a P2PS

3.13
magnetic field wireless power transfer system
MF-WPT system
system comprising the supply device and the EV device to perform MF-WPT

3.14
natural offset
X- and Y- components of the vector from the centre of the primary device to the centre alignment point of the secondary device.

3.15
open systems interconnection
OSI
reference model developed by ISO to enable different or similar systems to dialogue with one another

Note 1 to entry: This model constitutes a reference framework for describing data exchanges. Each layer performs a service at the request of the adjacent higher layer, and in turn, requests more basic services from the lower layers. It is described in 7 layers.

Note 2 to entry: Open systems interconnection (OSI) is an international effort to facilitate communications among computers of different manufacture and technology.

[SOURCE: ISO 15784-3:2008, 3.11, modified – Note 2 to entry has been added.]

3.16
point to point signal
P2PS
unidirectional wireless link between EV device and supply device

3.17
primary device
off-board component that generates and shapes the magnetic field for power transfer

3.18
secondary device
on-board component that captures the magnetic field

3.19
secondary device ground clearance
vertical distance between the ground surface and the lowest point of the secondary device including the housing

Note 1 to entry: The lower surface does not need to be planar or parallel to the ground surface.

3.20
supply device P2PS controller
off-board equipment that controls the supply device's P2PS

3.21
supply equipment communication controller
SECC
entity which implements the communication to one or multiple EVCCs

Note 1 to entry: Functions of a supply equipment communication controller may control input and output channels, data encryption, or data transfer between the vehicle and the SECC.

Note 2 to entry: One SECC, in certain configurations, can control multiple supply devices.

[SOURCE: ISO 15118-1:2019, 3.1.68, modified – The words "and which may be able to interact with secondary actors" have been removed from the definition. Notes 1 and 2 to entry have been deleted, and a new note to entry has been added.]

3.22
supply power circuit
SPC
off-board component assembly comprising the primary device and supply power electronics, as well as the electrical and mechanical connections

Note 1 to entry: Supply power circuit in this document is defined specifically for MF-WPT systems.

3.23
supply power electronics
off-board component that converts the power and frequency from the supply network to the power and frequency needed by the primary device

3.24
wireless local area network
WLAN
local area network in which data are transferred without the use of wires

Note 1 to entry: MF-WPT system allows wireless communication between one SECC and one or more EVCC(s).

3.25
WPT session
MF-WPT session
WPT activities starting with successful communication setup and ending with terminate communication

3.26
WPT charging spot
WPT supply site with only one supply device