

TECHNICAL SPECIFICATION



**Electric vehicle wireless power transfer (WPT) systems –
Part 2: Specific requirements for communication between electric road vehicle
(EV) and infrastructure**

IEC TS 61980-2:2019

<https://standards.iteh.ai/catalog/standards/sist/24aac155-2d40-4d1f-8d87-02d4021a2737/iec-ts-61980-2-2019>



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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 61980-2, which is a Technical Specification, has been prepared by IEC technical committee TC 69: Electric road vehicles and electric industrial trucks.

The text of this Technical Specification is based on the following documents:

Draft TS	Report on voting
69/529/DTS	69/585B/RVDTS

Full information on the voting for the approval of this Technical Specification can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO Directives, Part 2.

In this Technical Specification, the following print types are used:

- *conformity statements: in italic type;*
- **states and messages: 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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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);
- IEC TS 61980-2 covers specific requirements for communication between electric road vehicle (EV) and wireless power transfer (WPT) systems including general background and definitions;
- IEC TS 61980-3 covers specific requirements for electric road vehicle (EV) magnetic field wireless power transfer (MF-WPT) systems including general background and definitions (e.g. efficiency, electrical safety, EMC).

The requirements described in IEC 61980-1 are general. The technical requirements for the various wireless power transfer (WPT) technologies are very different; they are specified in the technology specific parts of the IEC 61980 series. A list of possible WPT technologies is listed in IEC 61980-1. The requirements for magnetic field-wireless power transfer systems (MF-WPT) are described in IEC TS 61980-3. Further parts of the IEC 61980 series will describe other technologies such as power transfer via electric field or via electromagnetic field wireless power transfer systems (EF-WPT) or electromagnetic field-WPT systems, also named microwave-WPT systems (MW-WPT).

Reference to "technology specific parts" always refers to each parts of the IEC 61980 series. The structure of the "technology specific parts" follows the structure of IEC 61980-1.

WPT systems are still under development. For this reason, there is the future but not immediate possibility of an agreement to publish an International Standard. The committee has decided, by following the procedure set out in ISO/IEC Directives, Part 1:2018, 2.3, that the publication of a Technical Specification is appropriate. The reasons for publishing the Technical Specification is a high market need for a first basic technical description.

IEC TS 61980-2, also published as a Technical Specification for the same reasons as IEC TS 61980-3, deals with communication and for this reason has an independent structure. The numbering of the clauses does not follow the numbering of the other parts of the IEC 61980 series.

The electric road vehicles (EV) requirements of the MF-WPT system are covered by ISO/PAS 19363.

ELECTRIC VEHICLE WIRELESS POWER TRANSFER (WPT) SYSTEMS –

Part 2: Specific requirements for communication between electric road vehicle (EV) and infrastructure

1 Scope

This Part of IEC 61980, which is a Technical Specification, applies to communication between electric road vehicle (EV) and wireless power transfer (WPT) systems when connected to the supply network, at standard supply voltages per IEC 60038 up to 1000 V AC and up to 1500 V DC.

This document also applies to wireless power transfer equipment supplied from on-site storage systems (e.g. buffer batteries) at standard supply voltages per IEC 60038 up to 1000 V AC and up to 1500 V DC.

The aspects covered in this document include

- standards for operational characteristics and functional characteristics of the WPT communication subsystem,
- communication requirements for WPT system while driving, which are under consideration,
- communication requirements for two- and three-wheel vehicles, which are under consideration, and
- communication requirements for bidirectional power transfer are under consideration

This document does not apply to

- safety aspects related to maintenance, and
- trolley buses, rail vehicles and vehicles designed primarily for use off-road.

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 TS 61980-3:2019, *Electric vehicle wireless power transfer (WPT) systems – Part 3 Specific requirements for the magnetic field wireless power transfer systems*

ISO 15118 (all parts), *Road vehicles – Vehicle to grid communication interface*

ISO 15118-2, *Road vehicles – Vehicle to grid communication interface – Part 2: Network and application protocol requirements*¹

¹ Second edition under preparation. Stage at the time of publication: ISO/DIS 15118-2:2019.

ISO 15118-8:2018, *Road vehicles – Vehicle to grid communication interface – Part 8: Physical layer and data link layer requirements for wireless communication*

ISO 15118-20, *Road vehicles – Vehicle to grid communication interface – Part 20: 2nd generation network and application protocol requirements²*

3 Terms and definitions

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

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

electric vehicle communication controller EVCC

on-board component which implements the communication with the SECC

3.4

EV device

on-board component assembly, comprising the secondary device, the EV power electronics and all on-board communication controllers, as well as the electrical and mechanical connections between the assemblies

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

Note 2 to entry: The hardware packaging of the assemblies is up to the discretion of the manufacturer.

3.5

EV device P2PS controller

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

3.6

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 is here defined specifically for MF-WPT systems.

² Under preparation. Stage at the time of publication: ISO/DIS 15118-20:2019.

3.7

EV signal

P2PS from EV device

3.8

foreign object

object that is not an attached part of the vehicle or the MF-WPT system

3.9

low power excitation

LPE

energizing of the primary device as a P2PS

3.10

MF-WPT system

system comprising the supply device and the EV device to perform MF-WPT

3.11

natural offset

vector from the centre of the primary device to the centre alignment point of the secondary device in x and y direction

3.12

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, 3.17]

3.13

point to point signal

P2PS

unidirectional wireless link between EV device and supply device

3.14

primary device

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

3.15

rechargeable energy storage system

RESS

rechargeable system that stores energy for delivery of electric energy for the electric drive

EXAMPLE Battery, capacitor, flywheel.

[SOURCE: ISO 6469-1:2009, 3.16, modified – The definition has been rephrased, and the term "flywheel" has been added to the example.]

3.16

secondary device

on-board component that captures the magnetic field

3.17**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.

3.18**SR signal**

EV signal with a short range that is intended to be received by only one supply device

3.19**supply device**

off-board component assembly, comprising the primary device, the supply power electronics, and all off-board communication controllers, as well as the electrical and mechanical connections between the assemblies

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

Note 2 to entry: The hardware packaging of the assemblies is up to the discretion of the manufacturer.

3.20**supply device P2PS controller**

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

3.21**supply equipment**

off-board equipment comprising the SECC and one or multiple supply devices working under the control of the same SECC

3.22**supply equipment communication controller
SECC**

off-board component that implements the communication with the EVCC(s)

Note 1 to entry: One SECC can control multiple supply devices for certain configurations.

3.23**supply power circuit**

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 is here defined specifically for MF-WPT systems.

3.24**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

3.25**wireless local area network****WLAN**

network which allows wireless communication between multiple EVCCs with one SECC

3.26**WPT session**

WPT activities starting with successful communication setup and ending with terminate communication

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